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**The Information Needs of Contemporary  
Academic Researchers**

**Eti Aniko Herman**

**Thesis submitted in fulfilment of the requirements  
for the degree of Doctor of Philosophy**

**Department of Information Science  
City University, London**

**VOLUME ONE**

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The research endeavour is a way of life, not merely a vocation or an occupation... I don't consider my being a researcher a profession; it's my identity, just as much as my being a Hungarian born Israeli Jew is, as intensely so as my being a man, and not a woman... It's part of what I am... I get up in the morning with my material, I go to sleep thinking about it; I constantly ask myself questions on it, I'm concurrently the actor and the audience of this play... I don't think that apart from a sexual liaison any other relationship can be as intimate as that of the researcher's with his material...

The professor of social welfare interviewed for the study

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## **Abstract**

This thesis looks at the information component of the research endeavour at a particularly interesting point in time, when strikingly new developments in both the scholarly world and its information environs cast doubt on the validity of anything and everything we have traditionally been holding true as to academic researchers' information needs and practices. Indeed, the host of societal demands driven transformations in the organisation, values and practices of scholarly knowledge production of recent years, coupled with the technology-enabled, rapidly evolving opportunities for creating, accessing and communicating information suggest that neither researchers' information needs, nor their attempts at meeting these needs could conceivably remain untouched. This state of affairs has been the impetus for undertaking the re-examination reported here of our long-established notions concerning scholarly information needs and practices.

The study sets out, therefore, to investigate, analyse and systematically describe the information work of researchers in academe of the knowledge society. This, with the express aim of achieving a comprehensive, state-of-the-art portrayal of the generic, as well as the disciplinary and/or age specific information needs and corresponding information behaviour of today's university-based researchers.

Towards this purpose, the thesis integrates three inter-related elements: a user-centred theoretical perspective, proposed by Nicholas (1996, 2000), which views an information need as having eleven different dimensions; a state-of-the-art review, based on the literature; and a hybrid, field research project, conducted at the University of Haifa, Israel, comprising two consecutive stages, a two-phase qualitative stage of interviews, and a quantitative stage of a questionnaire survey. Thus, the theoretical perspective and the insights offered by the published literature in the field combine with the data collected for the present undertaking to inform the research questions.

Unravelling the complex picture of contemporary academic researchers' information needs has proven to be an undertaking of exceptionally wide scope. Not only does it look at an entire information community, but also, utilising as it does the eleven-pronged analytical framework for assessing information needs, developed by Nicholas (1996, 2000) on the basis of his conceptual approach, it also took a far more comprehensive view of the concept of research-related information need than other field-based investigations.

Endeavouring to draw an overarching portrayal of the information needs characterising today's academic researchers, the thesis opens, therefore, with the rationale for the investigation, its aims, scope and setting. Then it proceeds to recap our traditionally held notions concerning scholarly work and its information component by reviewing the literature depicting the socio-cultural context of the scientific enterprise. Next the theoretical foundations of the investigation are delineated, followed by a detailed account of the field-work based insights gleaned into the information component of academic research work. Then all of the information presented is interpreted in the light of the research questions, for a comprehensive portrayal of contemporary researchers' information needs and practices to materialise.

As surmised, many elements of the present-day, research-associated information work, as they emerge from the findings of this investigation, comprise changed or changing features. Nevertheless, the overall picture bears testimony to the continued existence and relevance of those core scholarly information needs, which are dictated by the basic professional values of academics and their discipline-specific research work conventions. Thus, today's researchers may define their information needs in terms of the changing realities of conducting research in academe of the knowledge society, may more or less happily embrace information work practices, which involve novel responses to the new challenges posed to them, but their fundamental information needs seem to have remained by and large unaffected by the recent upheavals in the scholarly world and its information environs. Indeed, the present study re-affirms yet again that the inter-disciplinary differences in analytic processes and research work-habits, stemming as they do from the very nature of the way knowledge grows in each of the knowledge domains, entail discretionary information needs and uses both on the inter-individual and the intra-individual level. These needs, summarised here as a generalised profile of scientists, social scientists, and humanists, whilst clearly indicative of changing elements in contemporary research-associated information work, nevertheless bear testimony to the ongoing vital importance of heeding the research-work conventions rooted specific information needs of the different communities comprising the academic population.



## **1. Introduction**

This chapter provides an introduction to the comprehensive, state-of-the-art appraisal of scholarly information needs and practices reported in the present study. First the rationale for the investigation is rooted in the need to re-visit the information component of academic research work in an era of strikingly new developments in both the scholarly world and its information environs. Then the overall aim of the study, defined as investigating, analysing and systematically describing the information needs of contemporary academic researchers is introduced, and the specific objectives to be attained, as well as the research questions to be addressed are outlined. Lastly, the scope of the present undertaking is delineated and its particular setting described.

### **1.1 The Rationale: The Call for Re-Assessing Researchers' Information Needs**

The research environment and the research process itself have been undergoing, for quite some time now, dramatic changes, with the recent (and still ongoing) transformations in academe of the knowledge society, on the one hand, and the constantly evolving opportunities for harnessing innovative information technologies to scholarly purposes, on the other. True, the essence of the scholarly enterprise, the creative thinking of the researcher aimed at contributing new knowledge and understanding, has remained basically unaltered from time immemorial, but the long-established conventions and modes of the research endeavour seem to have grown very different indeed in response to the concurrent upheavals both in its social, economic, and cultural contexts, and in its information environment.

The truly remarkable changes in academe seem to culminate first and foremost in the nature of the present-day scholarly endeavour. Indeed, the traditional armchair thinkers of the past, secreted in their ivory towers, happily contemplating an esoteric problem for as long as need be to reach a satisfactory resolution, by now seems to belong to a vanishing (if not already extinct) breed. The academics of today, at least in the developed countries, where the academic systems, while embedded in national issues and circumstances, nevertheless share common realities (Altbach, 1997; Farnham, 1999b), have to be far more pragmatic, faced as they are with the challenges of the changing higher education scene of the knowledge society.

Under the conditions of this brave new world, where knowledge has become a de-personalised, deterritorialised and globalised commodity, universities, no longer the exclusive producers of knowledge, are being forced to implement new regimes of management that more closely resemble businesses than the traditional sites of unaccountable knowledge, competing with each other for students, star professors and their share of the state's diminishing budget (Delanty, 1998). The resultant atmosphere of constant financial pressures has contributed to relentlessly increasing demands for faculty accountability, accompanied by questions about the relevance of much academic research, which, in turn, have been linked to demands that professors teach more and devote more of their time to 'reaching out' to society at large.

This novel concept of scholarship does not seem to have found much favour among the professorate, many of whom seem to be of one mind with Podgorecki (1997) in claiming that whereas the scholars of yore were free to think, their present-day counterparts are busy instead serving on numerous committees, resisting the onslaught of students demanding to be given higher marks than they deserve, and straining their inventiveness to outwit peers in writing myriad application forms. In fact, Rice (1996), in his analysis of 'the new American scholar' (which, not very surprisingly, seems to be just as true of scholars elsewhere in the global village) asserts that contemporary academics are 'under siege': caught between the times, they are held to an earlier era set of performance criteria based on the concept of scholarship as specialized research, reinforced at every turn by their graduate school experience, and at the same time expected to respond to the imperatives of a vigorous change agenda.

Moreover, this different atmosphere in the scholarly world is coupled with profound changes in the information environment, felt in academia no less, and probably more than elsewhere. The background facts are too well-known to need much elucidation: by the beginning of the third millennium we are in danger of drowning in a sea of information (to use the expression which, although by now a commonplace, if not a platitude, nevertheless best encapsulates the situation), despite the fact that this over-abundant supply of information is more accessible than ever in terms of scope, speed and ease. The computer-aided accumulation of data allows for the ongoing creation and easy management of a dynamic, growing knowledge base, which is so wide-range, that it is all encompassing. Seekers of information have at their disposal an unprecedented array of information resources, inclusive of the enormous variety of formal and informal sources on the Internet. So much so, that the sheer volume of relevant information available can sometimes be overwhelming even for academics, who need to keep abreast of new and key research in their fields. True, computer applications can be of immeasurable help in easing the problems of locating, accessing and retrieving relevant information, but they present a host of new problems, especially in the conservative milieu of higher education. Thus, as the Report of the U.S. National Enquiry into Scholarly Communication (1979, p. 32) prophesied so aptly more than twenty years ago, "the scholar's essential work is still done with the mind; that will be just as difficult as ever – perhaps more difficult because there will be more possibilities and more information".

The parallel development of these strikingly new orientations in both the scholarly world and its information environs puts in quandary the validity of anything and everything we have traditionally been holding true as to the information component of academic research work. After all, with fundamental aspects of the research enterprise of the knowledge society so radically changed, the unassailability of our long-established notions concerning scholarly information needs can hardly be taken for granted. Thus, it is crucial that we make a new diagnosis of researchers' information needs: if we unwaveringly go on basing the thinking which goes into the planning and provision of scholarly information services on customarily held concepts, we take the risk of squandering scarce resources on systems and services, which may turn out to be less than wholly appropriate. And that is not even the worst of it, for if the actual information needs of today's researchers are not properly identified, and in consequence cannot be satisfactorily met, the ensuing damage to the scientific endeavour may truly be of far-fetching implications. Thus, a study devoted to a comprehensive re-examination and re-assessment of the various aspects of contemporary researchers' information needs appears to be a very timely undertaking indeed.



## **1.2 Aims, Objectives and Research Questions**

The aim of this study is investigating, analysing and systematically describing the information needs of contemporary academic researchers.

Its objectives are:

- To achieve a state-of-the-art appraisal of scholarly information needs, as these have crystallised in response to the concurrent developments in both the scholarly world and its information environs.
- To identify current information work practices in academe, focussing on the perceived suitability of electronic, as opposed to traditional, systems and services for meeting scholarly information needs.
- To identify barriers to academic researchers' meeting their information needs.
- To determine if and how information needs and information behaviour vary among today's researchers by discipline and/or by age, with a view to identifying the special needs of the different groups comprising the university community.

Driven by the four research objectives of the study, it thus sets out to pose answers to the following questions:

- What are the information needs of contemporary academic researchers? To what extent have previously identified needs changed in today's transformed realities of the research enterprise and its information environs?
- How do present day academic researchers go about meeting their information needs? What are their information seeking practices and strategies? What are their perceptions of the suitability of electronic, as opposed to traditional, systems and services for meeting their scholarly information needs?
- What barriers do academic researchers of today encounter in meeting their information needs?
- Do information needs and information seeking practices vary among researchers of different disciplines and ages? And if they do, how?

## **1.3 Scope**

Aiming at unravelling the complex picture of contemporary academic researchers' information needs, the present study is perforce an undertaking of exceptionally wide scope. Not only does it look at an entire information community, which indubitably consists of some of the heaviest information consumers, but it also takes a far more comprehensive view of the concept of research related information need than other field-based investigations.

The endeavour to present an overarching portrayal of the information needs characterising the scholarly population in its entirety is in itself a recipe for an investigation of unusual proportions. After all, given the crucial role played by information in the research enterprise, all productive scholars have information needs, for it is only through their continuous dialogue with their predecessors and peers that they can contribute to the advancement of human knowledge. And, of course, these needs vary highly: on the intra-individual level, with the idiosyncratic circumstances of each and every particular researcher, and on the inter-individual level, with the inter-disciplinary differences in analytic processes and research work-habits, which stem from the very nature of the way knowledge grows in the different knowledge domains.

Further to that, the analytical framework for the assessment of information needs (Nicholas, 1996, 2000), which has never been put to use for investigating research information needs until its utilisation for the purpose in the present study, whilst shedding light on heretofore unexplored characteristics of scholarly information needs, did turn out to necessitate an extraordinary breadth of treatment. Indeed, previous literature into scholars' research associated information work has focussed from time to time on one or another characteristic of their information needs from among the eleven identified by Nicholas (1996, 2000), on occasion even on several together. However, a comprehensive representation of researchers' universal, as well as disciplinary-specific and age-specific information needs and practices, which encompasses the whole range of information need characteristics discerned, has never been achieved up to now. The attempt undertaken in this research to do so, does, therefore, fill an unquestionable void, albeit at the price of a longer discourse than customarily expected.

#### **1.4 Definition of Terms Used**

**Information needs** are defined for the purposes of the present study as gaps in one's state of knowledge, which, when recognised and found to necessitate remedy, are resolvable through the procurement of appropriate information. Thus, an information need is to be distinguished from an information want, which refers to information desired, or an information demand, which refers to information requested because it is believed to be wanted, or an information use, which refers to information actually consumed.

The term '**information seeking behaviour**' denotes in this enquiry the complex activities comprising the process in which information needs are pursued.

The phrase '**contemporary academe**' and its various synonyms refer in the present study to the profoundly changed scientific/scholarly endeavour of the knowledge society, with its pragmatic, revenue-oriented and accountability-dictated principles, as it unfolds in the dynamic setting of the constantly evolving information environment.

The term '**academic research**' is used in the present undertaking in its widest meaning: the scientific inquiry component of the academic profession, which, in its quest for advancing human knowledge, aims at exploring the entire spectrum of pure and applied subject areas. Thus, while the distinctive content, work styles, conventions and traditions of the sciences, the social sciences and the humanities are acknowledged (for the definition of '**academic disciplines**' in this investigation, see below), the terms



'academic research', 'science' and 'scholarship' are used with a high degree of overlap, as are 'academic researchers', 'scientists', 'scholars' and 'faculty'. However, where specifically required, there are clear distinctions drawn.

The commonly accepted clustering of the **academic disciplines** into the sciences, the social sciences and the humanities serves in this enquiry to delineate three broad disciplinary areas, each of which is characterised by distinct definitions of what constitutes knowledge, how knowledge grows, and how the inquiry aimed at extending its certified knowledge base is conducted. When perceived as better representing the distinction between academic fields, reference is also made to the 'hard' to 'soft' continuum of knowledge areas proposed by Storer (1967) to denote the characterisation of different branches of science according to the degree to which they are rigorously organised, and therefore amenable to appropriate assignment of professional recognition. In the same vein, the distinction between academic fields is at times described in terms of the 'urban' versus 'rural' ways of scholarly activity suggested by Becher (1989), which differentiates between specialisms according to their people-to-problem ratios and the variations these entail in communication patterns, as well as in the nature and scale of problems investigated.

The umbrella term '**electronic information sources and resources**' is used in this study interchangeably with '**IT-based sources and resources**' to denote information disseminated and archived via computer storage media, and accessible through computers in stand alone mode and/or connected to communication networks.

## **1.5 Setting**

The investigation into academic researchers' information needs reported here has been conducted at the University of Haifa, one of the seven research universities of Israel. It is thus a case study undertaken at a specific university, in a specific country, which is geographically removed from the world centres of mainstream research activity. Still, the insights gained into the information needs and information work practices of scholars at this university should have a significant measure of general applicability to Western-world academic research populations: the University of Haifa is a well-established, doctorate-granting institution, located in a developed country, which, typified as it is by an extensive production of high-level information, is very much part of the international scientific community.

Israel's scientific wealth, to use the apt turn of phrase coined by May (1997) to denote the scientific research output of a country, compares very well with that of other nations; not, obviously, in terms of total output, but in terms of performance in relation to population size. Thus, May's (1997) comparative study of scientific research outputs among several countries, based on Science Citation Index data for the fourteen year period of 1981 – 1994, reveals that Israel ranks second (after Switzerland) in scientific papers per person, and third (after Switzerland and Sweden) in citations per person. In the same vein, Kellerman (2001), building on Cole and Phelan's (1999) data concerning the scientific productivity of nations in 1987, finds that Israel has the highest number of research scientists per 1,000 population in a list of 33 countries, coming in ahead of Switzerland, Sweden, Canada, USA, UK, Netherlands, Denmark,

Australia, Finland and France, to mention only the first ten. In addition, Cole and Phelan (1999) note that Israel ranks fourth, following Switzerland, the USA, and Sweden, in the number of the most frequently cited articles written by research scientists (defined as those who published one or more papers in a journal included in the Science Citation Index), with over 40 citations per 1,000,000 population.

Furthermore, as the former director general of the Council for Higher Education of Israel testifies in 1999, in an international comparison Israeli higher education occupies a very respectable position: 10<sup>th</sup> place regarding the number of students per capita in postsecondary education, and 7<sup>th</sup> regarding the proportion of entering students in tertiary and higher education in an average cohort (after the United States, Japan, Denmark, Sweden, France, and Germany). Israel stands in third place (after Germany and the UK) in the number of degrees awarded in mathematics, computer sciences, the natural sciences, and engineering, as well as in the number of advanced degrees awarded relative to the size of the work force. The national expenditure on tertiary education in Israel is 1.7 percent of the Gross Domestic Product (GDP), which places Israel second (after the US) in international comparisons with developed countries. Regarding the national expenditure per student in postsecondary education as a percentage of the GDP, Israel takes the first place (at 73.4 percent) among developed countries (Limor, 1999).

It seems then that the level of Israel's scientific achievements are on par with those of other developed countries, a state of affairs which substantiates the premise of the generalisability of the data gleaned in the present study. Further to that, the Israeli higher education system is in fact quite typical of publicly controlled higher education systems elsewhere in the Western world, and the Israeli scholarly scene of today manifests the aforementioned radical transformations that took place in other economically advanced societies (to be discussed in more detail in the forthcoming chapter on the background and context of the present study).

The wider setting of the present study, the Israeli higher education system, currently comprises: seven research universities and an Open University; twenty-four academic institutions that are not universities - general colleges, technological colleges and colleges devoted to one profession or discipline – either publicly supported or private, so called 'extra-budgetary' (that is, not budgeted by any government or State agent); twenty-six academic institutions for the training of teachers; a number of academic programs at regional colleges, for which universities are academically responsible; and extensions of foreign universities authorised to operate in the country. All of these institutions provide academic instruction, but only the universities (excluding the Open University) have a concomitant obligation to research (Limor, 1999; Shavit et al., forthcoming; Council for Higher Education in Israel, 2003).

Very much in line with the trend towards the massification of higher education in the developed countries (see in the forthcoming chapter on the context and background of this investigation), the Israeli higher education system has been expanding rapidly and extensively. When the State of Israel was established in 1948 there were about 1,600 students in institutions of higher education and by the end of the first decade of statehood the number of students had increased to about 9,000. During the 1960's there was rapid growth (about 14% per year) in the number of students and in 1970 there were more than 35,000 students in the higher education system. The rapid growth of student numbers continued during the 1970's and by



1980 reached 56,000. During the 1980's growth tapered off to about 2.5% per year and in 1990 there were 76,000 students in the higher education system. Since 1990 the institutions of higher education have expanded their activities significantly. The number of students, at all degree levels (bachelor's, master's and doctorate) increased from 76,000 in 1990 to 180,229 (not including students in the Open University) in 2002. Of these, 65.2% were in universities (including students in academic programs in regional colleges under the auspices of universities), 23.7% were in various colleges, and 11.1% were in teacher training institutions. In addition, 36,710 students were enrolled in the Open University (Council for Higher Education in Israel, 2003).

The framework within which the system of higher education in Israel operates is delineated in the higher education law, enacted in 1958. The law grants complete academic and administrative independence to the institutions of higher education, although the Council for Higher Education (CHE), which is responsible for higher education in Israel and acts as the licensing and accrediting authority for academic undertakings, is able to determine and to some extent control the shape of the higher education sector. Indeed, serving as a buffer body between the government and academia (Limor, 1999), the CHE is empowered by law to advise the government on the development and financing of higher education and scientific research. Through the activities of its permanent subcommittee, the Planning and Budgeting Committee (PBC) the Council thus also aims at planning the optimal use of the national resources for higher education. Enjoying a reasonable degree of independence from the CHE itself, the PBC submits the ordinary and development budgets for higher education to the government; allocates the budgets provided by the government to the institutions; ensures that budgets are balanced and executed according to plan; and proposes plans for the coordinated and efficient development of the national higher education system.

The bulk of a higher education institution's funding is demand driven and its student enrolments and completions are monitored against targets by the PBC on a quarterly basis. Beyond this, the institution has autonomy over its finances. Universities receive a higher funding rate than colleges for degrees at the same level in the same field, in recognition of their research role. Universities also receive additional research infrastructure funding. The allocation of funding to institutions is based on performance, that is, the objective evaluation of instruction and research output. Thus, as of 2003 the CHE conducts regular assessments of institutional teaching quality, intended to canvas the entire range of higher education study programmes offered in Israel in six-year cycles. In addition, although in Israel there are no external or formal Research Assessment Exercises (RAEs) to enable the distribution of public funds selectively on the basis of research quality, the PBC regularly collects data from a variety of bodies (ministries, government agencies, the Central Bureau of Statistics, etc.) and maintains an independent database in an effort to correctly identify those institutions carrying out the best research. Funding of institutions is channelled through three streams: (1) the main bulk of the available monies (about three quarters) is allocated through block grants for both teaching and research based on two thirds student numbers (with account taken of graduation rates and quality control of teaching) and one third on research indicators (competitive and non-competitive research contracts, number of doctoral students, number of peer reviewed articles and their citation rates); (2) around 15 percent of the remaining monies is allocated for matching endowments and for critical interventions, such as encouraging enrolment in particular

disciplines according to perceived national requirements; (3) the remaining 15 percent or so is allocated to the Israel Science Foundation, which in turn funds basic research at higher education institutions, and to student aid programs (Council for Higher Education in Israel, 2003; Limor, 1999; Mosely, 2000).

It is within this national setting that the University of Haifa, one of the seven research universities of Israel, strives to fulfil its stated dual mission of the generation of high quality and innovative research and the provision of first-rate higher education. Offering graduate and undergraduate programs to 14,400 students, in a range of academic fields, the university is organised in six faculties: Humanities, Social Sciences (including the Graduate School of Business Administration), Law, Health and Welfare, Education, and the relatively recently established Science and Science Education Faculty. More than 600 tenure-track faculty members comprise the university's academic community, alongside part-time research fellows, affiliated with the research centres of the university, and teaching fellows (faculty formally appointed by the university for the purpose of instruction only). However, since the present investigation aimed at soliciting data specifically on research information needs, it only studied tenure-track faculty and/or research fellows, whose main concern, by definition, was the research component of their work.

The technological infrastructure of the campus is fully developed, with all faculty and staff offices connected to the university network, which is also accessible from home. Electronic mail is widely used and there is full support for Internet searching 24 hours a day, on and off-campus. The university's one central library houses a collection of over 1,000,000 print and non-print items and offers access to a wide range of information services and databases in electronic format. The library's Internet-based catalogue and its ever-growing collection of electronic journals, books and databases are all fully accessible from within the library, from campus-wide workstations, and for the university community - from the campus office and from home.

It seems then that Israel's standing among other developed countries, in terms of both its investments and achievements in producing high-level scientific and scholarly information and in maintaining an advanced system of tertiary education, render the premise of generalisability from the data gleaned from the faculty in one of its research universities quite reasonable.

Having outlined the overall aims of this study, explained the call for its conduct and defined its scope, use of terminology and setting, we can now proceed to place it in context. Thus, the next chapter describes the background of the present investigation by means of a review of extant knowledge and understanding pertaining to its various aspects.



## **2. Background and Context**

The attempt to take a fresh look at contemporary researchers' information needs and practices necessitates recapping first our traditionally held notions concerning scholarly work and its information component; this, in order to ensure a solid base for comparison in later discussion of developments. Then the current socio-cultural context of the scientific enterprise needs to be presented, to make it possible to examine previously identified patterns of scholarly information work within the novel realities of the academe of the knowledge society and its information environs. Towards this end, this chapter is devoted to an extensive review of the literature pertaining to the topics under consideration. The review opens by an overview of the nature of the scholarly endeavour and its information component. The three elements in academic research Noam (1997) discerns are discussed: the creation of knowledge, the preservation of information, and the communication of knowledge and information to others. Then the disciplinary-rooted differences in the conduct of a scholarly investigation are identified, their influence on information needs is delineated, and the resulting inter- and intra-individual variations in researchers' information seeking behaviour are highlighted. This is followed by a portrayal of the newly emerging academic landscape, within which today's scholar strives to align old priorities with new agendas and expectations. Finally, the chapter concludes with a survey of the literature pertaining to the plethora of issues surrounding the integration of electronic media into academic research work.

### **2.1 The Scholarly Endeavour and Its Information Component<sup>1</sup>**

#### **2.1.1 The Nature of the Research Activity**

The first major element of research activity according to Noam (1997), the creative element, can be seen as a process, analogous to industrial or physical processes, in which information is the ultimate product. Collections of data or other observations are the raw materials, which, combined with the intuition and reasoning of the researcher are processed to form publications. These become in their turn the raw material for another cycle of the research process, with some additional increment of knowledge extracted at each cycle (Burnard, 1990; Garvey, 1979). However, Burnard (1990) proposes a different approach: she finds that the model of research as a process, with quantifiable, identifiable inputs and outputs, does not reflect accurately the creating of new knowledge, assuming, as it does, both that all research areas are either productive or non-productive (whereas experience has shown that what is unproductive in one historical or social context may not be in another), and that all human knowledge advances incrementally (whereas sometimes we tend to see further 'by demolishing the giants who preceded us than by standing on their shoulders'). Instead, she suggests that we might more profitably regard research as a form of cultural activity aiming at the extraction of meanings and interpretations from the raw material of scholarship.

Whichever view of the creative component of the research activity is chosen, it is surely at the very heart of the scholarly endeavour, a pivotal factor in the researcher's success - and the one where the direct

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<sup>1</sup> For a more comprehensive treatment of the topic, see: Herman, 2001a, reprinted in Appendix 1

impact of the all-electronic environment is the least felt. Proceeding from Mortimer Adler's work on learning, Crawford and Gorman (1995) explore the relevance of computerization to that part of the research activity, which takes place in the mind of the scholar. They conclude that among the "four goods of the mind" on the Adlerian ladder of learning: information, knowledge, understanding and wisdom, information is the most amenable to computerization. Since information, which can be further subdivided into data (facts and other raw material) and information (data processed and rendered useful), does not require the human mind to provide it with meaning, it is eminently suitable for processing and transmission using electronic technology. However, as we move higher up the ladder of learning, the human mind becomes vital and the role of the computer is consequently diminished. Knowledge, defined as information transformed into meaning, can be recorded and transmitted, but the computer is not the ideal medium for such transmission. Understanding, defined as knowledge integrated with a worldview and a personal perspective, exists entirely within the human mind, as does wisdom - understanding made whole and generative. And, of course, being the purely mental processes that they are, they can and indeed are carried out without the direct support of electronic technology.

The second element of research activity Noam (1997) identifies is the preservation of information. It is, as Glicksman (1990, p. 342) explains, a prerequisite of every scholarly undertaking: "The scholar must describe the results of his work in a form which others can interpret faithfully. The scholar whose work is known only to herself is forgotten, in fact is never 'known' ... Hence scholars should and do take care to describe their work for peers to critique and use and for future generations to have as reference in their own work." In fact, Derek de Solla Price (1963) sees the establishment and maintenance of intellectual property as the motivating force behind scientific publishing. He contends that the scientific paper seems to arise out of the researcher's need to lay claim to newly won knowledge as his or her own, and as such, "only incidentally does it serve as a carrier of information, an announcement of new knowledge promulgated for the good of the world, a giving of free advantage to all one's competition" (p. 68). Garvey (1979) too notes that the creative researchers' constant reporting on their work is impelled by strong motives to attain social recognition from their scientific peers for having made an original and relevant scientific contribution. True, both are talking about the scientist, who is under such intense pressure to publish 'fustest and mostest' because, as Price (1963, p. 68) puts it, "if Michelangelo or Beethoven had not existed, their works would have been replaced by quite different contributions, [but] if Copernicus or Fermi had never existed, essentially the same contributions would have had to come from other people." However, since professional prestige is crucial for researchers' achieving tenure and promotion, as well as a standing among their peers, social scientists and humanists are no less highly motivated to publish, if not 'fustest', then at least 'mostest'.

It is hardly surprising to find then that scholars have always seen to it that the fruits of their scholarly efforts were suitably preserved and disseminated. In fact, Noam (1997) traces the preservation of scientific information as far back as ancient times, when the advent of writing solved the problem of transmitting information across time and space and led to the establishment of formal information storage institutions – libraries. However, if, as we have seen, the influence of novel information technology on the creative, intellectual element in research activity is at most indirect and marginal, its impact on the preservation element in it is much more strongly felt. Information is no longer preserved and stored only



in the traditional print on paper form; an increasing amount of material is now appearing first, or only in electronic form. Digitalisation of older print material into machine-readable form is accentuating this trend (Oppenheim, 1997).

The advantages of digitalisation for information storage and preservation are well-known - even the most avid opponents of 'the madness of technolust' (so dubbed by Crawford and Gorman, 1995) admit that coping with the deluge of publications in the modern scholarly world couldn't have been possible without the information management capabilities of electronic technologies. Nevertheless, Burnard (1990) and Kircz (1998) are both quick to point out that at the same time as enhancing the possibilities for information storage, retrieval and dissemination, innovative technologies have also facilitated the exacerbation of this flood into a torrent. Marchionini (1995) too, finds that electronic information is both enabling and complicating. On the one hand, digital information is more accessible – available from anywhere in the world, but it is less accessible because it is not directly perceivable to humans unaided by technology. Electronic digital information is simple because it is fully expressed by only two elements (bits), but it is complex because the many sets of codings necessary for humans to 'make sense' out of digital information allow the same digital code to be represented in many ways; in consequence, words, numbers, images and sounds can be interchanged – for better or worse. Furthermore, although much progress has been made in making computers easier to use, the evolution of hardware and software and the rapid pace of information creation and manipulation mean that for the foreseeable future, significant material and intellectual resources must be devoted to acquiring, learning to use, applying and maintaining electronic tools.

In this context, libraries, the traditional agents for the preservation and use of knowledge, are facing probably the greatest challenges in the history of their existence. Libraries are no longer the only storage-houses and providers of information, and librarians no longer aspire to be the gatekeepers, the sole possessors of the keys to information. In fact, in these days of digital information, libraries tend not hold physical copies of works, but license access to them, so that it is quite unclear who will have responsibility for archiving, and the level of trust in archiving arrangements is uncertain. This is all the more problematic, as digital media are fragile and access to them is dependent on rapidly evolving hardware and software, which, just as rapidly, grow obsolete (Beagrie, 2003). Lancaster and Sandore (1997), summarizing the current literature on the subject, warn that academic libraries are in a real danger of breaking down because they tend to be organized according to a model that is no longer relevant to the modern world of scholarship. As Noam (1997) observes, when information was scarce and hard to move, reproduction expensive and restricted and specialization low, scholars came to the information; therefore information had to be centrally stored and provided in a wide range of subjects. Now, when the volume of information grows exponentially and the evolution of fields of expertise continues into ever-narrower slices, comprehensive library collections become increasingly unaffordable; at the same time, electronic alternatives are increasingly powerful in storage, broad ranging in content and efficient in retrieval. In consequence, information flow has changed its direction; now it's more and more the information 'coming' to the scholar, and not vice versa. Indeed, Sack (1986) and Lancaster and Sandore (1997), thinking along the same lines, suggest we change our perspective: instead of viewing the universe in

terms of libraries centrally located for users, we need to think in terms of each user being surrounded by libraries and other information accessing opportunities.

Having taken a look at the impact of innovative technologies on the first two of Noam's (1997) research activity elements, we now come to the third element - the communication of knowledge and information to others. The academic community resembles any other community, inasmuch as it is defined by a set of common assumptions, a mode of discourse and a way of distinguishing itself from the rest of the universe (Burnard, 1990), but it does manifest one distinctive feature: its members are particularly strongly motivated to network themselves both professionally and technically with their peers (Agre, 2000). The networks so formed are, of course, Derek de Solla Price's invisible colleges, which, although more central to the sciences and social sciences, exist in the humanities as well. The invisible colleges give their members status in the form of approbation from their peers, confer prestige, and, above all, effectively solve the problem of communication among scholars by reducing a large group to a small select one of the maximum size that can be handled by interpersonal relationships (Price, 1963).

Garvey and Gottfredson's (1976) findings, in an extensive questionnaire survey of the scientific information-exchange activities of several thousand scientists and social scientists, conducted by Garvey and his colleagues (Garvey et al, 1972a, 1972b, 1972c, and 1972d), lend support to the notion of the scientific enterprise as a social system, whose salient feature is interactive communication and exchange of information and ideas among similarly interested colleagues. The social mechanism, which holds this scientific communication process together, is the interplay of the self-interest of individuals and groups, controlling one another. The scholars in any area depend on the opinion of other scholars in their field have of them; they depend on other scholars to provide information to enable them to proceed with their work so that they can earn a good reputation. At the same time they are being depended upon by other scholars for their good opinion of them. If one scholar pursues his or her own self-interest too far in a direction incompatible with that of other scholars, he or she will be checked. Social groups obviously check individual scholars (for instance, editors check and shape the individual scholar) and individuals can 'control' social groups (for example, editorial policies may quickly change if scientists important to a discipline divert their manuscripts to other journals). Garvey (1979, p.2) sums up the ensuing state of affairs saying: "[thus]...we have the situation where a relatively small group of scientists are reinforcing one another for successful contributions while at the same time competing with each other to be the first to proclaim such contributions to the group." Therefore, he adds, the scientists live in two worlds – a scientific world with its special norms and rigorous communication structure and a separate 'outside' world. Agre (2000) also notes the dichotomous nature of the scholar's world, albeit seeing it somewhat differently, saying that the research world has a matrix structure: on one axis are the campuses and on the other axis are the research communities. Indeed, as he points out, scholarly interaction, both on the formal and informal level, is such an essential part of research activity, that the invisible colleges are in many ways more visible to the researchers than the physical campuses where they organize their places of work.

Unlike Burnard (1990), who puts forward that the undeniable improvements in scholarly communication, and hence, scholarly cooperation, are hardly so great as to approximate to a qualitative rather than a quantitative change, both Agre (2000) and Noam (1997) argue that the impact of electronic developments



on the flow of scientific information is far-fetching indeed. Thus, Agre (2000) suggests that the advent of innovative communications media has brought about the invisible colleges' becoming more and more real, with research 'centres' located on several different campuses and research communities developing their own network infrastructures, sometimes referred to as 'collaboratories', that encode their own distinctive methods, practices, and concepts.

It seems then, that while the profound changes in the information world of the researchers do not have much of a direct effect on the creative component of their work, the impact of these changes on the preservative and communicative aspects of their scholarly activity has been rather significant. However, before we can examine to what extent the conduct of research has been revolutionarised by the beginning of the 21st century, we need to take a closer look first at the research process and the role of information in its advancement.

### **2.1.2 Information and the Research Activity**

The research activity is inextricably intertwined with information: it is based on the use of existing information and aims, at least on an interim level, on the way towards attaining the ultimate goal of generating new knowledge, at the production of new information. In fact, every scholar can be seen as a link in an information chain, on one side receiving scientific advances from his or her own and other fields of interest, on the other side processing the results of his or her own research into information for the benefit of others (Hills, 1983). Case (1986) cites Orr's model of the scientific knowledge generation circle (proposing that it can accommodate non-science fields as well), in which the researcher is envisioned as a stream of inputs and outputs. The inputs come from his or her observations of the world and from information generated by others, accessible either orally or in a recorded form; the output is the information produced by research, which goes to people (colleagues, students or project sponsors) and/or to records of some sort (books, articles, films, etc.). Thus, researchers, aspiring to modify the existing state of knowledge by a new contribution, link together individual pieces of scholarly work, taken in their appropriate critical context. This is accomplished by their citing prior work that forms the critical context of their own work while also linking it to the rest of the knowledge structure. Their work in turn is further argued, criticized, and referred to in subsequent publications, becoming part of the never-ending cycle of scientific advancement (Swanson, 1980).

Indeed, on the basis of his findings in his study of scientists' sources of information, Voigt (1959) identifies three distinct information needs of researchers: the first is the need to know what other researchers have recently done, or are doing, both in the specific field in which they are doing research but also in a broader area (the current approach); the second need for information is the one that comes to the researchers in the course of their work, a need for some specific piece of information directly connected with the problems at hand (the everyday approach); the third need for information is the need to find and go through all (or at least as much as can be found or as much as is relevant) information existing on a given subject, usually the specific subject the researchers are working on (the exhaustive approach), which arises when they start work on a new investigation and becomes even more urgent at the time they report on the results of the investigation. Menzel (1964) adds a fourth need for information to the three on Voigt's list, the researchers' need to brush up on a field, to familiarize themselves with a

field of inquiry which had not previously been included in their attention area, either because they wish to branch out to a new line or because they wish to understand developments in some line that is new to them, in the hope of adapting them to work in their own old line.

However, although the term 'research' is used indiscriminately in all the academic disciplines to describe the intellectual activity of searching for knowledge, ever since Snow (1993) coined the phrase 'The Two Cultures' in 1959, referring to the worlds of literature and science, there seem to be an ongoing debate as to the nature of the humanities, as opposed to that of the sciences, which has further developed into a parallel debate on the nature of the social sciences in comparison to that of the sciences, on the one hand, and the humanities, on the other. The debate itself is beyond the scope of this work, as is the question of where precisely the boundary lies between the three major groups of disciplines, but the analyses of those generic features of research conducted in the sciences, the social sciences and the humanities, respectively, which may call for differential information provision, need to be explored.

### **2.1.3 Discipline-rooted Differences in Research Work and Information Needs**

According to Price's (1963) widely accepted observation, science progresses by a series of building blocks, whereby each generation builds upon the achievements of the previous one, although Kuhn (1970, p. 208), suggesting that it is not invariably the case, contends that scientific development is rather "a succession of tradition-bound periods punctuated by non-cumulative breaks". Progress is achieved by a concentration at the frontier of research of ideas, data, experiments and findings, until consensus about theories and methods is obtained (Brittain, 1979). In comparison, the humanities do not normally progress in a linear fashion; one discovery is not necessarily the result of a prior one and will not necessarily lead to a later one (Budd, 1989). To use Meadows' (1974) picturesque metaphor, scientific knowledge grows in the orderly fashion of a skyscraper being built, with each new floor depending on the previously constructed floor for support, whereas growth in the humanities might more reasonably be compared with the construction of a rambling country house. The humanist's work consists less of sequentially inter-related blocks of knowledge than is true of the scientist's work, and humanists' bodies of knowledge are rarely sequentially and hierarchically ordered (Weintraub, 1980). Brittain (1979) claims, that neither does social sciences progress appear to be the same orderly process that can be seen in science, of each generation's building upon the achievements of their predecessors and arriving at a general consensus about subject matter, procedures, methods, and interpretation of data; rather, each generation appears to react against the achievements of the previous one and to revert, at least in part, to earlier formulations.

The researcher's work varies in accordance with the differences in the way progress is achieved in each of the three major disciplines. In the sciences knowledge grows by the accumulation of new discoveries, resulting from painstaking experimental work founded on previous findings (Line, 1973), and the scientist deals with realities, with phenomena amenable to mathematical investigation (Budd, 1989). In the humanities knowledge grows by the discovery of facts and the methodical analysis of factual relations, in an effort to achieve understanding and discovering a meaning (Weil, 1973). In consequence, the humanist, striving to reconstruct, describe, and interpret the activities and accomplishments of men and women by establishing and studying documents and artifacts created by those men and women (Wiberley and Jones, 1994), deals with the less tangible, the less concrete, relying more on informed opinion (Budd,



1989). In the social sciences, where knowledge grows by a gradual progress in understanding, based both on theoretical thinking and new data (Line, 1973), research looks, at least on the surface, similar to scientific research: problems are stated, hypotheses proposed, data gathered, and conclusions drawn. However, the social scientist's research work often does not follow the hypothetico-deductive research approach of the sciences: since many social science theories and problems cannot be resolved by and/or developed by the empirical inquiries alone, it is common for a theoretical point of view in the social sciences to be supported by citing other reports of theory building or empirical evidence (Brittain, 1979). At the same time, since the social sciences, like the humanities, attempt to describe and explain the activities and accomplishments of men and women, the social science researcher's work seems to resemble that of the humanities researcher, but with a difference: humanists use sources created by the subjects of their research, while social scientists initiate and, much more than humanists, participate in the creation of their sources (Wiberley and Jones, 1994). The influence of these discipline-rooted differences in the conduct of research on information needs has been extensively analysed, yielding the following picture:

As the advancement of science depends on previous findings, and every scientist stands on the shoulders of hundreds (or thousands) of other scientists, access to the data that have been accumulated is of obvious importance. However, where the findings of previous generations of scientists are still relevant, they are part of the building blocks of science, and therefore readily available in textbooks, treatises, handbooks, etc. Many other scientific works are superseded and become obsolete - only historians and philosophers of science require an active information service for data and information that is much more than about twenty-five years old. Citation practices in the sciences supply abundant proof to this point: the oldest person on a list of the 300 science authors most cited between 1961 and 1976 was born in 1899 (Garfield, 1980). However, if scientists do not seem to require access to more than a generation-old literature, they are very anxious indeed to ensure that they are well aware of current and recent information. Not so much out of choice, but because the penalties for not keeping up are heavy: no scientist would want to publish work which betrays ignorance of relevant discoveries and facts, and, in addition, repeating some research to obtain information may slow progress unnecessarily, thereby impeding the establishment of the priority of a discovery (Garvey, 1979).

At the other extreme, the humanities are mainly dependent either on fairly well-established data (such as historical archives) or texts (literary or other), or on original thought and interpretation – or both. Consequently, as Weintraub (1980, p. 25) observes "...humanists are probably the most book-bound creatures in the world of scholarship... Their appetite for books is insatiable... Many humanists have a special reverence for manuscripts... Humanists care about texts in their varieties... [for humanists the] old book (not the rare book) is... at least as important as the current book." In other words, humanists need first and foremost primary sources of information, which they interpret using their judgement and imagination (Wiberley and Jones, 1994). Thus, since the humanist researcher's innovative contribution to knowledge can consist of different perspectives or different understandings of the same work and might not present any new 'facts', awareness that others have worked or are working in the same field is less important. There is small chance of actual duplication occurring, and it may not matter much if it does, so long as each presents an original interpretation. Consequently, having retrospective coverage of the



literature may be more important to the humanist than having access to current material (Stone, 1982). Since humanist researchers desire to understand either a work of man or the lives of specific men, or the minds standing behind the works of men through texts (Weintraub, 1980), works published decades ago might still be definitive works for them. The humanist scholars cannot rely on recent material alone, as it may or may not incorporate or build on a previous body of knowledge, and even if it does, past work may be required for purposes of comparison. Recent documents may present the most up-to-date perception of a particular set of events in the light of both past and recent evidence, but scholars may still wish to go back to the original sources, rather than rely on any interpretive work about them (Stone, 1982). Also, as Garfield (1980) points out, interest in a work or period may remain dormant until it is reawakened in some way, so that previously unheeded material may assume or resume importance. It is, therefore, hardly surprising to find differences in the works consulted by scientists and humanists: if, as mentioned above, among the 300 most cited science authors between 1961 and 1976 the oldest person was born in 1899, in a humanities citation study 15 of the 300 most cited authors between 1977 and 1978 lived before A.D. 1400 and nearly 60 percent were born before 1900 (Garfield, 1980).

As to the social sciences - obviously, if research in the social sciences differs from research either in science or in the humanities, there is reason to assume that information needs in the social sciences would have distinctive features as well. Line (1969, 1973) suggests that information needs in the social sciences fall somewhere between the humanities and the sciences, as a result of the social sciences' depending on, and drawing from both to an extent that these two broad areas do not draw from the social sciences. Thus, some social scientists resemble humanists, inasmuch as they are concerned mainly with theory and concepts, often from a multi- or inter-disciplinary approach and as their main source of information is their own thinking. Others are more like scientists in basing their research on data, frequently using information that is current and readily available (for example, election statistics) or generating their own information, in the form of survey data or economic models, but, unlike scientists, they also rely heavily on past research findings and evidence accumulated in regard to a particular theory, especially when theories cannot be supported by experimentation and scientific verification. In any case, the data they use are rarely of so 'hard' a nature as in the sciences (that is, it is less of a high factual, particularly mathematical, content), because of the inherent instability characterizing the subject matter under study in the social sciences – human beings and their interactions with one another. Therefore, according to Line (1969, 1973), the social scientists, just like their humanist colleagues, are less concerned with currency than the scientists: the dangers of precise duplication of an experiment are very small, since the circumstances differ from place to place and from time to time, and the penalties for not knowing other works are correspondingly less severe. However, (Garvey et al., 1970) and Garvey and Gottfredson (1976) do not seem to share Line's view: their findings point to social scientists' being no less anxious to keep informed and to ensure priority in making a scientific contribution than their scientist colleagues.

#### **2.1.4 Fulfilling Research Information Needs: Inter- and Intra-individual Variations**

Having surveyed the characteristic information needs arising in the course of the scholarly endeavour in each of the three major disciplines, we now come to the question of how these needs are met on the inter- and intra-individual level.



Proceeding from the notion that information providers need to be conversant with the scholarly research process, so that they can enquire as to the stage of research for which information is being sought in order to be able to meet information needs more efficiently, several studies investigate the inter- and intra-individual variations in researchers' information seeking behaviour.

Egan and Henkle (1956) present an analysis of the functions of information in the various phases of a 'typical' research project, derived from a consideration of the researcher's activities at each step of the process. Thus, whilst the perception of a problem involves the use of theoretical treatises or research reports, and its precise statement necessitates looking at prior investigations of the same problem or similar problems, the choice of techniques to be used in gathering and analysing evidence requires a recourse to the literature of statistics, to laboratory manuals, to accounts of investigations, or even to trade catalogues (for available equipment). Then the conclusions may necessitate access to discussions of conclusions found in other research studies or of conflict with theoretical statements found in the literature.

Garvey et al. (1974) also explore the function of information at the different stages of the 'typical' research process, focussing on the sciences and social sciences, in order to shed light on 'intra-individual variations' (changes which occur within individual scientists as their scientific work progresses). According to their findings, there is a reliable progressive order in the stages of scientific research (though not always consciously or rigorously followed by the experienced researcher, who is likely to be involved in more than one of these stages of scientific activity), from planning and the preparation of a research proposal, through preliminary experimentation or field trial and the design and development of equipment/apparatus, to the collection and analysis of data, the interpretation of results and the preparation of the final report. In order to progress from stage to stage, researchers need information beyond their own knowledge, and since different kinds of mental processing are going on at the different stages, different kinds of information are required at the different stages. Thus, during the early stages, information serves as an aid in the perception of the research problem and in the formulation of procedures appropriate to the inquiry; in the intermediate stages the researchers' need of information becomes more specific (for example, they want details of techniques and methods); and in the final stages their information needs shift to the general body of scientific knowledge, as they seek to fully interpret their data and integrate their findings into the current state of scientific knowledge. Therefore, researchers use a variety of sources, both formal and informal, at the different stages of their investigations. In addition, since the productive scientists are generally engaged in the conduct of more than one scientific research at any one time, at any instance they may have different information needs relative to several different research activities. Moreover, some sources are better suited for providing certain kinds of information: for example, local colleagues and students are superior providers of more technical information, such as data collection techniques.

However, Kircz (1998), who also discerns different information consumption needs at the different stages of a research programme, argues that an additional measure is necessary in order to ensure that researchers find information necessary for their work more quickly and better placed in context. He divides the scientific readers into four general categories (out of which only the first three are of our

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concern here, the fourth category being that of the science administrator), emphasising that in the course of a research programme a reader changes from one typology to another and back. The first category is the informed reader, who knows what he or she is looking for and is able to find his way in the literature quickly; this knowing-where to-look-reading is typical for the stages of research where precise, pertinent information is needed. The second category is the partially informed reader, who is not conversant with the specific research as such, but is interested in the general aspects that might be of use for his or her investigations. This type of reader wants to know how a particular paper fits within the broad spectrum of his or her own research, what the relations are with other methods in the same field, and what the connections are with related fields, typically in those phases of the research process where ideas and results are to be confronted by and compared to other, related work. The third category is the uninformed reader, the researcher who wants to learn something new in the exploratory phase of a research project, who hopes to get a fresh idea from fields that are either unknown to him or her or of which he or she has only a rudimentary knowledge. Kircz proposes, that the electronic-era scientific paper provide information tailored to the requirements of each type of reader, suggesting that this can be accomplished by breaking up the present-day linear type classical article into a coherent set of well-defined modules, each with its own characteristics, so that readers can access (by 'zooming-in/out') only the module they need, when they need it.

In absence of empirical studies of a similar nature into information use at different stages of the 'typical' research process in the humanities, Watson-Boone (1994) attempts to "open a window into the mind of the individual humanities scholar" by piecing together a tentative outline of the different stages of the humanistic research process on the basis of a personal account of a historian, Stephen Nissenbaum, from his description of his work on the creation of a poem. In Stage I: Ideas, Speculation, and Interweaving, Nissenbaum moves from ideas to speculations, which yields direction or focus: he makes a mental note to hunt down a early illustrated edition of the poem; he "thinks," "skims" a variety of material, "learns," "infers," "wonders," "begins to connect"; a colleague makes a suggestion; Nissenbaum "continues to speculate," and four critical suggestions evolve; he develops an intriguing angle. In Stage II: Focus, Findings and Completion, he seeks evidence, makes findings and revisions, and comes to some initial conclusions: he has a month of relatively straightforward pursuit, based on now-formed categories of information; he derives some findings; he develops five hypotheses; evidence, some more findings, initial conclusions, and three new hypotheses emerge. Taking this outline of a research process for what it is (and was meant to be) – a chronological construction of what appears to have been one scholar's research into a specific problem (although Nissenbaum says that this is really the way he mostly works), it nevertheless rings true (at least to the ears of the author, who has been working with researchers for twenty five years). In fact, Stone (1982), in her review of the literature on the information needs of humanities scholars, draws a similar (if less detailed) picture of the research process in the humanities, summarized by Case (1986) into the following outline: Thinking and talking to people about the topic; Reading the studies that have already been done in the area; Studying original sources and making notes on them; Drafting an original contribution to the literature; Revising the article for publication.

Evidently, humanistic research proceeds along the same general lines as scientific research, progressing from planning, through collection and analysis of data and information, to the interpretation of the results.



However, there is one noteworthy difference between the two: the subjective component permeates the different stages of the humanities researcher's work to a much more significant extent. As Reagor and Brown (1978, pp. 242-243) put it: "The humanistic approach basically involves the application of a single person's imagination and vision to a human problem. Humanistic knowledge results from the application of one mind investigating a slice of reality and interpreting it anew in the context of that individual's total experience and understanding." Weintraub (1980, pp. 30-31) expresses the same notion in saying that "the scientist can have the belief – whether right or wrong – that he queries an objective nature until his mathematical relations correctly express its fundamental workings. The humanist's object of study is a much more multilayered one, and his conceptual tools are much more problematic in their adequacy to the supposed reality... Rarely can he settle a matter with the decisiveness of the scientist's answer." It is, incidentally, this highly individualistic and subjective manner of conducting research, which explains the humanists' well known fondness for browsing: examining the catalogue, scanning titles of books in the stacks or leafing through a book sometimes results in his stumbling across information which may bring about the fortuitous discovery of connections between ideas and words (Saule, 1992).

As a result of the subjective nature of humanities research, the collaborative efforts among humanists are less customary than in the sciences, and the notion of the invisible college is less observable (Stone, 1982). Weintraub (1980), too, notes the scientists' collaborative vs. the humanists' more individualistic style of research work and speculates on its origins: scientists, he says, have a much clearer sense of where the frontier of knowledge currently lies and what the truly significant issues at the frontier are. For the humanists the whole tradition is often essential and present; the frontier is less visible, and the dominant current concerns need not be as significant as they are fashionable. The scientists' knowledge of the relevant problems on the frontier permits them more frequently than the humanists to collaborate usefully in advancing and ever more systematising knowledge of an objective world of nature, whereas the humanists tend to be more alone with their problems. Wiberley and Jones (1994) also seek to provide insight into the humanist researchers' obvious reluctance to collaborate in research, contrasting their work-style to that of the social sciences researchers. They maintain that humanists do consult colleagues, but tend not to share responsibility for projects, since their primary evidence, unlike the social scientists' primary evidence, is neither easily categorised and entered into a relational database nor readily subjected to quantitative measure or statistical analysis. Therefore, the humanities research project cannot easily be divided into discrete tasks that different members of the research team can perform separately and later assemble.

It seems then, that although scholarly research proceeds within a clearly discernible generic framework, the academic culture surrounding the disciplinary areas brings about characteristic differences in thought processes and work-habits, which have been shown to entail discretionary information needs and uses both on the inter-individual and the intra-individual level. However, for quite some time now, the socio-cultural context of the scientific enterprise has been undergoing far-fetching changes of such magnitude, that these previously identified patterns might not have remained unaffected. The novel realities of conducting research in academe of the knowledge society are, therefore, the topic of the discussion to follow next.



## 2.2 The Academic Enterprise in the Information Society<sup>2</sup>

### 2.2.1 The Changing Countenance of Academe

A plethora of changes, propelled by a host of closely linked circumstances, conditions and forces, some primarily contextual (economic, political, social and technological), and as such external to the academic community, others internally generated, converge to fashion a newly emerging academic landscape. These changes range from the altered standing of the university in the knowledge-based society of the twenty-first century and the shifting modes of knowledge production and contribution, through the flux towards 'more education for more people', with open, mass systems of higher education taking the place of the closed, elite ones of yesteryear, to the greatly altered nature of contemporary academic research.

Although not always directly impacting on the research component of the academic endeavour, which is of our concern here, these changed realities of the higher education scene shape the circumstances surrounding the scientific enterprise, posing new challenges to each and every individual scholar. Thus, for example, with the academic world inevitably becoming geared towards the teaching of large numbers of students from all walks of life, for, according to the ethos of the learning society, life-long study, as well as training and retraining, are possible and taken for granted by large segments of the population (Altbach, 1998; Farnham, 1999a; Gibbons et al., 1994), university faculty are facing different expectations. For one, as present-day undergraduates seem to be not as well prepared to enter college as their predecessors, faculty are being forced to teach more basic-skills courses, 'dumb down' the level of their classes, and reduce the number of advanced courses they offer, all of which influence their ability to enjoy teaching. Moreover, with learning having become a routine and ongoing feature of their lives, today's students bring to the university exactly the same consumer expectations of convenience, quality, service and cost they have for every other commercial enterprise with which they deal. Indeed, they regard the university as the supplier of expert services, expected to give them the education they want and pay for, a rather novel attitude in academia, which certainly necessitates some adjustments on the part of the faculty who teach them (Levine, 1997). After all, if their responses to the demands of the changed realities of higher education turn out to be inadequate, students might 'take their business elsewhere', a prospect which not many institutes can face with equanimity in our era of financial difficulties.

However, the fundamental orientation in academe has always been towards research, not teaching. For instance, in the U.S. the call for new definitions of scholarship and research, through a broadening of the criteria, by which faculty are judged in their development, to include "the full range of academic work...not only the *scholarship of discovering knowledge* but also the *scholarship of integrating knowledge*, the *scholarship of applying knowledge*, and the *scholarship of teaching*" (Boyer, 1995, p. 2, italics in the origin), although originating in the 'grand old man' of American higher education, Ernest L. Boyer, and evoking untold number of discussions, seems to have so far remained largely unheeded. Academics are more research than instruction focussed, mostly for intrinsic reasons (many simply enjoy research more than teaching), but also in view of incentives inherent to university reward systems, which

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<sup>2</sup> For a fuller account of the novel features of the present day Western world academic scene and the developments leading up to its transformation, see Appendix 2



favour research over teaching when considering tenure, promotion and salaries (Rhoades, 2000). Still, the winds of change have been seeping into that hub of academia, research, too.

### **2.2.2 Scholarship in Transition: New Orientations and Shifting Patterns**

The literature abounds with discussions of the changing nature of contemporary academic research, converging around the notion of its 'commercialisation', 'marketisation', instrumentalisation and bureaucratisation. If the word 'research' still conjures up visions of an inherently elite activity, aimed at developing knowledge and understanding for the benefit of mankind, the development of entrepreneurial patterns of academic research, intent on cashable knowledge production, is nevertheless indubitable.

Traditionally, the scholarly quest for knowledge was seen as end to itself, and in consequence, its major (if not sole) custodians, the universities, were generously supported from public funds to enable their fostering research and scientific progress. However, with knowledge becoming a commodity of major value, and, in result, with the justification of academic practices becoming the production of 'knowledge for use' instead of 'knowledge for its own sake', a gradual break-up of the historic pact between knowledge production agents and the state occurred (Calas and Smircich, 2001; Delanty, 1998; Duderstadt, 1997). The subsequent decline in the financial resources of universities in the developed countries, although seeming to fly in the face of the consensus, pointed out among others by de Weert (1999) and Farnham (1999a), as to the central role accorded to knowledge and its producers and propagators in all spheres of social and economic life, is undeniable (Altbach and Lewis, 1995). Furthermore, as part and parcel of global processes, and driven by the rhetoric of 'quality', 'efficiency', 'value for money' (Harvie, 2000), state-funding of university research, perhaps diminished and stagnating, but still an important source of research budgets in most highly industrialised countries, is made more targeted by allocation mechanisms mimicking the market. This, in order to enable governments to commission useful research, designed explicitly to boost industrial performance and increase support for science, with the enhancement of the country's economic competitiveness in mind Gibbons et al. (1994).

Indeed, since the ability of higher education to attain its most important goals, the free pursuit of the discovery and dissemination of knowledge, is very much limited as well as enabled by the economic context in which it is embedded (Davis and Chandler, 1998), the retreat of the state from its role as primary provider and financier of knowledge and the ensuing dearth of resources has forced universities to seek alternative sources of funding. Obviously, once state support was no longer forthcoming unconditionally, universities could no longer afford to go on financing the rising institutional operating costs without distributing the results of their research beyond the academic community. In result, a multi-billion dollar knowledge industry has developed in and alongside universities, with the unequivocal purpose of providing more direct and effective responses to the needs of industry and the labour market in return for financial support (Gibbons et al., 1994; Massey, 1997). In result, however, the university seems to be losing ground as the primary centre of learning and the main repository of accumulated wisdom.

Thus, amidst increasing pressures to become extra-focussed on revenue generation, these days higher education is becoming more and more instrumental. Concurrently, the state, which continues to provide



the lion's share of universities' resources, seeks in return, through 'new' management processes and systems, greater efficiency of provision, even more marketisation, and especially greater accountability (Farnham, 1999a). The call for accountability, and for strengthening the link between money and work in higher education, has brought about the introduction of measures of assessment involving the quantification or valorisation of research. In the U.K. this has been happening through the five-yearly nation-wide Research Assessment Exercise (RAE), and in the U.S. and elsewhere in the Western world, through more localised, but no less determined institutional evaluation processes aimed at gauging productivity and assessing quality for both pre- and post-tenured faculty. Thus, on the basis of the 'Mathew Principle' of 'to him who hath shall be given' (Trowler, 1998), essentially immeasurable research outcomes are assigned 'research values' on the basis of varying standards of measurement: in some disciplines authorship of books is the principal unit, in others refereed journal articles are preferred. The (many) oppositions to the mere idea of attempting to assess and measure research are outside the scope of this discussion, bar the one noted by Harvie (2000), which has to do with the constraints imposed thereby on researchers' free thought and creativity: the strong pressure on academics to produce research output, as opposed to being engaged in research means that there is an incentive to undertake 'safe' research projects, that is, those which are more likely to yield publishable, if not earth-shattering, results, as well as to plan and execute these projects with the next evaluation process in mind (for example, with assessment every few years, the incentive must be not to embark upon lengthy research projects).

In an attempt to comply with these increasing pressures for quality, performance, value for money and economic relevance in both their teaching and research, universities, often criticised for their inherent inefficiency, have been compelled to move much closer to an industrial pattern of organisation, with senior management teams and strategic plans, line managers and cost centres and more active Boards of Trustees. However, the advent of managerialism in higher education is often interpreted as tantamount to a reduction in the autonomy of the universities: an expression of the withdrawal of trust by the government in the institutions on the grounds of their being 'full of less able students and teachers', and as such incapable of improving their own performance (Farnham, 1999a). With the locus of control for decision making shifting away from departments and their faculties, some even question the ability of higher education institutions to sustain their status as organizationally and intellectually viable and attractive places for academic work (see, for one, Gumpert, 1997).

Along with the vulnerability of institutes of higher education to political and administrative dictate, a gradual erosion in the social status and professional leadership of faculty also seems to have been taking place (Clark, 1997), to the extent that Halsey (1992, p. 13) is driven to say that "...the don becomes increasingly a salaried or even a piece-work labourer in the service of the expanding number of administrators and technologists". This waning of the professional domination in academia has been accelerated by the diffusion of scientifically literate people through society, consequent to the massification of higher learning, for many people nowadays feel that being familiar with science and technology and the methods and procedures of science, they are in a position not only to understand what university researchers are doing but also to pass judgement on the quality and significance of their research (Gibbons et al., 1994).



### **2.2.3 To Be an Academic Today: Aligning Old Priorities with New Expectations**

What does it mean then to be a scholar in the radically changing contexts of contemporary higher education? It seems to mean, first and foremost, a constant grappling with the disparity between what is traditionally valued as scholarship and the pragmatic needs and dictates of modern society.

The time-honoured image of the archetypal academic researchers is that of highly autonomous scholars, able to set their own research goals in accordance with their interests, work diligently towards them with what they judge to be their own capacity and to do so without much direct interference from anybody (Ziman, 1981). In fact, although in the past too a level of research activity was expected of academics, for research was considered to be the central professional endeavour and focus of academic life, their obligation was to engage in research or other 'scholarly activity', rather than to produce a research output; thus, for all practical purposes they were doing research because they wanted to, working alone and enjoying a considerable degree of autonomy, and publishing only if they thought they had some ideas or results worth making public. Therefore, although research output of high quantity and quality would almost certainly be rewarded in terms of academic prestige and promotion, which may or may not have brought financial benefits, their mission in life was considered to be the pursuit of knowledge for its own sake, with no close correlation assumed to be necessary between research quantity and quality, on the one hand, and material reward, on the other (Harvie, 2000; Rice, 1996).

Nowadays, although the academic core values, such as autonomy, freedom, and personal commitment still appeal strongly to scholars, affecting profoundly the choices made in the course of their work (Hakala and Ylijoki, 2001), extrinsic factors may play an increasingly significant role in their research decisions. With the emphasis in university research moving away from free enquiry, to problem solving within the framework of specific programmes funded by external agencies for defined purposes (Gibbons et al., 1994), academic researchers' work is less and less curiosity-driven, or initiated with the sole purpose of contributing to the advancement of human knowledge per se (Podgorecki, 1997). Institutional policies often coerce them into targeting their research to commercially attractive issues and marketable outcomes, if they are not compelled to do so anyhow in order to secure the necessary financing for their work, so that the scholar has to become in the words of Slaughter and Leslie (2001) "a state-subsidized entrepreneur who vies for external resources in a competitive environment", with the highest mark of academic achievement becoming entrepreneurship (Delaney, 1997).

Moreover, as Gumport (1997) insists, admittedly giving voice to the most extremist stance in the matter, the academics of today, considered redeployable resources and sources of potential revenue, to be utilized and monitored at the discretion of the management, are freely given revised or additional workloads, told how to spend their time and which programs to devote their energies to, and asked to report office hours, consulting activities, and time spent out of town.

Indeed, Rhoades (2000, p. 47), lamenting the current scholarly ethos, draws a rather bleak portrait of the contemporary academic:



"As a faculty member, I am now not principally an intellectual but an economic being. In my teaching I am now focussed not on intellectual development but on preparation for employment. In my connections to alumni, I am now not a concerned professor following up with my students, but a fundraiser, expected to play a role in the capital campaign of my university by tapping my former students. In my research activities I am pursuing discoveries not to advance knowledge in the public domain but to pursue economic interests in the private marketplace. Moreover, I am now an entrepreneur, seeking venture capital from foundations and corporations and private parties to support revenue-generating activities. And in cultivating connections in the community I seek to engage in outreach as a service not for free, but for a fee. In this configuration of values, the public interest is served by professors working not as public servants in an institution oriented to knowledge growth, but as private entrepreneurs in an enterprise oriented to revenue generation."

However, Rhoades' tongue-in-cheek description of his and his colleagues' seemingly utter compliance with the seemingly rigorous dictates of the new academic culture masks the far more heterogeneous reception they actually accord to the ostensibly ubiquitous requirements for changes in attitude, values, and behaviour in academia. Apparently, the picture of the changes in contemporary research work is more nuanced than the mournful accounts of entrepreneurship marking the end of 'the good old days of true scholarship' would have us believe. True, the purely academic orientation in research is no longer considered the only viable alternative open to the scholar (Hakala and Ylijoki, 2001). However, research is still often academically oriented, with the traditional academic values and norms stalwartly upheld, and with the researchers choosing their research topics out of scientific curiosity and aiming at generating knowledge of a theoretical nature. For obvious reasons the academic orientation is strongest among researchers who are not dependent on external funding, but undoubtedly working on intellectually challenging research topics, contributing to one's field and achieving academic merit within the scientific community are regarded as important values among all researchers. Also, at least in theory the traditional academic research orientation can reside side by side with the other, more application-oriented approaches to research work, although in practice often one dominates and there are tensions among them.

Furthermore, not only does this multi-coloured research terrain seem to have the traditional approach to research as its focal point, but academics' varying reactions to the numerous options and/or demands arising from the new trends in research also indicate that acquiescence is by no means as prevalent a coping strategy as it may seem at first glance (Trowler, 1998).

Still, if in the past different persons' adopting different personal research policies was seen as wholly "related to the imponderable temperamental factors that presumably govern their plans over the long run of a lifetime" (Ziman, 1981, p. 15), in the academic milieu of today the academic researchers are increasingly called upon to adjust their priorities and long-standing professional values to the host of new challenges posed by the far-fetching changes in their professional world. They are coerced to take on new, entrepreneurial roles, aimed at securing funding, which entail the preparation of countless research proposals; to conduct research cost-effectively; to reorient their research to practical, preferably commercially exploitable undertakings; to cooperate with other researchers within and without academe, despite the need this entails to change their practices of conducting and disseminating research; to be more productive in their scholarly work (and to prove their productivity by recording and reporting their professional activities in standardised formats, at a considerable cost in time devoted to the purpose), whilst teaching more, teaching better, taking on administrative tasks and reaching out to the community at



large; and above all, to undertake research projects according to the likelihood of these yielding publishable results.

The look just taken at the new breed of scholars increasingly peopling the corridors of our higher education institutions truly drives home the point: it seems essential that their information needs are re-investigated. With their priorities and long-standing professional values challenged to the extent that they seem to be by the realities of the shifting academic scene of the knowledge society, could these needs have possibly remained those of their predecessors? And the picture drawn so far is not even the whole representation of the transformation of the academic enterprise, for we are yet to examine the trends characterising the information activity of scholars in an increasingly electronic environment. Indeed, with the advent of the brave new world of electronic scholarship, the traditional patterns of research-related information activity are tested against a promising, if perplexing array of evolving opportunities for new methods of fulfilling information needs. So much so, that looking at scholarly information seeking behaviour in the past few decades is in fact telling the tale of the transition to the electronic information era in academia.

### **2.3 The Move to Electronic Scholarship: User Acceptance of IT in Academe<sup>3</sup>**

The integration of electronic media into academic work has been investigated in a large number of studies, each contributing an additional detail to the slowly emerging picture of university faculty progressively harnessing the new technologies to scholarly information gathering endeavours. The perusal of the literature, which affords some insight into the directions and basic trends characterising the information activity of university faculty in a progressively electronic environment, proves beyond any possible doubt that overall, academia has been gradually moving to the electronic information era. Although both the speed and the extent of the move to electronic scholarship seem to vary with subject-specialisation, not so much between the scientists and the social scientists, whose adoption rates reveal a considerable degree of homogeneity, as when comparing the humanities researchers with their colleagues in the sciences and the social sciences, move they do'— at least, as a group.

Indeed, proceeding from the notion that information technology based services and resources can and do play an increasingly important part in scholarly work, universities have been offering their faculty a plethora of ingenious modes of electronic access to information, aimed at meeting their information needs, with the libraries traditionally fulfilling groundbreaking and leadership roles in these endeavours. Rightly so, of course: it is certainly important for all information provision policy makers in academia, on the global, the national and the local level, to be aware of this trend towards electronic scholarship, as a general framework for planning and development. However, only as a general framework, no more than that, for, as all information providers know by now (though unfortunately sometimes inclined to forget) it is only through an understanding of what information individual researchers need and how they set about finding it can we ensure that suitable information systems are provided.

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<sup>3</sup> For an extensive review of the large number of studies investigating user acceptance of IT-based information sources and resources in academe, see: Herman, 2001b, reprinted in Appendix 3



In fact, as Morrow (1999) observes, the ready availability of a technology does not guarantee its immediate take-up and exploitation, and unless it promises some personal advantage, it will not change well-established practices, to which Barry and Squires (1995) add, that no matter how useful a piece of technology appears to be in isolation, its true usefulness can be evaluated only through the perceptions of the user. Thus, a researcher's acceptance or rejection of novel methods of information gathering depends on their suitability to his or her personal circumstances, experience, individual capabilities and specific preferences. Unlike Everest, which had to be conquered simply because it was there, the electronic systems and methods for acquiring information are perceived by researchers as a means to an end, to be chosen when it seems that the information need that arises can best be fulfilled in this way, and if deemed suitable to their individual inclinations and capabilities (although, life being more complicated than that, peer pressure can often be an overriding consideration).

Moreover, here again disciplinary research conventions seem to play an important role in determining the rate and extent of academics' adoption of electronic sources and methods, as Kling and McKim (2000) posit: "*...it is not just a matter of time* for disciplines to converge on common ways to using e-media to support scholarly communication" (italics in the origin). Thus, although they too believe that "the move to electronic scholarship appears to be an inescapable imperative", they nevertheless maintain that "communicative plurality and communicative heterogeneity are durable features of the scholarly landscape, and... we are likely to see field differences in the use of and meaning ascribed to communications forums persist, even as overall use of electronic communication technologies both in science and in society as a whole increases".

All of this means, first and foremost that access to electronic materials can be "liberating for some researchers, but burdensome or superfluous to others, who can continue to be successful enough using their paper-based materials and work-practices" (Covi, 1997). Indeed, academics are prepared to learn and use the IT-assisted information systems only where they perceive themselves as having a need that could be met by that system, and IT is only seen as a way of augmenting research where it is appropriate (Barry and Squires, 1995). This anticipation of evident advantages of what is offered as new is often the motivating force behind the decision to adopt the novel information services, or as McKnight (1997) puts it: "People think the same about electronic journals as they do about any new development – 'what advantage does it have for me?' Unless readers can see a real advantage to electronic journals, why should they use them? Unless readers can do at least the same thing – and preferably more – with electronic journals as they do with paper, what incentive is there for them to change?" Such potential advantages may include access to wider and more diverse sources of information as well as to material not otherwise available; more efficient ways of information seeking; hyperlink access to searchable and manipulable full-text documents; the ability to do information work from one's desk, circumventing the constraints of library opening hours and avoiding the notorious frustrations of library use, such as time spent searching for missing items, queues, and delays in the arrival of new journal issues; the possibility to communicate in real-time with colleagues all over the globe, etc. However, when Barry and Squires (1995) put to test widespread beliefs as to the advantages of the electronic library for academics, they found that researchers did have some reservations: for example, they seemed to feel that the time spent searching for and reading the vast amount of literature available electronically allowed less time to think,

and that data delivered to the their desktop would encourage a less interactive mentality and a decrease in creative thinking.

Also, even when researchers are perfectly willing to use the novel technologies in their information work, seeing them as potentially beneficial and suitable to their needs, a basic condition for their deciding to adopt the electronic library is an appropriate technical infrastructure, or to be more specific, the availability of equipment and access to networks. There seems to be little doubt that technological readiness plays an important part in researchers' move to the electronic era, although it is not very clear whether the technologically developed environment brings about greater acceptance of novel information seeking methods, or perhaps it is the other way round, with information needs driving the provision of appropriate technologic infrastructures.

Evidently, the increasing adoption of electronic resources does not mean that all researchers are ready for them, and not even that those willing to accept some of the novel technologies are prepared to have them replace altogether traditional modes of communication and information gathering. Still, if the emerging electronic library does not seem to be the panacea for any and every information problem a researcher may come up with, and certainly not god's gift to academics, it is all the more reason to re-investigate the variations in the information needs of present-day academic researchers, for only if we do so, can we aspire to attain our ultimate goal of creating custom-made personal information infrastructures, tailored to the distinctive needs of individual researchers. The next chapter delineates the methodology developed for such an investigation, as it is conducted in the present study.



### **3. Methodology**

This chapter focuses on the methods utilised in the present study to address the research questions posed. First the research design is outlined to provide an overview of the strategy of investigation: consisting of three inter-related elements, it integrates a user-centred theoretical perspective, which views an information need as having different dimensions; a state-of-the-art review, based on the literature; and a hybrid research project, integrating qualitative and quantitative methods. Then each of the three elements is considered, to show how the theoretical perspective chosen and the insights offered by the published literature in the field combine with the data collected for the present undertaking to inform the research questions. Thus, first the conceptual framework of the study is introduced, followed by a discussion of the evaluatory framework for assessing information needs, developed by Nicholas (1996, 2000) on its basis. Next a detailed description is provided of the techniques of investigation used in each of the two consecutive stages of the field work undertaken, the two-phase qualitative stage, and the quantitative stage. The research process in each stage is outlined, inclusive of details of data collection and analysis. The chapter concludes with a deliberation of the methodological limitations of the study.

#### **3.1 The Research Design**

The research design for this study comprises three inter-related elements:

- A theoretical perspective, which provides the conceptual framework for viewing an information need as having different dimensions, with each dimension determined by the specific circumstances of the information user as a unique individual, operating in a given environment (Nicholas, 1996, 2000).
- A state-of-the-art review, based on the literature, which systematically presents, synthesises and interprets past and current information and opinion pertaining to the research questions. The insights from the research literature thus fulfil the dual role of providing background and context, as well as serving as the point of reference against which the findings of the present undertaking are measured.
- A hybrid research project, which integrates qualitative and quantitative methods towards the systematic exploration of the information needs of present day academic researchers and their ways and means of meeting these needs.

The study thus aims to see how the theoretical perspective chosen and the insights offered by the published literature in the field combine with the data collected for the present undertaking to inform the research questions. Therefore, guided by the conceptual perspective driven, individual centred approach to the assessment of an information need and its role in triggering information behaviour, developed by Nicholas (1996, 2000), the present exploration captures the perceptions of contemporary academics of their information needs and practices in the context of extant knowledge, understandings and opinion on the subject.



## 3.2 The Conceptual Framework

As Pettigrew et al. (2001) assert in their extensive state-of-the-art review of the major conceptual developments in the study of information behaviour (which they define as the study of how people need, seek, give and use information in different contexts), there is little doubt that the past two decades or so have seen a paradigmatic shift from a system/resource approach to a user-centred approach to studying information behaviour. Indeed, Nicholas (2000) focuses upon the individual in his approach to the understanding of the concept of an information need and its role in triggering information behaviour. In fact, greatly lamenting the all too often systems-driven character of the information profession, which "shows an enormous interest in the processing and storing of information, to the general neglect of the user" (p.6), he suggests that the Information Society will never become a reality until people's individual and special needs are genuinely met. Making a strong case for bringing the information customers to their rightful place at the forefront of the information chain, he asserts:

"There is a mistaken belief amongst the profession that the future is all about sharing information – knowledge management style, or storing and distributing information – digital library style, but it is, in fact, about getting closer to what people need in the way of information and producing it in a processed, packaged form for the individual to consume at a particular point in time that they [sic] choose. Customisation, individualisation, segmentation in the information market – the next stage of the information revolution – can only come on the back of personal detail and knowledge. The future of information provision is surely personalised information flows – it would be an extremely brave (foolish?) person who would argue against that. And how else do you get personal information other than from information needs assessment?" (p.16)

Undoubtedly so, although beyond this point the paths of Nicholas and other theoreticians, who also focus on the individual in their explorations of information needs and behaviour, seem to diverge. The prevalent view in the literature seems to be that it is use or information-seeking behaviour data which point most directly to the needs experienced by people (see, for example, Cronin, 1981; Wilson, 1981). Indeed, either in consequence of this line of attack, or because the concept of 'information need' is not unequivocal, in fact many studies that claim to be studies of information need are actually studies of information use (Elayyan, 1988; Green, 1990; Hewins, 1990). Nicholas (1996; 1997; 2000), however, argues for the greater value of information needs assessment. Building on the work of Line (1969; 1974), he distinguishes information needs from some closely associated, but distinct, information concepts like information wants, information demands and most notably information use, to show that effective information provision can only be based on information needs data.

To be sure, the nature of an *information need*, that is, the information that individuals ought to have to do their job effectively, solve a problem satisfactorily or pursue a hobby or interest happily, is best understood through its examination in comparison with information wants, information demands and information use. Thus, an information need, which can theoretically be the same as an *information want*, that is, the information that individuals would like to have, hardly ever is: for a variety of reasons stemming from subjective factors of personality, time, and resources, not all that is needed is wanted and not all that is wanted is actually needed. For example, individuals may not attempt to meet their information needs fully, that is, may not strive to obtain all that they in fact need for lack of time, skills or finances, or, alternatively, may be tempted to obtain information that they do not actually need (a prime example of this is the way people surf the Net). Neither is an information need synonymous with an *information demand*, which is information requested because it is believed to be wanted. Individuals may



demand information they do not need (for example, they may borrow a book from the library upon a friend's recommendation only to discover in the due course of events that it is of no interest for them), and they certainly need or want information they do not demand (for instance, because they are not aware of its existence). Neither is *information use*, the information which an individual actually uses or consumes the clean, hard, direct manifestation of need it is purported to be. Clearly, use can be an expression of need and at times might even be fully equated with it. However, more often than not use data can only offer a limited view of need: as people can only use what is available, use is very heavily dependent on provision and access. Also, 'use' can and does refer to a wide array of very different manifestations of information consumption, from the determining of whether some information is worth using in the first place to actually putting it to purpose-relevant use. In any case, use data can really tell us very little about key needs characteristics, like function and viewpoint. Thus, use data can only help an information system improve on what it is already doing, but since there is no guarantee that it was on the right lines to begin with, this is of partial value only; they will not help build a system which will do new things. And, of course, where use data are concerned, non-users are often not taken into account. Thus, use data may be very welcome for measuring the use of what is provided, but it is no substitute for needs data, a point amply proven by the example Nicholas (2000, p. 151) cites: it is often argued that there is little point in introducing technology to the library because so many of its clientele are elderly and would not be receptive to it. However, the elderly turn to the library precisely because it provides what they want – lots of hard-copy fiction. If libraries offered the young Internet terminals and CD stations, perhaps they would become the chief customers... It seems then, that the case for focussing on the need people have for information, rather than the wants they express for it, and the demands and use they make of it, is indeed very strong.

Furthermore, although the user-oriented holistic approach to the development of information systems and services has been strongly advocated by the vast majority of information scientists for quite some time now (for extensive reviews of the literature on the subject see Dervin and Nilan, 1986; Hewins, 1990; Pettigrew et al., 2001; also see: Brittain, 1982; Cronin, 1981; Wilson, 1981), practice seems to lag (far) behind theory where the actual design, evaluation and auditing of information provision systems are concerned. As Nicholas (2000, p. 4) puts it: "While space-age information systems... grace our information centres and libraries, we still do not use suitably modern and effective management methods to ensure that these systems are providing users with what they need and want. To say that information systems are largely free from user evaluation and are rarely challenged with user needs (or use) data, would be to exaggerate, but not to exaggerate by very much." Batt (1990, p. 87), speaking in the name of the people who actually manage library services, expresses much the same sentiment in saying: "My experience suggests that, until recently... much of the management of library services has been based on professional values and opinion rather than hard evidence... Collecting and exploiting useful data is a time consuming business and this has meant that, in the past, librarians have either not bothered or have tried to make do with minimal information..." Indeed, as Pettigrew et al. (2001) stress, the realisation that information systems and services should be designed to support information behaviour and that the design of such systems should be based on our understanding of this behaviour has not often led to the forging of a direct link from the study of information behaviour to information provision specifications.

The analytical framework for evaluating information needs proposed by Nicholas (1996; 2000) aims to fill precisely this void in offering up a method for the systematic collection of information needs data to



facilitate the design, evaluation and auditing of information systems, a method which, although highly practical, is firmly entrenched in the sound theoretical outlook and principles delineated above.

### **3.3 The Evaluatory Framework**

Seeking to translate into practical terms his user-centred, individual needs based theoretical approach to the study of information behaviour, Nicholas (1996, 2000) proffers a precise and understandable analytical framework to be used for the assessment of information needs at both a macro level – for effective strategic information management planning, and at a micro level – for the efficient carrying out of routine enquiry work. Aiming to achieve a comprehensive picture, he identifies and describes the eleven essential characteristics of information need - subject, function/purpose (to which the information is put), nature, intellectual level, viewpoint, quantity, quality/authority, date/currency, speed of delivery, place of publication/origin, processing and packaging. Taken together, these form an evaluatory framework for assessing information needs, presented in full detail in Nicholas (1996; 2000). The following is a précis, delineating the major features of the framework, in preparation for its being shown in the present study at work in the characterisation of the information needs of academic researchers:

**Subject:** Subject is undoubtedly a very important characteristic of information need, central to nearly all information need statements. Indeed, it is probably the one characteristic most readily coming to mind for describing an information need. However, the portrayal of an information need through subject terms (keywords) alone can hardly make for its accurate and comprehensive analysis, as users of the various Web search engines can surely testify. Even if the degree of specificity or depth of the interest is taken into account, and the subject is successfully translated into sufficient terms in the language of the system to adequately clothe the subject, it takes the consideration of other (preferably all) characteristics of the information need to provide a truly fitting answer to the problem encountered. Suffice to cite the example of the unsuitability to most UK based high-school students of some information, which may be right on target subject-wise, but, say, scientific in its level and in Chinese, to demonstrate the point.

**Function/Purpose (to which the information is put):** Each individual and each information community puts information to work in different ways. Their end products are different and so are their uses for information. Furthermore, within each profession (and organisation) the prime function to which information is put will vary with the role and specialism of the individual. Still, people need information essentially for five broad functions or purposes, each of which requires very different information solutions. The five are: (1) providing answers to specific questions (the fact-finding function); (2) to keep up-to-date (the current awareness function); (3) the investigation of a new field in depth (the research function); (4) to obtain a background understanding of an issue/topic (the briefing function); and (5) to provide ideas or stimulus (the stimulus function).

**Nature:** Information of different types (conceptual or theoretical, historical, descriptive, statistical, methodological) can be found on any subject, but not all types are equally suited to the needs of different individuals. Indeed, nature, like level, is very much allied to the readership/audience for which the information is intended. Thus, for example, practitioners are far less likely to require theoretical information than their academic colleagues are.



**Intellectual Level:** This characteristic refers to the minimum extent of knowledge and sometimes the level of intelligence required of the individual in order to understand the information. However, it is not simply a question of matching the intellectual powers of individuals with suitably intellectual documents: for one, the complexity of information is a function of how abstract or compressed it is, and how it is presented. Moreover, intellectually advanced individuals might require elementary knowledge in fields beyond their areas of expertise. It is in an effort to meet this requirement for suitable-level information that some information systems index documents according to their intellectual level, allocating them, for example, academic/research, practitioner and consumer codes.

**Viewpoint:** Information, especially in the social science and life style fields, is sometimes written up from a particular view or approach. Writers may belong to a distinctive school of thought and represent its interpretative approach, or tackle problems from a particular political point of view, or present the information they wish to communicate in a positive or negative form (say, when they set out to portray a person in a favourable/unfavourable light), or, in interdisciplinary fields, come from a specific subject orientation (for example, write on criminology from the perspective of sociology, rather than psychology or law). Therefore, any assessment of information needs must take into account whether it is objective or subjective information which is required, and if the latter, the viewpoint called for.

**Quantity:** While the realities of the Information Society require us to be more informed than ever, people's information appetites vary greatly with individual circumstances as well as the nature of the need encountered. Obviously, whereas the researcher starting out on a new investigation in an unfamiliar subject field may want all the information available, along the lines of 'you can't have too much information', most people do not have the time, inclination or need to wade through large volumes of information. Thus, in these days of easily obtainable abundant information, determining the amount of information required has certainly come to the fore, becoming a key consideration in information needs assessment.

**Quality/Authority:** Assessments of the quality of information may be decidedly subjective, but, nevertheless, quality ranks very highly on the list of information priorities. Quality concerns loom particularly large in the light of the information explosion that is currently being experienced, since quality determinants enable knowledgeable selection. Also, the veracity and accuracy of information is more often than not a crucial consideration: suffice to cite the example of health information, so easily available on the Web, in ample proof of the point. Thus, quality and authority requirements, traditionally considered fundamental in information need assessment, have become more important than ever in these days of huge amounts of easily accessible information, some of which is of dubious origin.

**Date/Currency:** This information needs characteristic involves two inter-related questions: how far back in time is information required, and how up-to-date does the information need to be? Plainly, information can become obsolete with time, in the wake of change: new discoveries, new equipment, computerisation, political and economic factors and legislation can render valueless – even dangerous, what we know and do. However, often, especially where humanities information is concerned, the very opposite can be true: information may actually gain value with age. Still, since everybody has to keep up-to-date, the new is more likely to capture people's interest, although they do differ in their perception of what constitutes



current information: for instance, stockbrokers are very likely to consider only the last few minutes' information current, whereas for the historian the definition of current may extend to a year or more.

**Speed of Delivery:** The speed of delivery aspect of an information need refers to the speed with which the information is required. Plainly, full-text online services, electronic document delivery, the fax, and of course the Internet have changed our definition of speedy delivery, which, in turn, has driven up our currency expectations. With the urgency and immediacy characterising modern life, instant, or at least rapid response to an information need is highly prized, rendering the speed of delivery aspect of an information need a decidedly central one in information need evaluation.

**Place of Publication/Origin:** Although the global society is becoming more and more a fact of modern life, apparently the place or country of origin of the information is nevertheless not always immaterial to its potential consumer. Whether it is the case or not seems to depend on three main factors. Firstly, the subject matter of the information needed: some fields are more international than others; for example, in many areas of science research emanating from anywhere in the world is of interest (although even in science the literature of developed countries is held in higher regard than that of developing countries), whereas in the social sciences information tends to be more parochial. Secondly, since ideas and theoretical information 'travel well', academics are more likely to adopt a more international approach to information seeking than practitioners. Thirdly, linguistic ability obviously plays a central part in determining whether information from foreign countries is fit for consumption or not.

**Processing and Packaging:** Processing refers to the different ways that the same ideas and research can be represented. For example, a single scientific discovery, social survey, government inquiry can, and often is processed for a whole range of audiences and purposes. Packaging in this context means the external presentation or physical form of the information – the form in which it is stored and communicated. The relationship between processing and packaging is a very close one, because certain information packages are designed for the storage and dissemination of specific levels of processed data. Thus, dissertations and theses are packages that convey a good deal of data and detail have a limited audience, whereas the Internet, newspapers, television and leaflets – all purveyors of highly processed information have vast and popular audiences. However, it is not the level of processing alone that attracts users to various forms of information package. Other features of the packaging play a part too: some packages are more current than others (the Web, news-wires); some are more exclusive (oral sources); some demand much less of the individual in digesting their messages (television); some are very accessible (newspapers); and some are just plainly more familiar (books). The personality of the individual comes into it too, so that a person's preference for a certain package may be a result of an amalgamation of factors.

Having reviewed the major features of the framework designed by Nicholas (1996, 2000) for evaluating information needs, we now come to the manner in which it is put to work in the present study for the characterisation of the information needs of academic researchers.



### 3.4 The Research Strategy

Taking a post-positivist approach, which advocates methodological pluralism (Guba and Lincoln, 1994; Hirschheim, 1985; Patton, 1980), the enquiry presented here combined interpretive (or phenomenological) and positivist methods to address the research question posed: the first, exploratory stage of the investigation into contemporary academic researchers' information needs was conducted from an interpretive perspective, utilising the qualitative technique of interviews, whilst the larger-scale quantitative exploration of the first insights thus obtained, which followed, was executed in the positivist tradition.

The decision to take a post-positivist approach to the study of the complex picture of contemporary academic researchers' information needs was prompted first and foremost by the different foci of the evaluation to be undertaken at each of the two stages of the planned investigation. For, as Wildemuth (1993, p. 451) points out, the rationale behind the post-positivist view of research is that "... there is no such thing as the one correct scientific method. Instead, the method to be applied... should be selected based on the research question being addressed." Indeed, the different goals of the investigation in each of the two stages of the present project called for such methodological pluralism.

Setting out to lay the groundwork for the study, the initial goal of the investigation was a preliminary mapping of a terrain deliberately assumed to be unknown. As it has already been noted, the point of departure for the present undertaking was the postulation that in the changed and still constantly changing realities of contemporary academe anything and everything we have traditionally been holding true as to the information component of the scholarly endeavour may no longer hold true. This premise of a 'clean slate', rendering the first stage of the investigation exploratory in its nature, made the choice of an initial interpretive qualitative study almost given. After all, the basic epistemological premise of interpretive/phenomenological approaches is that "knowledge is a representation of the world which has been cognitively worked by the mind, and physical reality is, therefore, only known by an act of mind on phenomena presented to it" (Bains, 1997, p. 2). The notion of a reality, which is subjective as well as culturally derived and historically situated (Crotty, 1998), clearly calls for the study of phenomena through the eyes of people in their lived situations (Hjorland, 2005), in an attempt "to know what the actors [in a particular social world] know, see what they see, understand what they understand" (Schwartz and Jacobs, 1979, p. 7, quoted in: Wildemuth, 1993). Opting for the interpretive approach entailed, almost predictably, the choice of a qualitative research method, for the interpretive research tradition is commonly associated with qualitative research (Bains, 1997; Wildemuth, 1993). Hardly surprisingly, of course, for qualitative research, aiming as it does at studying people in situ, without constrictions of preconceived notions, is considered the most appropriate for capturing what people's lives, experiences, and interactions mean to them in their own terms and in their natural settings (Grover and Glazier, 1985; Hepworth, 1998; Patton, 1987a).

Indeed, the interpretive qualitative approach promised a holistic, in depth and detailed understanding of the present day academic researcher's information needs. For, as Patton (1987a, p. 187) asserts, qualitative methods yield "raw data from the empirical world", which, according to Lofland (1971), faithfully represent the participants in a study in their own terms, depicting "what goes on in their lives and what life is like for them" (quoted in Patton, 1987a, p. 188). Since, as both Nicholas (2000) and



Wilson (1981) contend, better understanding of the information user is contingent on better understanding of the facts of his or her everyday life and the role played by information in it, taking an interpretive qualitative approach was deemed particularly appropriate to the goal of the first stage in this study of information needs, which aimed at an exploratory "mapping of the terrain".

However, as it often happens, the practicalities of obtaining the qualitative data were such, that the samples to be studied were by necessity relatively small and unrepresentative. This state of affairs plainly precluded any possibility to draw conclusions as to the prevalence of the findings. Thus, at this stage of the study, with the goal of discerning statistical regularities of researchers' information needs and behaviour at the forefront of the investigation, the positivist research approach was deemed to be the more appropriate. This approach, which views reality as "objective, transcending an individual's perspective... [and] expressed in the observable statistical regularities of behaviour" (Wildemuth, 1993, p. 450; see also Hjørland, 2005), and the world as "highly systematic, well-organised...[,] a world of regularities, constancies, uniformities, iron-clad laws, absolute principles" (Crotty, 1998, p. 28), assumes that human behaviour is sufficiently uniform to allow for accurate forecasts on the basis of statistical samples (Bains, 1997). As such, it is commonly associated with quantitative confirmatory studies (Wildemuth, 1993), although as both Hjørland (2005) and Crotty (1998) point out, positivism is not the use of quantitative methods. Still, a positivist approach, utilising quantitative methods, can be very helpful indeed in determining whether hypotheses yielded by interpretive techniques are generalisable to a wider population (Sonnenwald and Iivonen, 1999). Therefore, for the purposes of the investigation reported here it was thought indispensable to have the findings of the qualitative stage consistently measured against pertinent insights derived from both past and current studies, as well as to put them to test among a wider population. Thus, much along the lines of the cycling approach suggested by Hounsell and Winn (1981), whereby an initial qualitative evaluation forms the basis for a larger-scale quantitative study, the questionnaire survey, which followed up the hypotheses formed in the course of the qualitative stage, thus allowed for the greater generalisation of the study findings.

Thus, the project was carried out in two consecutive stages: an interpretive stage, consisting of two phases, which utilised the qualitative research technique of interviews, followed by a positivist quantitative stage. The underpinnings of the study have been laid down in the first phase of the qualitative stage, a pathfinder pilot project of seven information needs interviews with academic researchers. The preliminary insights thus gained into the information component of present-day research work then served as the basis for the next phase of the qualitative investigation, another set of in-depth interviews. Finally, the evidence emerging from the two-phase qualitative stage of the study, having been crystallised into a series of hypotheses, was put to test in a questionnaire survey conducted among the target population, the researchers.

The strategic decision at the basis of the present study to take a post-positivist approach in combining interpretive research with positivist research did indeed yield very valuable results. The interpretive qualitative stage of interviews enabled the generation of rich narratives of the informants' truth, which would have been unobtainable otherwise. However, only when supplemented with the insights offered by the literature, as well as with findings derived through the positivist paradigm based quantitative study (the questionnaire survey), were the analyses of the qualitative findings validated and the necessary



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breadth of view attained. Thus, as Hammersley (1981) and Greene and Caracelli (1997) suggest, the use of different methodological approaches (methods triangulation) served to enhance the validity and reliability of the study, by counterbalancing the flaws or the weaknesses of each method with the strengths of the others.

Furthermore, very much in line with Wildemuth's (1993, p. 466) assertion that "interpretive research can be combined effectively with positivist research, in spite of the fact that the two approaches take very different views of the nature of reality and how one comes to know about or understand reality... [so that] the results from the two approaches... richly inform each other", the combined advantages of the different methods used achieved a powerful, holistic and comprehensive portrayal of academic researchers' information needs.

### **3.5 The Qualitative Stage**

#### **3.5.1 Population**

Eighteen faculty members of the University of Haifa were asked to participate in the information needs interviews, which comprised the first, qualitative stage of the study: seven in the initial, pilot phase and eleven more in the second, follow up phase. No attempt has been made to assemble a scientifically representative sample of a 'typical' academic community for the pilot project phase, in view of the exploratory nature of the investigation at this point. Nonetheless, the seven interviewees participating in this initial phase of the study were not chosen entirely randomly; rather, they were selected with the intent of learning the views and experiences of as varied a group as possible. Thus, the participants were from different disciplines (history, economics, philosophy, psycho-oncology, computer science, communications), some younger and some older (mid-thirties to mid-sixties), of senior ranks as well as relative newcomers to academe, men and a woman.

For the second phase of the qualitative investigation, the original sample of seven academics was augmented with eleven additional faculty members of the University of Haifa, chosen so as to form together with the pilot group a more characteristic representation of an academic community, according to two sets of criteria: age and disciplinary affiliation. Aiming at eliciting as much as possible of the range of perspectives held in academe concerning research information needs, each researcher interviewed belonged, therefore, to one of three age groups: 'young' (up to the age of 45), 'middle aged' (mid-forties to sixty) and 'older' (in their sixties), and concurrently represented one of three broad disciplines (the Sciences, the Social Sciences, and the Humanities).

The division into age groups was meant to enable the detection of possible differences in information needs and information seeking behaviour among active researchers, whose socialisation into the profession and accumulation of academic experience took place in diverse circumstances: those among the academics who are in their sixties today have learned the tools of their trade when traditional attitudes to and patterns of research work were the prevalent norm, and computers were, if not unheard of, then at least far less of a significant element of their lives; those belonging to the thirties to early forties age group were practically born into the realities of the knowledge society with its novel information opportunities; and the interim generation, now aged round about fifty (mid-forties up to sixty or so), who had embarked on their professional careers when the traditional concept of research and conservative



approaches to its information component still reigned, witnessed and willingly or not probably took part in the transition to the new era in academic work.

The sampling according to disciplinary affiliation was deemed necessary for identifying the variations in information needs and information behaviour among contemporary researchers from different knowledge areas, with a special emphasis on the re-examination of previously established findings on the matter, which by now have become so widely accepted that they are considered among the conventions of the academic scene.

Thus, the population at the qualitative stage of the investigation (phases one and two) comprised eighteen researchers. The sample was put together according to a matrix consisting of nine cells, with each cell represented by two interviewees, as shown in Table 3.5.1 below:

**Table 3.5.1: The Research Population at the Qualitative Stage of the Investigation**

	Aged 44 and under	Aged 45 - 60	Aged 61 and over
<b>Sciences</b>	Lecturer, Neurobiology	Assistant Professor, Computer Science	Assistant Professor, Mathematics
	Lecturer, Physics	Professor, Biology	Assistant Professor, Psychopharmacology
<b>Social Sciences</b>	Senior Lecturer, Communications	Professor, Psycho-oncology	Professor, Economics
	Senior Lecturer, Political Science	Professor, Social Welfare	Assistant Professor, Political Science
<b>Humanities</b>	Senior Lecturer, History	Senior Lecturer, Philosophy	Professor, Literature
	Lecturer, Philosophy	Professor, History	Professor, Archaeology

### 3.5.2 Data Collection and Analysis

**The Data Collection Method:** The above-noted decision to proceed from the premise of a 'clean slate' in exploring the intricacies of the changing terrain of research related information needs and information behaviour suggested that eliciting the hoped for rich insights into present-day trends and patterns could be best done by means of interviews. Considered the 'bread and butter' of qualitative evaluation and an important source of qualitative data (Bawden, 1990), interviews are uniquely suitable for probing beneath the surface in order to solicit detail and provide a holistic understanding of individual point of view (Patton, 1987b). As such, interviews are particularly suitable for the purpose of unearthing data on information needs, which, by definition, refer to imprecise, far from concrete and not easily definable notions: they can probe for both qualitative and quantitative data, throw up unexpected findings, which were not asked about, and, unlike other methods, allow for studying not only users, but also non-users (Nicholas, 1996, 1997, 2000).



There were, of course, an abundance of interview types to choose from, but the in-depth, open-ended, one-to-one, face-to-face interview was deemed the most suitable for the purposes of the present study. First of all, the method has numerous advantages specifically for information needs evaluation, such as the opportunities it affords the interviewees to question, explain, and reflect, or the greater likelihood of obtaining full and complete responses to questions through prompting, or the observational occasions provided (Nicholas, 2000; Stone, 1984).

Also, it is especially useful when the territory is unfamiliar (Nicholas, 1997), as it was deliberately assumed to be in the case of the present undertaking. As Nicholas (2000, p. 112) notes, the face-to-face, open-ended, in-depth interview holds the specific attraction of allowing the interviewees to express freely, and in their own terms, what they consider to be the important issues, whereas "too often, as in the case of questionnaires, individuals are shoehorned into forms of words devised by the interviewer", in result of which "an unwanted or unwarranted bias intrudes". Considering that the territory had, in fact, been extensively explored, maintaining the premise of 'a clean slate', that is, approaching the subject of researchers' information needs with an open, unbiased mind, made the initial data collection for the project via this form of interview almost crucial. Indeed, with the academics interviewed given the opportunity for musing out loud on needs, wants, requirements, practices and routines, as well as for voicing concerns, the evidence gathered held the potential of providing a true-to-life, multi-faceted snapshot of the information component of the present-day scholarly endeavour, which may have been limited in its reliability, in view of the small sample interrogated, but certainly not in its validity.

**The Data Collection Procedure:** Following Barry's (1995) line of thinking in assuming that the information component of the research activity is largely of an implicit nature, and as a result not easily retrievable to consciousness for discussion in an interview situation, the interviews were loosely based on the critical incident technique (for a discussion of the technique and its application to information studies see: Urquhart et al., 2003). The researchers interviewed were, therefore, requested to talk about their current/recent research projects, the various research-associated activities performed in the course of a typical workday, and the problems or difficulties encountered thereby. The issues thus raised either spontaneously led to, or at least provided an opportunity for a discussion of their past and present information needs and information seeking behaviour.

The participant centred interviews were structured around the user need framework delineated above, which, as suggested by its developer (Nicholas, 1996, 2000) functioned at this stage as a template for data collection. Expanded into a more detailed interview guide (Appendix 4), the framework served to ensure that all relevant aspects were explored and to alert the investigator in the course of the interview to the topics to be pursued. As the initial findings emerging from the first, pathfinder phase led to more pertinent questions concerning the information component of academics' research work, the interview guide was revised and updated accordingly for the second, follow up phase of the qualitative stage (Appendix 5).

The interview sessions took place in the researchers' personal workspaces, both in view of the observational opportunities this afforded and in a deliberate effort to create a relaxed atmosphere from the outset by meeting on their home turfs. Fortunately, the investigator's thirty year long close work relations and fruitful cooperation with the faculty at the University of Haifa resulted in an easy mood throughout



the interviews, which proved to be conducive to researchers' talking about themselves. Indeed, the researchers were forthcoming with tales of their research-associated information experiences, citing anecdotes, cases and examples, as well as freely allowing their views to emerge. Thus, despite the necessary 'formalities' - all of the interviews were tape-recorded for later transcription and analysis, and points of special emphasis were also recorded in writing at the time of the interview - the interviewees actually seemed to enjoy the opportunity to talk of their information needs and practices. Probably in result, they were very generous indeed with their time: on average, the interviews lasted an hour and a half to two, and in one case, over three hours.

The taped interviews were fully transcribed and returned to the interviewees for any additional information of pertinence which the researcher might have neglected to mention in the course of the interview. In further proof of researchers' willingness to give unstintingly of their time, quite a few of the interviewees read the transcripts and commented on them, adding considerably to the completeness and richness of the data obtained.

**Analysis of the Pilot-Project Phase Interviews Data:** The first series of interviews, conducted with seven researchers over a period of three months, constituted a pathfinder pilot project.

The specific objects at this stage of the investigation were:

- To pinpoint the main features of contemporary scholarly information needs.
- To examine the validity of customarily held notions as to the information component of academic research work.

Towards this end the interviews sought to elicit data on the information needs of present day academic researchers, how they go about meeting these needs, and the barriers they encounter in the process.

Performing crosscase analysis, intended to bring all the data to bear on the research questions and to identify central themes, the data obtained in the first series of interviews were analysed, as planned, by means of the user need framework proposed by Nicholas (1996; 2000). Used at this stage as a template for classifying the data at hand, the framework facilitated an in-depth evaluation, which considered eleven aspects of research information need: subject, function, nature, intellectual level, viewpoint, quantity, quality/authority, date/currency, speed of delivery, place of publication/origin, and processing/packaging. As part and parcel of the issues under discussion, the questions of how the information needs identified were being met and what obstacles were encountered in the process have also been looked into. Based on text analysis suggestions made by Patton (1990), the data were disaggregated into its thematic components. In the first round of coding the transcripts were broken down into passages by predetermined general topics, the eleven aspects of research information need. In the second round of coding the excerpts were assigned more specific thematic descriptors, either the predetermined ones of the interview guide, or new ones, derived inductively from the data.

Fulfilling its pathfinder mission, the pilot project thus served to pin down emerging patterns of research information needs, usages and problems, yielding a comprehensive, if initial and tentative picture of academic researchers' information needs and information behaviour in our age. This provisional portrayal has been crystallised into a series of hypotheses, delineating researchers' information needs, how they go



about meeting these needs and the barriers they encounter in the process, which served as the basis for further methodical exploration of research information needs.

**Analysis of the Second Phase Interviews Data:** The next phase of the qualitative investigation consisted of another series of in-depth, critical incident technique based interviews, undertaken over a period of three months, this time with eleven faculty members of the University of Haifa. Aiming at rounding out, enhancing, and bringing into sharper focus the picture of the present-day academic researcher's information needs tentatively emerging from the exploratory first phase, the specific objects at this stage of the investigation were:

- To collect additional qualitative data, which would serve either to further substantiate, and where necessary amend, or else to repudiate the hypotheses hitherto formed.
- To gain fresh insights, in order to form new, additional hypotheses.

Therefore, the second run of interviews focussed on the hypotheses tentatively formed in the first phase of the investigation, querying researchers on their current/recent research projects, the various research-associated activities they performed in the course of a typical workday, and the problems or difficulties they encountered thereby.

The additional information needs data thus gleaned were thoroughly evaluated, again performing crosscase analysis, by means of the framework developed by Nicholas (2000) for the purpose, and utilising the same data analysis procedure. The resulting insights served, as planned, both to hone the previously advanced hypotheses concerning the contemporary academic researcher's information needs and information behaviour and to form new hypotheses. The full evaluation of the qualitative data gathered considered, therefore, the aforementioned eleven aspects of information need, as well as the meeting of these needs and the obstacles encountered in the process. Thus, although the main purpose at this stage of the study was the testing of the hypotheses against additional qualitative evidence, the exploratory nature of the investigation was upheld.

Upon its completion, this second phase of the enquiry into research information needs, usages and problems produced a definitive version of hypotheses, to be put to test in the following, quantitative stage of the study. Indeed, the rich, if still non-generalisable picture which emerged from this stage was undoubtedly a suitably firm basis for the next, quantitative stage of the re-examination and re-assessment of academic researchers' information needs.

## **3.6 The Quantitative Stage**

### **3.6.1 Population, Demographical Data and Response Rate**

Data for the quantitative stage of the study were gathered through a questionnaire survey canvassing the entire population of researchers at the University of Haifa, defined for the purposes of the present study as tenure-track academic faculty members and/or research fellows affiliated with the research centres of the university. The decision to focus on these two groups was driven by the goal of soliciting data specifically on research information needs: only those academics, whose main concern, by definition, was the research component of their work, were approached. Thus, teaching fellows, that is, faculty formally



appointed by the university for the purpose of instruction only, were not asked to participate. Neither were doctoral students selected: not as well connected as more seasoned scholars, and of course less experienced in research work, they were presumed to have somewhat different information needs.

The main areas of research conducted at the University of Haifa were broken down into three broad disciplinary categories, according to the commonly accepted (if not absolute) consensus about the spectrum of the three major disciplines: sciences, social sciences and humanities. The areas of botany, molecular biology, genetics, evolutionary genetics, brain research, computer science, mycology, mathematics, neurobiology, neurophysiology, neuropsychology, physiology, and theoretical physics were aggregated into the broad disciplinary category of sciences. The areas of anthropology, law, epidemiology, ecology, organisations, management, geo-politics, demographics, education, sociology, economics, environment, political studies, cultural studies, information science, business administration, information systems, social work, psychology (developmental, clinical, social, educational, organisational), and criminology were aggregated into the broad disciplinary category of social sciences. The areas of religions, archaeology, ethics, linguistics, theatre, history, Judaism, biblical studies, literature, philosophy, Jewish philosophy, and history of the arts were aggregated into the broad disciplinary category of humanities.

The decision to focus on the research population of the university raised a potential problem, which needed to be taken into consideration and prepared for in advance: a predictably low response rate to the planned survey. As Bar-Ilan et al. (2003) point out, in surveys of academics the response rate is notoriously rather low, an observation amply borne out by the response rates of the studies referred to in the present undertaking too. Thus, for example, in a survey, conducted in the first half of the 1980s among biology, chemistry, physics, psychology, economics, and sociology researchers in the United States and Canada, the response rate was 19 percent (Borgman et al., 1985); in a 1992 survey at the State University of New York (SUNY) the response rate was 27 percent (Adams and Bonk, 1995); in two faculty surveys, one in 1993 at Eastern Illinois University (Larabee and Lorber, 1994), and the other in 1994 at Western Michigan University (Vander Meer et al., 1997), the response rate was, respectively, 31 percent and 42.3 percent; in a 1993 survey of scientists at the University of Alabama, Tuscaloosa, the response rate was 35 percent (Mehta and Young, 1995); in 1996, the response rate in a survey among Canadian chemists was 37 percent (Noble and Coughlin, 1997), and in a survey of British science and library study departments, respectively 14.39 and 21.2 percent (Gomes and Meadows, 1999).

In the particular case of the present investigation, two additional factors were seen as liable to lower the response rate even further. To start with, the eighty items long questionnaire only took approximately twenty minutes to fill out, a point which the cover letter made abundantly clear, but with its 14 pages it nevertheless looked quite formidable. Also, disseminating the questionnaire at the beginning of the academic year was an inescapable dictate of the project schedule, but it did coincide with the busiest time of the year for the academics approached.

Still, being well aware of the likelihood of receiving a limited number of responses to the survey made it possible to take appropriate measures to compensate for the foreseeable restrictions in its range. In fact, as it has been noted above, the strategic decision at the basis of the present study, to use different

methodological approaches (method triangulation), was intended to solve precisely such problems, by counterbalancing any flaws or weaknesses in a method utilised against the advantages of another. Indeed, the rich, if restricted-scope data, obtained at the qualitative stage, were consistently measured not only against the quantitative results of the present study, but also against the pertinent findings of a host of recent studies into academic researchers' information needs and information behaviour. Furthermore, in anticipation of a limited research sample, it was thought advisable to take steps to ensure that it would adequately represent the target population in its entirety. Thus, not only was there the usual reminder requesting participation disseminated, but concurrently, once the sample obtained in the first round of the survey was analysed to determine how representative it was of the total population, researchers belonging to under-represented disciplinary and/or age groups were approached in person, too.

Altogether 664 questionnaires were sent out in November 2003, of which 74 were returned within a month. After the dissemination of a reminder to the entire population in December 2003, and the above-noted personal requests calling upon researchers belonging to under-represented disciplinary and/or age groups to participate, another 59 questionnaires were received. This brought the total number of usable answers to 133. Table 3.6.1.1 below displays the distribution of the respondents by discipline and age. As anticipated, the response rate was relatively low: only a fifth of the total population, 20.03%, participated in the survey. However, the responses suggested a close match between the sample and the target population, both with regard to disciplinary affiliation and age, as Tables 3.6.1.2 and 3.6.1.3 (below) demonstrate. Thus, with all that the number of respondents was indeed small, it was representative of the population studied.

**Table 3.6.1.1: The Distribution of the Survey Respondents, by Discipline and Age\***

Category	Number of Respondents	Percent of Respondents
-44/Sciences	9	7.5
-44/Social sciences	12	10
-44/Humanities	10	8.33
45 – 60/Sciences	10	8.33
45 – 60/Social sciences	21	17.5
45 – 60/Humanities	25	20.83
+61/Sciences	10	8.33
+61/Social sciences	12	10
+61/Humanities	11	9.17

\*Excluding 13 respondents: 12 who did not specify their research areas, and one who did not specify his or her age



**Table 3.6.1.2: The Match between the Research Sample and the Target Population, by Discipline\***

<b>Disciplinary Category</b>	<b>Number of Researchers in Disciplinary Category</b>	<b>Percent of Researchers in Disciplinary Category of Total Population</b>	<b>Number of Respondents in Disciplinary Category</b>	<b>Percent of Respondents in Disciplinary Category of Total Number of Researchers in Disciplinary Category</b>
<b>Sciences</b>	149	22.44	29	23.97
<b>Social sciences</b>	263	39.61	45	37.19
<b>Humanities</b>	252	37.95	47	38.84
<b>Total</b>	664	100	121	100

\*Excluding the 12 respondents who did not specify their research areas

**Table 3.6.1.3: The Match between the Research Sample and the Target Population, by Age\***

<b>Age Group</b>	<b>Number of Researchers in Age Group</b>	<b>Percent of Researchers in Age Group of Total Population</b>	<b>Number of Respondents in Age Group</b>	<b>Percent of Respondents in Age Group of Total Number of Researchers in Age Group</b>
<b>44 and under</b>	157	23.64	34	25.76
<b>45 – 60</b>	308	46.38	62	46.97
<b>61 and over</b>	199	29.96	36	27.27
<b>Total</b>	664	100	132	100

\*Excluding the one respondent who did not specify his or her age

### **3.6.2 Data Collection and Analysis**

**The Data Collection Method:** As it has already been noted, in the second and final stage of the study the hypotheses, which had been formed on the basis of the findings emerging from the data obtained in the earlier, qualitative stage, were tested, generalised and triangulated by means of a self-administered questionnaire survey.

The survey instrument (Appendix 6), especially constructed for the purposes of the present study, consisted of 80 statements denoting research-work associated information needs and practices. In an attempt to ensure that the declarative statements, to be rated by the respondents in terms of agreement or disagreement, reflected authentic sentiments of 'real-life' researchers, rather than preconceived ideas of the investigator, the statements were excerpts from the in-depth interviews conducted in the first stage of the study. As the quotes from interviews were cited with as much adherence to the original utterances as clarity and/or coherence would allow it, their use served to promote the validity of the data to be procured by the questionnaire. The instructions for filling out the questionnaire therefore emphasised that the statements presented to the study participants were quotes from interviews with other academic researchers on their information needs and information behaviour. Thus, the respondents were in fact requested to indicate to what extent the statements made by their peers were true of them, too, that is, how faithfully these statements reflected their own views and experiences concerning the information component of scholarly research work.

Aiming to collect data on all of the different aspects of the question under study, whilst placing statements with similar content together, the survey instrument, too, was designed in adherence to Nicholas' (1996, 2000) framework for a systematic description of information needs. Thus, the statements pertaining to research information needs were in eleven categories: subject of the information, function of the information, nature of the information, intellectual level of the information, viewpoint of the information, quantity of the information, quality/authority of the information, date/currency of the information, speed of delivery of the information, place of publication/origin of the information, and processing/packaging of the information. The responses were to be given on a six-point Likert-type scale: Always true of me; Often true of me; At times true of me and at times not; Seldom true of me; Never true of me; Irrelevant for me.

A pilot version of the questionnaire was pre-tested among 12 faculty members, in an effort to identify problems and potential difficulties, such as excess verbiage, unclear or ambiguous wording, emotionally charged, leading or biased phrasing, unnecessary jargon, etc. The pre-testing procedure consisted of two phases. In the first phase the investigator held individual meetings with eight researchers. In each of the meetings the researcher was requested to fill out the questionnaire while 'thinking aloud' and commenting on it. The taped sessions of researchers' musing aloud on the statements presented to them, deliberating the different options and voicing their doubts, served as the basis for amending the survey instrument. Thus, the questionnaire was revised and modified after each session, resulting in a pre-testing process, which was incremental in its nature. In the second phase of the pre-testing procedure the last revised version of the pilot questionnaire was sent to four additional faculty members. This time the researchers filled out the questionnaires under realistic conditions, although they had been requested to, and did indeed let the investigator know of any difficulties encountered. Upon completion of this last round of pre-testing, the ensuing definitive version of the survey instrument was hopefully devoid of any major problems which may have impeded the collection of the quantitative data for the study.

**The Data Collection Procedure:** In November 2003 questionnaires were sent via campus mail to 664 University of Haifa researchers. The decision not to use the university intranet for distributing the



questionnaires via e-mail was dictated partly by technical constraints, which prohibited guaranteeing absolute anonymity to the participants, and partly by the importance accorded to canvassing non-users of electronic technologies, too. An accompanying letter stated the purpose of the research project for which the data were to be collected, promised anonymity and confidentiality to prospective participants, emphasised that the questionnaire only took about twenty minutes to fill out and requested faculty members' cooperation. Concurrently, the people who were about to receive a questionnaire were alerted to the fact by e-mail. They were also offered the alternative of filling out an electronic form at the price of foregoing their anonymity, an offer which indeed was eventually taken up by a minority of the faculty members. A reminder was sent in December to all members of the target population who had not responded to the first mailing, offering to resend to those interested another copy of the questionnaire. And finally, as previously explained, researchers belonging to under-represented categories in the responses were approached in person and requested to fill out a questionnaire.

**Analysis of the Survey Data:** As it has already been noted, the quantitative stage of the study was undertaken with the express purpose of exploring the validity and generalisability of the hypotheses formed at the qualitative stage. Aiming therefore at discerning both universal patterns of research information needs and practices, as well as variance by age and disciplinary affiliation, the specific objects of the data analysis performed at this stage of the investigation were as follows:

- To collect clear-cut, precise and accurate quantitative data, which would serve to validate or else to repudiate the hypotheses hitherto formed.
- To gauge the extent to which the validated hypotheses held true for the entire population studied as well as for each of the sub-groups comprising it.

Results of the survey were analysed statistically, using SAS, to determine overall support of each of the hypotheses put to test, as well as support by disciplines, by age, and by the combined factors of discipline and age. The more generalised information needs data thus gleaned were thoroughly evaluated, again within the framework developed by Nicholas (2000) for the purpose. The trends and patterns detected, mostly validating the qualitative data based hypotheses, were evaluated as to the extent to which they were found to hold true for researchers in general, as well as for particular groups within the research community.

The full evaluation of the data gathered for the present study considered, therefore, the aforementioned eleven aspects of information need, as well as the meeting of these needs and the obstacles encountered in the process. Having proven to be the hoped for opulent source of information, the study thus yielded a rich, complex, systematic, and to a considerable extent generalised picture of academic researchers' information needs.

### **3.7 Methodological Limitations of the Study**

Easily the most crucial limitation of the present study is that it in fact yields a snapshot of a moving target. Given the rapid pace of the changes occurring in the scholarly enterprise itself as well as in its

information environs, it is quite impossible to vouch for the lasting validity of the portrayal of research associated information needs and practices as it is presented here. Still, the study does offer a comprehensive review of the topics studied, providing valuable baseline data for future longitudinal comparison.

Another noteworthy limitation stems from the attempt to capture as complete a picture of research information needs as possible. Given that beyond the depth of understanding crucial for making the hoped for 'new diagnosis' of needs and practices, the study also strove for achieving a breadth of outlook, the population studied, and especially its sub-sets, were not invariably large enough for valid generalisations to be made. However, the trends and patterns, which nevertheless clearly emerged from the results, certainly pave the way for future research to be undertaken. Also, the data, even when examined by the broad user categories of the study, could not possibly reflect the more idiosyncratic characteristics of the many specific sub-groups comprising academic communities. Moreover, while academic researchers working in different institutions certainly share many similarities, the data procured in the present study reflect more specifically the information needs and information behaviour typical of faculty, whose main interests are focussed on cutting-edge research and publication. In the same vein, the picture of research information work emerging from this study is true of scholars who benefit from having at their disposal state-of-the-art information services, offering access to a vast array of monographs, journals and databases. However, the data presented here can serve as a solid basis for follow-up research, which would penetrate deeper into the study of the research information needs and practices of specific sub-groups in academe.

The study is also limited by the self-reported nature of the data collected. Obviously, it cannot be taken for granted that the reports of the informants accurately reflect their actual needs and practices. After all, informants rely in their reports on recall of past experiences, which, human memory being what it is, is not always as reliable as it might be. Furthermore, as Deutscher (1973) points out, informants are often unwilling or unable to articulate their feelings, attitudes and perceptions, and in result there can be a great discrepancy between what people say they do and what they actually do; thus, for example, people are prone to exaggerate what they perceive as successes and deny or downplay their failures. These limitations could not, of course, be completely avoided, but several steps were taken to minimise the difficulties. Thus, use of the critical incident technique, which relies on recall of an actual event, rather than on remembrances of elusive needs and behaviours helped to jog the memories of the informants by contextualising the specific need or practice reported. Another precaution taken was the imposing of cross checks both on the qualitative and the quantitative data: in the former, by examining each informant's statements for consistency between accounts of similar experiences; in the latter, by posing more than one statement pertaining to the same notion. And finally, perhaps most importantly, triangulating the data by the use of both qualitative and quantitative methods served to ensure their validity.

Having thus reviewed the methods utilised in this study to address the research questions posed, we now turn to the results achieved, starting out with the field data procured specifically for the purposes of the present investigation.



## **4. The Qualitative Investigation: Data Presentation, Analysis, Interpretation**

The purpose of this chapter is to report the initial insights into the information component of present-day research work, as they emerge from the first stage of the research project, the two-phase qualitative investigation. As it has already been noted, the first phase of the qualitative stage, a pathfinder project of seven information needs interviews with academic researchers, served to lay down the underpinnings for the study: it pinpointed the main features of contemporary scholarly information needs, whilst examining the validity of customarily held notions as to the information component of academic research work. The preliminary insights thus gained, crystallised into a series of hypotheses, were examined in another set of in-depth interviews. The further insights accrued served both to hone the previously advanced hypotheses concerning the contemporary academic researcher's information needs and information behaviour and to form new hypotheses. The full evaluation of the qualitative data, provided below, resulted, therefore, in a series of hypotheses pertaining to the eleven aspects of research information needs, identified by Nicholas (1996, 2000), as well as the meeting of these needs and the obstacles encountered in the process. These hypotheses will be put to test in the following, quantitative stage of the study.

### **4.1 First Insights into the Subject Aspect of Researchers' Information Needs**

#### **4.1.1. Variation of Information Needs with the Centrality of a Subject Area to Research Interests**

Traditional analyses (see, for example, Menzel, 1964), perceive each scientist's area of attention as comprising several fields or sub-fields arranged in concentric circles: the primary field of attention, at the centre, is to be kept up with in full detail; the secondary fields, at varying distances from the centre, are also to be kept up with, if not in the same detail; and fields towards the periphery merely warrant knowing about progress made. But is this distinction between a researcher's primary/secondary/peripheral fields of attention still relevant for today's highly specialised scholar, who, more often than not, also has inter- and multidisciplinary research interests? **Do the information needs of contemporary researchers vary in accordance with the centrality of a subject area to their interests?**

Actually, the distinction seems to be fading away. As one of the two philosophers interviewed puts it: "You have to specialise, otherwise you won't be able to cover all the knowledge in a given field, [and] because of the specialisation you need to delve deeper into your subject, you have to know more about it. As a result, you only work with the information, which is specific to your subject..." The psychopharmacologist also testifies to a focussing of his research interests, and as a direct derivative, of his information needs: "You know that you are unable to cover the whole field, and in consequence you concentrate on specific issues... you deal with the trees, rather than with the whole forest..." The expert on social welfare also links his more restricted information needs with the ever-growing specialisation in his area. He, however, seems to view these developments in a rather favourable light: "My field is growing more and more specific... the sausage has been cut into so many slices that each slice has become translucent, but it's still being cut further. This, of course, affects my information needs: the more specific a subject is, the easier it is to prepare its literature setting."



More specifically, the informants trace this focussing of information needs to today's standards of scientific writing, which, or so they claim, demand that each article deal with a specific topic. Thus, the psycho-oncologist says that if she is writing on stress, it is only in the context of her expertise, breast cancer. Therefore she will not consider, and in result, will not need information on stress models, or on disease-associated stress in general, or on any aspect of breast cancer other than the psychological one, for "presenting a more comprehensive view of the issue may be better, but they [i.e. the journal editors] will only cut it out of the article". With such a limited scope of material pertinent to each new project, it is hardly surprising that she simply reads all there is. Neither is she the only one among the informants in whose areas of attention no 'concentric circles of information' seem to be necessary, or even discernible. The computer scientist, who says that he concentrates on solving two, or at most three 'riddles' (as he calls them) a year, also finds that in consequence his information needs are limited: " I know people who devote most of their time to learning what is going on... [but] I'm not sure that they are the ones who produce the most. There are others, like me... I, what I don't need, I won't learn. I prefer to spend my time trying to solve problems." Thus, the social welfare researcher may be using the very same metaphor of concentric circles Menzel (1964) employs, but he paints a different picture: "... there are two circles of literature; one is the information pool of my area, and the other, the circle within the circle, is the specific topic I'm working on. Since on the whole I know my subject area, I look for information expressly on my specific topic."

The communications researcher traces the habitual focussing of his information needs to more intrinsic reasons: although he routinely sifts through huge amounts of material, he vigilantly regulates his actual information consumption, lest his creativity suffer: "It's important that I keep current, but...it is my thinking which is the core. All the rest [i.e. the information generated by others] just testifies to my having made my investigations, that I know what's going on, but it's marginal to the heart of the matter, which is your own opinion and your reasons for forming that [specific] opinion... Additional reading will not matter much for your thesis, in fact... it'll be redundant, it'll obstruct your train of thought, it'll impede your ability to say [to yourself] 'O.K., what do you make of this, where are you going from here'... "

The qualitative data seem to suggest then that as a derivative of the specialisation, so characteristic of contemporary scholarly work, there is today a tendency towards the focussing of both research information needs and information behaviour. The hypothesis to be advanced, therefore, as to whether the information needs of researchers vary in accordance with the centrality of a subject area to their interests, is as follows:

**With research increasingly focussed on ever-narrowing, ever-more specialised subject areas, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is fading away, and along with it the notion that information needs vary in accordance with the centrality of a subject area to the researcher's interests.**



#### **4.1.2 Coping with the Call for Information beyond Own Area of Expertise**

Although the preliminary findings gleaned in the course of the interviews clearly pointed to the aforementioned trend towards a focussing of research information needs, tracing it back to the specialisation in research, the informants by no means claimed not to need information outside their fields of expertise. When their investigations took new directions, but especially when they embarked on inter- or multi-disciplinary research projects, they seemed to have different information needs and different methods of meeting these needs, and no wonder: after all, in less familiar subject fields they were not as well versed in the literature, the methodologies and the jargon. **How do researchers cope when wide-ranging and/or interdisciplinary and/or multidisciplinary research ventures call for information in subjects outside their own areas of expertise?**

Trying to work backwards, from the solutions cited by the interviewees to problems they encountered, there appear to be three main courses of action open to researchers when they need information in subjects outside their own areas of expertise: depending on the level of 'outside' information deemed to be necessary, they can either embark on a collaborative research venture, or undertake to extend their knowledge bases by mastering unfamiliar domains, or simply try to make do with more basic level information.

As to the first option, joint scholarship, it seems to range from the teamwork of equals from different areas ("...every now and then researchers write a joint article, which bridges over two or more different knowledge domains, with each contributing his expert knowledge of his field") to the more opportunistic alliance of a researcher, who comes up with an innovative idea, with a knowledgeable colleague ("...sometimes one researcher provides the knowledge, and the other – a new way of looking at the facts"). Whichever model is chosen, the advantages of cooperative research enterprises seem to lie to a considerable extent in the information sharing involved, as the computer scientist, a fervent supporter of collaboration in research, describes: "When you begin to work [on a problem], you want to see if you can use previous work...it may very well be that somebody else has solved a similar problem, in an entirely different domain, but it is exactly the same, or you can use his know-how [for your purposes]. It's complicated, because it's usually in the literature you don't understand or don't read..., [but] friends help you. In our field it has been proven over and over again that team work is much better." The biologist, an expert on animal eco-physiology, is another enthusiastic devotee of scientific collaboration. Thus, he remembers with longing the five-o'clock tea gatherings in South Africa, where he has lived for a while, because these meetings with colleagues proved to be the incubator for many a cooperative research project. He too, much the same as his computer scientist colleague, sees the information sharing, which is part and parcel of collaborating with other researchers, as a great advantage; indeed, his heartfelt homily in favour of collaboration in research work manages to capture the essence of it all: "When I collaborate with a colleague, we each tackle one aspect of the problem and take responsibility for the literature concerning that aspect... Nowadays it's very difficult to work alone, to be a lone wolf. Wolves hunt in packs; that's why they succeed, because they combine forces, each contributing towards snaring their prey. That's the right way to work."

This synergetic approach to scholarly work, traditionally held in high esteem in the sciences and to a somewhat lesser degree, but still to a considerable extent, in the social sciences, is apparently gaining a strong foothold in the humanities too. However, given the individualistic nature of humanities scholarly work, it comes as no surprise that collaboration among humanists seems to be working 'side by side' rather than 'together'. The archaeologist, for instance, clearly demarcates his share of the work on a cooperative project from that of his colleague(s): "If I need information on a topic, which is not exactly in my line of expertise, I go to the experts and suggest that we collaborate. That's why I look for material in my own area only. I don't search for information in the subjects of the people I collaborate with, as I don't presume to have become all of a sudden an expert in their fields." The younger historian testifies to an even more clear-cut division of labour among research collaborators. He has co-authored several articles, but in point of fact each collaborator actually wrote a separate article on one facet of a topic, and the two were simply integrated for publication. Not unexpectedly, he reports that the information needs of each collaborating author were no different than those of a scholar working alone.

However, the findings at this stage of the study re-affirm yet again that collaboration in research is not for everybody, not even if it is of the 'side by side' variety: a very individualistic style of work, for one, seems to be perceived as negating expertise pooling, be its admittedly significant benefits what they may, as it is evident from the testimonies of both the communications scholar and the older of the two philosophers: each expresses a critical need for what the philosopher calls "discussions with myself" and "communing with the material", coupled, at least in the case of the communications expert, with an emphatic mistrust of people as information sources ("I don't trust people; wherever I can obtain primary information I go to the primary information ..."). Needless to say that both interviewees prefer to work alone... So does the psycho-oncologist, but for a different reason: "I try not to [participate in collaborative research ventures]... because [in such projects] everybody wants to steer the research in his own direction... the physician wants a clinical research, the geneticist wants an epidemiological research, the psychologist a quantitative research of some sort... it will happen every time... So, what I do, is work alone... It's not that it's the right way to go, you need to sit together, but then I'll reach the summit of my career in a wheelchair..."

Therefore, popular as opting for joining of forces in research work seems to be, it is apparently not uncommon for academics to prefer an alternative, if more labour intensive solution for the need to bridge over the information gaps inherent in crossing over the boundaries of their core knowledge domains: attaining the necessary level of expert knowledge in additional subject areas. As the younger philosopher puts it: "When you set out to work on a subject, which is new to you, you've got to learn it... [T]here's a lot of knowledge, a lot of information already known, so if you're interested in some new subject area, you learn it too." The mathematician also cites this mastering of the knowledge base of a field as the obvious choice when the researcher takes a new direction in his investigations: "Even as an experienced researcher, if you want to enter a new field you've got to start with its information basis, so you search for the previous work done... ". The physicist, too, habitually opts for acquiring the whole information base of a topic, which is new for him; it appears to be the norm in his ever-changing field: "With us the transfer from one area of interest to another is an every day occurrence. You could say that we're like a group of people trapped in a cave, yearning to escape; nobody knows where the way out is, so everyone



diligently digs in his own corner, until somebody seems to find a promising spot, which attracts everybody's attention, and they all flock there and start burrowing too... So you have to be able to relocate from one area of interest to another... or you won't be able to survive."

Mastering a whole new domain it is then for some of the informants, with all it takes, and apparently it takes quite a bit, as the younger of the two political scientists interviewed explains: "It's very, very difficult to expand to new areas; you've already mastered one field, you feel safe in it, and now you have to start all over again, with all that nagging fear that you will turn out to be one of those who get their manuscripts back with the observation 'you are not familiar with the literature'. Or even worse, what if [the referee] says: 'you haven't come up with anything original'; how embarrassing, what a disgrace... so you constantly worry that you waste your time re-inventing the wheel. That's why so many people steer clear of entering a new field, that's why they'd rather recycle their material. So, if you nevertheless enter a new field, you have to start reading, which often leads you to neighbouring subject areas, which in its turn necessitates that you read some more, until you really get submerged in the literature".

The living proof that a researcher may in fact prefer working alone, even if it entails mastering new knowledge domains in their entirety, is the communications expert, whose multi- and interdisciplinary interests span a variety of topics. Seeming to epitomise in his information behaviour the fundamental features identified by Palmer and Neumann (2002) as characteristic of interdisciplinary humanities scholars, a finding which is less surprising than it may seem at first glance in view of the authors' observation, based on the work of Geertz (1983), as to the 'blurred genres' of the humanities and the social sciences, he does not usually work in formal research teams and has co-authored papers only sporadically. Still, he certainly seems less isolated than, say, his philosopher colleagues: for example, he subscribes to 10-15 listserves. In the same vein, he testifies to a scanning mode of reading, to extensive use of mechanisms for routing information directly to him, such as subscriptions, mailing, and the just mentioned listserves, and to a high level of interaction with a wide variety of information, all typical to the primary strategies used by interdisciplinary humanities scholars to find, use, and integrate information from multiple domains.

And what if you do need to follow lines of inquiry beyond your area of expertise, but neither collaboration nor in depth mastering of a whole new knowledge domain appeals to you? Apparently, there is a third solution, as the psycho-pharmacologist explains: "If I need some information in a subject... I'm no expert on, I'll look for a source, which can provide me with the information on a sufficient level to answer my question. I won't delve ad infinitum into each subject, because I won't see the end of it". Using the same strategy, the psycho-oncologist, too, may on occasion look only for the basic level information needed to aid her in understanding the wider picture within which the specific point she is investigating is embedded, but then she consults an expert "to translate the information for her". Thus, for the fundamental medical information necessary for her investigations she will turn to Internet-based popular databases, but then ask the physicians with whom she works to decipher the information for her, thereby combining the benefits of both of the previously described methods used by scholars to extend the range of their knowledge bases (collaboration and mastering). True, this strategy



will only work when relatively superficial information suffices, but when no more is necessary, this may very well be an opportune solution.

The next hypothesis sums up the evidence as to the strategies used when the researcher needs information in subjects outside his specific area of expertise:

**When wide-ranging and/or interdisciplinary and/or multidisciplinary research ventures call for information in subjects outside a researcher's own area of expertise, he or she copes by taking one of three possible routes: depending on the level of 'outside' information believed to be necessary, either embarking on a collaborative research venture, or undertaking to extend his or her knowledge base by mastering unfamiliar domains, or simply trying to make do with more basic level information.**

#### **4.1.3 Impact of the Focussing of Research Interests over the Years on Information Needs**

Interestingly, this growing restriction of a researcher's information needs has been approached from a different angle, too, if only by one informant. The mathematician, musing aloud on possible explanations for a gradual, but clearly discernible curtailing of his information needs over the years, happens upon what seems to be a fresh insight into the matter: "I think that this is what happens in the life cycle of a researcher: when you're still learning, you need a lot of information, until you find out what's relevant to you. Then you... gradually make less and less of an effort to grab yet another piece of information, you become more focussed. So, at the beginning you need more information, and then, when you limit your interests to certain directions, when you grow to be focussed, you need less." **The question is then: do the information needs of researchers grow to be more restricted with the gradual focussing of their research interests over the years?**

Now, obviously, these ruminations may reflect nothing more than this one interviewee's personal experience, especially as nobody else among the interviewees came up with a similar idea. Rather to the contrary: a casual comment of the physicist among the informants seems to indicate that the exact opposite of the mathematician's speculations may very well be just as true, for the physicist contends that owing to the dynamic nature of his field, his information needs have in fact grown over the years: "My area changes so much, that I constantly have to spread out to more and more domains, and in consequence I need to know increasingly more. It's not the way it used to be; in the past you accumulated the information you needed in the first few years of work in a field and from then on you only needed to keep track of further progress made. Now it's the other way round: with the passing of time I need to know more and more of things I have never needed to know before... ". Which way lies the truth, only a more wide-ranging look at researchers' information needs will tell; for the time being the following hypothesis tentatively links the researcher's focussing of his information needs to the progress of his academic career:



**As their academic career advances, researchers become more focussed in their interests, and in result, their information needs grow to be more defined and restricted.**

#### **4.1.4 Effect of the Perceived Availability of Information on Choice of Research Topics**

The possibility that information availability may affect the researcher's decision to embark (or not) on a new research project has been suggested by the psycho-pharmacologist. Contemplating the realities of academic life in a world of abundant information he said: "Nowadays we're flooded by so much material, that you simply can't read everything... It seems to me that because of this deluge of information people a priori don't ask questions, which may necessitate that they compromise; they go straightaway to something more manageable as far as the quantity of information goes. That is, the question is somehow dictated by the ability to handle a certain amount of information." **How does the perceived availability of information affect the researcher's choices of topics for investigation, then?**

Reasonable as the opinion voiced here sounds, nobody else among the informants seemed to proceed from a similar frame of mind when considering potential research topics, despite some gentle prodding meant to draw their attention to the possibility without leading them or 'putting words in their mouths'. The information behaviour identified may very well be, therefore, idiosyncratic to this particular researcher, but it may also illuminate a more prevalent pattern of action, albeit one adhered to without much thinking and reasoning, perhaps as an almost instinctive defence against the much discussed information overload. In any case, the proposed connection, between a researcher's choice of a topic for investigation and his ability to handle the quantity of information needed for the purpose, based as it is on the testimony of a sole informant, can and should still serve to form a hypothesis to be further investigated. Not only is it too interesting a notion to be left unexplored, but also, were it to turn out to be prevalent among academic researchers, it would add a new dimension to our appreciation of the impact of the huge quantities of information on scholarly and scientific activity. Thus, the next hypothesis proposed is as follows:

**The researcher's choices of topics for investigation are dictated by his or her ability to handle a certain quantity of information. That is, he or she a priori asks questions, which are deemed manageable in terms of the expected quantity of pertinent information on it.**

#### **4.1.5 Researchers' Hypothesised Preferences in Information Retrieval**

With the advent of electronic databases, key-word based information seeking has inevitably come more to the fore, especially as many databases allow access to full text publications, which practically eradicated the problem of translating user-generated keywords into the retrieval language of the information system. True, academics seem to appreciate the structured subject access to information, at least in theory: in survey after survey they blame the limited usability of the information to be found on the Web on its lack of indexing and bibliographical organisation (see, for example: Kibirige and DePalo, 2000; Massey-



Burzio, 1999; Voorbij, 1999; Wang and Cohen, 1998; Zhang, 1999). So how do the researchers of today prefer to go about meeting the need for pertinent information on a given subject?

The interviewees for this study do not leave much doubt as to their strategy of choice: they manifest a marked preference for keyword-based information retrieval. All of them, bar none, equate successful searching for information on a subject with finding the right keywords: "Google is doing a great job for us these days... you only have to know how to search, how to choose the keywords..." says the computer scientist, and his psycho-oncologist colleague joins him in extolling the wonders of the technique: "I search for information by trying various word combinations which I think will get me to the information I need, all sorts of word combinations, until I find the ideal combination...only rarely... does it happen that I don't find all the material I need for an article in this way..."

Indeed, the interviewees' accounts seem to indicate that researchers have en masse migrated to a keyword based mode of information searching. Thus, the younger philosopher of the two interviewed testifies to the ease of keyword based information searching with the predictable self-assured enthusiasm of somebody born into the realities of an electronic world ("You have all these electronic archives, so it's very easy... you just type a keyword..."), but so does his sixty-plus year old psycho-pharmacologist colleague, too! True, the latter somewhat qualifies his habitual use of keywords for information seeking, stating that he does so only 'often' (as opposed to other informants' unhesitating 'always'), but he is also quick to point out that he is "learning from experience, getting better at choosing the appropriate keywords".

Of course, it is quite conceivable that researchers' seemingly unconstrained zeal for the use of keywords for information retrieval stems from a blessed ignorance of the possibility that thereby they might miss a relevant piece of information. Not that overlooking one or two pertinent articles poses such a threat for most of the informants, except for the scientists of the lot, for whom missing a paper may mean duplicating a work already done by somebody else; as for the rest, they seem to view the whole issue of locating all relevant information with quite a bit of complacency: "...maybe in the past, when there was no electronic access to information, if I neglected to cite one or two articles, they [i.e. the referees and the editors] were more lenient about it; today they will be not as flexible...but people don't usually have much to say concerning the literature review... it is the data and the methodology...which are important. You write your literature survey, an article more, an article less, it doesn't really matter..."

Be it as it may, the more senior, and therefore the more experienced historian insists that in any case there is an underlying system of checks and balances, which ensures that most articles, not only those heralding scientific breakthroughs or the ones of really innovative value, are rarely overlooked. For one, most informants search in more than one database, with the resulting overlap hopefully correcting any gross oversights stemming from the choice of keywords. Also, the increasing availability of searchable full-text documents means that keywords really are becoming more useful for tracking down pertinent articles, while, of course, increasing in direct proportion the chances of retrieving irrelevant information. The time-honoured solution to problems of precision in information retrieval, the use of thesauri and suchlike tools was not reported by any of the informants. For that matter, neither was turning to a librarian, which



may suggest that Line's (1973, p. 33) somewhat harshly worded observation that "researchers are prepared to consult almost anyone, except a librarian" is as valid today as ever, perhaps more valid in view of the popularity of desktop access to information.

The hypothesis thus clearly emerging from the qualitative evidence cited above, to be further explored in the forthcoming quantitative stage of the present study, is as follows:

**Keyword-based retrieval is the contemporary researcher's favourite approach to meeting the need for pertinent information on a given subject.**

To sum up the first insights gleaned into the subject aspect of contemporary researchers' information needs and practices:

**Table 4.1: The Subject Aspect of Researchers' Information Needs**  
**Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	With research increasingly focussed on ever-narrowing, ever-more specialised subject areas, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is fading away, and along with it the notion that information needs vary in accordance with the centrality of a subject area to the researcher's interests.	With research increasingly focussed on ever-narrowing, ever-more specialised subject areas, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is fading away, and along with it the notion that information needs vary in accordance with the centrality of a subject area to the researcher's interests.
<b>Hypothesis no. 2</b>	When inter- and multidisciplinary research ventures call for information in subjects outside a researcher's own area of expertise, he or she copes by taking one of three possible routes: depending on the level of 'outside' information believed to be necessary, either embarking on a collaborative research venture, or undertaking to extend his or her knowledge base by mastering unfamiliar domains, or simply trying to make do with more basic level information.	When wide-ranging and/or interdisciplinary and/or multidisciplinary research ventures call for information in subjects outside a researcher's own area of expertise, he or she copes by taking one of three possible routes: depending on the level of 'outside' information believed to be necessary, either embarking on a collaborative research venture, or undertaking to extend his or her knowledge base by mastering unfamiliar domains, or simply trying to make do with more basic level information.

	INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA	NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS
Hypothesis no. 3		As their academic career advances, researchers become more focussed in their interests, and in result, their information needs grow to be more defined and restricted.
Hypothesis no. 4		The researcher's choices of topics for investigation are dictated by his or her ability to handle a certain quantity of information. That is, he or she a priori asks questions, which are deemed manageable in terms of the expected quantity of pertinent information on it.
Hypothesis no. 5	Keyword-based retrieval is the contemporary researcher's favourite approach to meeting the need for pertinent information on a given subject.	Keyword-based retrieval is the contemporary researcher's favourite approach to meeting the need for pertinent information on a given subject.

## 4.2 First Insights into the Function/Purpose Aspect of Researchers' Information Needs

### 4.2.1 The Key Purposes and Functions to which Information is Put in Research Work

In view of the commotion that has been surrounding much of the scholarly information activity for quite some time now, expecting to find change everywhere is probably inevitable. However, the data from the interviews (obviously limited, but still indicative) suggest that the key purposes and functions to which information is put in contemporary research work may have remained those Voigt (1959) and Menzel (1964) identified almost half a century ago, with many of the previously discerned disciplinary-rooted differences in the information needs and information seeking behaviour of scholars still in place. What are then the key purposes and functions to which information is put in contemporary research work?

Basically, researchers still seem to need information mainly for reviewing the existing knowledge on a given topic and for keeping abreast of new developments, but also for solving topical problems and for getting ideas for a new research. The following is a more detailed account of the qualitative data based analysis of the ways information is put to work in contemporary scholarship.

**Reviewing the existing knowledge on a given topic:** the information need, which seemed to occur most readily to the researchers interviewed, was the need for finding all the relevant information in preparation for a new investigation. So much so, that it was usually given as the almost instinctive response to queries about the research tasks necessitating information,. When prompted gently, the informants did come up with needing information for other purposes as well, but the instantaneous association of a need for



information was with the literature search of the exploratory stages of a research project. This may stem from the tendency all of the interviewees seem to share, to think of information first and foremost in terms of written, preferably formally published information, even if in practice they happily use differently sourced and/or transmitted information, too. In any case, the informants all testify to information gathering expeditions on the eve of a new research project, more or less along the lines of the younger political scientist's description: "When you... begin to work on a problem... you look for the material that has already been written on it. Of course, that's only when you enter a new subject area; when you start work on a topic you are familiar with, you just check to see what was written on it recently". The expert on social welfare points in addition to the importance of being acquainted with the seminal work existing on a given subject: "In every field the classics are very important... I've just begun work in a new subject area, and there are publications dating back twenty five years, which are still vital".

Obviously then, laying the information foundations of an investigation is considered an important preparatory phase, and with good reason, too, as the computer scientist rightly points out: unless researchers are wholly cognisant of earlier findings on a subject and base their work on what is already known, they take the very real risk of wasting time, money and effort on re-inventing the wheel. However, the popularly held notion that a literature review is invariably a thorough, comprehensive, and meticulous exploration of the knowledge accumulated on a topic does not seem to tally with the initial findings presented here. For, whilst the political scientist claims that on the eve of a new research project he aims for obtaining the maximum information coverage possible, his neuro-biologist colleague says she only aims at 'getting the general drift of things': "I had quite a few arguments with colleagues [on the thoroughness with which the literature needs to be reviewed]. Each time I mentioned considering a new topic for investigation, I was told: 'Go read the literature first'. And I keep insisting that I'm not interested in the literature when I can see with my own two eyes what's going on... I don't hold with performing a full review of the literature... it should suffice that you know in general terms what has been done, and what hasn't, for you to go ahead".

The younger of the two philosophers offers a different explanation. Probably more intent on advancing his career than his older colleagues, he points to the need to publish as much as possible in as short a time as possible as the culprit in limiting the scope of the literature surveys he performs: "You are being judged on the basis of the number of your publications, nothing else really matters, even if not everybody is prepared to say so out loud, and the fact that this is the main criterion determines the way you work. You usually ask yourself, among other questions, how urgently you need to produce new publications, for if you are in a hurry, you won't start any new project which necessitates widespread information gathering". Apparently, he too considers the full information coverage, which the above quoted political scientist subscribes to, the right way to work, but, as he puts it "sometimes you have to settle for whatever you can do, instead of what you would like to do..." It is interesting to note that that this is very much in line with the connection previously suggested between a researcher's choice of a research topic and his ability to handle the quantity of information needed for the purpose (though both are yet to be proven to reflect the prevalent information work practices in today's academe).



**Keeping abreast of new developments:** Moving on to another research associated information task, we come to academics' habitual following of the new developments in their areas of interest. Wholly in line with previous findings on the subject (Garvey et al., 1970; Garvey, 1979; Garfield, 1980; Line, 1969, 1973; Stone, 1982), keeping current is reported by the participants of this study to present for any researcher, but especially for the scientist, what the computer scientist so aptly terms "one of the greatest information challenges".

A main concern of the scientists seems to be the danger of repeating some research ("re-inventing the wheel"), which, apparently, may have truly dire consequences. First and foremost, as the computer scientist explains, unless researchers know who is currently doing what, they are liable to waste their time, money and energies, to unnecessarily slow down their progress, and even to thwart their claim to priority of a discovery. The frustration entailed, as the neuro-biologist hastens to point out, can be devastating. What is more, this frustration is often coupled with a severe blow to the researcher's pride, not to mention his reputation, as the biologist describes: "I need to know what's going on so that I don't turn out to be the laughingstock of the field, proposing a 'new' project five other labs are already working on...". No wonder the neuro-biologist minces no words in getting across the message: "Keeping up is one of the measures you take in order to safeguard yourself... otherwise you've no way of knowing what goes on in the world, and in science it's truly critical and essential that you do. If you want to survive, you've got to do it, if you don't know other people's work you're as good as dead".

Yet, inadvertently repeating some research may not be invariably disastrous. As fervent an advocate of keeping current as she is, the neuro-biologist nevertheless says: [Still], if I were to find that somebody else has already dealt with a topic, it would not deter me from working on it too. So I'll replicate work already done, all the better, for then I can validate it..." Given the pressure on academics to produce original work, as much of it and as quickly as possible, it is a rather surprising attitude. Indeed, the psycho-pharmacologist is the only one among the interviewees who expresses similar views, and even he does not go to such lengths; all he says is that if he were to repeat some research, he would not see it as a total waste of time, but, he hastens to add, since it was not what he had intended to do, he would rather not have it happen.

As to the social science informants: they seem to be somewhat less anxious than their scientist colleagues to ensure that they see immediately all recent work in their areas. However, their more relaxed attitude to keeping current appears to be only a slight difference in degree. In fact, one of the two political scientists suggests that the question of 'who got there first' is just as crucial for him as it is in the sciences: "In my field it's very important to know what's going on now, not what went on a year ago, because it's a theoretical science... you've got to know what the last theoretical word is (and that's not the one proffered two years ago), because your aim is to fill any theoretical gaps still in existence. If you fill now a gap encountered two years ago, and meanwhile somebody else has already done that, what significance does your work have? You have to be on top of things all the time, so that you can identify the remaining theoretical lacunae".



With regard to humanists, the data underscores the previously established notion that they are less concerned with keeping current than their scientist and social scientist counterparts. True, they too try to make sure that no new contribution in their subjects escapes their attention, for nobody wants to demonstrate ignorance of relevant research. Indeed, the younger philosopher makes a strong case for his and his humanities colleagues' need to keep up: "[Keeping current] is very important. You can't conduct research... if you are isolated from other people's work; that is, you can, but it will be much less efficient... You can't discuss a problem without acknowledging that somebody wrote something on it recently, you can't write an article on a problem which somebody else has already solved... Only if all researchers determinedly keep pace with the developments in their fields can scholarly progress be guaranteed, [otherwise] they'll re-invent the wheel over and over again". At first glance, this danger of re-inventing the wheel does not seem very relevant where humanities research is concerned. After all, who dare claim that the ultimate word on, say, Hamlet has already been said? However, the 'horror story' recounted by the professor of literature amply demonstrates that in the humanities, too, the danger is there: "Having re-read Jane Eyre I realised that there was a recurring motif of opening and closing of doors and windows in it. Rather happy with my insight, I wrote a long article on the subject, only to discover that somebody else had come up with the idea long before I did and there was a very good article on the subject, far better, unfortunately, than mine. There was nothing to be done about it; I literally threw the article into the bin..." Evidently then, humanists too have very good reasons for following the scholarly advances made in their fields.

Thus, although researchers in the different disciplines do indeed seem to manifest varying degrees of intensity in their need for current information, keeping current appears to form a vital component of the scholarly pursuit as such.

**Solving topical problems:** Another previously identified key purpose of research information work, the finding of solutions for topical problems encountered, seems at this stage of the investigation to be as relevant as ever. Still, again, it is obviously so only within the limitations of the data provided by a relatively small sample of people.

As they proceed with their work, researchers frequently seem to encounter those gaps in their knowledge (Bernal, 1959), which send them in pursuit of a piece of necessary information. All the interviewees, of all disciplinary affiliations, mention that problems necessitating some fact finding or elucidation of technical and methodological issues do tend to crop up in the course of a research programme, although surprisingly enough, none of them seems to find this ostensibly abrupt disruption to workflow overly troublesome. This can, of course, be just a coincidence; after all, we are talking here of a relatively small number of researchers. It is also possible, however, that they are simply accustomed to such interruptions. However, one study participant offered a different solution to the mystery; according to his thesis, whenever a researcher comes across a missing link in his knowledge store, he can either stop working until the relevant piece of the puzzle is found, or he can provisionally substitute some sort of a hypothesis for the information needed and carry on. "Every now and then", he says, "having built the seventh row of blocks you find that [the building blocks for] the eighth and ninth rows are missing. So you...construct your own building blocks, imaginary ones, and you base on them your next rows... When the actual

material comes, if it is indeed [what you surmised it will be] then fine, the virtual blocks become real, but if it is not, then your carefully constructed creation collapses; seeing that it is not a real building, some researchers leave things as they are, assuming nobody will ever find them out." Whether this is indeed the explanation for researchers' serene acceptance of the need to look for a piece of information in the midst of an investigation is perhaps debatable, although the scholar quoted is well versed in the ways of academia.

A better sounding, though not necessarily truer to life explanation has been given among others by the younger philosopher: "If in the course of your work you need some information, and you have to wait for it, you may have to put your research on hold for a while. It's not too terrible, because you can work on something else... People usually work on more than one piece at a time anyway, and even if it's the same paper [they want to work on], they can carry on with other parts of it. But it can be a nuisance..."

All in all, the researchers interviewed seem to consider this problem solving function of information somewhat marginal to the research undertaking. That this should be so is perhaps not all that surprising: the problems encountered are usually easily solved, or so the interviewees say. Apparently, most of the informants simply "turn to the literature" or "go to the library" (obviously the two options are no longer held to be almost synonymous) in search of solution. However, as the younger philosopher explains, "... sometimes, when you don't know the answer to a question, there may very well be other people who do, but then it depends on your connections if you can obtain an answer..." Thus, the question does not seem to be whether the problem is best solved by means of some information; plainly, it is. The more interesting question is how the researchers prefer to go about obtaining the information required for the purpose, an enquiry which will be taken up in the forthcoming, quantitative part of the study. Meanwhile, we will proceed to the fourth purpose to which information is put in research work, the provision of stimulus for new investigations.

**Getting ideas for a new research:** The creative aspect of academic research feeds on information, which often sparks off fresh ideas for a new scholarly endeavour. As Ziman (1981, p. 17) observes:

"The key factor in a personal research policy is not skilful cost-benefit, or stake/pay off analysis of particular plans or programmes: it is response to change... The importance or difficulty of a particular scientific question can only be assessed... according to present understanding. Even one tiny scrap of new information may quite transform the situation. This is why all active scientists are so concerned about access to the very latest results of research. It also explains the contributions made by... scientists with wide interests, who are continually on the alert for the intimations of discovery."

Researchers may not give much thought to the role played by information in the creative processes involved in their work, and yet, when queried, the study participants voice much the same notions put forward by the above quoted expert. The archaeologist, for one, says: "You read the literature, you know what you know, and all of a sudden you realise that something looks at odds with what's held to be true, something doesn't fit into the existing body of knowledge. So you think about it, and then think about it some more, and perhaps come up with an alternative solution, which provides a better explanation. The existing knowledge is the trigger, yes, indeed, always, there's no such thing as not relying on previous information. Even if the idea occurred to Newton because the apple hit him on the head, it was his previous knowledge, which enabled him to come up with it". Wholly in agreement with him, his psycho-



pharmacologist colleague adds that the source of information, which may trigger off a novel idea, can also be a conversation with a fellow researcher: "I think that a lot of new research is on questions arising from previous work done... In other cases the idea for a new project emanates from information, say, following a conversation with somebody, which you succeed in connecting with previous information you have".

The qualitative evidence as to the key purposes and functions to which information is put in present day research work seems to yield the following hypothesis:

**The key purposes and functions to which information is put in contemporary research work have remained those previously identified in the literature, with little or no change at all. Basically, researchers still need information for reviewing the existing knowledge on a given topic, for keeping abreast of new developments, for solving topical problems, and for getting ideas for a new research.**

#### **4.2.2 Ways and Means of Assembling the Information Base of a New Investigation**

Having seen that there is reason enough to assume, at least until proven otherwise in the forthcoming stages of the present study, that the contemporary researcher regards the assembling of a solid information base an inevitable precursor of a new research project, we now come to the question of how he or she goes about performing the task. **How does the contemporary researcher go about assembling the information base of a new investigation?**

The answer, in a nutshell, seems to be that the researcher proceeds to unearth the knowledge already in existence on a subject with what seems to be a fairly loyal adherence to long-established, disciplinary culture associated traditions in choosing the information sources; he or she does, however, make use of a wide variety of information seeking methods, traditional as well as novel ones. In fact, within the obvious limits to generalisation from data reported by a small population, in their efforts to meet the need for exhaustive information coverage the informants seem to follow one of three patterns, held to be characteristic to one of the three main disciplinary cultures.

Bearing further testimony to their distinction as "the most book-bound creatures in the world of scholarship" (Weintraub, 1980. p. 25; see also: Brockman et al. 2001; Garfield, 1980; Palmer and Neumann, 2002; Stone, 1982; Tibbo, 1994; Watson-Boone, 1994), the humanities researchers interviewed set out to review the literature by locating the seminal monographs on the subject. A simple search in the library catalogue, usually limited to the last three to five years, leads them to the state-of-the-art information, with the next step being the time honoured practice of reference chasing (following citation connections between material): since in the humanities any new publication, as a rule, cites the important works on a subject (referred to by the informants as 'the classics'), "...in a blink of the eye you know... who the central researchers [in the specific area] are, so that in a matter of days you can cover the



topic..." Apparently, only when the basic monographic literature on the subject has been located, do the humanities researchers consult journal articles. First they turn to their private collections, built up over time by holding on to any material of possible future relevance. This is followed by an effort to track down any additional information they may have missed, sometimes by resorting to indexing and abstracting tools, but more often than not, by reference chasing. Still, unlike their scientist colleagues, not one of the humanist interviewees seems unduly worried at the possibility of overlooking some information. After all, as one of them says, "if it is central, I'll come by it sooner or later in a subsequent work..." It is interesting to note, that the younger among them do not seem to consider their having exchanged print searching tools for electronic ones as meriting a special mention; apparently they, unlike their over-sixty counterparts among the interviewees, must have come to terms with any reservations they might have had as to novel technologies (an issue discussed more extensively later on).

The scientist informants tackle the task of reviewing the literature in preparation for a new research project in a different manner, turning first, if not exclusively to journal articles, again confirming what has been found to be typical of scientists (Hurych, 1986; Palmer and Neumann, 2002; Skelton, 1973; Talja and Maula, 2003). A case in point is the computer scientist: summing up his activities as 'shooting in all directions', he in fact concentrates almost exclusively on finding relevant journal articles. Stating categorically that it is essential to locate "all the existing knowledge" accumulated on the subject under investigation, because "whenever we did not perform a very thorough search... we eventually found out that somebody else had been working on the problem, that we had been wasting time", he actually sets a more modest aim of finding about 15-20 pertinent articles. Since all of the journals in his speciality are published in an electronic format, and as he does not hold with books which, according to him, contain only 'rehashed' material (albeit explained the most clearly), once he rounds up the articles, for all practical purposes his information gathering for the literature review is done. However, he is well aware that in the sciences researchers really have to see to it that they know of literally everything published on a given topic, for, as he puts it, "if you don't, you turn out to be an idiot... because you have wasted your time, and because people will tell you: what, didn't you know?" Therefore, he always takes two additional precautions in order to ensure that he truly has all the previous knowledge accumulated on his current topic: he skims the references in the articles, working back, as researchers are wont to do, to earlier publications, but he also contacts knowledgeable colleagues for material he may have missed. Mostly he consults colleagues outside his own speciality, for, he says, whereas in his own field he can be fairly sure of being aware of most, if not all of the evidence to scientific progress made, it is not always the case in adjoining fields. Now, this seeking advice of colleagues is apparently a very tricky business indeed in the extremely competitive field of computer sciences, where finding a 'good' problem carries tremendous weight in itself; thus, despite the fact that this interviewee knows all the prominent figures in his field, he confesses to choosing very carefully the experts he feels he can turn to without incurring the danger of their "starting to work on the problem you queried them about".

The computer scientist's account of his efforts to attain as full coverage as possible of the literature on a subject tallies closely with the reports of the other scientists interviewed, bar one point: apparently, not all of them endorse the notion that books are of no use whatsoever in scientific work. The biologist, for one, holds forth on the importance of books, which does not mean, however, that he values articles any the less



for that; both seem to play an important part in his work, fulfilling different functions: "If I start working on a research project, the first step is journal articles. These will point me back, to previous articles as well as to books. Mind you, books are important, because a book links different subjects, or uses a comparative approach, or a developmental one, or it surveys the classical subjects, so we use books a lot..." It seems then, that in the sciences too the importance of an exhaustive literature review is indubitable, even if scientists' definition of 'exhaustive' and their ways and means of accomplishing the task differ from those of the humanists. And the social scientists?

Apparently, in the social sciences it depends on whom you ask... Each of the six social scientists seems to represent a slightly different variety of 'the species' where preparing a literature survey is concerned: the psycho-oncologist, whose speciality borders on the life sciences, reports on needs and activities that closely resemble those of the scientists, but then so do the expert on social welfare and the younger political scientist, whose areas are further removed from the sciences; on the other hand, the communications expert, whose work in fact often centres on multidisciplinary issues with philosophical, medical and legal aspects, as well as the older political scientist, mostly work on their literature reviews in a manner resembling that of their humanist colleagues. However, it is the economist's detailed report of his work habits which seems to conform most closely to previous findings as to how the 'typical' social scientist goes about his work (Folster, 1989, 1995; Guttsman, 1966; Hurych, 1986; Line, 1971a, 1971b; Skelton, 1973). Thus, for the economist the starting point of a literature review is a good textbook or two, or perhaps a Ph.D. dissertation, which sum up for him the knowledge accumulated on a topic. This brings him up to the last five years or so, for, as it has been often proven true in the case of scientists and social scientists of the 'harder' knowledge domains (Tenopir and King, 2000), he does not feel any need to go back to the original publications, even if he has them handy in his carefully kept up personal library. Having thus gained an initial foothold in a subject area relatively new to him, he puts to good use yet another time- and labour-saving device, the review article, which, having been written by a well-known expert, provides him with "a very reliable map of the terrain": a concise summary of recent developments, as well as a bibliography of the salient publications on the topic covered. By this stage all he needs is state-of-the-art information, the latest developments on the subject, both formally published in journals and semi-formally or informally reported as preliminary results of work underway (science and social science researchers' need for reports on ongoing research is well known, a point to be elaborated on in the forthcoming section on keeping current). Finally, if he knows of a specific item, which he cannot readily access via the Internet or in the library, he does not hesitate to ask the author directly for a preprint or a reprint. However, unlike his computer scientist colleague, he only requests specific articles, never pointers to additional information, probably because his systematic manner of assembling the information base of a topic ensures its thoroughness.

It seems then, that meeting the need for finding all the relevant information on a given topic, in preparation for embarking on a new investigation, has remained an activity very much embedded in traditional, disciplinary-rooted conventions, albeit somewhat changed in character consequent to the integration of the ubiquitous novel technologies in research work. Therefore, the next hypothesis advanced is as follows:



**The need to review the previous knowledge on a given topic is met by the researchers' actively searching for information, with their choices of information sources and information seeking methods firmly embedded in the conventions traditionally associated with their respective disciplines.**

#### **4.2.3 Information Seeking Aimed at Learning of New Developments**

As it has already been noted, researchers seem to be very conscious indeed of the need to keep current. However, at least to the extent that the findings here accurately represent the realities of academe, this does not mean that they all regularly invest time and effort in active information seeking aimed at learning of new developments. **How do present-day researchers go about fulfilling the need to keep up with the progress made in their areas of interest?**

The bottom line seems to be that there is a close link between the level of awareness deemed necessary in a researcher's disciplinary milieu to the work being done by others and the range, variety and frequency of his efforts to keep current. Obviously, when researchers accord a relatively lower degree of importance to following the progress made in their areas of interest, learning of new developments is less of a priority.

Indeed, the scientists among the interviewees, who are the most concerned with currency, devote truly significant amounts of time and energy to keeping up, as the detailed accounts of both the computer scientist and the physicist amply demonstrate.

The primary measure taken by the computer scientist to ensure that he is aware of the developments in his field is checking out very frequently indeed the journals in his field. No wonder he is a keen supporter of electronic journals: whenever he has ten minutes free, say, between meetings, and from wherever he is at the time, he habitually browses the new journal issues. Also, he frequently discusses his work (face to face, over the telephone or via e-mail) with his colleagues, confident in the knowledge that information on new research pertaining to his own is bound to come up in these exchanges. Nevertheless, he is clearly rather apprehensive about the possibility of his missing a vital piece of information, as throughout the interview kept bringing up his fear of having to discard some work because somebody else 'got there first'. Still, although this pressing need of his for current information is obviously not met adequately, and with all his sophistication in computer-aided work, he has not been looking for improved solutions. Thus, he dreams of a personalised alerting service, but has not bothered to find out if such a service actually exists in his area of interest.

The physicist also makes every effort to learn of all information of potential value for him. However, since in his disciplinary culture pre-print based exchange of information among researchers is the norm, he employs different tactics for seeing to his currency needs than those cited by the computer scientist. Specialising in high-energy physics, he has at his disposal one of the first and best known e-print archives, originally designed, as its founder, Paul Ginsparg (1997, p. 43) puts it "as an experimental means of circumventing recognized inadequacies of research journals". Thus, intent as he is on keeping



current, to the point of 'addiction' (his terminology), he never even has to budge from his chair in order to learn of developments even as they occur: "First thing in the morning, I check the new articles posted overnight. I'm addicted to this, I spend on average between half an hour to an hour each morning checking if there's something new and interesting, or something which may link up with what I've been working on... Since everybody, from students to the most valued researchers, sends the results of their work first to this archive, and only later to some journal, this is all I need to keep up."

In the social sciences too the considerable importance attached to keeping abreast of new developments brings about researchers' expending quite some time and effort on attaining currency. And it is not only the psycho-oncologist, with her research interests encompassing the sciences (medicine) as well as the social sciences (psychology and social welfare), who unfailingly keeps up "because information becomes obsolete in a fraction of a second". In fact, the information behaviour reported by all of the social scientists interviewed, bar none, has been aptly condensed by the professor of social welfare into one line, which says it all: "I work at learning not only what was written in the past year, but also what will be written in the upcoming year."

Thus, the psycho-oncologist sees to her needs for current information in a fairly regular manner: every week or so she checks the major databases in her subject areas for new articles (no use to look for new information in books, she says), using the same search terms each time. However, only rarely does she bother to read the articles, claiming that for purposes of keeping up with current developments reading the abstracts is enough.

The younger political scientist also routinely looks for new publications via the databases pertaining to his areas of interest, but, unlike the psycho-oncologist, he does not rely on this one method alone, and with good reason too: since in his field the terminology is less clear-cut, he cannot be sure that he can always correctly second-guess the authors' or the indexers' word usage, which may result in his failing to spot relevant material. Thus, for example, he complains of having almost missed an article of importance to him because it was indexed under 'prejudice' rather than 'xenophobia'. Adamantly refusing to put his faith in the current awareness services, for reasons to be discussed later on, about once a month he goes to the library for the specific purpose of browsing the new journal issues. His more senior political scientist colleague testifies to similar tactics, adding to the arsenal previews of new books sent to him by publishers, book reviews in the journals he reads, and especially colleagues' recommendations.

The economist's account of his approach to keeping current by and large tallies with the picture painted by his colleagues: he definitely considers being up to date a must, but although he, too, checks (if only "every now and then") the databases for new publications, as well as for work in progress, he primarily relies on his network of colleagues, his 'invisible college', to keep him posted of progress made. Experience has shown that with good reason, too: he rarely, if ever, misses any pertinent information.

And finally, to the last representative of the social sciences, who, as it has already been pointed out, actually does multi-disciplinary work, with his interests spanning both the humanities and the social sciences. Interestingly, although in his information gathering for a literature review he is the quintessence



of the humanities researcher, he sounds rather typical of his formal disciplinary affiliation as far as his keeping touch with scholarly developments goes. Thus, he too, much the same as the other study participants whose strategies of keeping current have been reported up to now, is undoubtedly mindful of the need to follow the progress made in his fields: he often searches the Social Science Research Network (SSRN) eLibrary for abstracts of forthcoming reports, he is registered with all the major publishers for receiving pre-publication announcements, and he subscribes to 10-15 listservs, all of which entail his regularly perusing 70-90 emails a day for the explicit purpose of tracking down relevant information. His information appetite is not only voracious, but also diverse, for he wants scholarly material as well as news and real-life stories, anything that pertains to his investigations. However, conscious as he is of the need to keep up, he is not nearly as nervous about the possibly disastrous consequences of letting down his currency guard as his scientist colleagues are. Thus, he goes through the huge amounts of information he gets rather quickly, deleting much, delegating some for future attention, and reading only the items he deems truly significant.

As to the humanities researchers interviewed, they seem to demonstrate the relative complacency attributed to them when it comes to keeping current, although obviously some are more enthusiastic about it all than others. For instance, the younger historian, whose research on the economic aspects of the developments in the Middle East is close in its nature to work in the social sciences, is far more anxious to obtain up-to-date data than other humanist informants. Indeed, he proactively works at keeping up, searching for current data over the Internet, checking out the latest journal issues, either electronically or in the library, whereas his philosopher colleague (the older one among the two) seems to take the whole issue in his stride; thus, he does not seem to pay too much attention to publishers' announcements or to the table of contents of the forthcoming issue of a journal when these land on his desk (he just throws them in a box until he has some time to spare, which may take from a week to a month, he says). Neither does he follow up colleagues' recommendations for new articles, although he does note the suggestions, mentally filing them away for future reference. In the same vein, both the other philosopher and the archaeologist follow the progress made in their respective fields with what can be termed as 'serene interest': they do make an effort to peruse the new journal issues quite consistently (the former, "every week", the latter, "on a regular basis"). Since the archaeologist also maintains that the truly innovative findings are reported in the five core journals of a knowledge domain, he does not have too hard a time keeping current, especially as he maintains that missing out on some new information is "never irreversible". And the professor of literature even confesses to quite a bit of negligence in keeping up...

This relatively tranquil attitude of humanities researchers to keeping up seems to stem from a generally held belief that research of real significance will come to their attention anyhow, if not sooner then later. Apparently, "people will talk about a piece of research... which is either very good or very bad". But then, humanities scholars can afford to be more passive in their efforts to keep current, confident as they are there is only an infinitesimal chance of their unintentionally duplicating somebody else's work.

The next hypothesis concerns therefore the above discerned discipline-associated variance in researchers' attempts to keep current:



**The range, variety and frequency of a researcher's activities aimed at keeping current are determined by the level of awareness deemed necessary in his or her disciplinary milieu to the work being done by others.**

#### **4.2.4 Needing Information in the Midst of Work**

Having already pointed out that that all the informants testify to the likelihood of encountering the need for some fact finding or elucidation of technical and methodological issues in the course of their research endeavours, we now come to the question of how they go about solving the problem. **How do the researchers solve problems of needing some information in the midst of work?**

The interviewees' accounts indicate first and foremost that locating necessary bit of information is not too much trouble; indeed, the specific incidences recalled are usually described as 'no big deal'. Apparently, more often than not a brief discussion with a colleague suffices to point the researcher in the right direction, or in the computer scientist's words: "So I tell Ilan over lunch of the problem I seem to have, and he says, go to...the computational geometry people, they solve problems of this kind... So I start working on the problem, search the literature, e-mail a friend..." In this specific case the consultation with a knowledgeable colleague only serves to put the researcher on the right track, no small feat in itself, of course, but the well-informed colleague consulted may be able to provide the answer itself, not just some pointers to the answer. This, however, brings to the fore the question of the right person to turn to.

Obviously, the best option is asking the world renowned expert on the subject, which is indeed the course taken by the more senior people among the informants. The archaeologist, for example, himself a prominent authority in his field, has no qualms whatsoever as to the right way to proceed when he finds himself up against a question: "I'll contact a friend of mine who is sure to know the answer, I'll just send him a quick e-mail, he'll get back to me in no time, and that's that." The economist, also of a standing in his field, takes much the same course of action, but he will insist on talking to the colleague who can provide the information: "...it'll cost the university for half an hour or an hour of a transatlantic phone call, but I'll have my answer on the spot..." However, life is not as simple for the novice academics, as the younger philosopher explains: "Sometimes, when you don't know the answer to a question, you're well aware that there are others who do. However, then it becomes a question of... the people you are in contact with in your day to day activities: if you work in a central place, where the action is, you just ask your colleague down the hall, but if you're not... you can't just write an e-mail to an expert and ask him! Even if you can locate his e-mail, you can't just land on him out of the blue, can you? He may not answer you at all, but even if he does, you can't be sure that you'll understand his reply and then, will you go on nagging him? It's not as if you know him personally, is it?" Clearly, the problem boils down to a researcher's having the right professional contacts, for in this day and age, courtesy of the ubiquitous e-mail, technically everybody is 'down the hall' from everybody else.

Well, if having the answer straight from the horse's mouth, so to speak, is not feasible, there is always recorded knowledge, which, as the professor of literature puts it, can "... clarify things, can give [him] an idea, can get [him] out of the bind" when, in the course of a research project, he "somehow get[s] stuck



with a problem... [and] sort of stop[s] in [his] tracks". The mention of recorded knowledge brings to mind the library, of course, which is indeed the solution cited by several of the informants, although when it is some specific information the researcher wants, it may not be the preferred option. The neuro-biologist, for example, says: "If in the midst of work I need some information, I leave everything and dash to the library to get it. Though nowadays it's best to search the Internet, it saves going to the library, looking for the specific volume, which may not be on the shelf, and even if it is, you have to go to the photocopying service, where there is a queue... Often a little e-mail, which you write in a second, can save you all that trouble, you just ask a colleague to send to you the information... ". The philosopher voices much the same notion: "If in the course of work you need some information, but you have to wait for the book to arrive to the library, you may have to put your research on hold for a while". Indeed, the younger political scientist, for one, prefers the Web: "If I need a piece of factual information... only rarely do I turn to colleagues, as... the Internet provides very efficient solutions to problems of this kind".

In view of the evidence given as to the solutions chosen by researchers when in need of a piece of specific information, the following hypothesis seems to be in order:

**If in the course of a research project the researcher comes across a missing piece of information, his method of choice for meeting this topical information need has remained the time-honoured method of consultation with a knowledgeable colleague, albeit this technique is now often augmented, if not supplanted by a quick search on the Web.**

#### **4.2.5 Unearthing Research-Inspiring Information**

That information serves a particularly vital purpose of the researcher's in providing stimulus for new investigations is too well-established a fact to have necessitated much probing in the course of the present study. It is rather the manner whereby such research-inspiring information is obtained which posed the more interesting question. **How do researchers come upon the information which ultimately fulfils for them a stimulating function in triggering new research?**

The computer scientist of the group, who gave voice to more concern with finding 'good' research questions (or 'riddles', as he prefers to call them) than any of the others, actually sets out from time to time to scour the literature for possible topics. Claiming that this is how it is usually done in his milieu, he peruses the journals in an attempt to detect promising problems: problems to which it may just be possible to come up with improved solutions, problems that others failed to solve in the past, but seem worthy of another try, or problems that can be looked at from a different angle. The other scientists interviewed also testify to some deliberate information seeking performed as part and parcel of choosing a new topic to work on. They only seem to do so, though, when they already have a potential problem in mind, albeit without the necessary grounding in the existing knowledge. A case in point is described by the neurobiologist: "During my post-doctorate in France I got interested in a new area, but I knew I was coming back to Israel to work on something else. So I decided to check out the literature, to see if a connection could be made, if there was a topic which would bridge over the two areas, and happily I did



find what I was looking for." However, the scientists seem to be the only ones who look for information with the express purpose of locating topics for new research; the other informants go about stimulation-seeking in information much less deliberately, simply browsing around while locating an item on the shelves or when leafing through the latest issue of a periodical they regularly read.

If literature thus fulfils a stimulating function for researchers, their frequent interactions with their colleagues do so too and possibly more intensely, at that. As it has already been pointed out, the interviewees conform to previous findings in regarding fellow academics as a much-appreciated 'wealth of information resources' (so termed by the communications scholar), but apparently, it is their colleagues' role in inspiring fresh ideas and new research directions, not in the least through the provision of thought-provoking information, which is truly momentous. Nobody could put it better than the older philosopher, who says: "My dialogues with myself undoubtedly echo both my reading and my conversations... I need to be in contact with people with whom you can really talk... I need to be where a worthy discussion is possible..., in which questions are raised, insights are given voice, and answers are provided... I've been talking with a major, well-known philosopher...and in an instant this chance conversation provided me with an insight, [so that my new] article was practically done..."

The philosopher's account is enlightening in more than one way: first of all, it lends credence to the notion that the idea for a new investigation can spring from the information exchange, which in effect takes place when two like-minded experts 'talk shop'. However, there is another interesting point hidden here: a chance conversation may suffice for the encounter to fulfil the stimulating function it does. Now plainly, the discussion which brings about the birth of a new idea can be held expressly for that purpose, as reported by the computer scientist, who says: "I write a lot with a colleague of mine; at the stage where we set out to find a research topic, we... come prepared, with the literature on the subject all covered, and we look at the possibilities". Still, as noted, it may take no more than a chance conversation to trigger a new research. Harking back to Pascal's well known saying, "surprise comes to the prepared mind", a possible explanation as to how this may come about suggests itself: apparently, the researcher constantly dwells on the problems he is working on, or as the professor of social work puts it, "all day long I jot down new ideas..., I relentlessly brood on my investigations...". No wonder then that even a scrap of new information, come by in a chance conversation, can spark off a fresh idea, for the researcher's mind is always prepared.

Thus, to the extent that the evidence at this phase of the study reliably depicts reality, it seems that some researchers may prefer accumulating possible topics for research as an inseparable, almost reflex part of their routine reading and communicating with colleagues, while others may set out to peruse the literature and/or to talk to colleagues with the sole intention of discovering new research opportunities.

This gives rise to another question: whether or not these differences in stimulation seeking information work have their roots in the conventions typical to the different disciplinary cultures. After all, scientists, unlike their humanities and social sciences counterparts, cannot afford to wait until they come across a problem by chance, for if they do not snatch up an unexplored problem, somebody else will (Price, 1963).



One possible result of this difference in attitude to finding suitable research topics may very well be a more proactive pursuit of information, giving rise to the following hypothesis:

**The manner whereby a researcher looks for information to serve as the spring board and the trigger for a new research has its roots in his disciplinary culture: in fields of intense competitive activity stimulation-seeking through information is a regularly carried out, intentional and focussed element in the researcher's professional pursuits, whereas in subject areas characterised by a less hectic scholarly work-pace finding suitable topics for a new research is a rather less purposeful and intense undertaking.**

#### **4.2.6 Activity versus Passivity in Researchers' Information Seeking**

One interesting question, which the evidence accumulated in the interviews obviously cannot settle, is whether researchers have become less active in their foraging for information, now that they can rely on 'the system' or on the ease of maintaining contact with colleagues to deliver to their virtual doorsteps any relevant scientific material. Aside from the limited ability to generalise from the data gleaned from just eighteen informants, it may be too early to tell in any case, for the IT based opportunities for improved research work, such as the alerting services, may not have been around long enough to change the ingrained habits of a group of people held to be relatively conservative. Still, the question is too interesting not to be investigated, even if it can be answered only to the extent of taking a snapshot of the situation. **Have present-day researchers become more passive in their information work, counting on novel technologies to bring all pertinent information straight to their desktop?**

No doubt contemporary researchers have an easier time following the progress made in their fields: ongoing communication with their peers is only a matter of a few keystrokes, at least technically speaking, which means that once they establish their network of professional connections, they are bound to learn about much of the important work being done in their areas almost in real time. Also, publishers vie for researchers' attention to their products, enticing them with promises of personalised services meant to alert them to pertinent new publications. The only question is whether researchers are prepared to put their faith in these novel solutions for keeping current.

The answer arising from the interviews seems clear enough, if in need of further corroboration: today's researchers may happily use the plethora of available devices aiding them in getting hold of information, but at least for now they will not wholly rely on them. Thus, for example, the younger historian confesses to a limited confidence in alerting services: "I don't count on these current awareness services, I take the initiative in these matters and set out to search for information on my own... I don't say, if this is all that has been sent to me, then that's all there is on the subject. So, I search the databases on a regular basis, to see what's going on..." The communications scholar echoes his colleague's sentiments: "A lot of information lands on my desk, I subscribe to listservs..., I get abstracts of new books about to be published, so I'm up-to-date in the literature. These services are supposed to signal to me "these are the key things", and often they are right... Still, I also initiate information searches..."



The whys and wherefores of the present situation can perhaps be traced back to the relative conservativeness popularly attributed to academics. However, there may be more to it than difficulties in adopting the 'right' attitude: obviously, colleagues cannot be counted on to notify them of everything going on, even if the communications channels are truly convenient, whilst the current awareness services still leave a lot to be desired, as the younger political scientist says: "There's a problem with the alerting services. You keep getting notifications as to articles of no interest to you, so at some stage you despair..." Nevertheless, the future looks promising, at least if the computer scientist is right in his predictions: "Today you still can't lean back and simply wait for the information to land on your desk, but we are making progress..., it's getting better day by day... only I'd like more than there is now... I'd like a site built according to my preferences..., so that when I get up in the morning there will be bells signalling that a new issue of journal x is out. Then...I could just view the cover, or perhaps the abstract of an article, or... the full-text article... It seems to me that it's just a matter of time..."

It seems then, that the need for information, especially for current information is still met by researchers' actively searching for it. Thus, the next hypothesis to be posed is as follows:

**Although theoretically allowing for more passivity on the researchers' part, neither the availability of services, which see to the delivery of full-text reports to their desktop, nor the ease of maintaining contact with expert colleagues, have changed the determination with which they go about acquiring the information they need.**

To sum up the first insights gleaned into the function/purpose aspect of contemporary researchers' information needs and practices:

**Table 4.2: The Function/Purpose Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	The key purposes and functions to which information is put in contemporary research work have remained those previously identified in the literature, with little or no change at all. Basically, researchers still need information for reviewing the existing knowledge on a given topic, for keeping abreast of new developments, for solving topical problems, and for getting ideas for a new research.	The key purposes and functions to which information is put in contemporary research work have remained those previously identified in the literature, with little or no change at all. Basically, researchers still need information for reviewing the existing knowledge on a given topic, for keeping abreast of new developments, for solving topical problems, and for getting ideas for a new research.



	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 2</b>	The need to review the previous knowledge on a given topic is met by the researchers' actively searching for information, with their choices of information sources and information seeking methods firmly embedded in the conventions traditionally associated with their respective disciplines.	The need to review the previous knowledge on a given topic is met by the researchers' actively searching for information, with their choices of information sources and information seeking methods firmly embedded in the conventions traditionally associated with their respective disciplines.
<b>Hypothesis no. 3</b>	The range, variety and frequency of a researcher's activities aimed at keeping current are determined by the level of awareness deemed necessary in his or her disciplinary milieu to the work being done by others.	The range, variety and frequency of a researcher's activities aimed at keeping current are determined by the level of awareness deemed necessary in his or her disciplinary milieu to the work being done by others.
<b>Hypothesis no. 4</b>	If in the course of a research project the researcher comes across a missing piece of information, his method of choice for meeting this topical information need is consultation with a knowledgeable colleague.	If in the course of a research project the researcher comes across a missing piece of information, his method of choice for meeting this topical information need has remained the time-honoured method of consultation with a knowledgeable colleague, albeit this technique is now often augmented, if not supplanted by a quick search on the Web.
<b>Hypothesis no. 5</b>	The manner whereby a researcher looks for information to serve as the spring board and the trigger for a new research has its roots in his disciplinary culture: in fields of intense competitive activity stimulation-seeking through information is a regularly carried out, intentional and focussed element in the researcher's professional pursuits, whereas in subject areas characterised by a less hectic scholarly work-pace finding suitable topics for a new research is a rather less purposeful and intense undertaking.	The manner whereby a researcher looks for information to serve as the spring board and the trigger for a new research has its roots in his disciplinary culture: in fields of intense competitive activity stimulation-seeking through information is a regularly carried out, intentional and focussed element in the researcher's professional pursuits, whereas in subject areas characterised by a less hectic scholarly work-pace finding suitable topics for a new research is a rather less purposeful and intense undertaking.
<b>Hypothesis no. 6</b>	Although theoretically allowing for more passivity on the researchers' part, neither the availability of services, which see to the delivery of full-text reports to their desktop, nor the ease of maintaining contact with expert colleagues, have changed the determination with which they go about acquiring the information they need.	Although theoretically allowing for more passivity on the researchers' part, neither the availability of services, which see to the delivery of full-text reports to their desktop, nor the ease of maintaining contact with expert colleagues, have changed the determination with which they go about acquiring the information they need.



Heretofore, analysis of the data collected in the qualitative phase of the present study on academic researchers' information needs has focussed on two major aspects of information need: subject and function. However, for a full (if precursory picture) to emerge, it is important to examine the data for other, possibly less obvious, but no less relevant characteristics of research information needs.

### **4.3 First Insights into the Nature Aspect of Researchers' Information Needs**

#### **4.3.1 Researchers' Need for Specific Types of Information**

Finding an answer to the question, when (if at all) researchers note the type of information they need and set out to seek specific types of information turned out to be unpredictably difficult. It seems that researchers do not pay much attention to the kind of information they need and use; so much so, that the interviewees even appeared to have some difficulty understanding what exactly they were being asked about. If and when different types of information were referred to in the course of an interview, it was in passing or in another context, and then as a well-known fact, in need of very little elucidation. Thus, for example, when the computer scientist says: "...stories are not for me; I leave them to my humanities colleagues....", he in fact alludes to the familiar notion that a research topic, and the work-conventions of the knowledge domain in which it is embedded dictate the need for certain types of information. Indeed so: after all, it is hardly debatable that theoretical, conceptual, methodological and factual information are indispensable in any scholarly endeavour, unlike, for example, historical information, which will rarely, if ever be needed in a scientific investigation. The economist, who did stop to ponder this aspect of research information, gave voice to these universally held views on the subject, albeit explaining things in his idiosyncratic, picturesque way. Drawing a clear demarcating line between information which he terms 'opinions', as opposed to what he calls 'facts', he says: "In the areas we deal with in economics we don't concern ourselves with opinions... When it's a matter of opinion, you collect the facts..., and then form an opinion..., [but then] somebody else can have a different opinion about the same facts ... However, in economics it's not what I think, it's what's actually going on...if I say that you need 5% to reach your goal, and somebody else says 4% will suffice, reality will soon put one of us right...so it's not a matter of opinion; the concept that will be accepted is the one which reflects reality more accurately, and reality is usually not disputable, it's easily verified...[if I tell you] the price of tomatoes, and you don't agree, the two of us go to the market... and see what tomatoes cost..."

Another interviewee who took the time to explore the nature of the information needed in research work is the expert on social welfare. Plainly of an analytic mindset in whatever he does, came up with a breakdown by nature of the information required at the different stages of a research project. It is interesting to note that his linking of the different stages of the research process with different types of information tallies in point of fact with the conclusions arrived at in the above-cited studies into the matter (Egan and Henkle, 1956; Garvey et al., 1974), according to which the different kinds of mental processing going on at the different stages of a scientific work entail a need for different types of information. Thus, at the initial stages, the perception of the research problem involves heavy use of theoretical and conceptual information; at the stage of reviewing the existing knowledge on the subject being queried historical and/or descriptive information is needed; the formulation of procedures appropriate to the inquiry necessitate methodological information; at the intermediate stages that follow,

when information is required to solve problems as they come up, specific information is usually the answer, along the lines of statistics or details of techniques and methods; and at the final stages, when researchers seek to fully interpret their data and integrate their findings into the existing body of knowledge, the need for information is focussed yet again on theoretical and conceptual, as well as descriptive and/or historical information.

The almost corresponding insights put forward by the professor of social welfare are obviously based on his own work experiences, although, having seen to the socialisation into the profession of scores of young people, his views are bound to be more solidly founded than individual perceptions usually allow for. At any rate, this is his version of how the nature of information needed in scientific/scholarly work varies with the different stages of a research project: "At the initial stage of a research project, when I'm at the conceptualisation stage, I go to the literature in order to see what questions to ask, so I read theoretical works. [Then], when I'm at the stage of research where I'm looking for tools, I read works on applications of concepts and tools, that is to say, works which investigate empirical parameters I am not familiar with or works, which investigate issues in a new way, one I haven't tried yet. And when I analyse [my] data, I need theoretical information, which helps me to interpret my data, because in my field theory and data interact. I try to understand the data in light of what I've read, and I try to answer the question, what do I know now that I didn't know before, that hasn't been already covered in the literature. That is to say, at this stage I turn to the literature in an attempt to find out how to interpret the answers".

However, other than that, the interviewees did not seem to have much to say on the nature of the information needed in research work, although the topic was broached more than once, and from different angles, too. In fact, it seems that the type of information required only comes to the fore when it is a truly prominent feature of the information need. Thus, for example, the psycho-oncologist, musing aloud on the subject, remarks that she really should look specifically for methodological information, as she does not always know the new statistical techniques in vogue. The younger political scientist also says that on occasion he sets out to look for specific types of information, for example, if he wants to learn how a certain statistical procedure is done. When he does need such information, searching the Internet is his favourite solution to the problem, "as it has sources, which are practically handbooks, telling you do this and this, the procedure goes like this..." He may at other times turn to the Citation Index for the purpose of finding an article, which contains information on a specific method he wants to learn about. It is the neuro-biologist, however, who actually sounds appreciative of the capabilities of today's information services to steer her to specific types of information she needs: "For us, researchers, life is unimaginable without our databases, without today's search technologies. For instance, I wanted to investigate some animal behaviour using a labyrinth, but I had no idea what the labyrinth should look like or anything [else about it]. So, I searched in a database, found an article which described the kind of labyrinth I wanted to use... and asked our technician to build for me a replica of the labyrinth described".

Still, the general impression given by the interviewees was that the nature of their information needs, the kinds of information they seek and use are hardly subjects they customarily concern themselves with. Therefore, the next hypothesis to be further explored in the forthcoming quantitative stage of the present study is as follows:



**Although the nature of the information being sought is a crucial factor in ensuring that the answer found is truly relevant to the question asked, it is seldom consciously formulated in the context of research-work related information seeking.**

#### **4.3.2 Access to Primary Sources of Information**

**There is another point worthy of note which has been brought up by the interviewees in the context of the nature of the information required by scholars: how do present day researchers get hold of the primary sources of information they need?**

Humanists' much discussed need for primary sources of information, as opposed to scientists' and many social scientists' happy reliance on secondary sources, has traditionally been met mostly by their travelling to the information sources, in remote locations, if need be. Even today, when researchers no longer have to go to the information located at the university, its library and its faculty, for information can come to them wherever they are (Noam, 1997), humanities scholars still cannot always forego actually travelling to wherever the information is located, first and foremost because of the overriding importance they accord to primary sources. To quote the senior historian: "In my field until recently...very little, very little indeed was lacking in our library collection... Thus, when you went to the SOAS or the British Library, or one or another of the important libraries in the US, you were focussed in your work...of course, not everything is obtainable even there, that's why I went to India...The sabbaticals used to be so significant for a researcher because he had to gather, gather, gather material, in order to have work for four-five years. It is still true as to the primary material...and the electronic library is no substitute, there are too many works which are not published in electronic format, and it is likely to remain so for a long time."

Moreover, the older philosopher sheds light on another important aspect of researchers' (and in this case it is not humanists' only) vital need to go to where the information is: "On the one hand, I lose myself in reading, but on the other hand, and it happens to me over and over again, I leave everything and just go to where... I know that the tête-à-tête I need so as to be able to carry on with my thinking and my writing can take place...and it has to be an unmediated meeting, so that I can see the person's eyes, so that I can touch him... These encounters are really very, very important sources of information for me." Needless to say, that he considers e-mail or the phone very poor substitutes indeed for an actual meeting with his 'source of information', sharing a view which seems to be commonly held by scholars (to be discussed in more detail in the section on the processing and packaging aspect of researchers' information needs).

And yet, it is precisely in the sphere of primary information where the younger historian seems to enjoy the benefits of electronic access to information: "We download the latest 'Human Development Report' in a jiffy, whereas in the past we had to wait two months for it to arrive...today you can download everything so easily, reports of the World Bank, the Palestinian Central Bureau of Statistics, the Israeli Central Bureau of Statistics... you can check the price of oil every few days, the exchange rates, the

reports of the banks in the Middle East, everything, all the time." True, it is debatable whether this interviewee faithfully represents humanities scholars, as his areas of interest are rather close to the social sciences (actually, history is often classified among the social sciences). Indeed, the younger political scientist makes the same point: "In my subject, terrorism, there is a site on the Web where you can find Hebrew and English translations of [original] documents. Thanks to the Internet you have lots of similar sources at your disposal; it really does provide great solutions for information needs..." Of course, both interviewees are interested in 'current history', truly the forte of the Internet, but apparently there are other reasons too for singing the praises of the improved accessibility to primary material in an electronic world. Thus, for example, the professor of social welfare points out that it has become the routine practice in his professional circles to allow public access to a researcher's data once he or she has "milked it dry". The resulting data bases of primary information surely would have been impossible to come by in the days before the electronic era!

It seems then the next hypothesis which can be advanced on the basis of the interviews data is as follows:

**Access to primary sources of information, especially current information, has been greatly enhanced through the ubiquitous availability of Internet based resources. However, there are circumstances in which the only way for the researcher to obtain a specific item of information is by actually going to wherever it is located.**

To sum up the first insights gleaned into the nature aspect of contemporary researchers' information needs and practices:

**Table 4.3: The Nature Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Although the nature of the information being sought is a crucial factor in ensuring that the answer found is truly relevant to the question asked, it is seldom consciously formulated in the context of research-work related information seeking.	Although the nature of the information being sought is a crucial factor in ensuring that the answer found is truly relevant to the question asked, it is seldom consciously formulated in the context of research-work related information seeking.



	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 2</b>	Access to primary sources of current information has been greatly enhanced through the ubiquitous availability of Internet based resources. However, access to primary sources of past information remains problematic, often requiring, if not as the sole, then at least as the best option that the researcher actually go to the information wherever it is to be found.	Access to primary sources of information, especially current information, has been greatly enhanced through the ubiquitous availability of Internet based resources. However, there are circumstances in which the only way for the researcher to obtain a specific item of information is by actually going to wherever it is located.

#### **4.4 First Insights into the Intellectual Level Aspect of Researchers' Information Needs**

##### **4.4.1 The Research Value of Web-Based Information**

Although the Web has received quite a bit of bad publicity with regard to the authority and quality of much of the information it offers so liberally, and, admittedly, not without good reason, it nevertheless does contain valuable information, well-worth seeking out (the above mentioned much appreciated availability of primary information on the Web is but one example). **The question is whether today's researcher is prepared to trade the guaranteed scientific level of information obtained through traditional scholarly communication channels for the easy availability of Web-based material?**

Apparently, the answer is no. The problem seems to lie in the difficulties of determining the intellectual level of Web-based information: it is undoubtedly easier said than done. It certainly takes more than a glance, especially with the really unbelievable quantities of information usually retrieved, search engines being what they (at least for now) are. No wonder the scholars interviewed, all busy people with little time to spare, and even less inclination to spend what little time they do have on the information component of their work, rarely embark on 'jewel hunting expenditures' on the Web. The biologist, for example, readily admits that although he could easily find Web-based information of a reasonable level on his topics, especially with animal eco-physiology (his main area of interest) having recently come into vogue, he still prefers what he knows to be scientific sources, simply because it is easier for him this way. Apparently, he could determine without too much effort if a piece of semi-popular information has solid grounding in scientific facts, but why should he, when the appropriate level of information is guaranteed in the scholarly publications? Holding much the same views, the younger political scientist says: "I don't search for theories and viewpoints on the Web; if it's academic information, it'll be published in scientific journals and books anyway... We have [our] journals..., we have the serious publishing houses, so why should I look for information on the Web?"

Indeed so, although a word of clarification is probably in order here: it is not that the academics interviewed do not appreciate the information to be found on the Web, only they rather not use it for research purposes. As long as the information is trustworthy, they certainly put it to good use for a variety

of aims, from enhancing their teaching to exploring new ideas, not to mention learning of conferences, posts advertised, etc. The physicist even mentions a website, supposedly very popular in his milieu, wholly devoted to what he calls gossip (who has been appointed to a new post, who has gotten a huge grant...). The psycho-pharmacologist seems thus to speak for them all when he says: "I can definitely... use non-scientific material or material not published via a scientific channel. Such information can be very welcome for pondering on it or even for my teaching... Of course I know enough to sift out the wheat from the chaff..."

However, as to research work related use of Web-based information, the interviewees' reports clearly give rise to the following hypothesis:

**Since the material floating around on the Web is so often popular level information of uncertain vintage, researchers prefer to rely in their information seeking on the traditional scholarly communication channels, by way of making sure that the information they find is fitting to their knowledge and intelligence level.**

#### **4.4.2 The Level of Information Needed for Research Work Purposes**

It seems then, that matching academic researchers' information needs with the appropriate level of information dictated by their requirements and abilities is easy enough. For research purposes academics obviously need only scholarly information of the highest level, do they not? Indeed they do, but only as long as the information is in their specific field; as it has already been expounded on, when they need information in areas outside their chosen spheres of expertise, apparently it is the level of the 'outside' information required that by and large seems to determine researchers' course of action. Thus, when no compromise as to the level of the information needed is possible, they either embark on a collaborative research venture, or undertake to extend their knowledge bases by mastering new domains; however, when more basic level information suffices, for example, in order to understand the general picture within which the point being investigated is set, they seem to make do with consulting an information resource of a more elementary level, possibly supplemented with an expert colleague's 'translation' of the information thus gleaned. Thus, there is another hypothesis to be advanced on the basis of the interviews data:

**In their specific area of interest researchers consistently need scholarly information of the highest level; however, in areas outside their chosen spheres of expertise their needs vary according to the level of 'outside' information deemed to be necessary: often no compromise as to the level of the information source used is possible, but sometimes, especially when consultation with an expert colleague is known to be readily forthcoming, more basic level information suffices.**



To sum up the first insights gleaned into the intellectual level aspect of contemporary researchers' information needs and practices:

**Table 4.4: The Intellectual Level Aspect of Researchers' Information Needs**  
**Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Since the material floating around on the Web is so often popular level information of uncertain vintage, researchers prefer to rely in their information seeking on the traditional scholarly communication channels, by way of making sure that the information they find is fitting to their knowledge and intelligence level.	Since the material floating around on the Web is so often popular level information of uncertain vintage, researchers prefer to rely in their information seeking on the traditional scholarly communication channels, by way of making sure that the information they find is fitting to their knowledge and intelligence level.
<b>Hypothesis no. 2</b>	In their specific area of interest researchers consistently need scholarly information of the highest level; however, in areas outside their chosen spheres of expertise their needs vary according to the level of 'outside' information deemed to be necessary: often no compromise as to the level of the information source used is possible, but sometimes, especially when consultation with an expert colleague is known to be readily forthcoming, more basic level information suffices.	In their specific area of interest researchers consistently need scholarly information of the highest level; however, in areas outside their chosen spheres of expertise their needs vary according to the level of 'outside' information deemed to be necessary: often no compromise as to the level of the information source used is possible, but sometimes, especially when consultation with an expert colleague is known to be readily forthcoming, more basic level information suffices.

## **4.5 First Insights into the Viewpoint Aspect of Researchers' Information Needs**

### **4.5.1 Importance and Feasibility of Detecting Tendentious Presentation of Information**

Plainly, the 'harder' knowledge domains, to use Storer's (1967) well-known and widely accepted terminology, are not as open to personal interpretations as the 'softer' ones, or, as the psycho-oncologist puts it "I always want facts and data, and although it's not mathematics, it's not open to different interpretations, either. It's in history that they mess about with interpreting the data this way or that way, in my field if the statistics say that 80% of the patients prefer a certain surgical procedure, neither you nor I can say that it's not the majority of women who feel this way... it's not open to interpretation, is it?"

True enough, but how about those researchers, whose subject matter allows, if not outright calls for interpretation? How important and how feasible is it for them to detect if some information is presented from a particular point of view, approach or angle?

As the interviews data unmistakably indicate for these researchers it does matter if some information is presented (overtly or covertly) from a certain point of view, approach, or angle. So much so, that for them 'information' is by definition 'information presented from a specific perspective', as the expert on social welfare explains: "I proceed from the almost always given notion that information is subjective; it is based on the subjective theoretical approach and presented through the subjective perspective of its originator. I never even expect anything else..." The younger philosopher, probing deeper into the circumstances necessitating that the researcher treat every piece of information as potentially representing the writer's personal point of view, suggests: "You have to take into account that people often write with hidden layers of meaning... it's important to be aware of the possibility... [and] to recognise the concealed elements in the text. In fact, part of the understanding of a text is identifying whatever the author assumes to be self-evident and therefore leaves unsaid, or whatever he chooses to conceal..."

Indeed, many of the interviewees, and most notably the social scientists of the lot, are constantly, seemingly almost intuitively on the lookout for any possible bias in the information they handle. They are obviously compelled to do so where primary evidence is concerned; for example, the psychopharmacologist, who often uses personal accounts in his work on drug abuse, is very well-aware indeed of the dangers of generalising from individual experiences. However, apparently any information is examined just as carefully for signs of less than complete objectivity in reporting. Thus, for instance, the communications scholar proclaims: "I always teach my students to try and find out who the author is: if he is, say, a politician, think of his party; if he is a journalist, you have to be cognisant of the points of view represented in his paper..."

Luckily, discerning any biased or one-sided approach used in a piece of information is plainly considered "no big deal". Those among the informants, whose research involves taking an interpretative approach to information, unanimously acknowledge the need to keep a wary eye on authors' possibly slanted presentation, but no less unanimously dismiss the task as undemanding. The more senior political scientist, for example, says: "It can undeniably happen that a piece of information is presented from a certain point of view, and it's important that you realise it. [However], since you're familiar with the topic, and since you read the article critically, you notice easily enough that it's aiming to present the picture from a specific angle ". His junior colleague voices essentially the same notion, explaining just how the researcher discerns any such bias: "It often happens that I come across some information, which is clearly presented from a specific point of view. Anybody who knows the field at all well can easily see that it is so. When I read such an article, I immediately recognise the author's viewpoint by means of the theories he uses, by his writing style, by the works he cites, and I can see quite clearly that he has in fact marked his target and now he is trying to draw the circle around it".

The two historians, both of whom focus in their work on the heavily politics laced issues of contemporary Middle-East, express the same sentiments and report similar work practices, albeit with an addendum: apparently, they also look for certain 'codes' signifying the author's political and/or ideological affiliation. As the more senior of the two explains: "There are these little symbols... for example, in an article [written by somebody] from the post-modernist school of thought the opening lines send you to a footnote citing Foucault or Derrida; now this is a code, a sign, which says 'I'm a post-modernist, I accept



the main concepts of post-modernism', even though he is actually writing on, say, the relations between Britain and Kuwait in the 17th century. What's the connection... but this is how he pays allegiance, how he tells you 'classify me correctly'. The younger historian's experiences tally with those of his colleague's: "...you know by the text..., by the sources used if it's a so called 'on behalf of' article." For example, he says, if the article uses 'the Zionist state' instead of 'Israel', it is written from a particular point of view, easily recognised by all those in the know.

The stance taken by the interviewees on the importance and feasibility of discerning if information is presented impartially, leads up to the following hypothesis:

**Given the vital importance accorded in the scholarly endeavour to scientific integrity, in areas where diverse interpretations of facts and data are possible and expected it becomes an important part of research work detecting whether a particular piece of information on hand is presented (overtly or covertly) from a certain point of view, approach, or angle. However, there are long-established ways and means which allow a researcher to do so easily enough.**

#### **4.5.2 Usability of Tendentious Information in Research Work**

Apparently, identifying biased and/or one-sided information for what it is forms an important part of research work, striving as it does to present an impartial and open-minded picture. However, if the lack of objectivity is openly acknowledged, or at least once it is detected, **can tendentious information be of any use to the researcher?** Indeed it can; information presented from a specific point of view can have its most welcome uses. First of all, as long as the factual information is reported faithfully, its one-sided presentation does not negate putting it to good use, although it is obviously it goes without saying that it is advisable to have it corroborated by other sources. A case in point is cited by the younger political scientist, who frequently turns to a website maintained by a very right-wing Israeli for Hebrew translations of addresses and interviews given by Arab politicians. Having made very sure indeed that the translations are consistently accurate, he gratefully uses them on an ongoing basis.

Moreover, there seems to be another important benefit to be derived from information which is not presented objectively, or, in point of fact, because it is not presented objectively, as the senior historian suggests: "I may definitely set out to look for an article, which has been written from a specific point of view, because in many instances you can deal with a topic only if you are well aware of the points of contention involved. If you're not familiar with the controversy concerning the subject, if you don't know who's against whom, and what each contender has to say for himself, you can make mistakes, you can misunderstand the situation". To which the younger philosopher adds: "As long as you realise that some information has been written from a particular point of view, there's no problem whatsoever with using it. Quite the opposite, actually: this way you learn that there is such a viewpoint, that it's possible to think... and to answer the question... differently; it can be of tremendous help even, because otherwise such an approach may not have occurred to you". The example cited by the younger historian serves to demonstrate the point: "If I want to write about family planning in Syria, I'll certainly look for the official



policy first, see what the Ministries of Economics and Social Affairs have to say on the topic... Not that I will rely on Syrian official sources only... or on the Syrian newspapers alone, for they... represent the regime; still, [the information therein] is very important too, for then... I have the official standpoint."

Somewhat surprisingly, however, if scholars do indeed need information representing specific viewpoints, nothing much seems to be happening in result; they certainly do not clamour for a solution, either because the problem is not that pressing, or because they do not even realise that they have a problem (of course, it is hardly a rare occurrence that information needs go unrecognised, or at least unvoiced). Thus, for example, the communications expert, whose multidisciplinary research interests include euthanasia, admits that although he needs to be familiar with the assisted suicide approach to the subject, he has never actually searched for information written from this specific point of view. Obviously, if information systems were geared to provide information presented from particular angles, patron behaviour might change in response; but first, the need for such a service has to be more firmly established. In any case, the hypothesis to be advanced on the basis of the informants' reports on the subject is as follows:

**Once the biased and/or one-sided approach used in a piece of information is openly acknowledged, or at least once it is identified, the information therein has its welcome uses for constructing a multi-faceted understanding of a topic.**

To sum up the first insights gleaned into the viewpoint aspect of contemporary researchers' information needs and practices:

**Table 4.5: The Viewpoint Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Given the vital importance accorded in the scholarly endeavour to scientific integrity, in areas where diverse interpretations of facts and data are possible and expected it becomes an important part of research work detecting whether a particular piece of information on hand is presented (overtly or covertly) from a certain point of view, approach, or angle.	Given the vital importance accorded in the scholarly endeavour to scientific integrity, in areas where diverse interpretations of facts and data are possible and expected it becomes an important part of research work detecting whether a particular piece of information on hand is presented (overtly or covertly) from a certain point of view, approach, or angle. However, there are long-established ways and means which allow a researcher to do so easily enough.



	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 2</b>	Once the biased and/or one-sided approach used in a piece of information is openly acknowledged, or at least once it is identified, the information therein has its welcome uses for constructing a multi-faceted understanding of a topic.	Once the biased and/or one-sided approach used in a piece of information is openly acknowledged, or at least once it is identified, the information therein has its welcome uses for constructing a multi-faceted understanding of a topic.

## **4.6 First Insights into the Quantity Aspect of Researchers' Information Needs**

### **4.6.1 Attitude to the Availability of Great Amounts of Information of Potential Pertinence**

As it has already been elucidated on, the past few decades have witnessed an exponential growth in scientific and scholarly information. Curiously enough, this unprecedented wide availability of information in academia is often evoked in the same breath with problems of information overload, almost as if the two phenomena were synonymous. Under the circumstances, it seemed that interviewing the study participants on the extent of their information needs was threatening to become an exercise in futility. Was there any point in asking academics about the subject when it would only serve to unleash yet again a flood of those woeful tales of the difficulties encountered in a world plagued with excess quantities of information? However, even before the first phase of the interviews had been completed there could be no doubt about it: the researchers testified to a very different state of affairs.

Not that the informants deny that the quantity of scholarly information is indeed vast, and constantly on the rise too, although the computer scientist does insist that it is not really justifiable to speak of an 'information explosion' as yet. According to him, until things are still under control, that is, until work is not being duplicated because there is so much information generated that it is impossible to keep track of new developments, the dramatic term 'information explosion' is by no means warranted. Appropriately named or not, the information deluge nevertheless forms an inseparable part of the interviewees' professional environment, amounting to what the senior historian calls "an information craze in academia". The professor of social welfare also seems to have little doubt as to the true state of affairs: "Of course there is an information explosion..., and increasingly so, at that, now that every couple of days there is a new journal". An information explosion there may be, then, but how do contemporary researchers feel about this wide availability of great amounts of information potentially pertinent to their work?

At least to the extent that the reports of the participants in this study are representative of academic researchers as a group, the abundance of information no longer seems to pose them any substantial problems. Indeed, the interviewees, none of whom heard his/her colleagues' views, present a united front in happily praising the availability of enormous amounts of information, with some version of the refrain 'a piece of good fortune' heard over and over again.



The general consensus among the informants seems to be that life is much easier now, with the abundance of information. Thus, the professor of social welfare may point out the obvious hopelessness of knowing everything, of reading every piece of possibly relevant information, which, according to him, entails an insatiable thirst for new material, along with some stress and guilt, but still he insists: "I would never go back [to the time there was less information around], I'm overjoyed with this explosion of information..." And even when the younger historian complains a bit (the only one of the lot to do so), it is no more than voicing some reservations in the face of a situation which is, on the whole, eminently satisfactory: "...the wealth of information makes [research] so much easier, though it can cause some difficulties, too. For example, when you get four different answers, it can be frustrating."

It seems then that today's researchers are far from being beleaguered by the so called information overload (in fact, the term itself may very well be on its way to become a misnomer, at least in academia). Rather, it looks as if somewhere along the way they have fallen in love with the information affluence. Thus, the next hypothesis to be put to test in the forthcoming quantitative stage of the study is as follows:

**Although vast amounts of information are a predominant component of the present-day scholarly environment, problems of information overload in research work are considered virtually non-existent; rather the contrary: the exposure to huge quantities of information is seen as a veritable blessing.**

#### **4.6.2 Information Overload Turning into Information Affluence**

Pondering the profusion of scholarly publications characterising the contemporary academic scene, the senior historian among the informants supplies the first clue to the solving the riddle of how researchers' perceptions of the quantities of available information have turned from information overload into information affluence: "It's the 'publish or perish' [syndrome] that brings about the information overload, the publications industry of the promotions", he says. "Also, the technical aids make it so easy to produce information and make it available quickly, that you don't do your work as assiduously as you used to..." Thinking along the same lines, the communications scholar also laments the lowering of academic standards associated with the profusion of publications: "People gather information and then re-tell it. I see it and feel sorry that this is how things are, that we recycle ourselves, generate a lot of books and a lot of articles, a great big part of which is virtually worthless." And the archaeologist minces no words in driving home the very same point: "If you read 20% of the publications on a given topic, you know all there is to know about it... the remaining 80% reiterate previous information, you miss nothing if you don't read it..."

All this leaves the listener with the strong impression that the days of treating information with deference bordering on reverence are gone, which may very well be at the roots of the seemingly much more pragmatic attitude of scholars to the information component of their research work. As the senior



historian suggests: "There's an overload of information... The increase is undoubtedly exponential, but in quantity, not quality. That's why these days you need many more rakes, many more filters". Thus, although at this stage it is obviously too early to tell with any degree of assurance, it looks as if scholars' change of attitude to information has resulted in their mastering the art of coping with the abundance.

What is truly amazing about it all, is that there seems to be nothing revolutionary, or even new about the strategy, which the interviewees report to have been using so successfully to combat information overload; actually, it is a tactic that probably has always been around, for the name of the game in overcoming any problems incurred by the constant flow of information to the scholar is apparently nothing but selective reading, pure and simple. Apparently, that is how the researchers all deal with the information situation, as the communications expert explains: "You really have to read selectively in order to deal with the wealth of information that floods you, and there truly is an inordinate amount of information all over the place, though I'm glad that it is so..." It seems then, that these days information is no longer treated with deference bordering on reverence; rather, it is customarily appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with scholars using selective reading as their main, if not only strategy to cope with the quantities of possibly pertinent information.

Indeed, the participants all, bar none, voice much the same sentiments and report very similar experiences in dealing with the quantities of information flooding them. As a rule, they seem to be using a fairly simple, but obviously very efficient stratagem: they first quickly skim any new documents encountered, both the ones constantly landing on their desks unsolicited and those sought out so as to meet specific needs. In the course of this scanning they note the details which form the basis for selecting items of possible relevance to their interests: first and foremost, they look at the title and (if available) skim the abstract, to see how the subject matter fits in with their own work; then they check the name of the author and the journal (if it is an article) or the publisher (if it is a book), seeking to establish the authority/quality of the information on hand (more on this later); finally, they try to take in any other feature which can aid them in judging its possible contribution to their research, down to the details of what the publication looks like, which, at least in the case of books, apparently say something as to its importance (or, as the senior historian puts it, something as to "how seriously the book has been taken"). After this preliminary stage the long list of items is curtailed into a far more manageable one, which is examined more thoroughly: this time the abstract or the blurb is read carefully, the index of a book is examined, the authority of the piece is taken into account and then the decision to read (or skip) it is finally taken. This process of selection is aimed, according to the pictorial description of the expert on social welfare, to separate the new publications landing on the researcher's desk into three piles: one of material which should be read, another of articles and books for his research assistant to check out, and the third, of items not worth his while.

The procedure looks very complicated and time consuming indeed, but apparently it is neither, at least not for the experienced scholar, which explains its benefits for dealing with the enormous quantities of information characteristic of our modern day world. Efficient it may be, but there is nothing new about it all, is there? So perhaps it is indeed the change in scholars' attitude to information, which explains their



apparent victory over the avalanche of information. This interesting question is to be explored more thoroughly in the last phase of this study via the following hypothesis:

**The lowering of academic standards associated with the present-day profusion of scientific and scholarly publications (the ‘publish or perish syndrome’) has brought about a change in attitude to information in academe. No longer treated with deference bordering on reverence, information is customarily appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with the scholar using selective reading as his main, if not his only strategy to cope with the quantities of information of potential importance to him.**

To sum up the first insights gleaned into the quality aspect of contemporary researchers' information needs and practices:

**Table 4.6: The Quantity Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Although vast amounts of information are a predominant component of the present-day scholarly environment, problems of information overload in research work are considered virtually non-existent; rather the contrary: the exposure to huge quantities of information is seen as a veritable blessing.	Although vast amounts of information are a predominant component of the present-day scholarly environment, problems of information overload in research work are considered virtually non-existent; rather the contrary: the exposure to huge quantities of information is seen as a veritable blessing.
<b>Hypothesis no. 2</b>	The lowering of academic standards associated with the present-day profusion of scientific and scholarly publications (the ‘publish or perish syndrome’) has brought about a change in attitude to information in academe. No longer treated with deference bordering on reverence, information is customarily appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with scholars using selective reading as their main, if not only strategy to cope with the quantities of information of potential importance to them.	The lowering of academic standards associated with the present-day profusion of scientific and scholarly publications (the ‘publish or perish syndrome’) has brought about a change in attitude to information in academe. No longer treated with deference bordering on reverence, information is customarily appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with scholars using selective reading as their main, if not only strategy to cope with the quantities of information of potential importance to them.



## **4.7 First Insights into the Quality/Authority Aspect of Researchers' Information Needs**

### **4.7.1 Establishing Authority and Determining Quality in Research Information Work**

Queried about his ways and means of ascertaining that the information he chooses to use is of appropriate authority and quality, the younger philosopher goes straight to the heart of the matter in answering: "Well, I simply need to read it, to see what it says..." However, he immediately hastens to qualify his statement, apparently deeming it somewhat divorced from reality: "Well, it's true that in order to determine if an article is good, you have to read it..., and if what it says is correct and innovative, and deals with a topic of some importance, then it's good. The only problem is [that]... with so much information around, you definitely have to do it very quickly! For instance, you have a forty page long article, which is not the only one awaiting your attention, obviously you can't read it cover to cover for the sole purpose of deciding if it's any good. That's why you resort to these longstanding props which help you to decide quickly... you check to see if you know the author, you scan the article, read the abstract, take a look at the references, see if the important works are cited; also, there's usually a correlation between the quality of articles and the journals they appear in." Sounding resigned, if less than overjoyed, he in fact speaks for his colleagues, all of whom seem to be in agreement as to how today's researchers single out from the abundance of information at their disposal the items deemed to be of appropriate authority and quality. Apparently, nowadays the researcher has to rely more than ever on authorship and channel of publication for picking out as efficiently as possible the worthwhile items from among the wealth of information available. The senior historian sums it all up in saying: "The author, and in fact the whole journal, serve as parameters for determining the quality and authority of a publication. As it happens, some very, very interesting things appear in negligible journals, written by authors you don't know, but when you have such an avalanche of material, that's the way you work".

Fortunately, establishing the authority of a piece of scientific information does not seem to pose much of a problem, at least not for those in the know. That this should be so can be accounted for, first and foremost, by the norms of the social system, which is at the base of the scientific enterprise. In this social system, portrayed so aptly by the economist, "people walk around with invisible ranks...they all look the same, not even wearing suits or ties, or [perceptible] ranks...and yet, whoever has to know, knows without any doubt who's leading and who's led, who makes the decisions and who follows..." What is more, these 'leaders' in academe are easily identified even by the novice in the field, for their names crop up in most every work; if, as many of the informants point out, a specific piece recurs in subsequent research, it is taken to be 'a good paper'. Of course, should these authority figures function as gatekeepers, which they in point of fact often do, writing review articles, and/or maintaining websites reporting the latest scientific developments in their areas, their recommendations understandably carry a lot of weight in determining the quality of a publication (the mere inclusion of a work in a review article serves as warranty of its excellence). In the same vein, citing these authority figures is almost a must, as doing so lends credence to the publication: if nothing else, it is taken to have sound scientific foundations.

Indeed, when an article or a book bears the signature of one of these influential scholars, the quality/authority question is resolved then and there. Not that there are people whose word is taken for



law in academe, but, as the younger historian says, it's more likely that somebody who is less of an authority in the field would make a mistake than one of the well-known experts. Furthermore, as the younger political scientist points out, approaching the quality/authority issue from a wholly different angle, the writings of the central figures in a given area often present research findings with considerable 'added value': "If you compare an article written by a well-known expert in the field with that of say, a graduate student, the latter may be more fastidious in its treatment of the subject, with the literature survey up to the very latest word on the topic, the methodology really impeccable, but it lacks the inspiration and the wide-perspective of the former... if you're looking for originality of judgment, possibly controversial, but definitely thought provoking, you'd better choose the article written by the experienced, senior scholar..." However, the professor of social welfare, who, on the whole, also expresses clear preference for the works of the prominent figures in his area, nevertheless warns against basing 'a vote of confidence' solely on the author's standing: "Clearly I treat differently the work of somebody, whose contribution to the field is indisputable, than that of a fledgling, who still sports a few bits of the eggshell on his head... Of course I do, and so does everybody else... Still, it is always possible that in some of his articles the author just reiterates previous sayings, and if so, prominent or not, these articles go straightaway to the pile of 'not worth reading'."

Still, even if the name of the author in itself is not always sufficient to establish the authority and/or determine the quality of some information, it is a most important consideration. Indeed, most of the scholars interviewed cite checking out the author of a piece of information as a primary measure for determining its worth, going about it in a time honoured fashion: if it is somebody whose name is known in professional circles, if he is affiliated with a 'first line' university, with a 'good' department in the relevant area of specialisation, and especially if he also holds a senior rank, he passes muster.

As important as the author is for establishing the authority and the quality of a scholarly work, the journal in which an article is published, or alternatively, the publishing house which carries a book, can be no less, and sometimes even more significant, especially when the author is a newcomer to the field, if not to academia. Equating trustworthy and high-quality publications with peer-reviewed information, the interviewees look first and foremost for what they perceive to be first-line sources of information: refereed journals of high-standing in the scholarly community they belong to, or books carried by reputable publishing houses. True, it is possible to infer from the interviews data that today's researchers are more willing to admit that it may be advisable to add to their arsenals of information sources both publications of lower standing (say, third or fourth line journals) and the novel, web-based publishing channels, first and foremost, the pure e-journals and the repositories of electronic versions of research papers (e-prints or e-scripts); however, for many of the interviewees this new awareness is never actually put to practice (a point to be discussed in more detail later on). Thus, when judging the value of an item published via traditional, paper or paper/electronic venues, researchers greatly rely on the esteem in which they hold a journal and/or a publishing house as a very reliable indication indeed for of the quality and authority of the information on hand. As one of the two philosophers interviewed explains: "I start out [on an information seeking expedition] with the principal journals of my field... as obviously there is a correlation between the quality of the articles and the [reputation of] the journals in which they appear". In consequence, for the researcher all journals are definitely not created equal, a point which the neuro-



biologist makes abundantly clear: "One of the most important features of a piece of information is the journal in which it was published. Not that it can never happen that you encounter an article in *Science* or *Nature* which is not really up to par, but as a rule you know that an article in one of these leading journals is most probably better than a piece in a not so highly rated publication." This unwritten ranking of the scholarly journals and publishing houses is so well-known, so much part of the disciplinary culture of any given field that active researchers hardly need bibliometrics-based indicators to aid them in deciding where to publish and/or look for information of appropriate quality. Indeed, only one interviewee mentioned the impact factor, remarking somewhat in passing that it can come handy for judging the quality of a journal, and hence, the quality of the articles therein.

Summing up the conclusions to be derived from the above cited reports of the informants with regard to the process whereby the researcher determines if the piece of information on hand is of appropriate quality and reliability, it seems to be strongly indicated that it is still the well known two-tiered procedure it has always been. That is, the first selection is made on the basis of what the senior historian terms "the wrappings of the piece of information". Ranked by the professor of literature in descending order of importance, these include: the author's professional reputation and institutional affiliation and the publishing venue. If the item's "wrappings" measure up to the researcher's expectations, it undergoes further scrutiny: this time the researcher scans the document, 'zooming in' to the parts deemed relevant to passing judgment on its quality and authority, or actually reads it in its entirety. Thus, the findings as to the methods researchers utilise to assure the authority and quality of the information they use in their scholarly endeavours give rise to the following hypothesis:

**Researchers still rely on a time honoured, two-tiered process for establishing the authority and/or determining the quality of scholarly and scientific information: first selection made on the basis of authorship and channel of publication, followed by a more in-depth scrutiny of the items which have been found to merit further consideration.**

#### **4.7.2 Publications Authored by Personal Acquaintances**

The extensive discussions with the informants concerning the quality/authority aspect of their information needs threw up a rather unexpected and therefore particularly interesting question: **does it matter to researchers if a piece of information originates with people they know personally?**

Apparently, it does. According to the interviewees, publications authored by personal acquaintances are often their initial choice for meeting an information need. The computer scientist was the first to point out that he much preferred information originating with people he knew personally, but once the point was raised with other interviewees, they voiced enthusiastic support of the notion. Thus, when requested to recall if, in a recent information seeking event, the items chosen first were written by their personal acquaintances, most informants affirmed that it had indeed been the case. It seems that knowing the author personally may not be a consciously formulated rule or criterion for passing judgment on the quality/authority of some information, but it makes such eminent sense, that researchers almost intuitively



abide by it! The archaeologist explains the rationale behind it all: "If I know the author personally, I know exactly what to expect: I know his areas of interest, and more importantly, I know the worth of the information he'll give me. Oh, yes, it definitely makes a difference if I know him..." Thinking along the same lines, the younger philosopher says: "If you know the person [who wrote the piece] you know if it's worth your while spending time on reading his work. For example, if you know that he is stupid, you won't waste time on his publications, as indeed you shouldn't..." Other interviewees, such as the mathematician and the physicist to name but two, do not count being acquainted with the author among the most important considerations in establishing the quality/authority of some information, but they do assert that all other factors being equal, there is a far better chance that they will choose something written by a colleague they know personally.

Should this prove to be characteristic of scholars as a group, it would underscore the enduring relevance of social events, which serve to facilitate the forming of ties with fellow researchers, be the admittedly considerable advantages of computer-mediated communication what they may. Therefore, the next hypothesis proposed is as follows:

**If and when relevant and available the publications of personal acquaintances are often researchers' first choice for meeting an information need. Therefore, the IT based communication opportunities by no means diminish for them the importance of attending professional events, if not solely, then at least to a considerable extent for the purpose of meeting with fellow researchers.**

#### **4.7.3 Perceived Quality of Marginal and/or Innovative Scholarly Information Channels**

As it has already been noted, the scholarly communication channel figures high on researchers' list of criteria for judging a piece of information. At the price of some inevitable repetition, it is important to point out in the present context too that this is not so much out of choice, than by necessity. Judging by the evidence gathered in the qualitative phase of this study, if it were at all feasible, researchers would rather base their evaluations on features inherent to the piece of information at hand, for, as the physicist puts it, "a researcher is his own best referee." However, given the concomitant constraints of the constantly growing quantities of scholarly and scientific information, on the one hand, and the ever-increasing work-load of university-based researchers, on the other, they are so pressured for time that, reluctantly or not, they make judicious use of features extrinsic to the information content itself in judging the value of an item. Not that they find the chore itself too taxing: it goes with the territory in any case, for they are very aware indeed of the tacit, but for all that widely known and generally accepted, pecking order characterising nearly all facets of the academic scene, among which the ranking of the publishing venues is certainly one of the most prominent. Understandably so, of course, with hardly any explanation necessary, unless it is for the wholly uninitiated to the realities of life in academe, but the younger philosopher makes an interesting point in inferring from the well-known priorities of the researcher, in his capacity as author, to his preferences when he is acting as information user: "...in academe you move



ahead in your career on the basis of your publications; the better the journal, the more likely it is that the article will bring the credit you crave. Therefore, a researcher will make every effort to get his work published in journals of good reputation, and only if he doesn't get accepted in the first-line journals, will he try his luck at less important ones. In consequence, every researcher has a list of journals in which he wants to publish, and these are the ones he'll also turn to when he needs information." **The question is, of course, to what extent is today's researcher is ready to accept the more marginal and/or innovative scholarly communication channels, too, as information sources of appropriate quality?**

Apparently, at any rate to the degree that our group of informants is representative of researchers in general, researchers much prefer to search for information in sources they hold to be first rate. Accepted a behaviour pattern thus it may be, but the informants unanimously deplore that it should be so, dubbing the practice 'a mistake' and 'a fiasco', for (as the more senior historian says) "some very, very interesting things appear in obscure journals... [and] although it very rarely happens that a truly important article is published in a very marginal journal...it can happen. Sometimes there is somebody who cannot be bothered to go to these heavy, prestigious journals, with their refereeing systems, which make you wait a year before they deign to look at you, and then there are requests for corrections, and only then the decision is taken whether to publish your piece or not, and meanwhile, in the year or two it may take, the novelty of your paper wears off, and others go on publishing...that's why it's possible that articles of value will be published perhaps not in truly trivial journals, but not in the top ones either..." The younger philosopher obviously holds the exact same views: "If an article is not published in a first rate journal, you can bet on it that it hasn't been accepted in one, which, however, doesn't mean that it's no good... I know of excellent articles which were published in truly marginal journals... it may have been something to do with the author, perhaps his thesis didn't get across, or it may have been just a coincidence..." The archaeologist's experiences tally with those of his colleagues; however, unlike them, he is not much concerned with the resultant possibility of missing a piece of information of value: "There are many more journals nowadays, and people do submit their articles to the new, less established ones too, because they just can't wait the three years it takes to get published [in a first-line journal]. I don't check out many of these new publications, which means that I may not spot something of value, but what can you do?"

If the likelihood of finding information of appropriate quality and authority in more marginal publications seems to be generally acknowledged, at least in theory, if not in practice, it is far from being the case where the novel Web-based scholarly communication channels are concerned. Unlike the information to be found in the majority of formal scientific publications, the information on the Web, including the information which on the surface seems to adhere to the conventions of academe, is not always vouched for by the built-in quality controls of the scholarly communication system. Still, since the fantastic amount of information floating about on the Web is too handy to be ignored, and as some of it is truly worthwhile, scholars do sometimes turn to the Web for information, albeit with a hefty dose of caution.

As we have already seen, the Web is unparalleled where access to primary information is concerned, but it can provide useful enough secondary information, too, if not without the researcher's expending some precious time and energy on tracing it down, verifying its contents and then weighing its worth. Thus, for example, the psycho-pharmacologist often seeks out presentations given at conferences and posted on the



Web, in lieu of attending in person. Taking these posters for what they are - informal, preliminary and unvetted communications of research results - he thus gains knowledge of new developments in his field without budging from his office, an advantage he confesses to have learnt to appreciate greatly with the passing of the years. However, the young political scientist, whose priorities plainly lie elsewhere, presents the other side of the coin: "I rarely use the conference papers posted on the Web, I really don't hold with this practice at all. If it's a good paper, it will be published in a proper scientific journal, and if it's no good, it won't be published at all and good riddance." The neuro-biologist, another young scholar, also sounds rather wary of Web-based information which is not endorsed by the formal scholarly communication system: "... for the purposes of my research work..., I use a good journal, something written by somebody from a good university. I can't base my hypothesis on findings posted on the Web, which haven't been published in a journal, it's just not reliable, that's why, even if the idea is terrific, I'll still take it for something unreliable".

Indeed, neither disseminating research results by self-archiving, that is, by posting them on personal or institutional Web sites, nor publishing them in electronic-only (pure) e-journals or repositories of electronic versions of research papers seem to be regarded by the vast majority of the interviewees as acceptable. In result, these information distribution venues are also held to be inferior sources of apposite quality/authority information. Furthermore, whilst for the less experienced, and therefore less academically self-assured among the researchers the lack of scientific quality control on the Web may present an almost insurmountable problem, their more senior counterparts are probably more prepared to trust their own judgment. However, the Web seems to present an equally insurmountable problem for the older generation, the need to cope with the intricacies of search engines for efficient information seeking, or in the words of the archaeologist: "Occasionally I try to look for information on the Internet, but I get frustrated by the amount of information I get, and the difficulties of selecting from it something of value. It's such a chore to choose the good stuff in what I get that it is easier to go to the library, to browse in the books, to read, so I just go to the library".

Be the reason what it may, the end result seems to be the same: as a potential source for reliable information of scholarly value the Web is held in a rather low esteem among members of the academic research community. The professor of social welfare, for one, contends that the purely electronic journals are "usually second rate", which (for him) is even putting it mildly, especially in light of the further clarification he provides: "These journals do nothing but retell information published in the previous century." However, he does check out these publications too, "just to be on the safe side", unlike, for example, his biologist and psycho-pharmacologist colleagues, both of whom say that so far they have not used this type of e-journal, and do not plan to do so for the time being. It is interesting to note that their reluctance does not stem from any difficulties with electronic media: the psycho-pharmacologist is a particularly avid fan of novel technologies based information work, but the biologist, too, although less of an enthusiast, still puts electronics to good use in his research endeavours. Rather, they seem to be proceeding from an apparent misconception as to what these journals are all about in justifying their outright rejection of the option by pointing to the dangers of using information, which both of them believe to be published without the benefit of peer review. Admittedly, their concern is not wholly unfounded, for some pure e-journals, which appear in conjunction with experimental publishing ventures,



do indeed forego quality control, at least in its traditional form, and e-print archives mostly aim at communicating research in progress or research not yet published. In any case, although in many pure e-journals the manuscripts submitted for publication do undergo traditional peer-review processes, and in quite a few e-print repositories published research is available too, the damage to the reputation of these novel information communicating venues seems to have already been done. This, of course, has obvious consequences when it comes to a researcher's actually using a pure e-journal or an e-print archive. The communications expert of the group sums it all up, displaying a rather limited measure of enthusiasm: "...the Internet ...has some good [information], but a lot of trash too; I think that for research purposes it contains more trash than anything else, and I would never use any of it without closely inspecting it first".

The exceptions to this 'rule' seem to be the physicist and the younger philosopher, who specialises in philosophy of the sciences, both of whom report intensive utilisation of the e-script repositories. That the only two interviewees to do so should be those involved with physics research is of course very much in line with Kling's (2004) reasoning, who suggests that the use of e-script repositories is confined to a minority of academic disciplines, in which certain features characterising customary research work-practices encourage communication via unrefereed e-scripts. However, although both interviewees happily avail themselves of these innovative information services, with the physicist actually describing his routine usage as being 'hooked', they seem to be very cognisant indeed of the perils entailed by indiscriminate use of information distributed this way. "These electronic archives are definitely no substitute to a regular journal", says the philosopher. "For example, if you log in today and find a pertinent article, tomorrow you may discover that it is no longer there, in all probability because the author has decided to retract it for corrections... an item posted there has not been refereed, so you've got to be very careful, you can't trust the information too much..." Obviously, this very partial and cautious opting for communication via unrefereed e-scripts needs to be further investigated in order to be able to tell if it is actually heralding an impending change in researchers' information seeking behaviour.

The conclusion to be derived from the qualitative findings presented here is that today's researchers may be aware of the possibility that information of quality and authority will be found via more marginal and/or innovative scholarly communication channels, but they manifest very limited willingness to actually put to practice this realisation. Furthermore, when they do so, it is with a great deal of wariness. Thus, the next hypothesis to be submitted to further investigation is as follows:

**Today's researchers are rather apprehensive about the quality and authority of the huge amounts of scholarly information readily accessible to them. Thus, they approach publishing venues not perceived to be top quality, or novel, Web-based ones (pure e-journals, personal or institutional Web sites, e-print servers) with limited willingness and great caution.**

To sum up the first insights gleaned into the authority/quality aspect of contemporary researchers' information needs and practices:



**Table 4.7: The Authority/Quality Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	The traditional measures for establishing the authority and/or determining the quality of scholarly and scientific information (authorship and channel of publication) are still the only ones in use; moreover, they serve the researcher's purposes as effectively as ever.	Researchers still rely on a time honoured, two-tiered process for establishing the authority and/or determining the quality of scholarly and scientific information: first selection made on the basis of authorship and channel of publication, followed by a more in-depth scrutiny of the items which have been found to merit further consideration.
<b>Hypothesis no. 2</b>	If and when relevant and available the publications of personal acquaintances are often researchers' first choice for meeting an information need. Therefore, the IT based communication opportunities by no means diminish for them the importance of attending professional events, if not solely, then at least to a considerable extent for the purpose of meeting with fellow researchers.	If and when relevant and available the publications of personal acquaintances are often researchers' first choice for meeting an information need. Therefore, the IT based communication opportunities by no means diminish for them the importance of attending professional events, if not solely, then at least to a considerable extent for the purpose of meeting with fellow researchers.
<b>Hypothesis no. 3</b>	Although in accordance with the widely accepted norms of the prevalent system of scholarly communication the quality and authority of a piece of information are held to be in direct correlation with the reputation of its publishing house or journal, the researchers are now becoming growingly aware of the possibility that scholarly information of value may be found in novel and/or more marginal publishing venues, which, however, does not mean that they act upon this new understanding.	Today's researchers are rather apprehensive about the quality and authority of the huge amounts of scholarly information readily accessible to them. Thus, they approach publishing venues not perceived to be top quality, or novel, Web-based ones (pure e-journals, personal or institutional Web sites, e-print servers) with limited willingness and great caution.

## **4.8 First Insights into the Date/Currency Aspect of Researchers' Information Needs**

### **4.8.1 Need for Current Information: Scientists and Social Scientists**

As previous research clearly indicates (Garvey et al., 1970; Garvey, 1979; Garfield, 1980; Line, 1969, 1973), scientists relentlessly clamour for the very latest information, inclusive of information on research still in progress, and usually limit their information seeking to no more than five years back. Social scientists, too, although far more relaxed in their efforts to follow the progress in their areas of interest,



nevertheless see to it that they keep current. Also, much like their scientist counterparts, they seem to need mostly relatively recent (no more than a few years old) material. **But do these patterns continue to hold true? Do scientist and social scientist researchers still consider access to current material the mainstay of their work, with their need for retrospective coverage limited to relatively recent information?**

In keeping with the reputation ascribed to them, the scientists among the interviewees repeatedly note that they are constantly on the lookout for the most recent information available, and that in result, they are highly appreciative indeed of the Internet's capabilities for rapid transmission of new information. Even when they need retrospective information, usually for the literature review of a new article, they seldom go back further than three, but at most five years, which, they claim, is the accepted norm in their disciplines. Furthermore, they seem to regard this need for currency in their information supply as patently obvious, axiomatic even, an inseparable part of their disciplinary culture; the psycho-oncologist, for example, says that more than once she has been called to order by a referee who remarked on her neglecting to cite a new article of relevance to her work "despite it's having been out for as much as three months". Heartily disliking the note of scorn, especially as she is wholly undeserving of it (if a journal does not have an electronic edition, it takes about three months for the latest issue to reach Israel), she nevertheless wholeheartedly agrees with the referee that keeping up with the latest findings is a real must because of the fast obsolescence of knowledge in her field: "...the world of medicine is one of the most rapidly changing, one of the most dynamic... whatever held true five years ago is more or less rubbish by now...just like my PhD dissertation, which is all but ready for the bin by now, since the huge progress in the prevention of the side effects [of chemotherapy for cancer] has rendered all I had to say on the subject of patients' coping with the treatments very much outdated..."

The social scientists among the study participants may be less concerned with getting hold of the latest research as soon as they get wind of its existence, but they still leave no doubt as to their ongoing need for current material. Also, they too seem to have only very limited use for any information more than a few years old. The economist, for example, whilst discussing the way he goes about organising his private library, notes in a very matter of fact manner, as if stating the obvious, that he weeds out any item after a few years: if the information therein is a significant addendum to the extant knowledge on the subject, it is sure to have been incorporated by then into the reviews and/or textbooks routinely generated in his field, with the original information thus put in its wider context and made far more palatable, so that there is no reason whatsoever to hold on to the original article. The other social scientists interviewed also testify to limiting their information seeking to a few years, ranging from the three (for a small project) to five (for a large project) year span, reported by the communications researcher, to the ten year span, cited as the norm in his field by the expert on social welfare.

The most notable exception to scientists' and social scientists' need for relatively recent information seems to be the salient works on a given topic. Apparently, in every field there are key publications, which, having shaped the course of research left an indelible imprint on its development. "These are the most important works on the subject, the corner-stones of a knowledge area", says the biologist, "which everybody seems to remember and cite, no matter when they were written. Therefore, I cannot say that I

only need current material, sometimes I may go back as much as fifty or sixty years for the basics." Indeed so, as the psycho-oncologist affirms: "I'll take the last five years, as it's customary in my field... unless it's a key article, which I'll use even if it was written in the eighties." In the same vein the physicist estimates that about ninety percent of the time he only needs the very latest information, although every now and then he does seek out 'the information at the roots of the work currently being done'.

Another instance when it is relatively unimportant for scientists or social scientists if some information is current or not, is when they want to learn the workings of a particular technique, calculation or method. Thus, both the physicist and the biologist talk of the lasting validity of articles, which proffer and describe for the first time some scientific procedure. The psycho-pharmacologist, too, says that there is information which retains its relevance throughout the years, although he maintains that it is the exception, rather than the rule: "The research on the topic I'm working on started out in the 1970s; the question asked then is the question I'm still asking now, there have been no new techniques developed since then, which might have made the techniques used then passé, so why should I ignore the articles written on the subject thirty years ago?"

In light of these reports on the currency aspect of scientists' and social scientists' information needs, the next hypothesis to be advanced is as follows:

**Today's scientists and social scientists exhibit unchanged levels of need for current information (crucial to the former, somewhat less imperative but still central to the latter), and, in view of the high obsolescence rate of the information in their areas of interest, follow traditional patterns in limiting their information consumption to no more than a few years old material.**

#### **4.8.2 Need for Current Information: Humanists**

Up to this point the findings of the present study do not seem to indicate that anything much has changed as to researchers' currency requirements in their information work: the scientists still seem to manifest the very same pressing need for the latest information they traditionally have been associated with, the social scientists still seem to maintain a somewhat more serene, but still adamant enough attitude to the matter, and for both the 'shelf-life' of information usually seems to be limited, with no change from the past, to a few years. **And the humanists? Do humanities researchers still consider having retrospective coverage more important than having access to current material?**

The evaluation of the reports of the humanists among the participants held a surprise in store: it seems that these days they no longer demonstrate the composed, if not outright complacent approach to keeping up-to-date, which has been traditionally associated with their work habits (Garfield, 1980; Reagor and Brown, 1978; Stone, 1982; Weintraub, 1980). Apparently, although they continue to value greatly the contribution of retrospective information to their investigations, they now want the latest information, too.



Apparently, they do not have much of a choice. For one, if in the past obsolescence in humanities research was an almost unheard of phenomenon, with new research usually supplementing rather than superseding previous knowledge, nowadays there seem to be instances of information becoming obsolete. As the senior historian puts it: "...in the humanities too, in history, philosophy, theology, there is so much research going on that now, and it was not so in the past, material does become obsolete...A significant part of this innovative research truly sheds new light [on the issues being considered], provides us with further understandings and different approaches...some humanities research done ten, fifteen years ago has simply become obsolete and it never used to be the case! So you can't say today 'I don't get to the recent work in my field', it won't hold water, because in most every area there are some new, very central, very important works, which have changed in one way or another the concept, the outlook, the understanding, the whole information infrastructure." The archaeologist's testimony lends further support to the historian's description: "Without a doubt, a book published, say, in 1932 is worthless by now... you can't use the information in it, because it is no longer correct... at least in archaeology information does become obsolete, the dates given are wrong, the facts are incorrect... I have in my private collection some older books, but not one line therein is still valid..."

The expert on the philosophy of the sciences, whose research touches upon the variations in scientific approach customarily taken in the different knowledge domains, claims that in any case obsolescence in humanities information has always been as inevitable as in science or social science information. Musing on the phenomenon from the special perspective afforded by his expertise, the explanation he offers is along the following lines: the relevance of older material depends on the question being asked. If it is a question which has already been answered satisfactorily, nobody, except historians, need to return to the material written on it. After all, who cares what tentative answers had been offered before the ultimate solution was finally found? On the other hand, if it is a question still awaiting adequate explanations, everything written on it is still important; the blind alleys as well as the new paths leading to possible ways out, everything. However, seeing that in the humanities no question can ever be said to have been given the ultimate answer, his theory does not in fact account for the phenomenon of obsolescence of humanities information. Indeed, the younger historian's account of his latest research project seems to fly in the face of his argumentation: "What Eli and I are working on right now is a scientific axiom that we think is mistaken; we approach [the issue] from a different perspective..., from an entirely different angle... The fact that a certain event has been researched doesn't mean that it's the end of the road: some new material coming to light, a new concept... a new methodology [can re-open the scientific discourse]." Obviously, then, since no scholarly query can ever be said to have been answered with definitive certainty, especially not in the humanities, information can be thought no longer valid or correct, and hence obsolete, but only until proven otherwise; that is, obsolescence of scholarly information is in fact a reversible process.

Be it as it may, the professor of literature points to a different aspect of the phenomenon. Maintaining that obsolescence in humanities information does indeed exist, he traces back its origins to what, according to him, is not so much research-work associated 'real' needs, but disciplinary-culture dictated behaviour. Apparently, in these days of easy access to information no humanist worth his or her salt can rely solely or even mostly on older material, for fear of being branded old-fashioned and 'out of it'; no laughing

matter, since "the chances of getting published are much better if the research is grounded in the newer works." Surely a strong incentive for humanists, too, to be increasingly mindful of new publications, which does not mean, however, that their regard for older material is liable to diminish in any way.

If indeed these days humanists manifest a more pressing need for current information, this is bound to have an impact on their information behaviour, a most interesting postulation to be followed up. Meanwhile, the tentative hypothesis emerging from the data gathered up to this point is as follows:

**Today's humanities researchers demonstrate a lesser degree of the complacency traditionally ascribed to them with regard to the need to keep up-to-date and to obtain the latest information on a subject, although time-depth is still a major characteristic of their information needs.**

#### **4.8.3 Value of Original Publications**

It must be one of the more commonly held truisms, at least where the sciences are concerned, that once some new information is subsumed in the general body of knowledge on a given topic, the original publication announcing it can forever be dispensed with. True, for humanities researchers such first pronouncements of groundbreaking information may in point of fact constitute primary material, the foundation on which they build their subsequent contributions to the cultural heritage of mankind, which, therefore by definition never can become expendable for them. Thus, for example, the philosopher says he could never substitute an article summarising, say, Plato's thinking for reading the works of Plato, and not only because the reviewer may have misunderstood the great philosopher or made a mistake in interpreting his work, but also because he is constantly on the lookout for previously unnoticed insights, which obviously can only arise from the original text. In the sciences and social sciences, however, researchers have no reason to locate the original publications; they can use instead a reliable summary of the progress made so far. Or can they? Seeing that researchers have the past information on their subjects conveniently encapsulated for them in a good review article or literature review, when (if at all) do they need original publications?

Surprisingly enough, the qualitative findings of the present study seem to indicate that some modification of our customarily held beliefs on the issue may be in order. Apparently, there are instances when going back to the original publications is important if not essential in the sciences or social sciences too, as the mathematician explains: "I've often found that if I encounter some difficulties in understanding something, then the original article, the one which first reported the breakthrough on the issue I'm trying to understand... clarifies things for me. Since the original article explains what the author really wants to do and how he goes about it, it gives you a different perspective. In the books subsequently written on the subject you find all sorts of things he never thought about when he wrote his article, and the improvements made on his initial notion, but you are better able to understand the original idea, the message nobody had come up with till then, when it is being described for the first time". The biologist echoes in his testimony the gist of his colleague's thinking: "Even if I have a good review article, I go



back to the original articles... because they put things in order for me". To what extent the reports of these two informants reflect the attitude and consequent behaviour patterns prevalent among scientists and social scientists, remains to be seen. Still, it does yield a hypothesis worthy of further exploration:

**Although a review article and/or a good literature review in a new publication provide the researcher with a concise summary of the salient developments in a given field, the original publications are still vital for a thorough appreciation of a subject.**

To sum up the first insights gleaned into the date/currency aspect of contemporary researchers' information needs and practices:

**Table 4.8: The Date/Currency Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Today's scientists and social scientists exhibit unchanged levels of need for current information (crucial to the former, somewhat less imperative but still central to the latter), and follow traditional patterns in limiting their information consumption to no more than a few years old material.	Today's scientists and social scientists exhibit unchanged levels of need for current information (crucial to the former, somewhat less imperative but still central to the latter), and, in view of the high obsolescence rate in their fields, follow traditional patterns in limiting their information consumption to no more than a few years old material.
<b>Hypothesis no. 2</b>	Today's humanities researchers demonstrate a lesser degree of the complacency traditionally ascribed to them with regard to the need to keep up-to-date and to obtain the latest information on a subject, although time-depth is still a major characteristic of their information needs.	Today's humanities researchers demonstrate a lesser degree of the complacency traditionally ascribed to them with regard to the need to keep up-to-date and to obtain the latest information on a subject, although time-depth is still a major characteristic of their information needs.
<b>Hypothesis no. 3</b>		Although a review article and/or a good literature review in a new publication provide the researcher with a concise summary of the salient developments in a given field, the original publications are still vital for a thorough appreciation of a subject.

## **4.9 First Insights into the Speed of Delivery Aspect of Researchers' Information Needs**

### **4.9.1 Expectations for Speedy Meeting of Their Information Needs**

As Nicholas et al. (2003) suggest in their analysis of information seeking behaviour in a digital environment, today's information consumers are interested above all in speed of delivery, and academics are no exception. **But how quickly is 'quickly' for today's researchers? What are their expectations as to the speed with which their information needs are to be met?**

Plainly, it is not that all academic researchers invariably have to have their information needs met in real time, or even with a high degree of urgency, but the standards they are used to by now as to the speed with which information can be delivered to their doorsteps certainly would not go down very well with librarians of the old school, whose idea of a prompt information service is putting a book on the shelf within three months or so of the request made for its acquisition. The computer scientist, for example, admittedly of the ilk constantly preoccupied with 'getting there' faster than his colleagues, thinks nothing of setting the standards of speedy information delivery very high indeed when he says: "Who has the patience to sit and wait for an hour until the information arrives?" However, his historian colleague, in whose disciplinary culture a relatively more relaxed pace of work is understood to be the rule, also seems to expect no less than an immediate response to his information needs. Obviously measuring his lot against the norms characterising the electronic generation, he grumbles good-naturedly that downloading a PDF format document is an exercise in patience; it takes so long, that he always goes out for a cup of coffee while it slowly metamorphoses into an article on his screen... No more than a few years ago obtaining the very same document would have taken him far longer, but those prehistoric times are long forgotten. In these times of electronic access to information, 'quickly' seems to be no less than 'immediately'; not 'in a few minutes', not 'soon', now! Thus, the first hypothesis to be advanced on this aspect of researchers' information needs is:

**In view of the easy availability and wide accessibility of the host of resources, channels and facilities, which enable the transferring of information from one end of the world to the other in a matter of seconds, today's researchers have high expectations as to the speed with which their information needs are to be met.**

### **4.9.2 The Determinants of the Urgency with which an Information Need is to Be Met**

If truth be told, researchers' looking forward to as swift a response as possible to their information needs is by no means simply a matter of their availing himself of what there is for the taking; actually, more often than not it is a very real need, part and parcel of the more wide-ranging need to produce and announce the results of their work quickly. **What are then the determinants of researchers' perceived degree of urgency in fulfilling their information needs?**



Perhaps the most compelling reason for obtaining information fast is that its lack halts the progress of work on a research project, as the senior historian explains: "When you are in the midst of this process of investigation and analysis, and you get to a certain link which seems to be missing, you go to your information reservoir...if you find your answer there, then you can continue with your work, but if it's not there, and you can only get what you need later on, you're stuck at the point you've reached until you do... So the velocity of the information flow is indeed immensely important for people engaged in intensive research work..." True, as it has already been pointed out, it is always possible to circumvent the problem by forming temporary hypotheses until the necessary information is located, but it is hardly the ideal solution; being able to get what you need straight away must be so much better... Indeed, the younger historian, too, considers speed of information delivery a key requirement for successful research work. Equating it with electronic accessibility, he pronounces: "If I don't have the information on-line, I have to go to the elevator, wait a long time, go down to the library, only to discover when I finally get there that somebody has just checked out the item without which I'm unable to continue working. It can mean a waste of three, four, five days of work, though I can always do something else." No doubt he can, though he sounds rather unhappy about it, as he usually prefers to focus on one problem at a time.

No wonder then, that the need to obtain some necessary information promptly can be a very pressing one, so much so, that some informants are prepared (and have actually been known) to dedicate some of their hard come by research funds to speed up the process of obtaining the information they set their hearts on. Still, there do seem to be instances when researchers can afford to view the issue with a measure of equanimity; in fact it is possible to infer from the interviews data that there may be a correlation between the pressure on scholars to arrive at demonstrable and publishable results, and the importance they accord to the speed with which they can lay their hands on the information necessary to aid them in accomplishing this goal. The soundness of the proposed correlation, which sounds plausible enough to anyone familiar with the realities of academia, undoubtedly needs further corroboration, but it is hardly attributable to a mere coincidence that the participants, each unbeknownst to any of the others, of course, associate the enhanced importance of speedy access to information with circumstances in which research results have to be achieved relatively quickly.

The economist posits that in countries where research funding is not directly linked with scholarly output (Israel is a case in point), scholarly work is done at a relatively leisurely pace, at least once the pre-tenure/beginning stages in the career of an academic, in which he or she is expected to publish copiously and quickly, are over and done with. Therefore, he maintains, beyond this initial period in their professional development, there is no real justification for researchers to demand urgent provision of information; "after all", he says, "we don't work from today to tomorrow... if my next conference is in June, I'll meet the colleague I'm collaborating with in February or in March, plenty of time till then... and if the article comes out a year later, so what?" The psycho-oncologist too sounds unperturbed at the prospect of possible hold-ups in her obtaining the information she needs, attributing her relative complacency to her having devised a system to get around such interruptions: she always does her information gathering way in advance, and in consequence, any reasonable delay in obtaining a piece of necessary information entails no adverse effects for her work.

In stark contrast, their scientist colleagues, most notably the physicist and the computer scientist, speak of their (and their colleagues') constant burning need to get hold instantly of any information which may be relevant to them; nonetheless, they too point to the pressures of scholarly life, albeit in their case pressures of a more ongoing nature, as possible explanations to the phenomenon. "When somebody comes up with an idea", says the physicist, "it may very well happen that simultaneously five others in the world come up with the same idea. You want the idea to be chalked up to you, but if somebody precedes you, you can't very well say that you've done it too. If you look at it from this angle, there is a definite need in my field to obtain information quickly". Thinking along the same lines, his computer scientist colleague also traces the hue and cry for speedy delivery of information characteristic of his professional milieu first and foremost to the previously discussed highly competitive disciplinary culture of the sciences, which is obviously not very conducive to tranquillity in any aspect of the work being done, inclusive of its information gathering component: "if you want to overtake the others... being too slow in your writing [and consequently] in your publishing... can be detrimental to your progress, because somebody may come up with the same idea that you work on, so being nippy has its advantages ..."

It is interesting to note, however, that beating your professional rivals is apparently just one aspect of the haste inherent in the scientific enterprise; the other side of the speed coin, at least in the specific case of the computer sciences, seems to be the need to be efficient at all times and in all respects, or as the computer scientist puts it: "I strive for efficiency; anything slow is inefficient and as such, irritating. My wife likes to recount how in the university cafeteria, where there is a choice of two soups, one chock-full of vegetables and noodles, but more expensive, and the other watery and unappetising, but cheap, computer scientists unfailingly opt for the low-priced alternative, because it is the more cost-efficient choice. And what about the pleasure factor? Well, for computer scientists that doesn't enter into it... That's how we are, that's the way things are in our field; we try for maximum efficiency. We relentlessly struggle to improve our solutions... constantly seek to find ever-more efficient ways to solve the very same problem... so anything inefficient gets on our nerves, really offends our sensibilities..."

Of course, the need to expedite the access to information truly assumes vital importance when the researcher is under duress to demonstrate concrete achievements, which, in academe, inevitably means publishing, and then publishing some more... The younger political scientist pinpoints one of the more obvious junctures in a researcher's career when speedy delivery of information plays a potentially significant part in his progress: "Academics in the beginning stages of their careers, especially those not yet tenured, are constantly pressured for time; they need to publish as much as possible, as quickly as possible. This pressure to publish, and as one of its components, the pressure for information, are thus contingent upon one's academic rank, and they are undoubtedly more pronounced for whoever is not tenured". Not that once the researcher attains the coveted tenure or the full professorship, he or she is forever exempt from any further pressure to publish at an accelerated pace, and in consequence, from any urgency in obtaining the information needed for the purpose. Hardly so, as the archaeologist is quick to point out: "I'm beleaguered these days with the need to finish the research I'm currently working on, since I'm about to take my sabbatical and then I'm due for retirement, and there are quite a few projects I'd like to finish in peace before I do, I don't want to leave unfinished business. Thus, at the moment I really can't afford the luxury of waiting for information to arrive; it'll hold me up unnecessarily..."



The expert on social welfare goes even further than that; contending that working under pressure is inherent to research work, he believes that in consequence the swift meeting of information needs is an enduring prerequisite in academe: "Even when you already have a reputation in your field, you still feel that you're under pressure to publish quickly, and therefore, [you also feel under pressure] to obtain information quickly... First of all, I think that in academe you're socialised to work under pressure, so when you no longer need to do so, you're already 'infected', so you keep working in the same manner. When you work on something, you always want it either validated or refuted so that you can get going, and this is not contingent on your academic rank, it's just how our work is. Also, when you're in the midst of developing something, you don't want to defer gratification for lack of information. Thus, there's always an element of immediacy in research work... we too work in an emergency room, only it's a virtual one, existing only in our heads. All of the above give rise to the next hypothesis:

**Researchers' perceived need for speedy access to information is in direct correlation to the extent to which they feel compelled (for extrinsic or intrinsic reasons) to produce and announce the results of their work quickly.**

#### **4.9.3 Compromising in Research Work for the Sake of Speedy Delivery**

One last question of interest in this context: **is speed of delivery an important enough consideration for researchers to justify their compromising on other attributes of a piece of information?**

Apparently, although some researchers apparently feel the need to expedite the processes of obtaining information more keenly than others, it is hardly the overriding consideration for any of them. All of the interviewees deny vehemently that they would be prepared to compromise, say, on the quality or intellectual level of some information in exchange for its quick availability. Thus, for example, the physicist maintains that he would never make do with whatever information he can quickly lay his hands on in lieu of taking the time and trouble of going to the library, even if it means giving up altogether on a worthwhile idea: "I may very well have an idea which necessitates that I go to the library. Now if I don't have the time or if it's too much trouble, it's not that I'll write the article without information, but I may decide that I won't try to solve the problem [at all]..." True, eighteen interviewees cannot be taken to represent faithfully the scholarly community in its entirety, but their unanimous denial that speed of delivery can compensate for otherwise lacking qualities of some information is still indicative.

There is perhaps one slight amendment to be made to the decisive stance taken by the researchers interviewed concerning the possibility of compromising for the sake of speedy access to information. Apparently, when the need for information cannot be met quickly enough, the abstract, usually available long before the item itself, suffices to provide the researcher with a temporary solution. The archaeologist, for one, routinely makes do with the abstract if he needs information quickly, as does the psycho-oncologist, who says: "If there's an article on the topic, which I haven't seen... I know by the abstract what goes on there, so... I can finish my article. Then, when the article gets in, I ... check it out to make sure that it really is what it is supposed to be... and that's that".

The next hypothesis summarises then this overall reluctance to compromise on the various attributes of a piece of information for the sake of obtaining it quickly:

**Even when researchers express a need to expedite the processes of obtaining information, speed of delivery is never a paramount enough consideration for them to justify their compromising on the more central attributes of a piece of information, such as its quality or intellectual level. Still, when the need for information cannot be met speedily enough, the abstract is an adequate interim solution.**

To sum up the first insights gleaned into the speed of delivery aspect of contemporary researchers' information needs and practices:

**Table 4.9: The Speed of Delivery Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	In view of the easy availability and wide accessibility of the host of resources, channels and facilities, which enable the transferring of information from one end of the world to the other in a matter of seconds, today's researchers have high expectations as to the speed with which their information needs are to be met.	In view of the easy availability and wide accessibility of the host of resources, channels and facilities, which enable the transferring of information from one end of the world to the other in a matter of seconds, today's researchers have high expectations as to the speed with which their information needs are to be met.
<b>Hypothesis no. 2</b>	Researchers' perceived need for speedy access to information is in direct correlation to the extent to which they feel compelled (for extrinsic or intrinsic reasons) to produce and announce the results of their work quickly.	Researchers' perceived need for speedy access to information is in direct correlation to the extent to which they feel compelled (for extrinsic or intrinsic reasons) to produce and announce the results of their work quickly.
<b>Hypothesis no. 3</b>	Even when researchers express a need to expedite the processes of obtaining information, speed of delivery is never a paramount enough consideration for them to justify their compromising on the more central attributes of a piece of information, such as its quality or intellectual level.	Even when researchers express a need to expedite the processes of obtaining information, speed of delivery is never a paramount enough consideration for them to justify their compromising on the more central attributes of a piece of information, such as its quality or intellectual level. Still, when the need for information cannot be met speedily enough, the abstract is an adequate interim solution.



## **4.10 First Insights into the Place of Publication/Origin Aspect of Researchers' Information Needs**

### **4.10.1 Globalisation of Research Information Needs**

As Smeby and Trondal (2003) point out, the long tradition of academic research transcending national boundaries has gained momentum with the general globalisation trends. And, plainly, the increasingly widespread availability of information and communication technologies has not only enabled and underpinned but also further accelerated the internalisation of research. **Have today's researchers become more global in their information needs, too, in consequence?**

Today's research activity certainly seems to have moved into the worldwide arena, as the computer scientist, perhaps taking a trifle extremist stand, sums it all up in saying: "Today research is wholly international...if it's not international, it's not research, it's nothing; it's worthless." However, international communication has never been, nor is it now, a two-way or reciprocal process: the literature of some countries is generally held in higher regard because of the quality and size of their research, with the research output of others, whose scientific activity is more low-key, held in lower esteem (Arunachalam, 1992, 1999; Nicholas, 2000). This is such an ingrained principle in academe, that a departure from the consensus had not been expected, and indeed, none was detected at this stage of the study. Undoubtedly, the informants are of one mind in regarding the Anglo-American world the hub of contemporary science and scholarship, and as such, today's principal fountainhead of learned information, although as a rule, publications appearing anywhere in the Western world are deemed at least worthy of consideration. Apparently, for some of the informants, all of whom, it is interesting to note, belong to the sixty-one plus age group, which may (or may not) be a coincidence, this is more or less as far as they are prepared to extend the span of their attention. Thus, both the professor of psycho-pharmacology and the professor of literature, regardless of their polar disciplinary cultures, profess to a pronounced partiality to information originating in the Western world: "If the author is unfamiliar to me", says the former, "and all I know is that the information originates from a third world country, as compared to another article where I likewise don't know the author, but he is from the U.S., it would definitely influence the decision I take. Whoever doesn't come from the Western world has got to prove that he has something more worthwhile to offer than somebody from the States". Obviously on the same wave length as his psycho-pharmacologist colleague, and sounding rather apologetic about it, too, the professor of literature says: "In my field, there's quite a lot of information coming from India, and somehow I have this somewhat derogatory attitude toward it; I keep expecting that it won't be all that significant. I don't know how justified I am for thinking so; I can't say I've read the piece and found it superficial, but my expectation is not the same it would have been were the author from the U.K. or the States or Holland. In fact, in India they have great English, we don't come near their level, and yet I have the feeling that whatever they write in India can't be serious. Part of it is the quality of the book: you see how cheap it is, both the paper and the print, and on the spot your expectations drop, it's not right, there's no justification to it, but that's how it is. You see something from Princeton or Oxford, and immediately think it's God knows what, although that's not always the case, not at all, but it certainly influences us".

Still, the contemporary researcher seems to be opening up to information hailing from other countries, too, as the expert on social welfare testifies: "The truth is that most of the salient items are published in the U.S. and Britain, but here and there, there are exceptions... For example, I'm amazed at the high quality of recent Eastern European publications". The biologist, too, sounds receptive enough to information not published in the Western world: "Western Europe and the U.S. are undoubtedly the core [sources of scientific information], but there is literature published in Australia, Japan, Russia (especially since as of late they have been publishing in English), South Africa, which certainly has to be taken into account too. Oh, yes, if it's relevant, I'll definitely use information published outside Europe or the States as well". The mathematician even claims, that as far as he is concerned the country from which an item of information originates "is immaterial, it simply doesn't matter". However, he also points out that this attitude of his is not often put to test, for "if a journal is published in, say, a third-world country, there's a good chance that you've never heard of it and it's not in the library either, so you probably won't go out of your way to read an article appearing in it".

Obviously, the findings in this qualitative phase of the study cannot be taken for definitive conclusions. However, the above described tentatively emerging trends, should they turn out to be more generalised, could certainly have interesting ramifications for providers of information services. After all, today's library collection development policies are as often as not based on the unwritten rule that scholars and scientist need only information published in the Western world, which may prove to be no longer as well-founded a notion as it used to be. In any case, the evidence tentatively points to contemporary researchers having become more global in their information needs. Thus, the next hypothesis advanced is as follows:

**With the trend towards the internationalisation of research, researchers have become more global in their information needs, more readily accepting information hailing from countries on the periphery of scientific and scholarly activity.**

#### **4.10.2 Proficiency in Languages**

Another problem associated with the country/place from which research information originates is what seems to be the most obvious of them all: the language barrier, which may thwart the attempt to read the literature of another country. According to the academics interviewed, although much of the research activity carried out worldwide is reported in English, considerable quantities of information are published domestically and in the local language, too. Indeed, the communications person, for one, greatly laments the ways of the French scholars, who "keep themselves so carefully secluded that they hardly ever publish in English". Indeed, English is truly the Esperanto of our times (only plainly far more thriving than the original has ever been), so much so that the computer scientist actually considers not having English a disability, and the mathematician likens it to not being able to breathe. **Is proficiency in languages other than English still considered necessary then in today's global village of scholarship?**



Apparently, it is. The interviewees still see lack of proficiency in other languages detrimental to their work; perhaps not always seriously damaging, but certainly disadvantageous. And yet, surprisingly enough, for it has been singled out by some of the informants as the only (!) barrier to their information needs being adequately met, they do not sound too anxious to remedy the situation, and not without some justification.

The psycho-oncologist is a case in point: "The only barrier I can think of is that I can't read material written in French, Spanish or Italian... Here and there it could contribute an additional facet [to the picture I present], although the whole of the Western world these days is centred on the U.S. and the U.K... [Moreover], when somebody publishes in his native tongue, in local journals...it is inevitably less of a contribution, just like in our case with Hebrew... What you really want is to present your work to the international scientific community, to measure up to the standards set by the scientific community, which today begins with publishing in English... If an author did not publish his work in English it's probably not because he hadn't wanted to, but because his work was rejected...."And yet", she concludes, "despite the fact that there's so much information in English that for every foreign language publication on a subject, which I can't read, there are ten which I can, and possibly better ones too, I still would prefer it if I knew other languages..."

The psycho-pharmacologist, who obviously holds the same views, bases on them an even more far-reaching information seeking policy: "I think that if a research work were worth anything, if it were a significant contribution, the researcher would have seen to its being published in English; so I never bother to search for articles in German or in French." In any case, as the archaeologist points out, nowadays even if the article itself is not in English, there is bound to be an English abstract appended to it; therefore the researcher can have a very good idea of what it is all about, and if need be, either have the article translated for him, or contact the author for further details.

However, the two political scientists and the communications expert sound far less sanguine when they talk of the problem incurred by their having only Hebrew and English, and no wonder; for them it means that every now and then their information needs cannot be met, at least not adequately, to the detriment of their research work. The communications scholar actually speaks for all of them when he says: "I only know two languages, Hebrew and English, and it's an obstacle in my research, a real obstacle... I'm very interested in Germany... their constitutional organisation, both from the legal and the political point of view is probably the best achievable... [However,] I don't read German, and they hardly ever translate themselves... two, three, four, five publications in my field have been translated, and they are the most important ones, but you can't understand a legal system without knowing the language... To me my ignorance is a great hindrance, I feel like an illiterate person, an ignoramus... it's a real obstacle, because knowing English doesn't always suffice..."

Thus, the next hypothesis arising from the qualitative evidence is as follows:

Although owing to the trend toward the internationalisation of science and scholarship, much of the research activity carried out worldwide is nowadays reported in English, considerable quantities of information are still published on the national level too; in result, lack of proficiency in languages other than English is seen as detrimental to research work, inasmuch as it constitutes a barrier to the adequate meeting of research information needs.

To sum up the first insights gleaned into the place of publication/origin aspect of contemporary researchers' information needs and practices:

**Table 4.10: The Place of Publication/Origin Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	With the trend towards the internationalisation of research, researchers have become more global in their information needs, more readily accepting information hailing from countries on the periphery of scientific and scholarly activity.	With the trend towards the internationalisation of research, researchers have become more global in their information needs, more readily accepting information hailing from countries on the periphery of scientific and scholarly activity.
<b>Hypothesis no. 2</b>	Although owing to the trend toward the internationalisation of science and scholarship, much of the research activity carried out worldwide is nowadays reported in English, considerable quantities of information are still published on the national level too; in result, lack of proficiency in languages other than one's mother tongue and English is seen as detrimental to research work, inasmuch as it constitutes a barrier to the adequate meeting of research information needs.	Although owing to the trend toward the internationalisation of science and scholarship, much of the research activity carried out worldwide is nowadays reported in English, considerable quantities of information are still published on the national level too; in result, lack of proficiency in languages other than one's mother tongue and English is seen as detrimental to research work, inasmuch as it constitutes a barrier to the adequate meeting of research information needs.

#### **4.11 First Insights into the Processing and Packaging Aspect of Researchers' Information Needs**

##### **4.11.1 The Move to Electronic Information Work**

The first question that comes to mind in the context of the processing and packaging aspect of researchers' information needs is, of course, to what extent contemporary researchers are inclined to incorporate the novel electronic information services in their work. However, before attempting to



answer the question just posed, it is perhaps advisable to note a point of considerable relevance. The lack of an appropriate technical infrastructure, or to be more specific, the scarcity of equipment and access to networks, once a major deterrent to the adoption of IT-based work methods in academe, no longer seems to pose any problem whatsoever, at least not at the University of Haifa (which, however, is rather typical of a modern-day Western-world research university). True, the absence of continually available technical support can pose a truly exasperating problem, as the doleful account of the communications scholar amply demonstrates: "Your PC comes to a halt; you can't work on it... So now, how do I get to all my information sources? So if it happens in the U.S., your PC is taken for repair and until it's fixed you're given another PC as a substitute for yours, so you don't have to deal with not having your computer, not even for a minute, God forbid... but first they call to make sure that the repairman comes when you're out of your office, so it's no interruption to your work... Here I'm told to bring in my PC to the shop at a time convenient to the repair people, and it takes two-three days for them to see what's wrong with it, and meanwhile I have to manage without a computer, and if they fail to solve the problem, they'll send the PC to the manufacturer in the States, and it'll take a month, a month and a half until I get it back..." Fortunately, however, the essential prerequisite for effective use of electronic information services, an appropriate technical infrastructure, is, on the whole, in place.

Coming now to the gist of our concern here, electronic information work seems to have become rather normative in the academic community. Among the admittedly small number of academics interviewed, none continue to do their information gathering utilising only traditional methods; even the three staunch subscribers to paper-based materials and work-practices report customary use of the more rudimentary electronic information services, such as e-mail and OPACs. In the case of one of them it is done through intermediaries, who aid him in electronic information retrieval and, more surprisingly, in e-mailing too, which can surely be taken as an indication of the indispensability of electronic means of communication in modern day academia.

Generally speaking, today's academics seem to be by now quite at peace with the novel technologies, which does not mean, however, that they have all become fervent supporters of electronic information work; even among the eighteen people interviewed some are undoubtedly more enthusiastic about it all than others. The older philosopher's heartfelt diatribe against electronic texts, which, he says, "lack the vitality of the printed word just the same as the canned music accompanying your purchase of a pair of underpants lacks the vitality of a live concert" undoubtedly attests to the soft spot reserved in the scholarly world for the erudite tradition of the book and the library. The professor of literature, who readily admits to being a 'dinosaur' of sorts where anything electronic is concerned ("I have finally mastered the art of searching the computerised catalogue, but it has taken me fifteen years", he says), blames the ephemeral qualities of IT based sources for his lingering wariness of them: "There's a transient feeling about it all; when you hold in your hand a piece of paper, it has presence... however, when you encounter the information on the computer screen, it is not only that your eyes and your brain are not accustomed to it, but it is also somehow of a temporary, insubstantial nature... When you find your information in a book, it's something tangible, standing on a shelf, but if it's on the Internet, today it's here, tomorrow it's gone, so how can you trust it?" His archaeologist colleague, who is (perhaps not very surprisingly) also of the sixty-plus age group, is of a rather more pragmatic mind-set; he professes to



being a not too great fan of electronic devices in his information work simply because he manages to do well enough without them too, so why bother...

Nonetheless, although the limited scope of the qualitative data on hand cannot lead to any definitive conclusions, there seems to be some indication that the often reserved, sometimes outright reluctant attitude towards electronic scholarship, until recently so frequently encountered in academia, has been mostly replaced by the matter-of-fact approach usually reserved for the rudimentary conditions and routine practices of life and living. Thus, the younger historian among the interviewees voices the more or less generally held sentiments among the informants when he says: "In my work, I use both paper based and electronic material; it doesn't matter, as far as I'm concerned, it makes no difference whatsoever what format the information comes in." True, this matter-of-fact acceptance of the electronic format seems to be limited to traditional publication venues (as it has already been noted, both electronic-only e-journals and repositories of electronic versions of research papers are held by the vast majority of the interviewees to be inferior sources of scholarly information). Furthermore, even when an electronic publishing venue is known to adhere to the conventions of academe, the electronic format is not held to be wholly equivalent to the print version: for example, the communications scholar reports that the editor of his most recent book has flatly refused to include in the bibliographic references the URLs of the articles cited, claiming that it is simply 'not done'. And yet, all in all electronic information work seems to have become the norm in academe, rather than the controversial novelty which aroused such polar emotions in the first stages of its introduction to the research community. Thus, the next hypothesis formed on the basis of these findings is as follows:

**Electronic information work has become the norm in academia, no longer approached with instinctive reluctance, but not evoking undue enthusiasm either. Rather, electronic systems and methods are seen as a means to an end, to be chosen when deemed both the most appropriate for meeting an information need, and reasonably well-suited to individual inclinations, capabilities and circumstances.**

#### **4.11.2 Suitability of Electronic Practices to Different Types of Research Information Needs**

As the interviewees most insistently kept pointing out, contemporary scholarly work would be unimaginable without the variety of electronic information sources and tools in existence. And yet, judging from their reports, IT is not always the answer, or at least not always the pre-eminent answer for any and every information problem a researcher may come up with. **To what extent are IT-based sources and services perceived then as suited for meeting the different types of information need arising in research work?**

Plainly, many academics do make the most of the unparalleled effectiveness of the various electronic channels for transmitting information. However, there are instances when they do not seem to regard the novel communication tools as wholly adequate alternatives to face-to-face interaction (which, no doubt,



must darken the day of many a university administrator, impelled to give up any sweet dreams he might have had, if only for a fleeting moment or two, of saving the expenses of sending faculty members to all those conferences held in far away locations). The participants in this stage of the present study categorically (and unanimously) hold forth on the matchless part played by face-to-face communication in research work, with the younger historian summing it all up in saying: "There's no substitute for the human touch, no substitute whatsoever... The electronic devices can help to decrease the need for human touch, but they are no substitute for it... After all, you wouldn't consider e-mailing your kids or even talking to them over the phone the equivalent of hugging them... You can't join forces with somebody you don't know, haven't met, haven't had coffee with..."

This insistence on face-to-face interaction in scholarly information work is by no means surprising in view of the findings on individual selection and use of communications media. Apparently, people distinguish among different communications media according to the social presence and richness associated with each medium, that is, the degree to which it is perceived as allowing for warm, personal, sensitive and active communication exchanges (Papacharissi and Rubin, 2000). Obviously, the configuration of personality traits and inclinations, as well as social relationships, organisational environments and local norms particular to an individual play an important part in choosing the most suitable communication medium, but people also base their decisions in the matter by matching the medium's inherent characteristics and the requirements of the communications task (Minsky and Marin, 1999). In the specific case of academic researchers, this matching of the different media at their disposal with the requirements of their communications tasks seems to follow a recognisable pattern.

As it has already been noted, researchers need information for four main purposes: for gaining an overview of the existing knowledge on a given topic, for learning of new developments, for solving topical problems and for stimulation. When scholars communicate for the sake of the first two purposes, and sometimes of the third purpose too, when the problem encountered is no more than the lack of some concrete detail, their contact involves little more than either providing or receiving factual information upon request. Thus, the information gathering performed for preparing a review of the literature on a subject or the search for a concrete piece of information to resolve a topical problem encountered do not often necessitate consulting with colleagues, unless it is in request for pointers, for recommendations, that is, for facts. The same seems to hold true as to researchers' need to learn of progress made in their areas of interest: here too, the information need is more of a factual nature, best met via one or other of the updating services delivering information to one's desktop, or by more or less systematic searches in relevant databases for new publications, as well as for work in progress. True, there seems to be somewhat more reliance on the network of colleagues, the 'invisible college', to keep one posted of new developments, but again, we're talking here of no more than providing or receiving some relevant factual information. Neither of these really necessitates much interactive communication with fellow researchers, which means that the media used need not be of high social presence or rich. Indeed, the interviewees report that e-mail, although almost totally lacking nonverbal cues (aside from the occasional insertion of a smiley or the use of capital letters as the agreed upon representation of shouting), seems to be the communication medium of choice for both purposes, although the economist, a great believer in talking, rather than writing to people, will insist on using the phone (a point to be expounded on presently).

In stark contrast, when researchers need information either for solving specific problems or for getting ideas for a new research, communication with colleagues often becomes a veritable brainstorming session, in which ideas and thoughts, rather than facts are being exchanged. Therefore, on these occasions matching the medium's characteristics and the requirements of the task calls for non-mediated communication, ideally face-to-face interaction, although a telephone conversation can suffice in a pinch; for example, the computer scientist, although an unwavering enthusiast of face-to-face information sharing in research work, nevertheless admits to having managed to accomplish some problem-solving with a colleague over the telephone, albeit only with a close friend of his, with whom he had often collaborated previously. Still, it is undoubtedly face-to-face contact which is the real star when thought processes need to be shared and both verbal and non-verbal information conveyed, as the younger philosopher puts it: "It's not that I do not find e-mail or the telephone useful enough, but in a [face-to-face] dialogue you can see the spark in your companion's eyes, you get his instantaneous, unalterable reactions, whereas an e-mail message can be edited before it's sent off... for me the stumbling, the stammering, the hesitation I recognise in my colleague's delivery of ideas all have their significance... What makes a spur-of-the-moment conversation really forceful is the lack of 'defence mechanisms', all those spellers and grammar checkers..." The neuro-biologist, whose area of interest is at the other extreme on Storer's (1967) aforementioned 'soft' to 'hard' continuum of disciplines, nevertheless seems to harbour the very same notions on the subject of mediated versus unmediated communication: "I think that e-mail has its limitations; sometimes face-to-face communication is far better, because it allows for getting the sort of feedback you can't get when you use e-mail. True, when you e-mail somebody you can give a lot of thought to what you're going to say before you actually write it down, whereas when you talk to somebody it's obviously much more spontaneous, but as a result of this spontaneity it may very well happen that that some notions which you haven't initially considered important, turn out to be precisely that. So, with all that I think that e-mail is one of the most amazing inventions of our times, even in science there are instances when face-to-face communication is preferable".

Furthermore, if academics of different disciplinary affiliations seem to hold the same views on the relative merits of unmediated communication, so do people separated in age by decades. Thus, for example, the mathematician, who is over sixty, sounds very much like his much younger colleagues when he explains why exchanging e-mails could never take the place of face-to-face meetings: "Swapping information in a face-to-face encounter is something else again, since you come up with an idea and immediately get some feedback on it. Therefore e-mail is not the same as, say, visiting somebody... When you come up with an idea, you drop in at his office, show him what you mean on his blackboard, he reacts on the spot, then ten minutes later he comes over to your office... Whereas if you e-mail him, the man has to figure out what you want, maybe he doesn't feel like getting into it, it's not the same..."

Thinking along the same lines, and voicing much the same sentiments, the economist offers an obviously long-experience based description of the circumstances, which make it vital for scholars to meet tête-à-tête. Speaking of the benefits of collaring a fellow conference participant right after he has given a paper, as opposed to e-mailing him later on from home, he says: "What you really want is his undivided attention. So you tell him 'let's sit together during lunch', and then you have an hour and a half with him



to discuss your research and his research. Getting the same effect via e-mail would necessitate corresponding with him for a year and a half... Why? Because first of all then you'd have to explain to him the problem you seem to be experiencing, and what exactly interests you ... and he'll get your e-mail right after a faculty meeting, or upon arrival home from another conference, or on a day when his students drove him crazy, or just before he has to attend a boring lunch with his Dean's illustrious guest, or when he is in a hurry to pick up his kids from school, so he'll have difficulty to remember who you are, and what you work on, and he'll take his time until he answers you (most people don't answer e-mails immediately in any case, aside from the freaks who in fact do little else than e-mailing)... whereas if you catch him right after the talk he has just given in a conference you both attend, he is still with it, he'll answer you on the spot, and if he doesn't get your point, he'll tell you so right away, and you can see it on his face anyhow, but if you wait until he returns home from the conference and contact him then, he'll say to himself, 'oh, yes, of course I'll answer him, but first I have to re-read my paper, recall what it's all about', and meanwhile he has on his back the editor of a journal who wants the promised book review, and being a prominent figure in his field other people also wait for his answers and suggestions... and then, when he is finally ready to write his answer to you, his married daughter calls, so he talks to her instead, while his reply to you is still waiting, with more and more paper accumulating on top of it, or perhaps when he goes over his mailbox he'll decide to delete your message, it's so old, and anyhow, he can't really recall who the person writing to him is..."

No wonder then that despite the ubiquitous availability and relatively low costs of the telephone, the e-mail and the video-conference, scholars go on insisting that when information sharing involves more than the exchange of dry facts, it best be done face-to-face, or in the words of the physicist, "...if what we need is to exchange some information, we prepare a file and send it off, but for the purposes of brainstorming, in the sense of sitting down together and thinking, e-mail cannot take the place of a personal encounter with people". This is especially true when researchers collaborate on a project, as the computer scientist's words amply illustrate: "If you write an article with a colleague, first you have to solve the problem you're working on... Now... this solution finding usually involves a face-to-face encounter, since you have to explain yourself, you have to use abstract arguments, it's not entirely trivial getting all that across to somebody, so it has got to be done verbally, it is truly essential to do it face-to-face". Thus, even today, when the aforementioned reversal in the flow of information no longer makes it imperative that researchers come to the information located at the university, its library and its faculty, for information can come to them wherever they are, scholars still make an effort, and contrary to popularly held notions sometimes it is an effort, to travel to distant locations for meeting their colleagues.

Furthermore, apparently it is not only where interactive communication of scholarly information is to take place that the novel resources and services are not seen as the ultimate solution. To quote the senior historian: "...many books and journals do not appear in an electronic format, and besides, some work methods are more effective, more comfortable vis-à-vis print material... True, when it's either this or that, because the resources are limited and you can't acquire both, it's like walking a tightrope, but you have to keep things in good balance".

Indeed, the one finding which seems to recur in every study investigating electronic information usage was confirmed yet again in the present undertaking: all of the interviewees, bar none, remarked on the discomfort involved in reading more than a few lines on the computer screen, although owing to the fact that the university covers the expenses incurred by the need to print out everything, it is viewed as a slight nuisance, nothing else. However, electronic information sources do not seem to lend themselves very well to browsing either, rendering print resources as important as ever, at least for humanities scholars, who favour browsing far more than their scientist and social scientist counterparts. Citing browsing as his main argument, the senior historian thus most eloquently defends the case for the ongoing need for print books and journals, even as the demand for electronic information resources grows: "There is so much material you have to peruse concurrently, and I really don't see how it can be done electronically... You scrutinise a lot of material, you skim [it], you don't know what exactly is to be found there, you check five, ten books in an hour, here you find half a relevant chapter, there a few pages, somewhere else a number of references... there's this skimming-the-pages reading... [whereas with electronic information] you have to look at screen after screen... browsing in electronic material is something else again... perhaps it's a matter of acquiring the skill too, perhaps it's a matter of getting used to it... [but for now] the electronic library is no substitute. There is too much material, which is not published in an electronic form, and it will remain so for a long time to come... and there are work methods you can utilize more effectively and conveniently with paper-based material... No two ways about it, electronic information alone is insufficient to meet research information needs. You can't work opposite a computer screen the way you work with paper. It's different. You can use electronic resources when you know exactly what article you're looking for; then you can read it on your monitor or have it printed out. But when you have to peruse a lot of material in order to pinpoint what you really want, you can't do it." True, as the computer scientist is quick to point out, in response to a question as to the feasibility of browsing when physical libraries truly become, as he contends they will, a thing of the past, electronic browsing has been made possible with the introduction of the 'more of the same' feature routinely offered by many Internet search engines. So perhaps it is indeed just a matter of learning the necessary skills, by no means an insurmountable task given today's widespread computer literacy among academics, or more conceivably, a matter of a change in attitude, in mindset. In any case, the discussion leads to the following hypothesis:

**There is a consistent pattern in researchers' opting for computer-mediated, text-based communication (multi-user conferencing or e-mailing) versus face-to-face communication when seeking to meet different information tasks arising in research work. Text-based communication is seen as suitable for obtaining or transmitting factual information, but the fruitful exchanging of ideas and thoughts is perceived to be contingent on face-to-face interaction.**

#### **4.11.3 The Effect of E-mail on the Research Community**

No other question elicited from the interviewees as enthusiastic a reaction as the one which aimed at finding out how e-mail has been affecting the research community. To quote but one informant's rather



typical answer: "It's a revolution! Thanks to e-mail, in a couple of hours you can interact with six people dispersed over 40,000 miles to discuss your idea; it's no child's play!" Indeed, the communication opportunities afforded by e-mail, which spans enormous distances at a single bound, are undoubtedly an enormous advantage for everybody, but surely doubly so for a researcher, whose professional activities involve the need to maintain close ties with colleagues from all over the world. Plainly, for a researcher, whose like-minded community of colleagues, his or her invisible college, traditionally knows no geographical boundaries, the wide availability of e-mail means almost unlimited opportunities for free-flowing, effective communication. The mathematician's concise description of the situation as it stands says it all: "Thanks to e-mail, these days you're never isolated!" The psycho-pharmacologist's short addendum to his colleague's statement dispenses any doubts which may have remained as to the centrality of the role fulfilled by e-mail in academe: "These days I am no longer acquainted with all of the researchers in my field, because there are so many, but it's far easier to keep in touch with your close circle of colleagues, because you have e-mail".

This cementing of invisible colleges, brought about by the ubiquitous use of e-mail, has had truly far fetching consequences for those researchers who do not happen to live near the centres of activity in their fields. Israeli researchers are, of course, a case in point, as many of the interviewees were quick to point out. The younger political scientist, for example, says: "E-mail helps a lot; I'm constantly, on a daily basis in touch with colleagues from all over the world, we write articles together and the like. True, it's still not the equivalent of living, say, in California, you still can't go to Berkley, Stanford or UCLA whenever you feel like it, to meet with people and consult with them, but thanks to e-mail your ability to exchange information with people, inclusive of colleagues from the leading universities, is very, very good." To which the expert on social welfare adds a further dimension: "At least in my field, which is concentrated mainly in the US and the UK, before the advent of the e-mail the 'natives' treated us as if we were some third world researchers. Now we have the same communication tools they do, if not better ones..."

No doubt, life is far easier for today's researchers, at least with regard to their ability to maintain close ties with their colleagues, among other purposes for obtaining the information they need, as the neurobiologist explains: "If I need some information, I have a network of people I can ask or request that they send it to me. So if I can't get what I need here in Israel, I can turn to somebody abroad, I always have somebody".

The last hypothesis to be advanced concerns, therefore, the pivotal role accorded to e-mail in cementing invisible colleges:

**Informal communication among researchers has been greatly enhanced by the ubiquitous use of e-mail. Thus, despite its limitations as a communications medium (lesser degree of richness and social presence than face-to-face contact), e-mail has served to cement invisible colleges.**

To sum up the first insights gleaned into the processing and packaging aspect of contemporary researchers' information needs and practices:

**Table 4.11: The Processing and Packaging Aspect of Researchers' Information Needs  
Summary of the Hypotheses Emerging from the Qualitative Findings**

	<b>INITIAL HYPOTHESES ADVANCED ON THE BASIS OF THE PILOT PROJECT DATA</b>	<b>NEW AND/OR UPDATED HYPOTHESES FOLLOWING THE SECOND SET OF INTERVIEWS</b>
<b>Hypothesis no. 1</b>	Electronic information work has become the norm in academia, no longer treated with reservation, but not evoking much enthusiasm either. Rather, electronic systems and methods are seen as a means to an end, to be chosen when deemed both the most appropriate for meeting an information need, and reasonably well-suited to individual inclinations, capabilities and circumstances.	Electronic information work has become the norm in academia, no longer approached with instinctive reluctance, but not evoking undue enthusiasm either. Rather, electronic systems and methods are seen as a means to an end, to be chosen when deemed both the most appropriate for meeting an information need, and reasonably well-suited to individual inclinations, capabilities and circumstances.
<b>Hypothesis no. 2</b>	There is a consistent pattern in researchers' opting for computer-mediated, text-based communication (multi-user conferencing or e-mailing) versus face-to-face communication when seeking to meet different information tasks arising in research work. Text-based communication is seen as suitable for obtaining or transmitting factual information, but the fruitful exchanging of ideas and thoughts is perceived to be contingent on face-to-face interaction.	There is a consistent pattern in researchers' opting for computer-mediated, text-based communication (multi-user conferencing or e-mailing) versus face-to-face communication when seeking to meet different information tasks arising in research work. Text-based communication is seen as suitable for obtaining or transmitting factual information, but the fruitful exchanging of ideas and thoughts is perceived to be contingent on face-to-face interaction.
<b>Hypothesis no. 3</b>	Informal communication among researchers has been greatly enhanced by the ubiquitous use of e-mail. Thus, despite its limitations as a communications medium (lesser degree of richness and social presence than face-to-face contact), e-mail has served to cement invisible colleges.	Informal communication among researchers has been greatly enhanced by the ubiquitous use of e-mail. Thus, despite its limitations as a communications medium (lesser degree of richness and social presence than face-to-face contact), e-mail has served to cement invisible colleges.

This chapter presented the initial insights into the information component of present-day research work, as they emerged from the first stage of the research project, the two-phase qualitative investigation. These preliminary insights, crystallised into a series of hypotheses, were followed up in the larger-scale, quantitative study, which is to be considered in the next chapter.



## **5. The Quantitative Investigation: Data Presentation, Analysis, Interpretation**

This chapter reports the results of the investigation at the quantitative stage of the study, which was undertaken with the express purpose of exploring the validity and generalisability of the hypotheses formed at the previous, qualitative stage. The quantitative data collected, having been carefully analysed to discern both universal patterns of research information needs and practices, as well as variance by age and disciplinary affiliation, did indeed enable the validation, as well as the rounding out of the hypotheses formed to date, whilst yielding additional hypotheses. The resulting enhanced insights into the information component of contemporary research work are presented here.

### **5.1 Further Insights into the Subject Aspect of Researchers' Information Needs**

#### **5.1.1 Greater Focussing of Research Information Needs**

##### **Hypothesis:**

**With research increasingly focussed on ever-narrowing, ever-more specialised subject areas, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is fading away, and along with it the notion that information needs vary in accordance with the centrality of a subject area to the researcher's interests.**

Setting out to look into the soundness of this first hypothesis pertaining to the subject aspect of researchers' information needs, the statement posed to the survey recipients sought to find out how focussed contemporary researchers were in their information needs. Did they restrict their information seeking to the specific subjects they specialised in, or look for information in knowledge areas more marginal to their interests, too? Thus, the researchers queried were requested to indicate the extent of their agreement with the following statement: "Since in general I know my field, I need information expressly on the specific topics I'm specialising in".

The responses revealed that on the whole researchers did indeed tend to be focussed in their information needs. Considerably more of the 130 respondents to this question agreed than disagreed with the claim to this effect: 51% (66) proclaimed that in their case the statement was always or often true, compared to 18% (24) who said it was never or seldom true; only one respondent found the statement irrelevant to his circumstances whereas for the remaining 30% (39) it was at times true, and at times not.

As a first indication of a pattern to emerge more fully when the data would be broken down concurrently by discipline and age, somewhat more humanities researchers said that they were focussed in their information needs than either their scientist or social scientist counterparts: 61%, compared to 50% and 48%, respectively. However, since humanists were also less likely than their scientist or social scientist counterparts to opt for 'at times true and at times not' (21% compared to 32% and 34%, respectively), and considering that the percentage of those for whom the statement was never or seldom true was roughly equal among researchers from all disciplines (18%, 16%, 17%), the difference found is not very marked.

The breakdown of the total figures by age yielded more revealing results. The younger researchers appeared to be less focussed in their information needs than their older colleagues: a third of the under 44s (36%) agreed with the notion of needing information in their specialisations, compared to slightly more than a half of the respondents in the two older age groups (54% and 56%, respectively). By the same token, more of the under 44s disagreed with the notion (27%) than their colleagues in either the 45-60 age group (16%) or the over 61 age group (15%). Perhaps not surprisingly: novice researchers, still in the process of mastering their chosen fields amidst searching for their professional niches, would be more likely to spread their 'fishing (for information) nets' over larger areas than their more senior colleagues.

Analysis of the data by the combined variables of age and discipline honed the picture considerably, although owing to the relatively small number of responses in some of the nine groups its results should be treated with caution. Still, as Table 5.1.1 below demonstrates, whereas social scientists and humanists tended to testify to an increasing focussing of their information needs with age, scientists' self-professed restriction of their information needs seemed to vary little over the years. The pattern discerned is very much in keeping with what we know of the nature and scale of the problems typically dealt with in each of the three major disciplines. As it has already been noted, research in the sequentially and hierarchically ordered corpus of knowledge in the sciences is clustered around the few topics of current interest, which form the basis of consequent developments; in result, all active scientists, the junior and the senior as one, aim their efforts at the deciphering of the concentration of ideas, data, experiments and findings at the frontier of research at a certain point in time. In contrast, the non-linear structure of the social sciences and the humanities allow for a far greater dispersion of the ongoing research effort, which accounts for the wider variety of scholarly topics investigated at any given instant in these knowledge domains. Thus, social scientists and humanists may indeed be more likely than their scientist counterparts to take longer until they gradually focus on their specialities, and in result, in their information needs. Indeed, this pattern is in line with the findings on another hypothesis to be discussed presently, which links researchers' progress in their careers with the focussing of their investigations, and in result, with a growing restriction of their information needs.

**Table 5.1.1: Perceived Focussing of Research Information Needs, by Discipline and Age\***

Since in general I know my field, I need information expressly on the specific topics I'm specialising in.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=11	Hum N=10	Sci N=9	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
56%	27%	40%	55%	43%	68%	40%	75%	63%

\*as measured by the number of 'always true' and 'often true' responses given



### **5.1.2 Three Modes of Coping with the Call for Information beyond Own Area of Expertise**

#### **Hypothesis:**

**When wide-ranging and/or interdisciplinary and/or multidisciplinary research ventures call for information in subjects outside a researcher's own area of expertise, he or she copes by taking one of three possible routes. Depending on the level of 'outside' information believed to be necessary, either embarking on a collaborative research venture, or undertaking to extend his or her knowledge base by mastering unfamiliar domains, or simply trying to make do with more basic level information.**

The three modes of coping with the call for information in subjects outside a researcher's own area of expertise, discerned in the qualitative stage of the present study, have been probed via three statements posed to the survey participants.

The first statement enquired into researchers' position on the first solution proffered, embarking on a collaborative research venture: "Nowadays, when it's impossible to cover all the knowledge in a subject area, so that specialisation is unavoidable, it's very difficult to be 'a lone wolf' in research work. Wolves succeed in snaring their prey because they hunt in packs; that's the right way to work in research too".

In general, the 129 respondents to this question were more or less evenly divided on the issue: about a third, 28% (36) reported the statement to be always or often true of them, another third, 34% (44) took the opposite view (never or seldom true), and the remaining third, 29% (37) said it was only at times true of them. However, 9% (12) deemed the statement irrelevant, that is, for them cooperation in research work was out of the question for any purpose, inclusive that of solving information problems.

The findings accrued by breakdown of the data by disciplines were by no means surprising: scientists and social scientists were more favourably disposed towards solving the problem of needing information beyond their areas of specialisation through cooperation than their humanist counterparts. Whilst 48% of the scientists and 40% of the social scientists said that the statement to this effect was always or often true of them, with only 17% and 21% respectively expressing disagreement, none of the humanists reported it to be always true of them, and only 6% reported it to be often true, with the percentage of those who disagreed coming up to a total of 55%.

Analysis of the data by age led again to the conclusion that age was certainly a factor to contend with in the attempt to discern research information need patterns: if in the two upper age groups the percentage of those who supported cooperation for meeting information needs was in the range of 23% - 27%, among those under 44 it rose to 36%. One obvious explanation to this somewhat greater willingness of the young researchers to participate in collaborative projects may be their relative inexperience in research work, inclusive of its information component, which can make cooperation with a knowledgeable colleague more attractive. However, the variance among those who did not endorse the notion was less marked, with about a third of the respondents in all of the age groups rating the statement as never or seldom true.

When grouped concurrently by discipline and age, the results, even if they are treated as cautiously as the limited number of responses in each category behaves, highlighted the marked differences among researchers with regard to perceived suitability of collaboration for acquiring information beyond their fields of expertise.

Clearly, the young scientists were the most likely to choose this option, with an overwhelming majority of them, 89%, saying that the statement to this effect was always or often true of them, whereas the senior humanists favoured the idea least of all – none of them opted for 'always or often true' on this. However, in line with the previously noted greater receptiveness to the solution among the younger researchers, even the most stalwart supporters of the notion, the scientists, seemed to tone down their support with age (40% of the 45-60s and 20% of the over 61s chose the 'always or often true' options), and even among the humanists slightly more of the two lower age groups demonstrated readiness to opt for it (4% of the 45-60s and 20% of the under 44s, compared to none of the over 61s). Interestingly, among the social scientists the younger age group tended to say that the statement was at times true of them and at times not, with 45% preferring this option over agreement (18%) or disagreement (27%), although with age the practice seemed to have grown considerably in popularity: 47% of the 45 – 60s and 50% of the over 61s said it was always or often true of them.

The next statement queried researchers' stance on the second solution to the problem of coping with the call for information in subjects outside a researcher's own area of expertise, that of mastering an unfamiliar knowledge domain: "When I set out to tackle a multi- or inter-disciplinary subject, or a subject that is beyond my specific areas of expertise, for all practical purposes I have to start reading from the basics and really get submerged in the literature".

This solution seemed to be the favourite, as it won the approval of a clear majority of the participants: of the 132 informants who responded to this question, 62% (81) pronounced the statement always or often true of them, with only 7% (9) deeming it never or seldom true. Apparently, the purported information overload did not deter a sizable percentage of the researchers queried from setting out to master a whole new subject area in its entirety, supporting the finding emerging from both the qualitative and the quantitative data gathered (with additional findings in support of it yet to be discussed) that the huge amounts of information are no longer considered problematic.

Somewhat surprisingly, the social scientists, rather than the humanities researchers were the more likely to opt for mastering a whole new subject area when they tackled a multi- or inter-disciplinary topic, or a topic outside their specific areas of expertise. Although humanists are more readily associated with taking a broad view of a problem (hence their oft-cited need for past literature and partiality to monographs), a total of 71% of the social scientists endorsed mastering, compared to 56% of the humanists who did so, too, and only 6% of the former, compared to 11% of the latter opposed it. Interestingly, although only 3% of the scientists said that mastering a new area was seldom true of them, and none said it was never true, no more than 45% seemed to hold with the practice, and a further 14%, compared to 4% of the social scientists and 4% of the humanists, even stated the option was altogether irrelevant for them.



Breakdown of the data by age yielded rather predictable results. The under 44s were the most likely to opt for mastering when the need for information outside their areas of expertise arose, with 67% of them supporting the notion and just 3% against it. Those aged 45-60 held a somewhat less favourable (but still unmistakably positive) view of the option, with 63% agreeing with the statement posed, and 6% disagreeing with it. And although the over 61s were the least enthusiastic about choosing the option, with the percentage of those opposing it (12%) four times as high as among the under 44s and twice as high as among the 45 – 60s, still as much as 52% of this age group endorsed the idea. Only to be expected, of course: looking for new 'hunting fields' is an inseparable part of the scholarly endeavour, and mastering the knowledge accumulated in these fields goes with the territory. Still, with age the incentive to invest the energy it takes to do so may dwindle, for whilst young researchers may still be on the lookout for specialisations, their older counterparts, having already 'gotten somewhere' in their designated fields would understandably be more wary of starting anew.

Indeed, breakdown of the data by the combined variables of age and discipline, even if again taken with the necessary grains of salt, still demonstrated how important it is to take into consideration the age of researchers when attempting to determine their information needs. Thus, if on the whole scientists were the least likely to opt for mastering a new subject area, significantly more of the under 44s among them supported the notion: 66% compared to 40% of the 45 – 60s and 30% of the over 61s. In fact, in the lower age group the percentage of scientists endorsing the notion was not very far from that of its most enthusiastic supporters, the social scientists (66% of the former and 75% of the latter), whereas in the two upper age groups the disparity became much more marked: 40% of the scientists aged 45 – 60, and 30% of the scientists aged 61 and over registered agreement with the statement to this effect, compared to 77% and 58% of the corresponding age groups among the social scientists.

The last mode of coping with the call for information in subjects outside a researcher's own area, making do with more basic level information, was probed via the statement: "If, in the course of a multi- or interdisciplinary investigation, or one, in which I the work extends beyond my specific areas, I need some information in an area I'm no expert in, I'll look for more basic level information, for instance in those databases on the Internet, which offer scientifically correct information meant for laymen".

The data gathered clearly indicated that this was the least preferred route among the three identified in the qualitative stage. Of the 131 respondents to this statement, only 2% (3) said it always reflected their behaviour, with an additional 18% (23) saying it often did, whereas a total of 39% (64) pronounced it never or seldom true of them.

The breakdown of the findings by disciplinary affiliation revealed some variance among the three groups of researchers, but the pattern unmistakably pointed to a general wariness of the practice in all three disciplinary groups. The social scientists seemed to be holding the least favourable view of making do with more basic level information when branching out beyond one's areas of expertise, with 53% disagreeing with the statement to this effect, and only 16% agreeing with it. However, the other two disciplinary groups were not lagging far behind: 45% of the scientists and 51% of the humanities

researchers said the statement was seldom or never true of them, and only 20% and 21% respectively said it was always or often true in their case.

Neither did the breakdown by age reveal significant variance among the respondents: the percentage of those who did not endorse managing with basic level information for endeavours beyond the researchers' own areas of expertise was around 50% in all age groups, and of those who did – around 20%.

Analysis of the results by the combined variables of discipline and age mostly underscored the general picture of findings on the possibility. One result, however, did stand out: 80% of the under 44s among the humanists said the statement to this effect was seldom or never true of them, compared to 40% and 45% of the two upper age groups of the same disciplinary affiliation, on the one hand, and to 50% of the social scientists and 33% of the scientists in the same age group, on the other. Given the small sample it may have been just a coincidence, but it could also signal an interesting phenomenon to be followed up in subsequent research.

Tables 5.1.2.1 and 5.1.2.2 below sum up and compare the extent of endorsement accorded to each of the three modes of coping with the call for information in subjects outside a researcher's own area of expertise: embarking on a collaborative research venture, undertaking to extend one's knowledge base by mastering unfamiliar domains, and making do with more basic level information.

The first of the two tables, Table 5.1.2.1 displays the overall results:

**Table 5.1.2.1: The Three Modes of Coping with the Call for Information in Subjects outside a Researcher's Own Area of Expertise**

	<b>Collaboration N=129</b>	<b>Mastering N=132</b>	<b>Making do N=131</b>
<b>Always / often true</b>	28% (36)	62% (81)	20% (26)
<b>Never / seldom true</b>	34% (44)	7% (9)	39% (64)

The second table of the two comparing the extent of endorsement accorded to each of the three modes of coping with the call for information in subjects outside a researcher's own area of expertise: embarking on a collaborative research venture, undertaking to extend one's knowledge base by mastering unfamiliar domains, and making do with more basic level information, is Table 5.1.2.2, which displays the results grouped concurrently by discipline and age.



**Table 5.1.2.2: The Three Modes of Coping with the Call for Information in Subjects outside a Researcher's Own Area of Expertise, by Discipline and Age\***

Collaboration								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=11	Hum N=10	Sci N=10	SSci N=19	Hum N=25	Sci N=10	SSci N=12	Hum N=11
89%	18%	20%	40%	47%	4%	20%	50%	0%
Mastering								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=9	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
66%	75%	50%	40%	77%	56%	30%	58%	54%
Making do								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=11	Hum N=11
44%	0%	20%	10%	10%	24%	10%	27%	18%

\*as measured by the number of 'always true' and 'often true' responses given

### 5.1.3. Growing Restriction of Information Needs Consequent to Focussing of Research Interests

#### Hypothesis:

As their academic career advances, researchers become more focussed in their interests, and in result, their information needs grow to be more defined and restricted.

Unlike most of the hypotheses examined here, the postulation, according to which the information needs of researchers grow to be more defined and restricted with the gradual focussing of their research interests over the years, did not reflect a recurring theme in the interviews data. In fact, the idea was suggested by

one interviewee only. Moreover, another informant's casual remark that his information needs had actually grown over the years, indicated that the actual state of affairs could turn out to be different than hypothesised. Nevertheless, it was an interesting lead to follow up. Therefore, the next statement solicited researchers' views on the statement: "Nowadays I don't need as much information as I used to at the beginning of my academic career because I've become more focussed in my interests".

On the whole, researchers' attitude to the suggestion of linking the focussing of interests coming about with the progress of a researcher's career with a decrease in the amount of information needed was found to be more negative than positive. Almost half of the 129 respondents, 47% (61) said the statement was never or seldom true of them, with only about a quarter, 26% (13) saying it was always or often true.

Still, breakdown of the data by disciplines again gave some inkling of the pattern, yet to emerge more fully, of social scientists and humanists reporting slightly greater agreement with the possibility that the focussing of research interests may impact on the extent of information needed, as Table 5.1.3.1 below indicates.

**Table 5.1.3.1: Scholars' Perceptions of the Change in the Quantities of Information Needed as a Result of the Focussing of Their Research Interests, by Discipline**

<b>Nowadays I don't need as much information as I used to at the beginning of my academic career because I've become more focussed in my interests.</b>			
	<b>Scientists N=28</b>	<b>S. Scientists N=45</b>	<b>Humanists N=45</b>
<b>Always / often true</b>	21%	25%	26%
<b>Never / seldom true</b>	54%	48%	44%

The breakdown of the data by age again yielded results which confirmed to the pattern of researcher's information needs changing with age, as Table 5.1.3.2 below indicates. Thus, if in the group of under 44s only 15% of the respondents endorsed the notion that as their career progressed and they became more focussed in their interests they needed less information, in the group of those aged 45 – 60 the corresponding percentage grew to 27%, and among those aged 61 and over the percentage further increased to 37%. At the other end of the scale much the same picture seemed to emerge; whereas in the youngest age group the percentage of those who disagreed with the statement was 58%, in the middle age group their percentage decreased to 45%, and in the oldest age group further dwindled to 39%. It seems then that whilst on the whole researchers did not tend to support the idea, when they nevertheless did, it were the older, and therefore more senior researchers who tended to say that as a result of having become more focussed in their interests the amount of information they needed decreased.



**Table 5.1.3.2: Scholars' Perceptions of the Change in the Quantities of Information Needed as a Result of the Focussing of Their Research Interests, by Age**

<b>Nowadays I don't need as much information as I used to at the beginning of my academic career because I've become more focussed in my interests.</b>			
	<b>Under 44 N=34</b>	<b>45-60 N=59</b>	<b>Over 61 N=35</b>
<b>Always / often true</b>	15%	27%	37%
<b>Never / seldom true</b>	58%	45%	39%

When broken down simultaneously by age and discipline, the previously noted pattern of variance emerged yet again. In the two groups of social scientists and humanists the percentage of the respondents, who supported the notion of a progressive focussing of information needs resulting in a reduction of the quantities of information required, small as it was to begin with, nevertheless rose with age, but in the group of the scientists, although the percentage of those who opted for 'always or often true' was higher among the group of 45 – 60s than among the under 44s, it dropped sharply among the over 61s, as Table 5.1.3.2 below demonstrates. At the other end of the scale much the same picture seemed to emerge: whereas among the social scientists and humanists the percentage of those who disagreed with the statement was 59% and 60% respectively in the lowest age group, 48% for both in the middle age group and 41% and 27% respectively in the upper age group, among the scientists the corresponding figures came to 55%, 44% and 60% respectively. True, the sample limitations allow for these findings to be taken for leads to be followed up only. Still, it is interesting to note that whilst among the social scientists and humanists the older researchers, who were probably more focussed in their interests, seemed to need less information, among the scientists age has not brought about similar developments.

**Table 5.1.3.3: Scholars' Perceptions of the Change in the Quantities of Information Needed as a Result of the Focussing of Their Research Interests, by Discipline and Age\***

<b>Nowadays I don't need as much information as I used to at the beginning of my academic career because I've become more focussed in my interests.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=9</b>	<b>SSci N=21</b>	<b>Hum N=23</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
22%	0%	20%	33%	34%	18%	10%	34%	54%

\*as measured by the number of 'always true' and 'often true' responses given

#### **5.1.4. Perceived Manageability of Information Affecting Research Topic Choices**

##### **Hypothesis:**

**The researcher's choices of topics for investigation are dictated by his or her ability to handle a certain quantity of information. That is, he or she a priori asks questions, which are deemed manageable in terms of the expected quantity of pertinent information on it.**

Seeking to find out how the perceived quantity of available information affects the researcher's choices of topics for investigation, the study participants were requested to indicate the extent of their agreement with the following statement: "I choose my research subjects mindful of the quantity of information on it and my ability to deal with that much. That is, the question I will work on is to some extent dictated by my ability to handle a certain quantity of information".

Almost 10% of the 132 respondents to this question said that the statement was irrelevant to their circumstances, a finding that is indicative in itself: 13 researchers did not perceive the quantity of information at their disposal relevant in any way to their decision making with regard to the topics of their research projects. Moreover, a substantial 43% of the respondents disagreed with the proposed linkage between their choices of research topics and the amount of information available on it: 17% (22) rated the statement to this effect as 'seldom true' of them, and a further 26% (34) said it was 'never true' of them. Only 5% (7) of the respondents fully supported the notion that researchers a priori asked questions, which they deemed manageable in terms of the expected quantity of pertinent information on it, with another 16% (21) testifying that it was often true of them, a total of no more than 21% (28).

The variation found among researchers of different disciplinary affiliations as to the possibility that their ability to handle a certain amount of information affected their choices of topics for investigation was not very striking. Still, humanists were less likely to report a favourable view of the idea, with only 15% of them saying it was always or often true of them, compared to their scientist and social scientist colleagues, the corresponding percentage of whom came to 24% and 27% respectively. It is important to note, however, that the percentage of those who disagreed with the notion (in the range of 42% - 45%) was almost twice as high as the percentage of those who agreed with it in each of the three groups.

However, here again, breakdown of the data by age revealed a pattern of change occurring with age. Of the 44 and under age group 24% agreed with the notion that researchers chose their research subjects mindful of the quantity of information on it and their ability to deal with that much, and 36% did not, whereas of the 45 – 60 age group 21% agreed and 42% did not, and among the group aged 61 and over even less voiced agreement – 14%, and more registered disagreement – 49%.

Categorisation of the data by the combined variables of discipline and age seemed to indicate that the pattern of support decreasing with age to the proposed linking of the choice of research topics with the quantity of information available on it held true in the sciences and social sciences, but not in the humanities; in fact, the pattern in the latter seemed to be reversed, as it can be seen in Table 5.1.4 below. The dispersion of results at the other end of the scale indicated a similar pattern: whereas 33% of the



lower age group of both the scientists and the social scientists said the notion was seldom or never true of them, compared to 40% and 43% respectively in the 45-60 age group and 60% and 50% respectively in the upper age group, the corresponding figures among the humanities researchers were 50% (under 44s), 44% (45-60s), and 36% (over 61s). Of course, here again the small number of responses in each category precludes the possibility of taking these results for more than indications of trends, in need of further investigation.

**Table 5.1.4: Researchers' Ability to Handle a Certain Amount of Information as a Determinant of Their Choices of Research Topics, by Discipline and Age\***

I choose my research subjects mindful of the quantity of information on it and my ability to deal with that much. That is, the question I will work on is to some extent dictated by my ability to handle a certain quantity of information.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=9	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
44%	33%	0%	20%	39%	12%	10%	0%	27%

\*as measured by the number of 'always true' and 'often true' responses given

It is important to note that more informants disagreed than agreed with the notion linking the amount of information available on a subject with their decision making on a suitable topic for a forthcoming research project. True, it cannot be ruled out that researchers may simply have found it difficult to admit that an extrinsic factor, such as the quantity of information, could be appropriate grounds for deciding on a research project. However, it is also possible that in line with the findings of this study, yet to be fully presented, the huge amounts of information available simply pose no problem to researchers, and therefore do not affect their choices of research topics, either.

### 5.1.5 The Preferred Technique of Information Retrieval: Keyword Based Searching

#### Hypothesis:

**Keyword-based retrieval is the contemporary researcher's favourite approach to meeting the need for pertinent information on a given subject.**

The above hypothesis as to the present-day researcher's method of choice for information retrieval being keyword based searching was indeed corroborated, even if it did not turn out to be as overwhelmingly accepted a practice as it had been surmised on the basis of the data gathered at the qualitative stage.

The statement that researchers were requested to express the extent of their agreement with, said simply: "I search for information by trying various word combinations, until I find the combination which is the most appropriate". The majority, 65% (85) of the 132 respondents to this question said that the statement was always or often true of them; however, 15% (20), said that it was seldom or never true of them, and a further 9% (12) even rated the statement as irrelevant.

The difference in attitude between social scientists and scientists, on the one hand, and humanities researchers, on the other, concerning the practice of keyword based searching, was discernible almost at first glance. 75% of the social scientists and 73% of the scientists asserted that keyword-based information seeking was their method of choice for information retrieval. In comparison, the percentage of the humanities researchers who testified to the same notion amounted to much less - 53%.

However, the breakdown of the data by age did not indicate much variance among researchers of the different groups: approximately two thirds of the researchers in each of the three groups registered agreement with the proposed notion, and about 15% registered disagreement. Under the circumstances it is hardly surprising that once the data were broken down by the combined factors of discipline and age, the emerging picture remained much the same: in each age group the humanities researchers were the least likely to opt for keyword based information seeking.

## **5.2 Further Insights into the Function/Purpose Aspect of Researchers' Information Needs**

### **5.2.1 The Ongoing Relevance of Previously Identified Key Purposes and Functions to which Information is Put in Research Work**

#### **Hypothesis:**

**The key purposes and functions to which information is put in contemporary research work have remained those previously identified in the literature, with little or no change at all. Basically, researchers still need information for reviewing the existing knowledge on a given topic, for keeping abreast of new developments, for solving topical problems, and for getting ideas for a new research.**

Looking into the soundness of the hypothesis postulating that researchers need information for reviewing the existing knowledge on a given topic, for keeping abreast of new developments, for solving topical problems, and for getting ideas for a new research, the next four items in the questionnaire survey sought to establish that these indeed were the key purposes and functions to which information was put in contemporary research work. The statements probing the question focussed on scientific and scholarly literature, equating 'information sources' with written/published material, although at a later stage information sources would be considered in a wider sense, too, to include colleagues.

The extent of support accorded to the first purpose, reviewing the existing knowledge on a given topic, was explored via the following statement: "When I start working on a new research project, I try to locate



all the knowledge to be had on the subject; I perform a very thorough literature review". A substantial majority (three quarters) of the 133 respondents to this question agreed with the statement. 43% (57) said it was always true of them and a further 32% (43) said it was often true. 14% (19) said it was at times true of them, and at times not, and only 8% (10) found the statement to be seldom and 2% (3) to be never true of them.

Conforming to time-honoured patterns, the scientist participants in the present study seemed to be the least likely, and the humanists the most likely to perform a thorough literature review for a new research: 66% of the scientists, 75% of the social scientists and 85% of the humanists said they always or often did.

Perhaps not surprisingly, bearing in mind that with the passing of time researchers are bound to grow more and more familiar with the knowledge accumulated in their chosen fields, the findings revealed that young researchers were more inclined to perform a thorough survey literature on the eve of a new research endeavour than their more seasoned colleagues: 82% of the under 44s said the statement to this effect was always or often true of them, as compared to 72% and 75% respectively of the 45-60 and over 61 age groups; similarly, only 6% of those aged 44 and under said it was seldom true of them, and none rated it never true, whereas the corresponding figures in the 45-60 age group were 6% and 3%, and in the over 61 age group 11% and 3%, respectively.

When analysed by the combined variables of age and discipline, the emerging patterns, although approached with the caution due to conclusions based on restricted data, nevertheless appeared to be more demonstrably defined: a clear 100% of the young humanists testified to performing a thorough literature survey on the eve of a new research project, although their social scientist and scientist colleagues of the same age bracket did not lag far behind either, with 83% of the former and 77% of the latter also endorsing the notion. With age researchers tended to feel less of a need for a thorough survey of the knowledge on a subject they were about to tackle, but the discrepancy among the different disciplines remained in place throughout, as Table 5.2.1.1 shows:

**Table 5.2.1.1: The Key Purposes and Functions to Which Information Is Put in Contemporary Research Work: Reviewing the Existing Knowledge on a Given Topic, by Age and Discipline\***

When I start working on a new research project... I perform a very thorough literature review.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
77%	83%	100%	60%	72%	80%	60%	75%	91%

\*as measured by the number of 'always true' and 'often true' responses given

The next item on the questionnaire was meant to look into the ongoing relevance of another traditionally held purpose of research-associated information work, that of keeping abreast of new developments in one's field. It said: "I make every effort to ensure that I know what is going on in my area of interest, so as not to re-invent the wheel, so as not to work on an idea which has already been published".

The present study confirmed yet again that keeping current undeniably remained an objective of academic researchers' information seeking, and a very central one, at that; the overwhelming majority of the 133 respondents to this question, 91% (121) agreed with the statement: 59% (79) said it was always and 32% (42) that it was often true of them. None of the informants testified that the statement was never true of them, although 2% (3) reported it to be irrelevant.

However, analysis of the data by discipline held a real surprise in store. One of the more widely held notions about humanists is that they are not as concerned with keeping current as the scientists or social scientists (Garfield, 1980; Stone, 1982). Findings of the present study suggest otherwise: 94% of the humanists, no less than the social scientists (94%) and more than the scientists (86%) confirmed that they made every effort to ensure that they knew what was going on in their areas of interest.

Looking at the data from the angle of the respondents' age yielded some, this time not unexpected variance among the researchers. Apparently, the younger researchers were slightly keener to keep current than their older colleagues. An overwhelming majority of the under 44s, 97%, agreed with the statement proclaiming the need to follow the developments in one's field, compared to 91% among those aged 45 – 60 and 86% among those aged 61 and over. Evidently, the novice researchers were taking no chances of missing some new information for fear of duplicating some work already done.

When grouped concurrently by age and discipline, the picture, though limited by the small sample sizes, was nevertheless further honed: humanists seemed just as anxious, if not more anxious to keep current as their social scientist and scientist counterparts, and the younger generation often appeared to be more concerned with the issue than the more seasoned researchers, as Table 5.2.1.2 below demonstrates:

**Table 5.2.1.2: The Key Purposes and Functions to Which Information Is Put in Contemporary Research Work: Keeping Abreast of New Developments, by Discipline and Age\***

<b>I make every effort to ensure that I know what is going on in my area...</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
100%	92%	100%	80%	100%	88%	80%	83%	100%

\*as measured by the number of 'always true' and 'often true' responses given



The survey recipients were also asked for their opinion on the hypothesised third key purpose to which information was put in contemporary research work, solving topical problems. Towards this end the next item on the questionnaire said: "If in the course of a research project I encounter a problem, so that I cannot make further progress, I turn to the literature in search of solutions, clarifications and ideas, to get me out of the dead-end I find myself in".

This statement too received substantial endorsement: of the 133 respondents, 35% (46) said it was always true of them, and an additional 40% (53) said they found it to be often true. A clear three quarters of the participants thus seemed to be favouring the notion that information was indeed needed to solve problems cropping up in a research project, and turning to the literature was the way to go about obtaining it.

The breakdown of the data by disciplines revealed that social scientists and humanities researchers were more likely to rely on the literature for solving topical problems encountered in their research work than scientists. Whilst 80% and 81% of the former, respectively, registered agreement with the statement to this effect, no more than 62% of the latter did so too. Still, scientists more often chose the option of 'at times true, and at times not': 28% compared to 11% and 9% in the other two groups.

When categorised by age, the data revealed little variance: about three quarters of the researchers in each of the three age groups agreed that problems encountered in the course of a research were best solved by turning to the literature. It is interesting to note, however, that the percentage of those who rated the statement as irrelevant was the highest among the over 61s: 11%, compared to 3% among the under 44s, and none among those aged 45-60, a finding which can perhaps be taken to suggest that the more widely networked senior researchers may prefer turning to colleagues when they encounter a topical problem.

Breakdown of the data by the combined variables of age and discipline further corroborated the emerging picture, as Table 5.2.1.3 demonstrates:

**Table 5.2.1.3: The Key Purposes and Functions to Which Information is Put in Contemporary Research Work: Solving Topical Problems, by Discipline and Age\***

If in the course of a research project I encounter a problem... I turn to the literature								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=10
75%	77%	90%	60%	85%	80%	50%	72%	72%

\*as measured by the number of 'always true' and 'often true' responses given

The humanists in all three age groups were thus the most, and the scientists the least supportive of the notion that the answer to a specific information need arising in the course of a research project was to be found in the literature. However, the percentage of the social scientists in favour of turning to the literature for the purpose more or less equalled the percentage of their like-minded humanist colleagues in the two upper age groups, whereas among the under 44s it closely resembled that of their scientist counterparts. Given the limitations of the small samples these patterns may not be more than coincidental, although where social scientists are concerned much depends on the extent to which their specialisations are closer to the sciences or to the humanities in nature.

The fourth and last purpose hypothesised to trigger an information need among researchers, the need for stimulation, that is, for **getting ideas for a new research**, was examined via the following statement: "The ideas for new research projects crop up whilst reading the literature, out of the existing knowledge".

The findings indicated that the stimulating purpose/function of information, in its more restricted interpretation as the literature existing on a subject, was not as widely endorsed as it might have been expected in view of the importance accorded to the notion in the literature (Borgman, 1993; Brockman et al., 2001; Ziman, 1981). Only 14% (19) of the 131 respondents registered unmitigated approval of the notion, saying that the statement, according to which the ideas for new research projects cropped up whilst reading the literature, was always true in their case. An additional 42% (55) said the statement was often true of them, bringing the total number of those who agreed with the statement up to more than half of the respondents. It is important to note, however, that the percentage of those who disagreed with the statement was negligible. None of the participants completely denied that recorded information fulfilled a stimulating function for them, and only 5% said that they seldom turned to information for this purpose. At the same time, 37% opted for 'at times true, and at times not' when rating the statement, which may be taken for an indication that at least for the purpose of triggering new scholarly or scientific investigations, the literature was by no means the only source of information capable of acting as catalyst.

The variation found among researchers of different disciplines on this was quite minimal: 52% of the scientists, 58% of the social scientists and 61% of the humanists agreed that literature fulfilled for them a stimulating function. Neither did grouping of the results by age reveal much of a difference in the views held: about half of the respondents across all age groups (56% of the under 44s, 60% of the 45-60s, and 53% of the over 61s) agreed with the statement proclaiming that the ideas for new research projects cropped up whilst reading the literature. Another third of the researchers in all age groups said it was at times true of them and at times – not. Obviously, with the researchers expressing similar views regardless of their age or disciplinary affiliation, breakdown of the data by the combination of the two factors did not contribute any additional information of significance.

Having examined each of the key purposes and functions to which information is put in contemporary research work in the light of the quantitative data gathered for the present study, Table 5.2.1.4 below summarises and compares the findings:



**Table 5.2.1.4: Summary: The Key Purposes and Functions to Which Information Is Put In Contemporary Research Work**

	<b>Reviewing existing knowledge</b> N=133	<b>Keeping abreast of developments</b> N=133	<b>Solving topical problems</b> N=133	<b>Stimulation</b> N=131
<b>Endorsement (N)*</b>	100	121	99	74
<b>Endorsement (%)*</b>	75%	91%	75%	56%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.2.2 Assembling the Information Base of an Investigation: The Enduring Relevance of Traditional Patterns**

#### **Hypothesis:**

**The need to review the previous knowledge on a given topic is met by the researchers' actively searching for information, with their choices of information sources and information seeking methods firmly embedded in the conventions traditionally associated with their respective disciplines.**

The qualitative data gathered in the first stage of the study seemed to lead to the conclusion that today's researchers went about meeting the need for the relevant information accumulated on a given topic in a time-honoured fashion, much as researchers had always done. Their methods and sources may have changed somewhat in character, consequent to the integration of the ubiquitous novel technologies in research work, but reviewing the existing knowledge on a subject appeared to have remained an activity firmly embedded in traditional, disciplinary-rooted conventions. For example, the humanities researchers participating in the qualitative part of the study testified to laying the information foundations of a research project by locating the seminal monographs on a subject, making use of journal articles only to put the finishing touches to the emerging picture; in contrast, the scientists and the social scientists seemed to prefer to start out with finding the pertinent journal articles, looking for books only (if at all) to complement the information base built.

The academics interviewed appeared to differ with regard to their choices of information gathering methods, too: thus, whereas humanities researchers seemed to hold in high esteem the age-old technique of reference chasing, scientists and social scientists looked more to searching for information in the core journals of their specialties and also mentioned turning to colleagues both for advice on recommended information sources and for obtaining expert information 'straight from the horse's mouth'. Thus,

researchers' choices of information sources and information seeking methods needed to be examined separately for each of the three major disciplinary groups.

Furthermore, it was thought likely that age would also influence a researcher's preferences for certain information sources over others for the purpose of assembling a literature review. First of all, with the passing of the years researchers probably acquired enough information seeking experience to come to fairly decisive conclusions as to the advantages and disadvantages of the various methods and sources; in other words, the older researchers were liable to have grown set in their ways, which could mean that their choices would be on the traditional side, along the lines of 'why exchange a method which has proven its effectiveness for something unknown?'

Also, it seemed plausible that at the outset of his career a researcher would be more prepared to turn for help to fellow academics, which could make such information gathering options more attractive for junior academics than for their more senior colleagues. On the other hand, with time researchers probably established wider and tighter professional ties, making the option no less appealing for the older generations among the researchers.

The survey participants were therefore queried as to their ways and means of tackling the task of preparing the literature survey in an attempt to establish the ongoing relevance of the patterns of information gathering believed to be characteristic of researchers, and at the same time to discern variance in their approaches to the task. Towards this end, researchers' reported preferences when setting out to put together the information for a literature survey had been taken for a measure of the importance they accord to the various information sources at their disposal. Proceeding from the notion that a researcher would be more likely to start assembling the information basis needed for a research project from the sources he or she holds to be most suitable for the purpose, nine different statements solicited participants' opinion on seven possibilities.

The first two statements probed the centrality of journals for laying down the information foundations of a new research project: "I begin the work on a new research project by first locating the journal articles on the subject" and "When I assemble the information I need at the outset of a new research project, I only use journals. I do use books, which provide the best of the knowledge accumulated on a subject, but only for my teaching". The responses left little doubt as to researchers' views on the matter: journals were deemed very important indeed, if by no means wholly sufficient.

18% (24) of the 130 respondents to the first statement said it was always true of them; a further 35% (45) said it was often true of them. Thus, slightly over half of the respondents, 53% (69), supported the notion that assembling the information base of a topic started with the scholarly journals. The extent of disagreement with the statement was equally indicative: only 13% (17) of the participants testified that journals were seldom, and an additional 3% (4) that journals were never the opening gambit for preparing the literature review. About a third of the informants (28%, 21) said the statement reflected their work practices only at times (and at times not); apparently, some researchers had more than one favoured way of tackling the task.



However, important as the informants seemed to consider journals for preparing the information background of a research project, they were wary of naming them the only suitable source. In fact, only 7% (9) of the 131 respondents to this question said the statement to this effect ("When I assemble the information I need at the outset of a new research project, I only use journals") was always true of them, and only a further 17% (22) said it was often true of them. In comparison, 19% (25) said it was seldom, and 24% (31) said it was never true of them. However, 31% (40) opted for 'at times true and at times not' on this, bringing home again the conclusion from the data on the previous statement, too, that researchers may favour journals over books for meeting this information need, but they are not prepared to altogether forego books for the purpose.

**Table 5.2.2.1: Setting Out to Review the Literature: Researchers' Views as to the Suitability of Journal Articles for the Purpose**

	Always / often true	Never / seldom true
<b>Journal articles first N=130</b>	53% (69)	16% (21)
<b>Journal articles only N=131</b>	24% (31)	43% (56)

Interestingly, the breakdown by discipline of the data gathered on the first of the two statements did not yield evidence of the hypothesised disciplinary variance in the choices made by researchers when gathering information for a review of the literature on a subject. In fact, the noteworthy measure of uniformity among the researchers in pointing to the journal articles as the starting point for doing so was one of the unforeseen results of the present study.

Finding that 57% of the scientists and 46% of the social scientists turned to the journal literature first had been expected and anticipated; however, discovering that 52% of the humanists did so too, came as more of a surprise. After all, humanist researchers were supposed to prefer the comprehensive view and breadth of scrutiny afforded by a monograph over the limited scope of a journal article, were they not? If, as the findings of this study seem to indicate, researchers found new ways to cope with the abundance of available information, humanists' greater readiness to look to the more focussed information in journal articles may be a sign of the times.

Still, the reluctance demonstrated by the researchers queried to restrict their information gathering to journal articles when preparing the information basis of a new research project was far more pronounced among the humanities researchers. Whereas 28% of the scientists and 25% of the social scientists said the statement to this effect ("When I assemble the information I need at the outset of a new research project, I only use journals...") was never or seldom true of them, more than twice as many, 65% of the humanities researchers, reported the same; at the other end of the scale, while only 7% of the humanists said the statement was often true of them and none said it was always true, 38% of the scientists and 33% of the social scientists registered agreement with it.

**Table 5.2.2.3: Setting Out to Review the Literature: Disciplinary Variance in Researchers' Views as to the Suitability of Journal Articles for the Purpose\***

	Scientists N=28	Social Scientists N=45	Humanists N=46
Journal articles first	57%	46%	52%
	Scientists N=29	Social Scientists N=45	Humanists N=46
Journal articles only	38%	33%	7%

\*as measured by the number of 'always true' and 'often true' responses given

When grouped by age, the data reflected a pattern of a slightly diminishing reliance on journals for the purpose of assembling the information base of a new research endeavour as researchers grow older (see Table 5.2.2.4 below). Thus, 62% of the under 44s testified (always and often true answers) that they began the work on a new research project by first locating the pertinent journal articles, and 12% said they seldom or never did. In comparison, in the two upper age cohorts 50% and 51% of the informants respectively said they did, and 14% and 23% respectively said they did not. By the same token, 33% of the under 44s reported (always and often true answers) to only use journals for the purpose, and 36% said they seldom or never did, whereas in the two upper age cohorts 23% and 17% respectively said they did, and 42% and 49% respectively said they did not.

**Table 5.2.2.4: Age-Associated Variance in Researchers' Views as to the Suitability of Journal Articles for Reviewing the Literature\***

	Under 44 N=34	45 - 60 N=60	Over 61 N=35
Journal articles first	62%	50%	51%
	Under 44 N=34	45-60 N=61	Over 61 N=35
Journal articles only	33%	23%	17%

\*as measured by the number of 'always true' and 'often true' responses given



This pattern of researchers' preference for the use of journal literature dwindling with age, at least for purposes of laying the information foundations of a research project, should perhaps be considered together with the forthcoming finding as to a reverse pattern of researchers' preference for the use of books for the same purpose actually growing with age. Possibly, here again, given present-day researchers' greater need to cope with the abundance of information at their disposal, especially when the pressures typical of the start of an academic's career dictate a very intense pace of progress, the more focussed information to be found in journal articles may serve their goals more efficiently than books.

Breakdown of the data on these two statements by the combined variables of discipline and age further honed the emerging picture, as Table 5.2.2.5 below demonstrates. True, as it has been repeatedly emphasised, the samples here are too limited to allow for definite conclusions, and indeed, the data on the first statement, designating journal articles as the starting point for assembling the information accumulated on a subject, yielded a rather curious result as to the scientists: whereas 89% of the under 44s and 70% of the over 61s supported the notion, only 33% of the 45-60s did so too. Also, although on the whole humanists did indeed seem to display a greater readiness to begin with journal articles when assembling the information for a literature review, neither among them, nor among the scientists did the pattern of support of the notion dwindling with age emerge clearly. Not so, however, as to the second statement, which talked of only using journals for the purpose. This time the findings wholly underscored the emerging picture: humanists in every age cohort were indeed far less likely to agree with the notion than their scientist and social scientist colleagues, and the pattern of dwindling support with age was quite clearly discernible across the different disciplinary groups.

**Table 5.2.2.5: Age- and Discipline-Associated Variance in Researchers' Views as to the Suitability of Journal Articles for Reviewing the Literature\***

Journal articles first								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=9	SSci N=21	Hum N=24	Sci N=10	SSci N=12	Hum N=11
89%	58%	50%	33%	52%	58%	50%	59%	45%
Journal articles only								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=24	Sci N=10	SSci N=12	Hum N=11
44%	41%	10%	30%	38%	8%	40%	17%	0%

\*as measured by the number of 'always true' and 'often true' responses given

It seems then that journal articles have come to play a more central role in the information work of humanities researchers, even if the aforementioned differences in outlook between them and their scientist and social scientist colleagues as to the relative merits of journal articles may not have completely evened out. The question is whether this change in outlook will be reflected in the importance they accord to books. Will they report a less marked preference for books over journals than traditionally attributed to them? The findings do indeed point to developments in these directions.

The two statements probing the centrality of books as sources of information when preparing a literature review were as follows: "When I want to review the knowledge accumulated on a subject, I mostly need books" and "I begin the information gathering for a new research project with the books I know; only afterwards do I go on to articles in journals I usually read". The data accrued yielded compatible, if surprising results. Although the second statement talked of starting out with the books the researcher was acquainted with, rather than needing mostly books in general, the findings on both statements seemed to point to a somewhat reserved attitude towards books, at least for the purposes of laying the information foundations of a research project (only when the data were broken down by discipline, did the picture become more finely-tuned).

Of the 130 respondents to the first of these two statements only 5% (7) registered unqualified endorsement (always true), with a further 15% (20) registering strong support (often true). By the same token, only 3% (4) of the 130 respondents to the second statement testified it was always true of them and 15% (20) said it was often true. In both cases the total number of those who disagreed with the statement posed was more than double of those who agreed with it. 33% (43) of the respondents to the first question, and 31% (40) of the respondents to the second said the statement was seldom true of them; 7% (9) and 14% (18), respectively, rated it never true of them. Here too, about a third of the respondents to both statements chose the option 'at times true of me and at times not', lending further credence to the possibility that some researchers did not have one set method of information gathering for a literature review.

**Table 5.2.2.6: Researchers' Views as to the Suitability of Books for Reviewing the Literature**

	Always / often true	Never / seldom true
<b>Books, mostly N=130</b>	20% (27)	40% (52)
<b>Books first N=130</b>	20% (26)	45% (58)

Breakdown of the data by disciplines revealed, somewhat surprisingly, in view of the traditionally held beliefs concerning the centrality of books for humanities research, that only about a third of the humanists, rather than the anticipated overwhelming majority of this group voiced a preference for books



when endeavouring to put together the information base of a research venture. Coupled with the aforementioned indications of their growing appreciation of journal articles, this may be taken to signal the possibility of a change in their preferences for information sources. However, with about a third of the humanists testifying to books being their information sources of first choice in their responses to both statements probing the issue, and with more than 40% saying books were at least some of the time their primary sources of information, it seems plain enough that they may not be as committed to the use of books as they are popularly surmised to be, but they are far from being ready to give up on them altogether either.

Indeed, despite these intimations of changes in humanities researchers' preferences, they still seemed to rely on books to a greater extent than their scientist and social scientist colleagues. The first statement, to the effect that researchers mostly needed books for reviewing the knowledge accumulated on a subject, was not rated as always true by any of the scientists or the social scientists; in comparison, 11% of the humanists said that for them it was always true. Moreover, the percentage of humanists who said that the statement was often true (26%) came to twice as much as that of the scientists (13%), and to five times as much as the social scientists (5%), who gave evidence to the same effect. At the other end of the scale, whilst only 15% of the humanists disagreed with the notion, 48% of the scientists and 61% of the social scientists did so too.

Analysis of the reactions to second statement probing the importance of books for amassing the existing knowledge on a subject, led to much the same conclusions. Although here the statement focussed on books known to the researcher, rather than books in general, the findings by and large tallied with the previous statement. Again humanities researchers accorded greater importance to books than their counterparts in either the sciences or the social sciences: 31% of the former rated the statement as always or often true, compared to 3% and 16% of the latter, respectively. By the same token, here too fewer of the humanities respondents (26%) than their scientist (55%) or social scientist (59%) colleagues said the statement was never or seldom true of them.

**Table 5.2.2.7: Researchers' Views as to the Suitability of Books for Reviewing the Literature\***

	Scientists N=29	Social Scientists N=44	Humanists N=46
Books, mostly	14%	5%	37%
	Scientists N=29	Social Scientists N=44	Humanists N=46
Books first	4%	16%	31%

\*as measured by the number of 'always true' and 'often true' responses given

Analysis of the data by age indicated that the centrality of books for reviewing the knowledge accumulated on a subject was more pronounced for the older researchers; in fact, support of the notion slightly but consistently grew with the move from the lower age group to the upper ones. Thus, whilst the percentage of the under 44s who agreed with the notion was 15% for each of the two statements, of the 45-60s it came to 22% and 21% respectively, and of the over 61s to 26% and 23% respectively.

**Table 5.2.2.8: Age-Associated Variance in Researchers' Views as to the Suitability of Books for Reviewing the Literature on a Subject\***

	<b>44 and under N=34</b>	<b>45 - 60 N=60</b>	<b>61 and over N=35</b>
<b>Books, mostly</b>	15%	22%	26%
	<b>44 and under N=33</b>	<b>45-60 N=61</b>	<b>61 and over N=35</b>
<b>Books first</b>	15%	21%	23%

\*as measured by the number of 'always true' and 'often true' responses given

A look at the data from the combined angles of discipline and age (Table 5.2.2.9) revealed first and foremost that humanities researchers did indeed seem to be more inclined to turn to books for assembling the information base of a new project. However, to the extent that the reports of the limited number of respondents in each group can be generalised from, this may be changing: whereas 63% of the over 61s among the humanists gave evidence that they mostly needed books when they wanted to review the knowledge accumulated on a subject (always and often true answers), only 38% of the 45 – 60s and 10% of the under 44s held the same opinion. The disparity of views among the humanists on the second statement was less pronounced, but still clear enough, if, here again, obviously limited in scope: 36% of the over 61s said it was always or often true of them, compared to 32% and 22% respectively of the 45 – 60s and the under 44s.

Not unexpectedly, the scientists expressed the least need for books for a review of the knowledge accumulated on a subject, and in their case the pattern discerned showed a decline of the need with age, to the point where none of the over 61s among them said the two statements were always or often true of them. For that matter, neither did the social scientists express much endorsement of using books for the purpose, although in a manner similar to that of the humanists, the older among them registered a greater degree of agreement with the statements posed to them than their younger colleagues. These dissimilarities may perhaps be traceable to the differences in the role fulfilled by books in research work in the different disciplines. In the 'harder' knowledge domains, which are 'summative' in nature, since each new layer added to the existing body of knowledge is based upon previous achievements and



incorporates them (Watson-Boone, 1994), the basic building blocks of the discipline are readily available in books. No wonder then that the more senior scientists professed to less of a need for books: after all, they had long since mastered the basics of their fields. In comparison, since scholarship in the 'softer' disciplines is cumulative, to use Watson-Boone's (1994) terminology, or aggregative, as Stoa (1991) prefers to call it, recent material alone may or may not include or build on a previous body of knowledge, books alone can afford the necessary broad view of a topic. No wonder then that in the humanities and social sciences the older researchers were the more likely to express a need for books when preparing a literature review.

**Table 5.2.2.9: Age- and Discipline-Associated Variance in Researchers' Views as to the Suitability of Books for Reviewing the Literature on a Subject\***

Books, mostly								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=20	Hum N=24	Sci N=10	SSci N=12	Hum N=11
22%	0%	10%	20%	0%	38%	0%	17%	63%
Books first								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=9	Sci N=10	SSci N=20	Hum N=25	Sci N=10	SSci N=12	Hum N=11
11%	8%	22%	0%	15%	32%	0%	25%	36%

\*as measured by the number of 'always true' and 'often true' responses given

Finally, it is important to note that many of the participants opted for 'at times true of me, and at times not' on the centrality of books for assembling the information base of a topic. That is, for a sizable number of the researchers books can be, albeit not necessarily are the most appropriate for the purpose.

The next statement, soliciting researchers' views on the possibility of learning the background information needed for a research project via a review of the knowledge accumulated on it, rather than via the original publications, said: "When I embark on a new research project, I begin with a few pages long summary of the knowledge amassed on the subject (in a textbook, Ph.D. thesis, or a review article); it saves reading the original publications". The practice was not reported to be very popular: no more than 3% (4) of the participants claimed to always, and 17% (22) to often opt for it. In fact, more than twice as many respondents disagreed with the statement than agreed with it: 21% (28) said it was seldom, and 20% (27)

said it was never true of them. However, a third of the respondents (33%, 43) did say it was true of them at least at times.

Breakdown of the findings by disciplines yielded an unexpected finding: the practice had been surmised to be eminently suitable for the summative knowledge domains; that is, for the sciences and the 'harder' areas of the social sciences, with their highly factual contents, in which each new increment of information incorporates previous findings. However, as it transpired, humanities researchers, whose scholarship is cumulative rather than successive in nature, made almost as much use of this shortcut option as their colleagues in the other two disciplines, which, in any case was not much all around. Thus, while 20% of the scientists and a similar percentage of social scientists said that the statement was always or often true of them, so did 17% of the humanists. Moreover, whereas 66% of the social scientists claimed never or seldom to opt for a summary in lieu of turning to the original publications, only 43% of the humanists said so too, not many more than the scientists, with their 38%.

At first glance the willingness to rely on a summary of the knowledge existing on a subject did not appear to be much affected by age, although the seasoned researchers were somewhat more likely to oppose the option than their young colleagues. Thus, 40% of the over 61s, 43% of the 45-60s and 38% of the under 44s deemed the option as being never or seldom true of them, and at the other end of the scale 15% of the over 61s, 23% of the 45-60s and 21% of the under 44s backed it.

However, once the data had been analysed by the combined variables of discipline and age, more emphatic differences among the groups seemed to emerge. True, as it cannot be over-emphasised, since the conclusions were drawn by comparing the relatively small samples in each group, they are to be considered pointers to developing trends, rather than generalisable evidence. Still, with their limitations clearly acknowledged and firmly kept in mind, the findings are of interest, at least as signalling the possible directions for further investigation. Thus, although on the whole humanities researchers, whose scholarship is cumulative rather than successive in nature, made almost as much use of this shortcut option as their colleagues in the other two disciplines, the younger scientists clearly revealed a greater tendency to utilise a shortcut measure for setting up the information base of a new inquiry than their social scientist or humanist colleagues, although the inclination to do so tended to diminish with age even in the sciences. Thus, 33% of the under 44s among the scientists agreed with the statement to this effect, compared to 20% of the 45 – 60s and only 10% of the over 61s; by the same token, the percentage of those who disagreed with the statement was, respectively, 11%, 30% and 70%. It may very well be then that the review article serves the needs of the novice researchers among the scientists particularly well: if in the sciences the summary of advances made can suffice, it still comes most handy for those at the beginning of their careers, who, as it has already been noted, work under greater time pressure. Indeed, researchers in either the social sciences or the humanities did not appear to change their opinion of the practice with age, at least not much: 17% of the younger social scientists and 20% of the younger humanists said the statement was always or often true of them, but then so did 19% of the social scientists and 20% of the humanists in the 45 – 60 age group, as well as 25% of the over 61s among the social scientists, although only 9% of the humanists of the same age group, which is not very surprising as 36% of them deemed the idea wholly irrelevant. Also, if 33% of the younger social scientists and 50% of the



younger humanists disagreed with the notion, so did 57% of the social scientists and 48% of the humanists in the 45 – 60 age group, as well as 42% of the over 61s among the social scientists; the comparatively low percentage, only 18%, of the older humanists who opposed the idea can be explained by the far higher percentage of them, in comparison to the other groups, opting on this for 'irrelevant'.

The centrality of another option for setting a literature survey in motion was probed by means of the following statement: "When I gather information at the outset of a new research project, I ask colleagues to refer me to pertinent information sources". Apparently, asking colleagues to recommend 'good' information sources was also held in relatively low esteem among the researchers queried. Only 7% (9) of the 132 respondents testified to always, and an additional 16% (21) to often doing so, but 11% (14) rated the practice as never true of them, and 26% (34) as seldom true of them. However, about a third of the informants (36%, 47) did opt for it at least at times.

Breakdown of the data by disciplines was expected to point to a rather pronounced level of variance, at least between the scientists and social scientists, on the one hand, and the humanists on the other. In view of the widely accepted tradition of cooperation in research work, characteristic of scientists and social scientists, but not humanists, the former were thought to be more likely to show willingness to consult colleagues on information problems encountered in the work on a literature review than the latter. Indeed, the statement on asking colleagues for recommendations on information sources was proclaimed to be always or often true by 24% of the scientists and 24% of the social scientists, but only by 15% of the humanists. Also, while 31% of the scientists and 35% of the social scientists reported the statement to be never or seldom true of them, the corresponding percentage of humanists came to 45%. Although the variance among the disciplinary groups was not very substantial, clearly the humanists were the least inclined to turn to colleagues for recommendations on information sources.

Grouping of the data by age revealed little evidence of variance among researchers. Across all three age groups only about a quarter of the respondents said the statement was always or often true of them, and slightly more than a third said it was never or seldom true. Neither did analysis by the combined factors of discipline and age yield further enhancement of the picture: humanists were indeed relatively less inclined (if not by much) than their contemporaries of other disciplinary affiliations to ask colleagues for recommendations on information sources.

In an attempt to gauge the prevalence of the second practice of the two looking into researchers' readiness to turn to expert colleagues for help in obtaining information, the survey recipients were posed the following statement: "When I embark on a new research project, I seek help from the experts in the subject area: I ask them to explain to me the background, to give me the basic information on the topic". The possibility found little favour among the researchers queried. Of the 132 respondents to this question, only 2% (2) said the statement was always true of them, and the number of those who said it was often true of them also came to no more than 19% (17). As the share of those who chose 'at times' was a mere 16% (21), for the remaining substantial majority the statement seldom (36%, 47) or never (25%, 33) reflected their ways.

The distribution of opinions among researchers of the three disciplinary groups on the option of asking a fellow researcher to explain the background information on a subject was in line with the aforementioned findings on the practice of turning to colleagues for recommendations on pertinent information sources. 21% of the scientists and 20% of the social scientists, but no more than 4% of the humanists said the statement to this effect was always or often true of them. At the other end of the scale, 51% of the science researchers, 56% of the social science researchers, but as much as 70% of the humanities researchers said the statement was never or seldom true of them.

Here again the findings tallied with those on the previous statement investigating researchers' readiness to turn to expert colleagues for help in obtaining information: the extent of agreement among researchers of all ages was rather pronounced. In all three age groups the percentage of those who agreed with the statement was in the range of 13% - 17%, and of those who disagreed – in the range of 57% - 67%. Also, although analysis by the combined variables of discipline and age did not greatly contribute to the honing of the picture, it lent further support to humanists' clearly favouring the option less than their scientist and social scientist colleagues in the same age bracket.

The next statement, the first among quite a few in the questionnaire developed for this study looking into currently held attitudes in academe to electronic resources and services, was trying to determine to what extent researchers perceived the Internet (whether correctly or not) as holding all of the journal literature in their respective fields, and in consequence, to what extent they were turning to the Internet for assembling the information base of a new research project. It said: "When I tackle a new subject, I gather the information I need by means of a very thorough search on the Internet, as in my field the journals are on the Net". Of the 132 respondents, 25% (33) reported the statement to be true of them at least at times, but, more importantly, twice as many testified to refraining from gathering journal articles for a literature survey via the Internet than to doing so: 44% (59) did not, compared to 22% (29) who did; 25% (33).

However, once the results had been broken down by disciplines it became quite clear that the inter-disciplinary differences concerning the option of turning to the journal literature on the Internet for assembling the information base of a research project were so marked, that giving the views of a 'characteristic researcher' on the issue was almost meaningless. Thus, the scientists proclaimed clear support of the practice, with 17% of the informants saying that the statement was always true of them, and a further 34% saying it was often true of them; only 14% said the statement was seldom true, and 7% that it was never true of them. In sharp contrast, none of the humanities researchers said the statement was always true of them, and a mere 2% said that it was often true, whereas for a substantive majority of them, 65%, it was never or seldom true. As to the social scientists, only 2% of the respondents said the statement was always true of them and an additional 22% that it was often true, with the percentage of those among them who never or seldom used the Internet for the specified purpose coming to 40%. As it will be shown in the section on the processing and packaging aspect of information needs, the pattern emerging here seems to be characteristic of disciplinary rooted variance among researchers with regard to electronic sources and services in general.



Breakdown of the data by age seemed to point to overall little appreciation of the Internet as a likely source of the journal literature needed for a literature survey, with only 24% of the under 44s, 23% of the 45-60s, and 19% of the over 61s saying that the statement was always or often true of them. Surprisingly, the percentage of those for whom the statement was never or seldom true was markedly lower among the over 61s: 21%, compared to 39% among the under 44s and 48% among the 45 – 60s.

Since disciplinary affiliation appeared to be of considerable significance for determining researchers' choices on this, it had been thought likely that analysis of the data by the combined variables of discipline and age would contribute to the more accurate portrayal of researchers' usage of the journal literature to be found on the Internet (at least for the purposes of a literature survey), which, in point of fact, did turn out to be the case. Approaching the findings with the caution due to the limited scope of the data, they still seemed to further reinforce the emerging patterns. The under 44s among the scientists were plainly the most enthusiastic supporters of the practice of turning to the Internet for the journal articles needed for assembling the information foundation of a new investigation: 66% of this age group said the statement to this effect was always or often true of them, and none at all said it was never or seldom true of them. In comparison, neither the social scientists, and certainly not the humanists in the corresponding age groups registered much support of the practice: only 17% of the first and none of the latter said the statement to this effect was always or often true of them, whereas 33% and 78% respectively said it was never or seldom true of them. Moreover, with age support of the practice tended to dwindle even among the scientists, as Table 5.2.2.10 below amply demonstrates:

**Table 5.2.2.10: Setting out to Review the Literature: Age- And Discipline-Associated Variance in Researchers' Turning to Journals on the Internet for the Purpose\***

	Under 44			45 – 60			Over 61		
	Sci N=9	SSci N=12	Hum N=9	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
<b>Journals on the Internet</b>	66%	17%	0%	60%	33%	4%	30%	16%	0%

\*as measured by the number of 'always true' and 'often true' responses given

The ongoing relevance of yet another method of information gathering for a new research project, the age-old practice of reference chasing, was put to test via the following statement: "When I set out to work on a new subject, I locate one good publication, and then one work leads to another". Perhaps not the method invariably given precedence over others, with only 5% (6) of the 131 respondents to this question rating it as always reflecting their practices, reference chasing nevertheless seemed to be a well-liked approach to information gathering: 33% (43) testified that the statement was often true of their ways, and only 13% (17) said that it was seldom and 5% (7) that it was never true of them.

The practice of reference chasing had been designated in the qualitative stage as characteristic of humanities researchers. However, breakdown of the quantitative data by disciplines seemed to indicate that the scientists and the social scientists were far greater advocates of this method of locating information than their humanist colleagues: 45% and 47% respectively of the former, compared to 21% of the latter said the statement was always or often true of them. A look at the other end of the scale was no less revealing: the percentage of the scientists and social scientists who disagreed with the statement came to 6% and 14% respectively, whereas the corresponding percentage of the humanists to 29%.

If analysis by disciplines yielded somewhat surprising findings, breakdown of the data by age substantiated the rather expected possibility that the more traditional methods would be favoured by the veterans among the researchers. Thus, the percentage of those who said that the practice of reference chasing always or often reflected their ways came to 30% and 35% in the two lower age groups, compared to 51% in the upper age group. By the same token, only 12% of the over 61s said the statement never or seldom was true of them, compared to 18% among the under 44s and to 23% among the 45-60s.

Concurrent grouping of the data by age and discipline put the picture into sharper focus. Humanists undoubtedly favoured reference chasing least of all: none of the under 44s among them said the statement reflected their ways, and although the older were more supportive of the notion, with 24% of the 45-60s and 36% of the over 61s opting for always or often true on this, they lagged far behind their counterparts of the corresponding age group in each of the other two disciplines, as Table 5.2.2.11 demonstrates:

**Table 5.2.2.11: Setting Out to Review the Literature: Age- and Discipline-Associated Variance in Researchers' Views as to the Suitability of Reference Chasing for the Purpose\***

	Under 44			45 – 60			Over 61		
	Sci N=9	SSci N=12	Hum N=9	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
Reference chasing	44%	33%	0%	30%	50%	24%	60%	50%	36%

\*as measured by the number of 'always true' and 'often true' responses given

### 5.2.3 Intensity of Keeping Current as Derivative of Disciplinary Patterns of Research Work

#### Hypothesis:

The range, variety and frequency of a researcher's activities aimed at keeping current are determined by the level of awareness deemed necessary in his or her disciplinary milieu to the work being done by others.

Hypothesising on the basis of the qualitative findings that there was a close link between a researcher's disciplinary-culture dictated need to stay abreast of the work being done by others and the time and effort he or she actually



invested in learning of new developments, the next two statements presented to the survey recipients aimed at exploring the issue. The first of the two statements reflected the aforementioned relatively complacent attitude to the need to keep current, best described as 'serene interest'. It said: "When I get these notifications on new publications, I may put them aside for a week or two, a month even, but eventually I do peruse them". The second of the two statements obviously represented a far more anxiety-ridden view of the task: "I check for new publications in my areas of interest on a daily basis; not a day goes by without my looking for new material. In my field, if you want to survive, you've got to do it, you've got to keep up with the very latest developments, for if you don't know other people's current work you're as good as dead",

Although the probability of variance among the researchers had been the underlying assumption when setting out to look into researchers' following the progress made in their fields, the findings pertaining to the whole population surveyed had been thought to be of value for learning the importance accorded in academe to keeping current. On the whole, researchers testified to treating the matter with a rather limited degree of intensity: half of the 132 respondents to the first statement to the effect that keeping up was done at leisure, said it was always (12%) or often (38%) true of them, and an additional third indicated it was at times true of them, and at times not; only 16% disagreed with it. Complementing the emerging picture, the second statement, which depicted keeping current as a vital, almost religiously performed component of the research endeavour, was endorsed by a surprisingly low percentage of the respondents. Of the 133 respondents, about a fifth agreed with the statement, whereas more than half said it was never or seldom true of them, as it can be seen in Table 5.2.3.1, below.

**Table 5.2.3.1: The Importance Accorded in Academe to Keeping Current**

	Always / often true	Never / seldom true
<b>Serene interest (N=132)</b>	50% (66)	16% (21)
<b>Dutiful fervour (N=133)</b>	19% (26)	56% (74)

In view of these findings, it seemed all the more intriguing whether there would be a significant divergence of opinions among the different disciplinary groups on the keeping current issue. The qualitative data gathered in the first stage of the study lent support to the commonly-held view that scientists were the most concerned with staying abreast of new information generated in their fields, humanists were the least apprehensive about the whole issue, and social scientists occupied the middle positions on the keeping current continuum, depending on their proximity to the 'hard' or 'soft' ends of the range of knowledge domains. The findings in the present, quantitative stage of the study did indeed corroborate previous results, but the differences among the disciplines turned out to be less marked than it had been surmised.

Thus, the humanities researchers were undeniably the most likely to report that the notifications on new publications were not attended to immediately or even in a hurry, with 53% saying that the statement to this effect was always or often true of them, and only 18% saying it seldom or never was. The social scientists did not lag far behind them, however, with 52% who agreed with the statement (always or often true), and 11% who did not (seldom or never true). However, the more surprising finding was that the



percentage of scientists who also supported the statement came to 37%; less than that of their counterparts from the other two disciplines, but not all that much less. Also, the percentage of those among the scientist who did not support the statement was 17%, more or less equal to that found among the humanities researchers.

The responses to the second statement revealed a more conspicuous degree of variance among the disciplines, but this may be attributed at least to some extent to the more emphatic style of the quotation ("...if you don't know other people's current work, you're as good as dead"). The humanists and the social scientists were undoubtedly in less agreement with the sentiments voiced in this statement than their scientist colleagues. 14% of the social scientists and 19% of the humanists, compared to 31% of the scientists said the statement was always or often true of them, and at the other end of the scale, 62% of the social scientists and 54% of the humanists, compared to 46% of the scientists said the statement was never or seldom true of them. Thus, a clear majority of the researchers in all three disciplinary groups testified that keeping up was hardly considered a matter of life or death, although the scientists were still more committed to staying current than their colleagues in the other two disciplines.

However, the more interesting findings emerged with the breakdown of the results by age. Apparently, age (and with it typically also academic seniority) had a significant effect on the researcher's perceived need to keep current. If the seasoned researchers seemed to be able to afford a more relaxed approach to the issue, the newcomers to academe probably could not: appearing less than well-versed in their own specialities could mean for them the difference between getting accepted in their professional circles or not, one hurdle which the veterans had probably long since overcome. Indeed, more researchers of the upper two age groups agreed with the statement referring to putting new publications aside "for a week or two, a month even" than of the under 44 age group: 57% of the over 61s and 52% of the 45-60s, compared to 41% of the under 44s. Also, whereas only 15% of the oldest age group and 11% of the middle age group disagreed with the statement, 27% did so in the youngest age group. The findings on the second statement showed even more pronounced variance among the age groups. Only 14% of the 61 and over age group and 13% of the 45-60 age group registered support of the fervent approach to keeping current reflected in the statement, compared to 39% of the 44 and under age group. Here too, the other end of the scale was also most revealing: while 61% of the over 61s and 59% of the 45-60s said the statement was never or seldom true of them, only 42% of the under 44s said so too.

In view of the clearly emerging pattern of variance among the researchers of the three disciplinary groups, on the one hand, and among those belonging to the three age brackets, on the other, analysis of the data by the combined variables of discipline and age had been thought likely to yield the most finely-tuned results. Indeed so, as Table 5.2.3.2 below amply demonstrates, even if the small scope addressed here obviously precludes definitive claims. It is interesting to note, for example, the youngest scientists were clearly the most concerned with keeping current: none of them said the statement reflecting a complacent attitude to the issue was always true of them, and even more significantly, 55% of them said the statement, according to which not keeping up equalled professional demise, was always or often true, and none at all said it was never true. In contrast, the over 61s among the humanities researchers paid the least attention to keeping current: 73% of them registered agreement with the relaxed attitude expressed in the



first statement, whereas only 27% endorsed the notion of needing to keep up with dutiful fervour of the second statement.

**Table 5.2.3.2: The Importance Accorded in Academe to Keeping Current, by Discipline and Age\***

When I get these notifications on new publications, I may put them aside for a week or two, a month even, but eventually I do peruse them.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
33%	41%	40%	20%	62%	52%	60%	41%	73%
I check for new publications on a daily basis... if you want to survive, you've got to keep up..., for if you don't... you're as good as dead.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
55%	25%	50%	30%	15%	4%	10%	0%	27%

\*as measured by the number of 'always true' and 'often true' responses given

#### 5.2.4 Ways of Coping with the Call for Information in the Midst of a Research Project

##### Hypothesis:

If in the course of a research project the researcher comes across a missing piece of information, his method of choice for meeting this topical information need has remained the time-honoured method of consultation with a knowledgeable colleague, albeit this technique is now often augmented, if not supplanted by a quick search on the Web.

The next four items on the survey questionnaire attempted to look into present-day solutions to the frequently encountered problem of the researcher's needing a piece of specific information in the midst of work on a project. The options explored were: turning to the library for assistance, asking a colleague to send the specific publication known to provide the information needed, requesting explanations from an expert colleague, and searching for answers on the Internet.

Given the leads discerned in the interviews, it was hypothesised that the time-honoured method of consultation with a knowledgeable colleague would remain the most prevalent, albeit now often augmented, if not supplanted by a search on the Web. Also, on the basis of the qualitative findings it was

thought likely that the data on researchers' methods of choice for meeting a topical information need would show more of age-associated than discipline-rooted variation. However, analysis of the responses to the aforementioned four statements did not confirm the contemporary researchers' hypothesised greater reliance on their colleagues; rather, the preferred solution when the need for a piece of specific information arose in the midst of work was found to be turning to the library. The assumption that the Web would be useful for the purpose was indeed borne out by the survey results, although apparently the practice was no more popular than requesting help from a colleague.

With all the talk in recent years of the impending demise of the library, researchers' responses to the statement: "If in the course of my research work I find that need some specific information, I turn to the library for assistance", was truly surprising. The majority of the 133 respondents to this question, 76% (102) agreed with the statement; as much as 35% (47) of the above even went as far as to say that it was always true of them. Moreover, no more than a mere 6% (9) of the respondents disagreed with the statement. True, as it will be shown before long, all of the other three options presented to the informants seemed to be utilised too, albeit far less extensively than this one.

The next statement: "If I need some specific information in the midst of working on a research, I simply e-mail a colleague and ask him to send me the publication", received 132 responses, of which 3% (4) were 'always true' and 30% (40), often true. However, just as many of the respondents disagreed with the statement: 24% (32) said it was seldom true of them, and 11% (15) said it was never true of them.

The third statement: "If I suddenly find that I'm missing a specific piece of information, which I need for my research, I turn for help to an expert colleague, as he may have the answer for my question", was again backed by about a third (31%, 40) of its 132 respondents, while another third (34%, 45) opted for never or seldom on this.

And finally, the statement: "If in the midst of working on some research it turns out that I need some specific information, with the aid of one of the search engines I can find answers very quickly on the Internet", was slightly more popular than the former two options: 38% (50) of the 132 respondents to this question said it was always or often true of them, although here again 30% (40) said it was never or seldom true of them.

Apparently then, the need for a specific piece of information cropping up in the midst of an investigation was met primarily by turning to the library. Consultation with a knowledgeable colleague, asking a colleague to send the relevant publication, or searching the Web, were all reported to be likely alternatives, but for most of the researchers queried, consulting the library was the method of choice.

Interestingly, breakdown of the data by discipline, which, on the basis of the qualitative findings had not been expected to reveal significant variation among the researchers, brought about a notable fine-tuning of the picture. To begin with, the option of turning to the library for solving a topical problem arising in the course of a research project, although universally preferred over any other method, was favoured by the humanities researchers to a much greater extent than by their counterparts from other disciplines.



While 89% of the humanities researchers said the statement to this effect was always (49%) or often (40%) true of them, 71% of the social scientists and 66% of the scientists rated it as always (33% and 14% respectively) or often (38% and 52% respectively) true. Also, whilst none of the humanities researchers said the statement was never or seldom true of them, 15% of the social scientists and 7% of the scientists did.

The data on the two options of turning to colleagues for obtaining the information needed for solving a specific problem arising in the course of research work again showed a marked variance among researchers of different disciplinary affiliations. This time, however, it was the two groups of scientists and social scientists who registered greater approval of the practices described compared to their humanities colleagues. Thus, the statement exploring the possibility of asking a colleague to send the needed item brought forth 'always/often true of me' responses from 42% of the social scientists, 48% of the scientists, but a mere 9% of the humanists (and even then in point of fact all of the 9% were 'often true' responses, not one was an 'always true' one). The findings on the possibility of consultation with a knowledgeable colleague again showed a similar pattern of disciplinary distribution: 38% of the social scientists and 34% of the scientists agreed with the statement, compared to 17% of the humanists. These results were plainly in line with the aforementioned reluctance discerned among humanists as to collaboration with colleagues for meeting the need for information beyond their areas of specialisation: 6% of the humanists, compared to 48% of the scientists and 40% of the social scientists said the practice reflected their ways.

The option of solving topical problems by turning to the Web also seemed to be held in higher esteem among the social scientists and scientists than among the humanists. The percentage of those who said that the statement describing the practice was always or often true of them was more than twice as high in the two groups of the former, 48% and 51% respectively, than in the group of the latter, where it came to 19%.

As it has already been noted, the findings of the qualitative stage seemed to indicate the probability of age associated variation among the researchers with regard to the ways and means chosen when the need for some topical information arose in the course of a research project. Discussing how with time a researcher established a network of colleagues he or she can turn to, the interviewees were of the opinion that the more seasoned researchers would be more likely to pick a solution involving consultation with a fellow researcher, whereas the less experienced ones would make more use of published sources, possibly on the Internet. The quantitative findings presented below do indeed reveal a rather marked variance among the age groups, if not as predicted.

The first option of looking to the library for solving topical problems, although greatly favoured in general, still revealed age-associated variance. Researchers of the upper age brackets found the practice more typical of their ways than their younger counterparts: 86% of the over 61s said the statement to this effect was always or often true of them, compared to 75% of the 45-60s and 67% of the under 44s. On the assumption that turning to the library was perceived as the traditional way of meeting information needs, perhaps it came more naturally to the older generation.

As to the two options of turning to colleagues: it seems that the younger researchers did indeed request help from fellow researchers to a slightly lesser degree than their older counterparts. Still, the variance found among those who registered agreement with the practice of asking a colleague to send a needed item was not very striking, with 34% among the over 61s, 38% among the 45-60s, and 26% among under 44s testifying to obtaining the necessary information in this way. Perhaps not surprisingly: after all, even novice researchers have some colleagues they know well enough to ask for the truly small favour of mailing them some publication.

The variance found in the data on the possibility of turning to an expert colleague for explanations was somewhat more marked. Not so much among those who reported agreement with the practice (29% of the over 61s, 33% of the 45-60s, and 29% of the under 44s), as among those who disagreed with it: whilst 28% of the over 61s and 27% of the 45-60s said the statement was never or seldom true of them, the percentage of the under 44s who also said so was almost twice as high: 53%. The explanation may indeed lie in the relatively marginal professional standing of an academic in the beginning years of an his or her career; obviously it takes time until one gains entrance to an invisible college and can afford to ask information from a reputable expert in the field at the drop of a hat.

The findings on researchers' turning to the Internet for some specific information presented a more puzzling picture (only when the data had been broken down concurrently by age and discipline did the results seem to make more sense): 42% of the over 61s, 32% of the 45-60s and 45% of the under 44s said the statement to this effect was always or often true of them, and at the other end of the scale 25% of the over 61s, 29% of the 45-60s and 36% of the under 44s said it was never or seldom true.

As Table 5.2.4 below demonstrates, grouping of the data on the first three statements by the combined variables of discipline and age seemed to further emphasise the previously discerned patterns. True, the results are hardly definitive, in view of the limited samples in each group, but they do seem to indicate that seeking solutions in the library to topical problems encountered was more to the liking of the upper two age groups, especially the humanists among them, and turning to colleagues either for the item needed or for explanations was almost equally supported in all three age groups across the different disciplines, although here the humanists were somewhat less in favour of the practice.

As to the possibility of turning to the Internet in search of answers to topical questions: the social scientists and the scientists in the lower two age-brackets revealed a greater propensity to do so than their older counterparts, apart, inexplicably, the under 44s among the social scientists, perhaps, here again, because the network of colleagues grows to be more extensive with seniority. However, humanists across all ages seemed to value the practice more or less equally – not very much.

Having examined each of the four methods for coping with the call for some specific information in light of the quantitative data gathered for the present study, Table 5.2.4 below summarises and compares the findings:



**Table 5.2.4: The Four Methods of Coping with the Call for a Piece of Specific Information in the Midst of Work on a Project, by Discipline and Age\***

<b>Turning to the library for assistance</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
67%	67%	60%	50%	66%	96%	80%	84%	100%
<b>Asking a colleague to send the publication</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
44%	33%	0%	50%	48%	13%	50%	42%	9%
<b>Requesting explanations from an expert colleague</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
44%	33%	0%	30%	43%	20%	30%	33%	27%
<b>Searching for answers on the Internet</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
100%	27%	20%	30%	60%	16%	30%	50%	27%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.2.5 Disciplinary-Culture Rooted Patterns of Stimulation-Seeking through Information**

#### **Hypothesis:**

**The manner whereby a researcher looks for information to serve as the spring board and the trigger for a new research has its roots in his disciplinary culture: in fields of intense competitive activity stimulation-seeking through information is a regularly carried out, intentional and focussed element in the researcher's professional pursuits, whereas in subject areas characterised by a less hectic scholarly work-pace finding suitable topics for a new research is a rather less purposeful and intense undertaking.**

The qualitative findings of the study indicated that there may be two distinct, possibly disciplinary-culture rooted approaches among researchers to the task of getting hold of the information, which ultimately fulfils for them a stimulating function in triggering a new research. Some researchers testified to tracking down possible topics for future research as an inseparable, almost reflex part of their customary reading and/or communicating with colleagues. Others, however, seemed to go about it much more consciously and purposefully, setting aside special times for perusing the literature and/or exchanging ideas with other researchers, with the sole intention of discovering new research opportunities. In an attempt to establish the veracity of these postulations, the survey recipients were posed four statements.

Two statements portrayed inspiration seeking through information as an intentional undertaking: "When I'm looking for a new topic of research, a new problem to work on, I actually set out to survey the literature, either to locate problems, already solved, but in need of better solutions, or to find problems, which still haven't been solved" and "When I collaborate with a colleague, we spend a lot of time just sitting together, trying to see what we'd like to work on and looking for a research topic together".

The next two statements presented the stimulating function of information as a chance occurrence: "My coming up with an idea for a new research may very well be a piece of pure luck. For example, I may attend a lecture at a convention, find the topic interesting, and eventually end up with a new idea for a research project" and "Ideas for new research projects crop up in the course of my conversations with colleagues".

On the whole, as Table 5.2.5.1 below sums up, it seems that inspiration finding through information was perceived by the researchers as a task better not left to fate. Almost half of the respondents (49%) reported agreement with the statement, which depicted the unearthing of topics for new research enterprises through intentional and focussed search of the literature, and an additional 12% said it was at times true of them (though at times not). However, the researchers reported far less determination once the potential sources of inspiring information were their fellow academics. Even taking into consideration that looking for a research topic together with a colleague was reported to be relevant for no more than 80% of the respondents to this question, still only 20% of the informants said that it was always or often true of them, whereas 42% said it was never or seldom true. Concurrently, the researchers seemed to be on the alert for potentially valuable ideas to be derived from information they fortuitously came across in the course of their work. Both statements describing the stimulating effect of information as coming about



by chance were rated as always or often true of them by about a third of the respondents (35% and 32% respectively). Roughly another third of the respondents said the two statements were at times true of them and at times not (28% and 27% respectively), while another third (33% and 38% respectively) registered disagreement.

**Table 5.2.5.1: Researchers' Perceptions of Inspiration Finding Through Information as an Intentional Undertaking Versus as a Chance Occurrence**

	Intentional Undertaking		Chance Occurrence	
	Scouring the literature for topics N=132	Looking for a topic with a colleague N=132	Happening on an idea N=132	Casual conversation with a colleague N=132
Always and often true	49% (64)	20% (27)	35% (46)	32% (42)
Seldom and never true	27% (35)	42% (60)	28% (37)	27% (35)
At times true, at times not	12% (16)	17% (23)	33% (44)	38% (50)

However, as the qualitative findings had already indicated, these general findings needed to be examined further in light of the disciplinary rooted differences discerned in researchers' information seeking behaviour patterns. It seemed to be indicated that in fields of intense scholarly activity fraught with competition, of the kind associated primarily with the 'hard' end of Storer's (1967) continuum of the disciplines, researchers would be more likely to seek out information with the express purpose of getting ideas for a new research endeavour than in fields progressing in a more leisurely fashion. Also, the data presented below on each of the four statements indicated that at times age has something to do with the variance detected on the issue among researchers.

There seemed to be only very slight variance either by discipline or by age in the data pertaining to the first statement ("When I'm looking for a new topic of research... I actually set out to survey the literature..."). True, the little variance which did emerge, seemed to be in line with the patterns expected to be found, but with the scientists registering just barely more vigorous approval of the practice than the humanists or social scientists, 52% compared to 48% and 49% respectively of always and often true responses, it was hardly the marked difference anticipated. Neither was there much disparity among the three age groups on the matter, though with age there was less and less agreement with the statement. Thus, whereas 56% of the under 44s said it was always or often true of them, their percentage among the

45-60s came to less, 48%, and among the over 61 it went further down to 45%. The reason for the phenomenon is not hard to fathom: novice academics can hardly afford to leave any aspect of their work to chance, certainly not the crucial one of locating topics for new research projects.

Breakdown of the data simultaneously by discipline and age (Table 5.2.5.2 below) showed the picture to be in line with the qualitative-stage based expectations, although here again, obviously, the small sample size in each group should be taken into account. The novice scientists were clearly the ones who went most determinedly about surveying the literature for the specific purpose of unearthing new research problems to work on; still, apparently with age even scientists could afford to relax a bit about it all. The humanists were not as deliberate about searching for new topics in the literature as their scientist counterparts, but among them too the pattern of intensity dwindling with age could be discerned, if less clearly. Somewhat surprisingly, the social scientists seemed to be marching to the beat of a different drum, with about a third of both the youngest and the oldest group of researchers saying they actually set out to scour the literature in search of new problems, compared to almost two thirds of the 45 – 60s, a quite inexplicable finding, which needs to be further investigated.

**Table 5.2.5.2: Researchers' Perceptions of Inspiration Finding through Information as an Intentional Undertaking: Setting Out to Scour the Literature, by Discipline and Age\***

Scouring the literature for possible topics to work on								
44 and under			45 – 60			61 and over		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=20	Hum N=25	Sci N=10	SSci N=12	Hum N=11
89%	34%	70%	50%	60%	40%	20%	41%	54%

\*as measured by the number of 'always true' and 'often true' responses given

The responses to the next statement ("When I collaborate with a colleague, we spend a lot of time... looking for a research topic together") showed rather marked variance among researchers of different disciplines, as well as little, but still indicative discrepancy between the two upper age groups, on the one hand, and the lower one, on the other.

Consistent with the findings of the qualitative investigation, the largest percentage of respondents who said that the statement was always or often true of them was found among the scientists: 35%, as compared to 23% among the social scientists and a mere 6% among the humanists. Presenting the other side of the same coin was even more enlightening: whereas only 24% of the science researchers disagreed with the statement (never and seldom true), the percentage of the social scientists who did so too came to 47%, and of the humanities researchers to 51%. However, this finding can be seen as indicative of more than the explanation offered at the outset of this discussion, attributing the greater deliberation with which



scientists searched for research-ideas inspiring information to the hectic pace of work in the 'hard' disciplines. It is not inconceivable that citing the exchange of research stimulating information in the context of cooperation had a halo effect: the mere mention of collaboration may have made the statement less attractive for humanities researchers, who, as it has already been shown, usually prefer to work on their own. No wonder that over a third of this group, 36%, rated the statement as altogether irrelevant compared to 11% of the scientists and 14% of the social scientists. Still, the halo effect cannot fully explain the variance found: cooperation is popular enough among the social science researchers, and yet their support of the statement was clearly not as manifest as that of the scientists.

As it has already been noted, the diversity found between the two groups of seasoned researchers, on the one hand, and the group of younger researchers, on the other, although not amounting to much, still bore out the pattern emerging from the qualitative findings. Thus, 15% of the under 44s testified to looking for a research topic together with a fellow researcher, compared to 22% of the 45-60s and 20% of the over 61s. By the same token, 39%, 45% and 40% of the three groups respectively said the statement was never or seldom true of them.

Analysis of the findings by the combined factors of discipline and age, despite its aforementioned limitations, seemed to have brought the picture into a much sharper focus, as Table 5.2.5.3 below reveals. Thus, for example, if the researchers of the lowest age group were on the whole somewhat less enthusiastic supporters of the notion that brainstorming with a colleague was a good way of finding new research topics, the humanists among them rejected the possibility altogether.

**Table 5.2.5.3: Researchers' Perceptions of Inspiration Finding Through Information as an Intentional Undertaking: Looking For a Topic with a Colleague, by Discipline and Age\***

Looking for a topic with a colleague								
44 and under			45 – 60			61 and over		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
33%	8%	0%	40%	38%	4%	30%	33%	9%

\*as measured by the number of 'always true' and 'often true' responses given

The third statement ("My coming up with an idea for a new research may very well be a piece of pure luck...") probed the prevalence of the serendipitous stumbling across some information. Since serendipitous information seeking is more readily associated with the work habits of humanities researchers than those of their colleagues in other disciplines, it had been thought likely that they would be less determined in their quest for information to spark off new topics of research, especially since their seemingly more relaxed work pace had been theorised to allow for it rather more easily. However, the

responses to the statement to this effect seemed to prove otherwise. None of the humanists, compared to 10% of the scientists and 13% of the social scientists, said the statement was always true of them. Moreover, whereas 38% and 27% respectively of the former said the statement was often true, only 19% of the latter chose the 'often true' option. At the other end of the scale the picture was equally revealing: the percentage of those who disagreed with the statement (never or seldom true) in the humanities group was manifestly higher than their percentage in the other two disciplinary groups: 41% as compared to 17% (sciences) and 27% (social sciences). It is interesting to note, however, that the percentage of researchers for whom the statement was at times true and at times not, was roughly equal across the disciplines, in the range of 31% - 34%.

When broken down by age, the results seemed to indicate that the older the researchers, the more likely they were to acquire stimulating information inadvertently. Thus, if in the group of over 61s 43% said that the statement to this effect was always or often true of them, in the group of 45-60s 37% and in the group of under 44s 24% registered agreement with it. However, when the data were grouped by the combined factors of discipline and age, no clear-cut, consistent pattern seemed to emerge. Either the inadequacy of the sample size prohibited the emergence of clearly defined trends, or, perhaps the serendipitous unearthing of new research ideas is so idiosyncratic in nature, that it does not follow any discernible patterns.

The responses to the last statement looking into researchers' inspiration finding through information ("Ideas for new research projects crop up in the course of my conversations with colleagues") lent further credence to the notion, that humanities researchers' are very much alone in their scholarly quests. Whereas 48% of the social scientists and 31% of the scientists agreed that ideas for new research projects cropped up in the course of their conversations with colleagues, only 13% of the humanists said so too.

The data on this statement revealed so little variance by age, that it could contribute nothing either to corroborate or to refute the previous finding, according to which the older the researchers, the more likely they were to acquire stimulating information inadvertently. 29% of the over 61s, 35% of the 45-60s, and 29% of the under 44 registered agreement with the statement, whereas 26%, 28%, and 25% of the three groups respectively registered disagreement with it. And, here again concurrent analysis of the results by discipline and age did not reveal any clear-cut pattern to the findings.

## **5.2.6 Pro-active Information Seeking Even as Novel Technologies Advances Allow for Passivity**

### **Hypothesis:**

**Although theoretically allowing for more passivity on the researchers' part, neither the availability of services, which see to the delivery of full-text reports to their desktop, nor the ease of maintaining contact with expert colleagues, have changed the determination with which they go about acquiring the information they need.**

The last point queried in the context of the purpose/function of information in contemporary scholarship was the possibility that, consequent to technological advances made, researchers have become more



passive in their information work. Hypothesising on the basis of the qualitative findings that in their activities, aimed at keeping current, today's researchers are not prepared to rely either on the increasingly available alerting services, or on the ease of maintaining contact with colleagues, the survey recipients were posed four statements aimed at probing four aspects of the question. Two statements explored the extent to which researchers were ready to put their faith in the by now ubiquitous IT-based opportunities for gaining knowledge of new publications: "A lot of information lands on my desktop, because I participate in listserves on subjects of relevance to me and colleagues send me e-mails with information, too, but still I initiate information searches" and "I get notified of new publications directly to my desktop, but I don't rely on these current awareness services; where keeping up with new developments is concerned, I prefer to take the initiative and search for new information on my own". The findings on both statements bore out the hypothesis as it had been put forward: indeed, neither the ease of maintaining contact with expert colleagues, nor the availability of current awareness services, which see to the delivery of information to researchers' desktops seemed to have changed the determination with which they went about acquiring the information they needed.

The responses to the first statement unmistakably indicated wide agreement with the notion of researchers' refusing to relinquish the responsibility for keeping up with the developments in their fields to their fellow researchers, be their professional ties as close as they may. More than twice as many opted for 'always/often true' on this than for 'seldom/never true': 44% (58) of the 132 informants, compared to 19% (26). However, it is important to note that for 20% (25) of the respondents to this question the statement was altogether irrelevant. This may be due to the fact that the information relaying methods cited were electronic ones (listservs and e-mail), which, as it will be shown in the section on the processing and packaging aspect of researchers' information needs, are widely, but still not universally used in research work.

Indeed, the highest percentage of those who rated the statement as irrelevant was found among humanists, whose adoption of IT-based work methods has been found to be less enthusiastic than that of their counterparts in the sciences and social sciences (see the section on the processing and packaging aspect of researchers' information needs). Whereas 28% of the humanists said the statement was irrelevant, only 18% of the social scientists and 3% of the scientists said so, too. Also, more of the scientists and the social scientists than the humanists found the statement typical of their practices, with the former two groups obviously seeing eye to eye on the subject: 50% of the social scientists and 48% of the scientists rated the statement as always or often true of them, compared to only 36% of the humanists. One possible explanation may stem from humanists' well-known penchant for working alone, in consequence of which they may not always maintain as close ties with peers as it seems to be characteristic of other disciplines.

Interestingly, age did not seem to matter much with regard to the stance taken on passivity versus activity in information seeking. In all three age groups close to half of the respondents said the statement was always or often true of them, with the lowest percentage (42%) found among the 45-60s, and the highest (48%) among the under 44s. Neither did analysis of the data by the combined variables of discipline and age enhance the picture by much, at least not where the scientists and social scientists were concerned: about half of the researchers in these two knowledge domains, regardless of age, said they did rely on

their close ties with colleagues for keeping up with new developments (always and often true answers). However, among the humanists the percentage of those for whom the statement to this effect was always or often true seemed to decrease with age: 50% of the under 44s, 36% of the 45 – 60s, and 27% of the over 61s. This concurs with the widespread notion, re-affirmed in the present study, too, that humanists have a more difficult time joining the ranks of electronic scholars.

The findings on the second statement lent further credence to the hypothesised notion that today's researchers saw to it as vigorously and resolutely as ever that all new information of potential relevance reached them. More than half of the respondents agreed with the statement which talked of a proactive approach to keeping up, rather than counting on the current awareness services to do the job: 21% of the 129 respondents to this question said the statement was always true of them, an additional 34% said it was often true, and only 15% said it was never or seldom true. Furthermore, researchers of all disciplinary affiliations and ages presented a manifestly united front on the subject: 57% of the humanists, 57% of the social scientists and 58% of the scientists said the statement was always or often true of them, as did 51% of the over 61s, 57% of the 45-60s and 55% of the under 44s. Under these circumstances, breakdown of the data concurrently by age and discipline did not much alter the picture.

**Table 5.2.6.1: Researchers' reliance on knowledgeable colleagues or current awareness services for learning of new developments\***

<b>A lot of information lands on my desktop... but still I initiate information searches.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
44%	54%	50%	40%	53%	36%	60%	42%	27%
<b>I get notified of new publications directly to my desktop, but...where keeping up...is concerned, I prefer to take the initiative and search for new information on my own.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=9</b>	<b>SSci N=20</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
77%	50%	50%	44%	70%	60%	50%	42%	63%

\*as measured by the number of 'always true' and 'often true' responses given



The remaining two statements focussed on today's widely available current awareness services; the extent of their use in view of their perceived efficacy, and researchers' specifications as to what these services should be doing for them.

The first statement, which looked into the perceived usefulness of the current awareness services, said: "I have a problem with the current awareness services meant to inform me of new publications on my subjects: having been notified again and again of articles of no interest to me, at some stage I have stopped using them altogether". The number of researchers who did not own up to the negative view of the current awareness services expressed here was twice as high as the number of those who found it true to life. Thus, while 15% (20) of the 131 respondents to this question agreed that there were problems with the current awareness services, to the point of justifying the cessation of their use, 37% (48) did not. However, it should be noted here that 25% (33) of the respondents found the statement irrelevant; that is, a quarter of the informants were in all probability non-users, who either did not feel a need for such services or were not aware of their existence or for some reason found the idea unappealing.

Breakdown of the data by disciplines revealed an interesting picture: although the percentage of humanities researchers who agreed with the statement, that is found the current awareness services problematic, was as low as that of the science researchers, 13%, and lower than that of the social science researchers, which came to 20%, more than a third of the humanists (36%), compared to 20% of the social scientists and a mere 3% of the scientists rated the statement as irrelevant. No wonder the percentage of humanists who disagreed with the statement, i.e. testified to the usefulness of the current awareness services, was the lowest of all disciplinary groups: 27%, compared to 34% of the social scientists and 56% of the scientists.

Breakdown of the data by age yielded a more predictable picture: the percentage of those who voiced agreement with the statement rose with age. Whereas none of the under 44s said the statement was always true and only 6% said it was often true, 16% of the 45-60s rated it always or often true, as did 23% of the over 61s. By the same token, the highest percentage of those who disagreed with the statement, that is testified to the usefulness of the current awareness services, was found among the youngest age group, 44%, compared to 34% in each of the other two age groups. Apparently, the younger and probably less socially networked researchers, whose professional grapevine was less reliable, rated the alerting services as more useful than their seasoned colleagues.

When grouped by the combined variables of discipline and age, some suggestive patterns seemed to emerge. Firstly, the under 44s across all disciplines were indeed the least likely to find fault with the current awareness services: none of either the scientists or the humanists, and only 17% of the social scientists in this age group said the statement was always or often true of them. However, whereas the percentage of those who disagreed with the statement (that is, reported the current awareness services to be of use to them) did not vary significantly across the disciplines in this age bracket, the percentage of humanists who rated it altogether irrelevant was 30%, compared to 17% of the social scientists and none at all among the scientists. Also, whereas the percentage of those who voiced agreement with the statement rose with age, that is, the older the researchers, the more likelihood there was that the current



awareness services would not be to their liking, the differences were somewhat more pronounced among the humanists: if among the scientists the percentage of those who deemed the alerting services problematic rose from 0% in the lowest age group to 20% in each of the upper age groups, and among the social scientists from 17% to 25% and 17%, respectively, among the humanists the comparable percentages came to 0%, 8% and 36%.

The last statement, which attempted to explore the attractiveness of a personalised alerting service, tailored to the specific needs of the individual researcher, was as follows: "I'd be glad of a service, which would bring directly to my desktop the information on all of the new publications pertinent to me, according to a pre-set profile of interest". The responses to the statement were quite enthusiastic; hardly surprisingly, of course: questions of this 'would you like' type, which probe willingness to accept some seemingly advantageous, but as yet theoretical possibility, rather than soliciting information on actual experience with a given practice, are often answered with great eagerness. However, they do indicate the presence or absence of at least the right frame of mind towards the proposed service (which does not guarantee, of course, that the service will be put to use eventually, and certainly not that once used, it will prove to be helpful). With regard to the personalised current awareness service discussed here, there seems to be widespread readiness for its adoption: an overwhelming majority of the 132 respondents, 84% (110) agreed with the statement proposing it.

Still, there was some variance in reception among researchers of different disciplinary affiliations and ages. Interestingly, the science researchers, among whom the percentage of those holding a favourable view of the current awareness services in their present format had been the highest, registered the least support of having them changed, even if it was for the better. 69% of the scientists, compared to 86% of the social scientists and 90% of the humanists said they would be glad of a service, which would bring directly to their desktops information on new publications according to a pre-set profile of interest. Possibly for some of them it was simply an understandable reluctance to change a setup which worked well, along the lines of 'if it ain't broken don't fix it'.

However, here again age was found to be a factor to contend with: researchers of the under 44 age group rated such a personalised alerting service as more useful than their seasoned colleagues, with 91%, as opposed to 83% of the 61 and over age group and 78% of the 45-60 age group registering agreement with the statement proposing their being notified of new publications according to pre-determined individual profiles.

Indeed, once the data were analysed by the combined variables of discipline and age (see Table 5.2.6.2, below), it became clear that in actual fact only the older scientists were against changes in the services offered to them, whereas the young scientists were even more enthusiastic than their contemporaries in the other two disciplines with regard to the idea of a personalised alerting service.



**Table 5.2.6.2: Researchers' Opinion of Personalised Current Awareness Services, by Discipline and Age\***

<b>I'd be glad of a service, which would bring directly to my desktop the information on all of the new publications... according to a profile of interest.</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
100%	83%	90%	50%	86%	83%	60%	92%	100%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.3 Further Insights into the Nature Aspect of Researchers' Information Needs**

#### **5.3.1 The Marginality of the Nature Aspect of an Information Need**

##### **Hypothesis:**

**Although the nature of the information being sought is a crucial factor in ensuring that the answer found is truly relevant to the question asked, it is seldom consciously formulated in the context of research-work related information seeking. .**

The qualitative findings of the first stage led to the admittedly provisional conclusion that unless it was a truly major feature of their information need, researchers rarely paid attention to its nature. The first statement in this section aimed, therefore, at learning if researchers actually set out to search for a specific type of information deemed necessary for performing some task. Thus, survey recipients were asked to say how true of them the following statement was: "I may set out to look for a specific type of information, say, theoretical, descriptive, methodological, statistical, or technical information. For instance, if I want to perform some experiment, I may look for technical information".

The findings pointed to researchers' actually paying more attention to the type of the information sought than it had been provisionally attributed to them: true, more than a third, 36% (47) of the 130 respondents to this question found it altogether irrelevant to them, but 47% (61) rated the statement to this effect as always or often true of them.

Grouping of the data by disciplines served to hone the picture to a considerable extent: researchers' purported disregard of the type of information was in point of fact characteristic primarily of humanists. Thus, whereas among the humanists only 27% agreed with the statement to this effect, and 55% rated it irrelevant, among the scientists and social scientists 55% and 58% respectively agreed with it and only

28% and 22% respectively rated it irrelevant. Still, it cannot be ruled out that the mere mention of statistical or technical information sufficed for humanists to decide that the statement was irrelevant.

However, breakdown of the data by age yielded a truly curious finding: 29% of the researchers in each of the two lower age brackets, compared to 53% of the researchers in the upper age bracket said that the statement depicting the possibility of looking for a specific type of information was wholly irrelevant to them. Also, while about half of the respondents in both of the lower age groups testified to looking for a specific type of information when deemed necessary, only 39% of the upper age group did so too. Could it be that researchers of the older age group, used to paper based information sources, did not readily think of information seeking by type as effortlessly doable?

Breakdown of the data by the combined variables of discipline and age, despite its scope-related limitations, lent further support to the soundness of this theory. Thus, if humanists in general were the least likely to look for information by type, the older among them reported even less support of the idea than their younger counterparts: whereas 40% of the under 44s said the statement was always or often true of them, with age the percentage of those registering agreement decreased to 25% and 20% in the two upper age groups. The variance found in the other two disciplines may not have been as marked, but the same pattern still seemed to be quite discernible, as, for example, the percentage of 'irrelevant' responses to the statement demonstrates (Table 5.3.1 below).

**Table 5.3.1: Researchers' Searching for a Specific Type of Information, by Discipline and Age\***

I may set out to look for a specific type of information, say, theoretical, descriptive, methodological, statistical, or technical information								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	IHum N=10	Sci N=10	SSci N=21	IHum N=24	Sci N=10	SSci N=12	IHum N=10
22%	25%	30%	10%	10%	54%	50%	42%	80%

\*as measured by the number of 'irrelevant' responses given

### 5.3.2 The Ongoing Inescapability of Actually Travelling to the Information Site

#### Hypothesis:

Access to primary sources of information, especially current information, has been greatly enhanced through the ubiquitous availability of Internet based resources. However, there are circumstances in which the only way for the researcher to obtain a specific item of information is by actually going to wherever it is located.



The next two items posed to the survey recipients set out to look into the qualitative finding, which intimated that despite the much improved access to primary information in these days of Internet based services and sources, researchers nevertheless cannot always forego actually travelling to wherever the information is located.

The first statement, which aimed at soliciting researchers' views on the perceived expediency of obtaining primary information via the Internet, was as follows: "Being able to download so easily from the Internet the primary sources of information that I need is a great help in my work". Somewhat surprisingly, the data did not seem to support as effusively as surmised the notion of greatly enhanced access to primary sources of information: of the 133 respondents only 35% (47) said the statement was always or often true of them, and 25% (33) said it never or seldom was. The first clue to understanding the discrepancy between the momentous improvements in access to primary information reported in the qualitative stage and the less than enthusiastic endorsement of the notion here was the relatively large number of researchers who rated the statement as irrelevant: 32% (42). Indeed, although some of the primary information available on the Web can be very useful indeed for scientists and humanists, from the raw data posted for the benefit of physicists to the facsimiles of art works so handily available to the art historians, but much of it, such as statistics, official reports, news, speeches, court cases, treaties, raw data, etc. is plainly more useful for social scientists. It should be noted, however, that with a third of the respondents saying that the notion was altogether irrelevant for them, the 47 researchers who did voice agreement with it in fact represented about half of those for whom the statement was applicable.

The disciplinary-rooted variance detected in the responses seemed to bear out this line of reasoning. Apparently, whereas only 11% of the social science researchers rated the statement as irrelevant, 38% of the science researchers and 47% of the humanities researchers did so. Indeed, the social scientists, more than the scientist, and far more than their humanist colleagues found the Internet of great help in accessing primary information: 60% of the former, compared to 31% and 17% respectively of the latter said the statement to this effect always or often true of them.

Breakdown of the data by age posed an enigma of sorts. Very interestingly indeed, there was a marked variance among the different age groups: 25% of the researchers in the middle age group (45-60), compared to 48% of the under 44s and 45% of the over 60s were in agreement with the statement designating the Internet as a superior source of primary information. That the under 44s were the keenest supporters of the notion, was in line with their greater endorsement of anything electronic (see the section on the processing and packaging aspect of information needs). That the 45-60s were not as enthusiastic about it all as their younger counterparts was likewise in keeping with their views on the subject. However, the rather emphatic backing of the notion among the over 61s came as a surprise, even if subsequent breakdown of the data concurrently by discipline and age showed the phenomenon to be peculiar to the social sciences.

Apparently, whereas social scientists across all age groups manifested staunch support of the practice of turning to the Internet in search of primary material (67% of the under 44s, 48% of the 45 – 60s, and 75% of the over 61s), even if for some reason the middle age group were relatively less enthusiastic about it



all, the scientists presented a far less united front on the issue. Thus, if the percentage of scientists who said that the statement was always or often true of them came to 55% among the under 44s, it dwindled to 20% in both of the older age groups. Also, the percentage of humanists who endorsed the notion came to no more than about 20% across all age groups. Furthermore, whereas only a small percentage of the social scientists in each of the age brackets reported that the statement extolling the virtues of the Internet for accessing primary material was irrelevant for them, their counterparts in the sciences or the humanities rated the statement less and less relevant with age, as Table 5.3.2 reveals:

**Table 5.3.2: Researchers' Perception of the Internet as a Likely Source of Primary Information, by Discipline and Age\***

Being able to download so easily from the Internet the primary sources of information that I need is a great help in my work								
44 and under			45 – 60			61 and over		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=12	Hum N=11
22%	17%	30%	30%	10%	52%	60%	8%	45%

\*as measured by the number of 'irrelevant' responses given

In an attempt to look at the reverse side of the access to primary material coin, the survey recipients were posed the following statement: "There are circumstances in which the only way to integrate a specific item of primary information in my research is actually going to where it is located". The findings definitely seemed to round out the picture: indeed, there are times when researchers have to go to the information instead of waiting for it to (electronically) come to them, although, as it will be shown presently, considerable variance was found on this among the different groups comprising the academic community. True, the notion of having to travel to where some primary information was located was alien to a considerable percentage of the respondents: of the 132 respondents to this question 19% (25) said the statement was irrelevant for them. Furthermore, for 17% (22) of the respondents the statement was seldom true, and for 20% (26), never true. Still, 9% (12) did say the statement to this effect was always true of them, with an additional 19% (25) saying it was often true. Also, another 17% (22) said that the statement was true of them at least at times.

Breakdown of the data by disciplines here again fine-tuned the picture: humanities researchers, for whom primary information was so often original, possibly rare, antique but at least old material, did indeed voice the most support of the notion that sometimes there was no alternative but to go to the information wherever it may be located. 19% of the humanists said the statement to this effect was always true of them, compared to 4% of the social scientists and none of the scientists. A further 28% the humanists said the statement was often true of them, compared to 16% of the social scientists and 10% of the scientists.



And, by the same token, 51% of the social scientists and 55% of the scientists, compared to a mere 8% of the humanists, disagreed with the notion.

Age did not seem to be of influence where the need to go to the information was concerned: the variance among the different age groups was quite insignificant. Thus, for example, 30% of the under 44s, 28% of the 45-60s, and 29% of the over 61s said the statement to this effect was always or often true of them.

Neither did grouping of the data concurrently by discipline and age alter the overall picture: the variance found among the disciplines remained in place across the different age-brackets.

## **5.4 Further Insights into the Intellectual Level Aspect of Researchers' Information Needs**

### **5.4.1 Preference for Traditional Scholarly Communication Channels**

#### **Hypothesis:**

**Since the material floating around on the Web is so often popular level information of uncertain vintage, researchers prefer to rely in their information seeking on the traditional scholarly communication channels, by way of making sure that the information they find is fitting to their knowledge and intelligence level.**

The next question on the agenda was the extent to which today's researchers were prepared to trade the guaranteed scientific level of information obtained through traditional scholarly communication channels for the easy availability of the popular level material to be found on the Web. Hypothesising on the basis of the qualitative findings that the answer to the question would be a resounding 'no', the next statement posed to the survey recipients was as follows: "I don't search for scientific theories and scholarly approaches on the Web; if it's academic level information, it'll appear in the journals we are familiar with or in books of the serious publishing houses".

As anticipated, the clear majority of the 131 respondents to this question registered agreement with it. 31% (41) of the researchers said the statement was always true of them, 30% (39) said it was often true, and 20% (26) said it was at times true of them and at times not. In comparison, a meagre 6% (8) said the statement was seldom true of them, and 5% (7) said it was never true. For 8% (10) of the respondents the statement was irrelevant, a finding which led one to speculate on the possibility that the mere mention of the Internet, even in a negative context ("I don't search for scientific theories...on the Web") might have rendered the statement irrelevant for some.

Indeed, the variance found among the different disciplinary groups seemed to support this line of thinking. Whereas none of the scientists, and only 2% of the social scientists said that the notion of preferring information obtained through traditional scholarly channels over material found on the Web was irrelevant for them, the percentage of the likeminded humanists came to 17%. This is again in accordance with previous findings, corroborated in the present study (to be discussed in the section on the

processing and packaging aspect of information needs), which point to a greater measure of hesitance in humanities researchers' adapting to the electronic information environment. However, all this did not greatly change the conclusion to be derived from the breakdown of the data by disciplines: respondents from all disciplinary affiliations displayed a rather united front in opting for scholarly publications, rather than information on the Web, when they needed information of appropriate level: 69% of the scientists, 57% of the social scientists and 62% of the humanists chose 'always' or 'often true' on this.

Breakdown of the data by age again showed only slight variance: 65% of the over 61s, 55% of the 45-60s, and 67% of the under 44s said the statement was always or often true of them. In view of the inconsequential variance among researchers, found in the analysis of the data first by discipline and then by age, it came as no surprise that concurrent analysis by the two did not much alter the picture.

#### **5.4.2 Need for Varying Levels of Information**

##### **Hypothesis:**

**In their specific area of interest researchers consistently need scholarly information of the highest level; however, in areas outside their chosen spheres of expertise their needs vary according to the level of 'outside' information deemed to be necessary: often no compromise as to the level of the information source used is possible, but sometimes, especially when consultation with an expert colleague is known to be readily forthcoming, more basic level information suffices.**

The notion that researchers may need varying levels of information has already been explored in the section on the subject aspect of information needs, in the context of researchers' coping with the call for information beyond their own areas of expertise. Here the possibility is re-explored, this time in an attempt to determine if researchers invariably need only scholarly information of the highest level. Towards this end, the next statement presented to the survey recipients was as follows: "When in the course of my work I need to know something which is not in my areas of speciality, I locate some basic level information on the topic and ask expert colleagues to explain it to me. This way I get to understand the issue sufficiently to do my research". The findings on this statement tallied closely with those on the previously investigated practice of accepting more basic level information, albeit specifically of the kind found on the Internet, of scientifically correct information meant for laymen. This state of affairs obviously contributes towards establishing the soundness of both sets of results. On the whole, the practice described here again was not found to be very popular: of the 129 respondents to this question only 2% (2) said the statement was always true of them, 12% (15) said it was often true, but a total of 43% (55) said it was never or seldom true of them.

The little variance found among respondents of different disciplinary affiliations clearly indicated that researchers were of one mind concerning the possibility of compromising on the level of the information source used. True, the humanists seemed to favour the practice least of all, with none of them testifying to the statement's being always and only 4% to its being often true of them, but neither did their colleagues in the other two disciplines appear to be much more enthusiastic about it all: a scant 2% of the social



scientists and 3% of the scientists said the statement was always true of them, and a further 14% and 17% of each of the two disciplines respectively said it was often true.

Age seemed to be of little consequence in determining researchers' views on making do with more basic level information, with the percentage of those who said that the statement reflected their behaviour in the vicinity of 12% - 15% in all three age brackets. However, more researchers of the two lower age groups said that the statement was at times true of them and at times not than researchers of the upper age group, which correspondingly raised the percentage of those of the latter, who disagreed with the notion: 53%, compared to 35% among the 45-60s and 44% among the under 44s. And, here again, the unanimity among researchers discerned in the separate analyses, first by discipline and then by age, precluded the possibility of greatly differing results in the simultaneous breakdown of the data by the two variables; indeed, none was found.

## **5.5 Further Insights into the Viewpoint Aspect of Researchers' Information Needs**

### **5.5.1 The Importance and Easy Feasibility of Detecting Tendentious Presentation of Information**

#### **Hypothesis:**

**Given the vital importance accorded in the scholarly endeavour to scientific integrity, in areas where diverse interpretations of facts and data are possible and expected it becomes an important part of research work detecting whether a particular piece of information on hand is presented (overtly or covertly) from a certain point of view, approach, or angle. However, there are long-established ways and means which allow a researcher to do so easily enough.**

The qualitative stage of the study left a strong impression that for those researchers, whose subject matter allowed for interpretation, it became an inseparable part of their research endeavour discerning if a particular piece of information was presented from a certain point of view, either in the open or by way of insinuations. Setting out to establish if that indeed was the case, the survey recipients were requested to give their views on two statements exploring the importance and the feasibility of the researcher's detecting if some information was presented from a particular approach or angle.

The first statement focussed on the phenomenon itself as well as its importance for the researcher: "It can undeniably happen that a piece of information I encounter is presented from a certain point of view, and it's important that I realise that it is the case". The results left no room for doubt: although for 18% (23) of the 125 respondents to this question the statement was indeed irrelevant, the majority agreed with it. 20% (25) said it was always true of them, 32% (40) said it was often true of them, and 18% (22) said it was at times true of them and at times not. No more than 11% (14) said the statement was seldom true of them, and just one respondent rated it never true.

When broken down by disciplines, the data revealed that the scientists were indeed far more likely to deem the whole idea of information presented from a given viewpoint as irrelevant: 43% of the scientists, compared to 11% and 12% of their social scientist and humanist counterparts, respectively, chose the



option. Neither did it come as much of a surprise that only 21% of the scientists said the statement was always or often true of them. The social scientists and humanists, however, presented a united enough front: 58% of the former and 65% of the latter opted for 'often' or 'always true' on this.

Age had not been expected to have an effect on the importance researchers accorded to noting if a piece of information was presented from a certain viewpoint, and indeed, no variance by age could be discerned. Thus, for example, 53% of the under 44s, 51% of the 45-60s and 53% of the over 61s said the statement was always or often true of them.

When the results were analysed by the combined variables of discipline and age, the picture became more sharply focussed. True, the small sample size in each group warranted quite a bit of caution in interpretation of the results, but at least as leads for further investigation the emerging patterns seemed to be of value. Thus, the scientists across all three age groups demonstrated the anticipated little concern with the possibility that some information would be presented from a given viewpoint, with the percentage of those among them who endorsed the notion ranging from 11% to 30%. However, and contrary to expectations, too, the humanists, not the social scientists, were the more likely to emphasise the importance of detecting if a particular piece of information was presented from a certain point of view, a finding which turned out to hold true across two of the three age groups: 70% compared to 50% of the under 44s, 68% compared to 58% of the 45 – 60s, though 60% compared to 70% of the over 61s.

The next statement aimed at verifying the assumption that the researcher could detect easily enough the point of view, approach, or angle from which a particular piece of information was presented. Therefore, the statement soliciting the survey participants' views on the matter was as follows: "If the information I have is presented from a certain point of view, I detect it very quickly, because I read the article or the book critically: for instance, the sources the author uses and his terminology can testify to it's being an objective research or not". Here again, the findings on the statement left little doubt as to the soundness of the hypothesis advanced. Of the 128 respondents to this question, 28% (36) said the statement was always true of them, 30% (38) said it was often true of them, 20% (26) said it was at times true of them and at times not; only 5% (7) said it was seldom and 1% (1) it was never true. And, here too, some of the respondents felt the statement was irrelevant: 16% (20) chose the option.

Breakdown of the data by disciplines yielded the same pattern: the statement was deemed irrelevant by 41% of the scientists, compared to only 10% of the social scientists and 6% of the humanists. And again, more humanists agreed with the notion than social scientists, 72% compared to 57%, which left the scientists (17%) far behind.

Interestingly, though perhaps not surprisingly in light of the qualitative findings, the breakdown of the data by age seemed to be intimating that experience may have something to do with the ability to deal with information presented from a given point of view: 54% of the under 44s, 56% of the 45 – 60s and 63% of the over 61s agreed with the statement to this effect. The variance detected was too slight to be taken for anything more than a mere hint of a possible pattern in need of further investigation, but analysis of the data by the combined variables of discipline and age seemed to lend further support to this



line of thinking: the senior researchers in the social sciences and the humanities seemed to be more likely than their younger counterparts to agree that it was easy enough to identify the point of view of a particular piece of information: in the social sciences 50% and 55% of the lower age brackets, compared to 70% of the upper age bracket, and in the humanities 60% and 72% of the lower age brackets compared to 82% of the upper age bracket opted for 'always' and 'often true' responses on this.

### **5.5.2 The Welcome Uses of Biased and/or One-sided Information**

#### **Hypothesis:**

**Once the biased and/or one-sided approach used in a piece of information is openly acknowledged, or at least once it is identified, the information therein has its welcome uses for constructing a multi-faceted understanding of a topic.**

The next statement was intended to look into the qualitative findings-based hypothesis, according to which biased and/or one-sided information could have its uses for the researcher, provided that its slanted approach was identified and taken into account. Thus, it said: "I may definitely set out to look for an article, which has been written from a specific point of view, because in many instances you can deal with a topic only if you are well aware of the points of contention involved". As it had been foreseen with regard to the viewpoint aspect of researchers' information needs, not all researchers found the statement relevant to their circumstances. The percentage of those who opted for 'irrelevant' was here again in the same order of magnitude as found on the two previous statements on the subject, 15% (19) of the 128 respondents to this question. Other than that, the data revealed strong support of the notion that imbalanced information could prove to be useful for researchers. 26% (33) of the respondents said the statement to this effect was always true of them and a further 31% (40) said it was often true. Only 13% (14) disagreed with the notion, with a mere 2% (2) of them saying it was never true.

The categorisation of the results by disciplines refined the picture considerably. Once more the percentage of the scientists, endorsing the notion that one-sided information could be put to good use in the scholarly enterprise, was much lower than the corresponding percentage among their fellow researchers in other disciplines: whereas only 31% of the scientists agreed with the statement to this effect, 62% of the social scientists and 71% of the humanists said it was always or often true of them. Also, 41% of the former rated it as irrelevant, compared to 10% and 4% respectively of the latter.

Grouping of the data by age seemed to strengthen the impression that scholarly experience may be of relevance to the extent of use made of information presented from a certain point of view or angle: respondents of the two upper age groups were more likely to support the notion than their colleagues of the lowest age group. Thus, while 63% of the over 61s, and 61% of the 45-60s said the statement was always or often true of them, only 42% of the under 44s said so too.

Here again, analysis of the data by the combined variables of discipline and age provided further, if, in view of the small sample sizes, obviously limited evidence to the contention that the usefulness of imbalanced information increases as the researcher gains experience: the highest percentage of

respondents saying that the statement to this effect was always or often true of them was found in the upper age brackets both in the social sciences and in the humanities (though again, not in the sciences): 33% of the under 44s among the social scientists, compared to 70% of the 45 – 60s and 80% of the over 61s and 55% of the under 44s among the humanists, compared to 72% of the 45 – 60s and 82% of the over 61s. Indeed, as the interviewees of the qualitative stage emphasised, familiarity with an area of interest seems to be a vital prerequisite of identifying biased information and putting it to good use.

## 5.6 Further Insights into the Quantity Aspect of Researchers' Information Needs

### 5.6.1 Perception of Today's Exposure to Huge Quantities of Information as Beneficial to Research

#### Hypothesis:

Although vast amounts of information are a predominant component of the present-day scholarly environment, problems of information overload in research work are considered virtually non-existent; rather the contrary: the exposure to huge quantities of information is seen as a veritable blessing.

Next the survey focussed on easily the most surprising finding of the qualitative stage: researchers' claim that the vast quantities of information available to them not only posed no problems of overload, but they were very beneficial indeed to their scholarly endeavours. The survey recipients were therefore asked to register the extent of their agreement with the following two statements, the first exploring the notion in general, the second concentrating on its helpful effect: "I'm truly flooded by large quantities of information, but I consider it a blessing, I'm glad that it is so" and "My life is easier with this abundance of information at my disposal than without it".

The data on the two statements showed comparable satisfaction on the part of the researchers with the affluence of information at their disposal, proving the qualitative data based hypothesis towards this end to be very true to life indeed. Over half of the respondents to each of the two statements registered agreement with it, whilst less than a tenth in each case disagreed, as Table 5.6.1.1 below shows:

**Table 5.6.1.1: Researchers' Views as to the Abundance of Information Available to Them**

	"A blessing" N=131	"Makes life easier" N=128
Always / often true	56% (74)	57% (72)
At times true, at times not	29% (38)	34% (43)
Never / seldom true	9% (13)	7% (9)



When broken down by disciplines, the data revealed little variance among researchers from different knowledge domains. Still, the humanists were somewhat less enthusiastic in their agreement with both of the statements than their scientist and social scientist colleagues: 49% of the former rated the first statement as always or often true of them, compared to 62% and 64% respectively, of the latter; similarly, 53% of the former rated the second statement as always or often true of them, compared to 58% and 64% respectively, of the latter.

Breakdown of the findings by age again showed little, if somewhat more marked variance among the researchers as to the extent to which the abundance of information made their lives easier. Thus, 59% of the lower, and 56% of each of the two upper age groups registered agreement with the first statement, as did 66% of the under 44s, 57% of the 45-60s and 47% of the over 61s with regard to the second statement. However, the extent of disagreement with either notion was negligible across all nine groups.

Within the limitations of the sample size, results of the data analysis by the combined variables of discipline and age seemed to further hone the emerging picture, inasmuch as the humanities researchers in the different age groups were mostly indeed somewhat less enthusiastic about the abundance of information available to them than their scientist or social scientist counterparts (see Table 5.6.1.2 below). Still, across all age groups the percentage of those among them, who did not agree that the huge amounts of information were a blessing, or made life easier, was just as negligible as that found among researchers of the other two disciplines.

**Table 5.6.1.2: Age- and Discipline-Associated Variance in Researchers' Views as to the Abundance of Information Available to Them\***

A blessing								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=11	Hum N=11
66%	67%	50%	60%	62%	52%	60%	63%	45%
Makes life easier								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=23	Sci N=10	SSci N=11	Hum N=11
78%	67%	60%	50%	71%	52%	50%	45%	54%

\*as measured by the number of 'always true' and 'often true' responses given

## 5.6.2 Effective Information Consumption in Contemporary Academe

### Hypothesis:

The lowering of academic standards associated with the present-day profusion of scientific and scholarly publications (the 'publish or perish syndrome') has brought about a change in attitude to information in academe. No longer treated with deference bordering on reverence, information is customarily appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with scholars using selective reading as their main, if not only strategy to cope with the quantities of information of potential importance to them.

The next two statements posed to the survey recipients aimed at exploring the soundness of the hypothesised change in attitude to information in academe, presumed to have been responsible for researchers' learning to cope with the quantities of information available to them by the simple strategy of selective reading. The first of the two statements focussed on the need to cope with the situation: "These days I need many more rakes, many more filters in my treatment of information. The publications industry of the promotions, all this 'publish or perish' have brought about an exponential increase in information, but in quantity, not quality". The second statement highlighted the strategy used for the purpose: "Careful selection is the only way to deal with the abundance of low quality information, which is brought about by the culture of 'publish or perish'". On the whole, researchers were in agreement with both statements:

51% (66) of the 128 respondents to this question said the first statement was always or often true of them, while only 11% (14) said it was never or seldom true. In the same vein, 64% (84) of the 131 respondents to the second statement said it was always or often true of them, while only 5% (6) said it was never or seldom true.

It seems then, that researchers did indeed support the notion that the 'publish or perish syndrome' brought about a decline in the quality of scientific and scholarly publications, in result of which information needed to be appraised and vetted carefully, with selective reading becoming the prime strategy for doing so. However, categorising the data by disciplines revealed some variance among the researchers, with a parallel pattern clearly discernible in the results on the two statements: in both cases the scientists were not as supportive of the proposed notions as either their social scientist or humanist colleagues. 31% of the scientists compared to 59% of the social scientists and 50% of the humanists opted for always or often true on the first, and 34% of the former compared to 70% and 68% respectively of the latter on the second statement.

When grouped by age, the findings on the two statements again revealed comparable patterns, with one interesting exception: whereas researchers in the upper age bracket registered less support than their younger colleagues of the need to be more discerning in information selection in view of its deteriorating quality, they were the most likely to agree with the second statement, which centred on the best way of coping with the situation. Thus, 42% of the over 61s agreed with the first statement (always and often



true), compared to 57% of the 45 – 60s and 51% of the under 44s, whereas the corresponding percentages of the respondents to the second statement came to 76%, 66% and 50%, respectively. However, breakdown of the data by the combined variables of discipline and age (see Table 5.6.2 below), limited as its results were by the sample sizes in the different groups, revealed this pattern to be very much discipline specific. Thus, the first statement, which stressed the 'publish or perish' associated escalation in the quantity, and concomitant corrosion in the quality of information generated, was perceived as accurately reflecting the realities of the information scene by approximately half of the social scientists and humanists across all age groups, but only by 33% of the under 44s, 40% of the 45 – 60s, and no more than 20% of the over 61s among the scientists. And whereas on the whole scientists were the least inclined to agree with the second statement, too, which emphasised the need for careful selection as the strategy for coping with the abundance of information, this time the upper age group among them did not differ from the corresponding age groups among the social scientists and humanist. All favoured the option more than the lower age groups.

**Table 5.6.2: Discipline- and Age-Associated Variance in Researchers' Coping with the Abundance of Information Available to Them \***

<b>These days I need... many more filters in my treatment of information. The publications industry of the promotions, all this 'publish or perish' have brought about an exponential increase in information, but in quantity, not quality.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=10</b>	<b>Hum N=11</b>
33%	58%	50%	40%	62%	54%	20%	50%	45%
<b>Careful selection is the only way to deal with the abundance of low quality information, which is brought about by the culture of 'publish or perish'.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=11</b>	<b>Hum N=11</b>
33%	58%	60%	40%	77%	68%	70%	72%	82%

\*as measured by the number of 'always true' and 'often true' responses given

The emerging picture is rather intriguing. Why is it that scientists consistently demonstrate a more relaxed attitude to the need to cope with the present-day profusion of publications than their social scientist and humanist counterparts? And why are the researchers of the older generation among them not as concerned with the need for careful vetting of the information as their younger colleagues? A possible explanation

may lie in the very nature of scientific, as opposed to scholarly research: as it has already been noted, scientists build on the results of others' previous work, whereas social scientists and humanists react against previous analyses of their objects of study (Garfield, 1980; Stoa, 1991). Therefore, scientists require mainly the latest reports of research outcomes of relevance to their own, whilst scholars want the whole gamut of the various works on their topic. This may render the filtering of the available material relatively straightforward for scientists: after all, unless some research is refuted, they only need the original article reporting on it, especially as the validity of scientific information, with its highly factual contents, can be established fairly easily. No wonder that scientists, and especially the seasoned researchers among them, whose professional confidence is bound to be greater, can afford to demonstrate less of a concern with the profusion of publications, so characteristic of today's academe.

## **5.7 Further Insights into the Quality/Authority Aspect of Researchers' Information Needs**

### **5.7.1 Enduring Reliance on Traditional Ways and Means of Establishing Authority and Determining Quality in Research Information Work**

#### **Hypothesis:**

**Researchers still rely on a time honoured, two-tiered process for establishing the authority and/or determining the quality of scholarly and scientific information: first selection made on the basis of authorship and channel of publication, followed by a more in-depth scrutiny of the items which have been found to merit further consideration.**

The next two items on the survey questionnaire sought to establish the soundness of the qualitative findings based (and therefore tentative) conclusion that the contemporary researchers still relied, as the first step in ascertaining that the information at hand was of appropriate quality and authority, on the scholarly criteria of authorship and channel of publication, only then turning to a closer reading of the document. Towards this end the survey recipients were posed two statements, which explored in tandem how today's researchers coped with the need to single out from the abundance of information at their disposal the items they deemed to be of suitable value: "I look for articles published in journals of good reputation, because when there is such an avalanche of material, that's the way to ensure the quality and authority of the information", and "I judge the quality of an article in a two-tiered process: first I take a look at who the author is (where he teaches, what his academic degree is, etc.), and note the journal in which it is published. If by this stage the article looks worth my while, I look at the references, read the abstract and devote some time to a more in depth reading".

The first statement, focussing on the channel of publication as a measure of the worth to be accorded to some information, received appreciably positive responses. 68% (89) of the 131 respondents to this question said the statement was always or often, and 19% (25) said it was at times true of them, and only 9% (12) deemed it seldom or never true. The social scientists were the most likely to consider the reputation attributed to a channel of publication, represented in this statement by the scholarly journal, especially important for determining the quality and authority of some information. 78% of them,



compared to 62% of both the scientists and the humanists agreed with the statement to this effect, and 7% of them compared to 10% and 11%, respectively, disagreed with it. The pattern, which seems to emerge here in the information behaviour of researchers, and recur in the findings on the next statement, too, can probably be traced to differences in the extent of agreement on standards of scholarship in the various disciplines, as described by Becher (1989), Meadows (1993) and Zuckerman and Merton (1979), and in the way in which ideas are transmitted, as pointed out by Bates (1996), Becher (1989) and Stoa (1991).

The topic will be discussed in full detail later on, but a summary of the relevant points is still necessary for interpreting the data at hand. Still, for our purposes here suffice to say, that the scientists face a relatively easier task when they set out to assess the value of some information. First of all, in their areas of investigation the criteria for adequate scholarship are likely to be clear-cut. Also, since new scientific information generated is routinely communicated before its formal publication, the 'official' report (most likely in the form of a journal article) is a brief report of unequivocal results. Thus, scientists do not really need, and therefore can probably often afford to forego the utilisation of any 'props' for judging the worth of the information at hand. Neither are the humanists more prepared to accept some information on faith, but for a very different reason. In the humanities the standards of 'good' or trustworthy scholarship are more flexible, which means that they often need to read the piece of information at hand in its entirety to assess its value. Also, since in the humanities the reporting of research results is contingent on context building, and the highly ambiguous results dictate a more elaborate and detailed presentation to justify the particular information being put forward, reading the text itself in its entirety is indispensable for its adequate appreciation. It seems then, that if scientists do not really need external measures for evaluating information, humanists are often simply unable to use them. No wonder then that social scientists, located as they are mid-way between the 'hard' and the 'soft' ends of Storer's (1967) continuum, seemed to be the ones more inclined to utilise authorship and publication venue as indicators of the value of some information: they needed these evaluation aids more than their scientist colleagues, whilst being able to better utilise them than their humanist colleagues.

The slight variation by age found among the respondents indicated that with scholarly experience the reliance on the reputation of a journal as a measure of the value of the information to be found therein may somewhat diminish: 73% of the under 44s said the statement was always or often true of them, compared to 68% of the 45-60s and 63% of the over 61s. Perhaps not surprisingly: obviously, the novice researchers are more likely to need some objective measures for determining the scholarly value of a piece of information than their more experienced and self-assured older colleagues.

However, when broken down concurrently by both discipline and age, the distinction between novice/experienced researchers did not appear to hold universally true, as it can be seen in Table 5.7.1.1 below. Thus, if in both the sciences and the social sciences researchers of the lower age groups were more likely to say that they used the reputation of a journal to gauge the merits of some information than their counterparts of the upper age group, the exact opposite seemed to be the case in the humanities: the staunchest supporters of the practice among them were the over 61s. Given the small sample sizes at the basis of these findings further research is needed for any definite conclusions, but humanists'

idiosyncratic behaviour recurred in their responses to the next statement too, which looked into the use of additional criteria for judging the quality of some information.

**Table 5.7.1.1: Researchers' Reliance on the Reputation of a Journal as a Measure of the Value of the Information to be Found Therein, by Discipline and Age\***

<b>I look for articles published in journals of good reputation, because when there is such an avalanche of material, that's the way to ensure quality and authority...</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=11</b>	<b>Hum N=11</b>
78%	83%	60%	60%	86%	52%	50%	54%	81%

\*as measured by the number of 'always true' and 'often true' responses given

The second statement, describing the process of judging the quality of some information as a two-tiered process, in which first evaluation is made on the basis of the criteria of authorship and publishing venue, followed by a more in-depth scrutiny of the document, was less enthusiastically received than the one preceding it. True, nearly half of the 130 respondents, 42% (55) did say it was always or often true of them, and a quarter of them (27%, 35) said it was at times true and at times not; however, another quarter of the informants, 25% (33) said the statement was seldom or never true of them.

However, the pattern of variance discerned above among researchers of different disciplinary affiliations was upheld here too. 57% of the social scientists, 38% of the scientists and 33% of the humanists agreed with the statement depicting the determining of the quality of some information as a two-tiered process, and 16% of the former, compared to 31% and 33% respectively of the latter disagreed with it.

Analysis of the results revealed only very slight variance by age: 41% of the under 44s, 46% of the 45-60s and 39% of the over 61s voiced agreement with the statement. However, once the data were broken down by the combined variables of discipline and age, the previously discerned pattern seemed to reappear: across two of the three disciplines, the sciences and the social sciences, the under 44s were more likely to demonstrate a lesser degree of reliance on the criteria of authorship and publishing venue for judging the quality of a piece of information, whereas in the case of the humanists the very opposite seemed to hold true, as Table 5.7.1.2 below shows.

A possible reason for the phenomenon may stem from humanists' highly individualistic and subjective manner of conducting research. Thus, although as it has already been noted, they may very well be more often than not simply unable to use objective, 'dry' criteria, extrinsic to the work itself for really and truly



determining the value and merits of some information, when they have already achieved a standing as researchers, they may be more likely to resort to such shortcuts.

**Table 5.7.1.2: Judging the Quality of Information as a Two-Tiered Process, by Discipline and Age\***

I judge the quality of an article in a two-tiered process.								
44 and under			45 – 60			61 and over		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=24	Sci N=10	SSci N=11	Hum N=11
44%	50%	30%	40%	72%	29%	30%	36%	45%

\*as measured by the number of 'always true' and 'often true' responses given

### 5.7.2 Publications of Personal Acquaintances as the First Choice for Meeting an Information Need

#### Hypothesis:

**If and when relevant and available the publications of personal acquaintances are often researchers' first choice for meeting an information need. Therefore, the IT based communication opportunities by no means diminish for them the importance of attending professional events, if not solely, then at least to a considerable extent for the purpose of meeting with fellow researchers.**

Seeking to establish the soundness of this two-part hypothesis, the survey recipients were posed two statements. The first set out to explore if researchers did indeed prefer information originating with people they knew personally, and the second attempted to look into the possibility, that if they did, they would in consequence express more appreciation of professional events as providers of opportunities for meeting colleagues.

The first statement was as follows: "If the author is a personal acquaintance of mine, I know exactly what he works on, and I know the value of the information I'll be getting from him. Thus, when I am about to pick the articles I want from a list of information items, I'll favour the publications of authors I know". The responses to the statement indicated that on the whole researchers were quite favourably disposed towards the notion of giving preference to the publications of their acquaintances: 45% (59) of the 131 respondents to this question said the statement was always or often true of them, compared to 19% (25) who maintained it was seldom or never true of them. More than a third of the informants, 34% (45) testified it was at times true of them and at times not.

Breakdown of the data by disciplines revealed very little variance among researchers on this: 48% of the social scientists, 42% of the scientists and 47% of the humanists agreed with the statement. Analysis of

the data by age, however, again proved that this was a factor definitely to contend with where research information needs are concerned. By far more over 61s endorsed the statement according to which researchers favoured information originating with their personal acquaintances: 59% of them opted for always or often true, compared to 39% of the middle and 44% of the lower age group. Having established more extensive networks, as well as tighter professional ties over their longer years in academe, the senior researchers in all probability had more personal acquaintances whose work they knew intimately enough to be able to foresee the quality and reliability of their publications.

Breakdown of the data by the combined variables of discipline and age seemed to point to a possible difference between scientists, on the one hand, and social scientists and humanists, on the other, as Table 5.7.2.1 below demonstrates, although here again the results need to be treated with considerable caution in view of the small sample sizes. Thus, if in both the social sciences and the humanities researchers of the lower age groups demonstrated preference for publications of colleagues personally known to them, the exact opposite seemed to be the case in the sciences, if only where the under 44s were concerned. However, since the percentage of the 45-60s endorsing the notion only came to 30%, further research is needed to establish that scientists truly differ on the matter.

**Table 5.7.2.1: Publications of Personal Acquaintances as Researchers' First Choice for Meeting an Information Need**

If the author is a personal acquaintance of mine... I know the value of the information I'll be getting from him. Thus... I'll favour the publications of authors I know.								
44 and under			45 – 60			61 and over		
Sci N=9	SSci N=12	Hum N=10	Sci N=10	SSci N=21	Hum N=25	Sci N=10	SSci N=11	Hum N=11
67%	33%	40%	30%	43%	44%	30%	72%	64%

\*as measured by the number of 'always true' and 'often true' responses given

Still, information contributed by personal acquaintances was often enough held in higher esteem; but did that mean that academics actually attended professional events, if not solely, then at least to a considerable extent for the purpose of meeting with fellow researchers? Not too often, apparently, to judge by the responses to the next statement: "I attend conferences primarily for the social encounter, for the opportunity to form ties with other researchers in the field". It seems that a professional event may have its social aspects, but only 37% of the 131 respondents to this question always or often considered them the primary purpose of attending; 27% never or seldom did.

Categorising the responses by disciplines revealed that scientists were the most likely to attend social events primarily for socialising: 44% of them, compared to 26% of the social scientists and 32% of the humanists said it was always or often true of them. However, breakdown of the data by age revealed little



variance among the respondents: 39% of the under 44s, 37% of the 45-60s and 29% of the over 61s registered agreement with the notion of attending conferences for the sake of establishing professional ties. Although the differences among the three age groups were quite slim, they nevertheless seemed to point to the possibility that the younger the researchers, the more they seemed to appreciate the social aspects of attending a conference.

Indeed, grouping of the data concurrently by discipline and age corroborated the emerging pattern, as Table 5.7.2.2 (below) demonstrates, though, again, the limitations of the small sample studied preclude the possibility of definitive conclusions. Apparently, at least in the social sciences and the humanities, the under 44s clearly held a more favourable view of attending professional events for the sake of socialising. That it should be so is only to be expected (it is rather the different outlook presented in the sciences which is surprising): after all, the senior researchers, with their professional stature already established, probably needed to invest less effort and time in sprucing up their professional contacts than the newcomers to academe.

**Table 5.7.2.2: Researchers' Views on Attending Social Events Primarily for Socialising, by Discipline and Age\***

<b>I attend conferences primarily for the social encounter, for the opportunity to form ties with other researchers in the field.</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=9</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
33%	44%	44%	40%	29%	36%	50%	17%	18%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.7.3 Reluctant and Cautious View of Marginal and/or Innovative Scholarly Information Channels**

#### **Hypothesis:**

Today's researchers are rather apprehensive about the quality and authority of the huge amounts of scholarly information readily accessible to them. Thus, they approach publishing venues not perceived to be top quality, or novel, Web-based ones (pure e-journals, personal or institutional Web sites, e-print servers) with limited willingness and great caution.

Hypothesising on the basis of the qualitative findings of the study that in an era of plentiful scholarly information neither the traditional, albeit more marginal, nor the innovative Web-based information resources are perceived to be of appropriate quality and authority, four statements posed to the study participants aimed at looking into the matter. One attempted to gauge just how ready today's researchers

are to turn to the Web for scholarly information, in general, and the additional three focussed on their willingness to use each one of three specific information dissemination venues: journals not considered to be of the first line in a given field; pure e-journals; and unvetted, personal or institutional websites and e-print archives.

The first statement thus said: "I do use Web-based scholarly information, of the sort to be found on personal or institutional websites or in e-print archives, but in view of the liability that much of this information will not conform to my standards of quality and authority, I only do so after careful inspection". On the whole, only about a third of the 129 respondents to this question, 35% (45), testified to cautious use of Web based information, although 26% (33) of the informants did say it was true of their practices at least at times. However, another 26% (34) disagreed with the notion; that is, in effect, they did not use Web-based scholarly information at all. Furthermore, for a relatively large percentage of the respondents, 13% (17), the statement was altogether irrelevant.

Interestingly, researchers of different disciplines seemed to be of one mind with regard to the possibility of using, albeit cautiously, scholarly information to be found on the Web: although the percentage of those who rated the statement as irrelevant was higher among the humanists, 18% compared to 10% among the scientists and 9% among the social scientists, about a third of the researchers in each group (39%, 34% and 31% respectively) opted for always or often true on this.

No noteworthy variance by age was found either: 36% of the under 44s, 34% of the 44-60s, and 35% of the over 61s supported the proposed notion, and 24%, 31%, and 21%, respectively, opposed it. Still, even if researchers' views of the scholarly value of Web-based information did not seem to reflect age associated differences, their incentive for behaving as they did was not necessarily the same from group to group: as it had already been suggested at the qualitative stage, for the less experienced among the researchers the lack of scientific quality control on the Web may have presented a problem, while their more senior counterparts were more prepared to trust their own judgment. However, the Web may have presented a different problem for the older generation: the need to cope with the intricacies of electronic information work.

Setting out to further probe the issue, the recipients of the survey questionnaire were posed the next three statements, each of which, as it has already been noted, focussed on researchers' willingness to use a specific publishing venue: journals not considered to be of the first line; pure e-journals; personal or institutional websites and e-print archives.

The first of the three statements aimed at investigating the qualitative stage based notion that researchers may acknowledge the likelihood of finding information of appropriate quality and authority in marginal publications, but in actual practice they do not too willingly act upon this awareness of theirs. Thus, the informants were requested to register their reactions to the following: "I don't limit my information seeking to the top journals only, being conscious of the possibility that articles of value will be published in more marginal journals too". Apparently, researchers in point fact do go beyond the top journals in their information seeking, as Table 5.7.3.1 below shows. As many as 26% (34) of the 132 respondents to



this question said the statement to this effect was always, and a further 35% (46) said it was often true. In contrast, a mere 7% (9) said the statement was seldom true of them, and only 3% (4) said it was never true.

Still, researchers of different disciplinary affiliations did appear to differ on the possibility that information of value would be found in more marginal journals too: the lowest support of the notion was found among the scientists, with 51% of them, compared to 66% of the social scientists, and 56% of the humanists rating the statement to this effect as always or often true. Although the differences are not very marked, they may still reflect the differences found among the three main knowledge domains in the rejection rates of manuscripts submitted for publication: science has a low rate, social sciences a higher rate and humanities the highest rate (Zuckerman and Merton, 1979). These differences, ascribed in part to the aforementioned variation in consensus across fields, but also to the relative amount of space available for publication (journals in the sciences can publish a higher proportion of manuscripts submitted there because the articles in the scientific knowledge domains are ordinarily short), may be responsible for humanists' and social scientists' considering it more likely that information worthy of their attention could be found in more marginal journals, too. After all, they are familiar with the rules of the publishing game in their disciplinary milieu!

However, although age did not seem show too great a variance among researchers, with 59% of the under 44s, 66% of the 45-60s and 52% of the over 61s agreeing with the statement, breakdown of the data by the combined variables of discipline and age further honed the picture (see Table 5.7.3.2, below). Obviously to be treated with caution, in view of the limited sample sizes, it is nevertheless interesting to note that scientists' above noted reluctance to look for information in more marginal outlets was in fact truly pronounced only among the under 44s: 33% of them, compared to 67% and 70% respectively of their social scientist and humanist contemporaries opted for 'always' and 'often true' on this, whereas differences among the three disciplines across the upper two age groups were less marked. Perhaps the younger scientists, fearing the disapproval of their promotion committees, did tend to limit their information seeking to the top journals only, whilst social scientists or humanists, for whom the disciplinary-culture dictated norms legitimised information published in venues, considered lower-rate, revealed no such qualms. However, the similarly low percentage (36%) of the humanists in the upper age bracket supporting the notion remains a mystery.

The second of the three statements probing researchers' willingness to use innovative Web-based information said: "In my opinion, journals published in an electronic format only are not on the same level as traditional journals, which come in an electronic version too, because only people, who don't get accepted by the regular journals, publish there". Interestingly, researchers do not hold the pure e-journals in as a low esteem as rumour would have it (see Table 5.7.3.1 below). True, for 18% (23) of the 132 respondents to this question the statement was altogether irrelevant, which may be taken to indicate that almost a fifth of the informants were not users of pure e-journals, possibly because there were none in their fields, or at least because they knew of none. However, those who did not agree with the alleged inferiority of the pure e-journals outnumbered (admittedly not by much) those who did: 32% (42) said the statement was never or seldom true of them, compared to 27% (36) who said it was always or often true

of them. About a quarter (23%, 31) of the researchers rated the statement as true at times, which may mean that they probably judged an e-journal on its own merit.

Categorising the data by discipline did not reveal noteworthy variance among the researchers, with approximately a third of the informants across the disciplines agreeing that pure e-journals were inferior in quality to traditional journals, and another third or so taking the opposite stance. However, perhaps not surprisingly, in view of their aforementioned more sluggish acceptance of electronic resources and methods, the humanists were more likely to say that the statement was irrelevant for them than the social scientists and the scientists: 20% compared to 13% and 10% respectively.

Grouping of the data by age revealed a not too marked, but still plainly perceptible demarcating line between the two upper age groups, on the one hand, and the lower one, on the other: whereas only 29% and 25% respectively of the 45-60s and over 61s were of the opinion that pure e-journals and traditional journals were on par (i.e., disagreed with the statement), 44% of the under 44s were of the same opinion. Still, although the percentage of those who agreed with the statement was the highest among the over 61s - 34%, it was not all that different across the younger two age groups: 27% of the under 44s and 24% of the 45-60s said the statement was always or often true of them.

Breakdown of the data by the combined variables of discipline and age (Table 5.7.3.2) served to hone the picture, although here again, given the limitations of the small sample sizes, the trends discerned should perforce be considered tentative. Across the three disciplines agreement with the notion of pure e-journals being inferior to traditional journals with electronic versions was less marked among the under 44s than among the over 61s: 11% compared to 30% in the sciences, 25% compared to 33% in the social sciences, and 40% compared to 50% in the humanities. Also, disagreement with the notion was patently more widespread among the under 44s in both the social sciences and the humanities, though more or less on the same level across all three age groups in the sciences. Thus, in the social sciences 58% of the under 44s said the statement to this effect was seldom or never true of them, compared to 29% of the 45 – 60s, and 17% of the over 61s, and in the humanities the corresponding percentages were 50%, 28% and 10%, respectively. Moreover, although in the sciences the percentage of researchers, who did not endorse the idea of pure e-journals being of a lower quality than traditional ones, came to about a third of the respondents in each group, the under 44s among them showed a greater tendency to choose 'at times true of me' than their older counterparts: 44% compared to 10% and 20% respectively; that is, at least some of the time here too the younger researchers were more likely to consider the pure e-journals up to par. It seems indicated then, that on the whole the younger researchers were more prepared to rate the pure e-journals equivalent in quality to traditional publications.

The next statement posed to the survey recipients focussed on the reception accorded to innovative sources of unvetted information: "When I look for information, I check out personal or institutional websites and electronic archives too. True, the information there is not always peer reviewed, but it is available ahead of the formal publication and reports more fully on the research done". Of the non-traditional information channels investigated, the ones cited in this statement seemed to be the least popular, as Table 5.7.3.1 (below) amply demonstrates: only 28% (37) of the 131 respondents to this



question said the statement was always or often true of them, whereas 42% (55) said it was seldom or never true. In addition, 10% (13) of the respondents rated the whole notion as irrelevant for them.

The categorisation of the results by disciplines yielded an unforeseen finding: despite humanists' much discussed more pronounced reluctance to join the ranks of electronic scholars, it were the social scientists who were more likely to say that checking out personal or institutional websites and electronic archives did not reflect their work habits; 53% of the social scientists, compared to 41% of the humanists said so (never or seldom true responses). By the same token, 18% of the social scientists agreed with the statement which talked of turning to these novel information stores, compared to 28% of the humanists.

The key to this somewhat puzzling result is perhaps to be found in the percentage of those who opted for 'irrelevant' on this statement: 4% of the social scientists compared to 13% of the humanists. Provided that choosing 'irrelevant' in response to this question did indeed equal non-use of e-print archives and personal or institutional websites, this may explain the discrepancy between the social scientists and humanists. As to the scientists among the respondents – the results undoubtedly lent further credence to the findings of the qualitative stage, which pointed to a greater willingness among them to utilise the novel communication channels for meeting their information needs. 34% of the scientists agreed with the statement to this effect, a higher percentage than the corresponding one among the humanists or the social scientists. True, a similar percentage of the scientists (34%) disagreed with the statement, but this percentage was nevertheless lower than that found in the other two groups. Still, the differences found were hardly as marked as it had been predicted.

Breakdown of the data by age revealed yet again that the younger the researchers, the more willing they were to make use of novel sources of unvetted information. Of the under 44s, 30% said they always or often checked out personal or institutional websites and electronic archives, and 33% said they seldom or never did; of the 45-60s, 29% said they did, and 46% did not; and of the over 61s 27% did, and 45% did not. True, the differences were not very pronounced, but clearly the same pattern which had been encountered before emerged here again, lending further support to previous findings.

Categorisation of the data concurrently by discipline and age, with all its repeatedly noted sample-size limitations, nevertheless put the findings into sharper focus (see Table 5.7.3.2, below). Conforming to previously noted patterns, at least in the lower age brackets scientists were the more inclined to manifest support of the novel electronic channels for the communication of non-peer reviewed research information. However, the under 44s among the humanists (though not among the social scientists) did not seem to be lagging as far behind their scientist contemporaries as popular belief would have it: if among the scientists 33% supported the notion and 44% said it was at least sometimes true of them (though sometimes not), among the humanists 40% said the statement to this effect was always or often true, and 10% said it was sometimes true and sometimes not. Still, whilst among the scientists only 22% registered disagreement, among the humanists the percentage of likeminded researchers was twice as high, coming to 50%.

**Table 5.7.3.1: Summary: Researchers' Willingness to Use More Marginal and/or Innovative Scholarly Communication Channels as Information Sources**

	<b>I don't limit my information seeking to the top journals only.</b> N=132	<b>[Pure e-] journals... are not on the same level...</b> N=132	<b>I [also] check out... websites and electronic archives.</b> N=131
<b>Always / often true</b>	61% (80)	27% (36)	28% (37)
<b>At times true</b>	26 (34)	23% (31)	20% (26)
<b>Never/seldom true</b>	10% (13)	32% (42)	42% (55)
<b>Irrelevant</b>	4% (5)	18% (23)	10% (13)

**Table 5.7.3.2: Summary: Researchers' Willingness to Use More Marginal and/or Innovative Scholarly Communication Channels as Information Sources, by Discipline and Age\***

<b>I don't limit my information seeking to the top journals only.</b>								
<b>Under 44</b>			<b>45 - 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
33%	67%	70%	70%	66%	56%	50%	67%	36%
<b>[Pure e-] journals... are not on the same level as traditional [ones].</b>								
<b>Under 44</b>			<b>45 - 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=10</b>
11%	25%	40%	50%	25%	20%	30%	33%	50%
<b>I [also] check out personal or institutional websites and electronic archives.</b>								
<b>Under 44</b>			<b>45 - 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=10</b>
33%	8%	40%	50%	19%	24%	20%	25%	30%

\*as measured by the number of 'always true' and 'often true' responses given



## **5.8 Further Insights into the Date/Currency Aspect of Researchers' Information Needs**

### **5.8.1 Unchanged Levels of Need for Current Information among Scientists and Social Scientists**

#### **Hypothesis:**

**Today's scientists and social scientists exhibit unchanged levels of need for current information (crucial to the former, somewhat less imperative but still central to the latter), and, in view of the high obsolescence rate in their fields, follow traditional patterns in limiting their information consumption to no more than a few years old material.**

### **5.8.2 Growing Levels of Need for Current Information among Humanists**

#### **Hypothesis:**

**Today's humanities researchers demonstrate a lesser degree of the complacency traditionally ascribed to them with regard to the need to keep up-to-date and to obtain the latest information on a subject, although time-depth is still a major characteristic of their information needs.**

These two hypotheses of the three pertaining to the date/currency aspect of researchers' information needs were explored by means of three statements posed to the survey recipients. Two aimed at establishing what 'maintaining currency' meant for researchers of different disciplinary affiliations. The third statement attempted to look into their perceived need for older material in the different knowledge domains.

Of the two statements, which probed what researchers meant when they spoke of the need to keep current, one presented a rather extremist stance on the subject: "First thing in the morning, I check the new articles posted overnight to see if there's something new and interesting, something which may just link up with my research. I'm 'addicted' to this!" The other statement reflected a more composed attitude to the notion of maintaining currency: "I really need to keep up with the current information because my area changes so much, it's very dynamic indeed".

As the hypotheses cited above indicate, finding inter-disciplinary differences concerning researchers' perceptions as to the need to obtain the very latest information on their chosen subjects of interest had been anticipated. This obviously steered the analysis towards the breakdown of the data by disciplines, but the overall picture proved to be interesting in itself. On the whole, researchers did not seem to be very anxious to obtain the latest information on progress made in their subjects of interest: only about a third of the respondents reported that the statement to this effect always or often reflected their ways, although for close to an additional third it did so at least at times. They certainly did not tend to endorse the somewhat agitated attitude to the need to do so, suggested in the first statement, with only a tenth or so saying it was always or often true of them, as opposed to almost three quarters of the respondents who opted for never or seldom true on this.

**Table 5.8.1.1-5.8.2.1: Researchers' Attitude to the Need to Obtain the Very Latest Information on Their Subjects of Interest**

	<b>First thing in the morning, I check the new articles posted overnight... I'm 'addicted' to this!</b>  N=132	<b>I really need to keep up with the current information because my area changes so much.</b>  N=132
<b>Always / often true</b>	9% (12)	31% (41)
<b>At times true</b>	7% (9)	27% (36)
<b>Never / seldom true</b>	71% (94)	31% (40)

Breakdown of the data by disciplines unmistakably bore out the hypothesis that scientists and social scientists had retained their respective levels of need for keeping abreast of current information (crucial to the former, somewhat less imperative but still central to the latter). As anticipated, humanities researchers showed much less of a need to gain awareness of the most recent information pertinent to their investigations (only when the data were grouped concurrently by discipline and age, did intimations of the qualitative stage based postulated change of approach to the matter seem to emerge).

Thus, the scientists among the respondents were indeed the most enthusiastic supporters of the need to learn as soon as possible of the progress made in their areas: 49% said the second statement, which talked of researchers' really needing to keep up because their fields were so dynamic, was always or often true of them, whilst no more than 17% said it was seldom or often true of them, and only 3% deemed it irrelevant. Moreover, their approval of the more radical first statement was relatively higher than that reported by their colleagues from other disciplines: 24% agreed with it, although a clear majority, 66%, did not. Apparently, even in the sciences keeping up with the latest developments does not often mean that the researchers actually have to learn of them as soon as they are made known.

The social scientists, again wholly in line with expectations, seemed somewhat less pressured than their scientist colleagues to obtain any new pertinent research results available, although they plainly did see the issue as important. 38% of them agreed with the more moderately worded statement (always or often true), whilst 29% did not (seldom or never true), and only 7% said it was irrelevant. However, the stance they took concerning the more extreme view of keeping up was rather sceptic: none of them said the statement describing the practice of keeping current as an addiction was true of them; only 4% said it was often true of them, and an unambiguous majority of 78% rated it as seldom or never true.

Not surprisingly, the humanists among the respondents on the whole registered considerably less interest than their scientist or social scientist colleagues in following closely the progress made in their fields; in point of fact, the complacency traditionally attributed to them as to the whole notion of maintaining



currency seemed very justified indeed. Thus, only 15% of them rated even the less extreme statement as always or often true of them, 39% said it was seldom or never true of them and almost a quarter, 24%, testified to its being irrelevant for them. In view of these findings, the results on the more radical statement were none too surprising: a meagre 6% of the humanist respondents agreed with it, a clear majority of 66% did not, and nearly a quarter (23%) rated it as altogether irrelevant.

Breakdown of the results by age indicated that researchers of the youngest age group were more likely to follow closely the developments in their areas than their older counterparts. Whereas 26% of the under 44s said that the statement talking of the need to keep up because of rapid changes in the field was always true of them, only 5% of the 45-60s and 6% of the over 61s voiced the same opinion. True, little variance was found among those who opted for 'often true' on this (18% of the lowest age group, compared to 21% and 25% respectively in the upper age groups), but the under 44s were also the least likely to disagree with the statement (24% compared to 36% of the 45-60s and 28% of the over 61s). By the same token, the younger researchers were relatively more in agreement with the statement likening the practice of keeping current to an addiction: 18% of the under 44s said it was always or often true of them, compared to 5% of the 45-60s and 9% of the over 61. Perhaps not surprisingly: after all, the novice researchers are as yet less widely networked in their disciplinary communities and therefore have less opportunities to learn of work being done. Also, as some of them are bound to be still in the process of finding their own scholarly niches, they can hardly afford not to know which subjects have already been 'taken'.

Further analysis of the data by the combined variables of discipline and age, with all its sample-size limitations, nevertheless lent further support to the heretofore discerned pattern, as Table 5.8.1.2-5.8.2.2 below clearly demonstrates.

Plainly, the scientists were the most likely to stress the importance of keeping current, far more so than either their social scientist or humanist colleagues in the same age bracket or their older colleagues of the same disciplinary affiliation. Moreover, even among the social scientists, who did not seem overly anxious to get hold of the latest information, the under 44s were the more eager to do so. And, although the importance accorded by the humanists to keeping current was quite low, certainly a far cry from the scientists, but even from the social scientists, among them too the younger generation seemed to be more mindful of the issue. True, none of the humanists said that even the first, more mildly worded statement was always true of them. However, 20% of the under 44s said it was often true of them, as compared to 12.5% of the 45-60s and 18% of the over 61s. Also, whereas only 10% of the under 44s among the humanists said the statement was never true of them, 21% of the 45-60s and 18% of the over 61s held the same views. By the same token, whilst 10% of the under 44s among the humanists said that the second statement, which likened keeping up to an addiction, was always true of them, and none of them said it was irrelevant, none of the 45-60s and the over 61s opted for always true on this and 28% and 36% respectively deemed it irrelevant. Of course, these differences between the younger humanists and their older counterparts may stem simply from the aforementioned greater likelihood that novice researchers would seek out current information. Still, as suggested in the qualitative stage, these may very well be first intimations of a change of attitude among humanists to keeping current.

**Table 5.8.1.2-5.8.2.2: Researchers' Attitude to the Need to Obtain the Very Latest Information on Their Subjects of Interest, by Discipline and Age\***

<b>First thing in the morning, I check the new articles posted overnight... I'm 'addicted' to this!</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
44%	8%	10%	20%	5%	0%	10%	0%	18%
<b>I really need to keep up with the current information because my area changes so much.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=10</b>
78%	41%	20%	40%	43%	13%	30%	25%	18%

\*as measured by the number of 'always true' and 'often true' responses given

The next statement set out to look into the above noted linkage, discerned in the qualitative findings, between the need for current material and the perceived rate of obsolescence of the information in the different disciplines, which, at least in the humanities, seemed to be changing. Thus, the next statement posed to the survey recipients said: "In my field some of the research conducted a few years ago has already become obsolete because there is a great deal of research going on and swift progress made".

On the whole, researchers tended to disagree with the notion of rapid obsolescence of information: 47% (62) of the 132 respondents to this question opted for seldom or never true on this, more than twice the share of those taking the opposite stance - 20% (27).

However, looking at the data by disciplines allowed for considerable honing of the picture: unmistakably, scientists, and to a lesser (but still sizeable) degree social scientists were far more in agreement with the notion of information becoming obsolete in a few years than their humanist colleagues. 38% and 26% respectively of the former said the statement to this effect was always or often true of them, compared to a mere 6% of the latter. At the other end of the scale the results again led to the same conclusion: whereas of the scientists 24%, and of the social scientists 42% said the statement was seldom or never true, of the humanists 62% said so. Moreover, 19% of the humanists, compared to 7% of the social scientists and 3% of the scientists claimed the notion was altogether irrelevant for them. It seems then, that the qualitative findings, which pointed to an increased obsolescence rate in humanities information, too, did not reflect the view prevalent among the researchers queried.



Breakdown of the data by age yielded an interesting result. Apparently, the younger researchers were more likely to agree with the notion of information becoming obsolete quickly: 33% of the under 44s said the statement to this effect was always or often true of them, compared to 17% of both the 45-60s and the over 61s. Indeed, when broken down concurrently by discipline and age, the results bore out the pattern discerned: in each of the three disciplines more researchers of the lowest age bracket supported the notion than their counterparts in the upper two age brackets. Thus, whereas 66% of the under 44s among the scientists said the statement to this effect was always or often true of them, only 30% of the 45-60s and 20% of the over 61s said so too. By the same token, if on a smaller scale, 34% of the social scientists and 10% of the humanists in the group of 44 and under said the statement was always or often true of them, compared to 29% of the former and none of the latter among the 45-60s, and 17% and 18% respectively of the over 61s. A tentative conclusion to be derived from these results is that the younger among the researchers, who, as it has already been pointed out, are also keener to keep current, are more attuned to the fast pace of progress made in their fields. Therefore, they may also be quicker to discern paradigmatic changes in the current thinking characterising their areas of expertise, which render previous knowledge, and in result the information reporting it, obsolete. Of course, here again the finding needs to be explored further, in view of the limited samples it is based on.

### **5.8.3 The Importance of the Original Publication for a Thorough Appreciation of a Subject**

#### **Hypothesis:**

**Although a review article and/or a good literature review in a new publication provide the researcher with a concise summary of the salient developments in a given field, the original publications are still vital for a thorough appreciation of a subject.**

The qualitative stage of the present study brought forth the idea that some modification of our customarily held beliefs on the enduring value of original publications may be in order. Traditionally considered of central importance in humanities research, but more easily dispensed with in the sciences or social sciences, where new information is eventually subsumed in the general body of knowledge, the qualitative findings suggested otherwise. In an attempt to explore if indeed original publications retained their importance over time in all disciplines, the survey recipients were asked to give their views on the following statement: "If I have some difficulty in understanding something, I go back to the original article on the topic; I find that it is easier to understand the original idea, the message, when it is being described for the first time".

In general, the notion was endorsed by the researchers: 45% (58) of the 129 respondents to this question agreed with it ('always' or 'often true' answers), whereas only 10% (14) disagreed, opting for 'seldom' or 'never true' on this. Still, the more interesting question was to what extent scientists and social scientists agreed with the notion.

Apparently, this time the lead discerned in the qualitative stage was wholly borne out by the quantitative findings. Sizable percentages of both the scientists and the social scientists agreed that going back to the

original publications facilitated better understanding of a topic: 48% of the former and 53% of the latter said the statement to this effect was always or often true of them. However, their humanities counterparts were less likely to think so too, with 35% of the respondents endorsing the notion, a finding which is not as surprising as it looks at first glance. True, in the humanities publications retain their importance over time, which seems to go counter to humanists' relatively limited support of this statement, but then, they were also three or four times more likely to deem the statement altogether irrelevant to their needs (13% of them said so, compared to 3% of the scientists and 4% of the social scientists), and no wonder. After all, for humanists the need to use the original work is truly par for the course: as it has already been noted, they cannot incorporate prior knowledge in their own research, unless they get hold of the particular writing, which reports the unique insights yielding these results. Thus, for them, it is not really 'going back' to the original article, it is the way things are, and should be done in research work.

Categorisation of the data by age indicated that age did not have much to do with the practice of going back to the original publications on a subject, although there seemed to be slightly more enthusiastic endorsement of the practice on the part of the older researchers: 47% of the under 44s, 39% of the 45-60s, and 54% of the over 61s supported the notion, whereas 12%, 14% and 6% respectively did not.

Analysis of the data by the combined variables of discipline and age, limited as its results were by the small sample sizes, nevertheless seemed to indicate that resorting to the original item of information written on a subject, when some difficulty in understanding arises, reflected scientists' work habits more accurately than anybody else's. Apparently, although the practice described was deemed true to life by about half of the under 44s among the researchers across all three disciplines, only in the sciences no researcher of this age group said the practice described was seldom or never true of him/her. By the same token, although in the group of over 61s more social scientists than scientists endorsed the statement, 17% of the former also disagreed with it, whereas none of the latter did. The humanists in each and every age bracket tended to report the least enthusiastic support of the notion, although only in the upper age group the difference was truly marked, with the percentage of the humanists coming to 27% only, compared to the 75% and 60% of the social scientists and scientists, respectively.

## **5.9 Further Insights into the Speed of Delivery Aspect of Researchers' Information Needs**

### **5.9.1 High Expectations for Speedy Meeting of Research Information Needs**

#### **Hypothesis:**

**In view of the easy availability and wide accessibility of the host of resources, channels and facilities, which enable the transferring of information from one end of the world to the other in a matter of seconds, today's researchers have high expectations as to the speed with which their information needs are to be met.**

Having walked away from the qualitative stage of the present study with the strong impression that in these times of electronic access to information researchers expected no less than an instantaneous



response to their information requirements, the survey questionnaire set out to establish the soundness of the postulations to this effect. Two of the statements posed to the survey recipients sought therefore to find out what the expectations of the contemporary researchers were as to the speed with which they wanted their information needs to be met.

The responses to the first statement, "I like to work quickly, so that when the need for some information crops up in the course of my research, I want immediate response", immediately indicated that in this case the qualitative findings reflected quite accurately the general atmosphere in academe. Of the 132 respondents to this question, 57% (74) said the statement was always or often true of them, and another 22% (29) said that at times it was true of them. In contrast, only 16% (20) of the respondents said the statement was never or seldom true of them.

However, when willingness to pay for obtaining necessary information more quickly was taken as a measure of the importance researchers accorded to the speedy delivery of information, their enthusiasm seemed to wane. Asked to react to the statement "I'm even prepared to pay for speeding up the process of obtaining information", 16% (21) of the 131 respondents found that the notion was altogether irrelevant for them, and only 19% (25) said it was always or often true of them, compared to 42% (55) who said it was never or seldom true of them.

The variance found among the different groups was wholly in line with expectations. Since researchers' perceived need for speedy access to information had been linked to the extent to which they felt compelled to produce and announce their achievements quickly (a topic to be discussed extensively in the next section), scientists, ever racing 'to get there first' had been hypothesised to be the most interested of all disciplinary groups in having their information needs met quickly. By the same token, and for the same reason, so were the youngest among the researchers. The findings on both statements did indeed bear out these assumptions. 69% of the scientists and 61% of the social scientists, compared to 49% of the humanists agreed with the first statement, which argued for an immediate response to an information need. The dispersion of the results on the second statement, on the option of paying for speeding up access to information, again indicated the relatively greater importance scientists and the social scientists accord to having their information needs met rapidly: 24% and 20% of them, respectively, agreed with the statement, compared to 15% of the humanists.

Breakdown of the data on both statements not only left little doubt that the younger researchers were indeed the more anxious to obtain the information they needed as quickly as possible, but also indicated that where this Aspect of Researchers' Information Needs is concerned, age may be crucial for determining the different needs of different researchers. The notion of wanting immediate response was endorsed by as much as 70% of the under 44s, compared to 52% of the 45-60s and 48% of the over 61s. Similarly, the readiness to pay for information was reported to be always or often true by 30% of the under 44s, compared to 17% of the 45-60s and 9% of the over 61s.

Breakdown of the data by the combined variables of discipline and age further honed the emerging picture: across all three disciplines the under 44s among the researchers expressed the greatest and the

over 61s the least need for speedy delivery of information. Furthermore, in each age bracket the scientists and the social scientists were more likely than the humanists to agree with the two statements which probed researchers' expectations for immediate response to their information needs, as Table 5.9.1 below clearly demonstrates.

**Table 5.9.1: Researchers' Expectations as to the Speed with which They Want Their Information Needs to be Met, by Discipline and Age**

<b>I like to work quickly, so that when the need for some information crops up in the course of my research, I want immediate response.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=11</b>	<b>Hum N=11</b>
100%	75%	60%	60%	62%	44%	50%	45%	45%
<b>I'm even prepared to pay for speeding up the process of obtaining information.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=12</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=25</b>	<b>Sci N=10</b>	<b>SSci N=11</b>	<b>Hum N=11</b>
33%	25%	30%	30%	24%	8%	10%	9%	9%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.9.2 Researchers' Perceived Degree of Urgency in Fulfilling Their Information Needs as a Derivative of the 'Publish or Perish' Syndrome**

#### **Hypothesis:**

**Researchers' perceived need for speedy access to information is in direct correlation to the extent to which they feel compelled (for extrinsic or intrinsic reasons) to produce and announce the results of their work quickly.**

Inferring from the qualitative data that there may be a correlation between the extent to which scholars feel pressured to arrive at demonstrable and publishable results of their research endeavours, and the importance they accord to obtaining quickly the information needed for accomplishing this goal, the survey aimed next at exploring the determinants of researchers' perceived degree of urgency in fulfilling their information needs. Three statements looked at three sets of circumstances in which a researcher's



need to demonstrate concrete achievements quickly was reported to have entailed a need to expedite the access to information.

The first statement linked the need for speedy delivery of information with professional rivalry: "When I do some research, I want it chalked up to me, but if simultaneously others work on the same idea, somebody may 'get there' ahead of me. Therefore, I must obtain information very quickly, so as not to get delayed". Generally speaking, researchers did not seem to be too supportive of the notion, but scientists, with their highly competitive disciplinary culture were far more likely to say it reflected their work experiences than their social scientist or humanist counterparts. Perhaps not surprisingly, so did the young researchers, compared to their older colleagues.

On the whole, the 131 respondents to this question were almost evenly divided amongst those who agreed with the statement (28%, 37), those who disagreed (30%, 39), and those who opted for 'sometimes true, sometimes not' (26%, 34). A further 16% (21) rated the statement as irrelevant. Categorisation of the results by disciplines, however, pointed to the aforementioned greater endorsement of scientist to the notion of wanting some needed information quickly so as not to hamper progress towards the goal of overtaking one's professional opponents: 45% of the scientists, compared to 32% of the social scientists and 17% of the humanists said the statement to this effect was always or often true of them. The percentage of those for whom the statement was true at least some of the time was also the highest among the scientists: 31%, compared to 23% and 21% respectively of the social scientists and the humanists. And finally, the percentage of those who rated the statement as irrelevant was by far the lowest among the scientists: 3% compared to 21% of the social scientists and 45% of the humanists.

Breakdown of the results by age showed the percentage of those, who agreed that obtaining information quickly was important for winning the race to some professional goal, to be the highest among the younger researchers: 47%, compared to only 15% of the over 61s and 26% of the 45-60s. At the other end of the scale the picture was no different: 18% of the youngest group opted for 'seldom' or 'never true', compared to 36% of the middle and 33% of the oldest age group. The percentage of those who rated the statement as irrelevant was also the lowest among the under 44s: 9%, compared to 16% and 24% in the upper two age brackets. That it should be so is not very surprising: the younger researchers, intent as they are on advancing their careers, are bound to be more pressured to obtain quickly the information needed to overtake their professional rivals than their more established counterparts.

Grouping of the data concurrently by discipline and age served to put the picture into sharper focus, although, obviously, here too, the small number of researchers in each group necessitated caution in interpreting the results: the over 61s in each disciplinary group were by far the least likely to say that they needed information quickly, so that nobody overtook them, with their younger colleagues, and especially the scientists of the lot, patently feeling more strongly on this. Thus, in the sciences, whilst 77% of the under 44s testified to the notion being always or often true of them, only 20% of the over 61s did so, too. By the same token, in the social sciences and the humanities the percentage of the under 44s who opted for 'always' or 'often true' on this was 33% and 40%, compared to no more than 9% and 18% of the over 61s, respectively.

The second statement probed the soundness of the hypothesised correlation between researchers' perceived need for speedy access to information and the coveted promotion: "My personal experience is that the pressure to publish as much as possible in a given period of time, and as part of it, the pressure for obtaining information without undue delays, are associated with getting promoted and tenured". Somewhat surprisingly, for the academics interviewed at the qualitative stage seemed to have very little doubt as to the validity of their observations to this effect, the survey yielded less decisive results. For one, 21% of the 129 respondents to this question rated as irrelevant the whole idea of associating their efforts directed at being promoted and tenured with the pressure for obtaining information quickly in order to be able to get on with their publishing. Furthermore, only 30% (39) agreed with the statement to this effect, although even less disagreed: 22% (28). Still, speedy access to information as a component of hastening one's professional progress appeared to be less crucial than it had been surmised.

In any case, the variance found among the researchers pointed to the possibility that the statement reflected the experiences of some groups in the research population more accurately than that of others. Thus, for example, breakdown of the data by age showed the percentage of the researchers, who said that the statement linking the need for speeding up the access to information with promotion and tenure pressures was irrelevant for them, to grow with age: 32% in the upper age group, compared to 20% in the middle age group and 12% in the lowest age group. Not very surprisingly, of course: although the statement queried the researcher's past experience, the information component involved (or not) in the process of promotion and tenure may have been too far removed in time and interest for the older, and therefore more senior academics. Probably for the same reason, the percentage of those who agreed with the notion was lower among the over 61s than among the 45-60s or among the under 44s, 21% compared to 31% and 36% respectively, and, correspondingly, the percentage of those who disagreed with the notion was higher, 30% compared to 25% and 9% respectively.

The variance by discipline discerned in the data seems to reflect the aforementioned relatively more leisurely pace of research work in the humanities, as opposed to the sciences and the social sciences. Thus, whereas 24% of the scientists said the statement was always or often true of them, and an additional 38% said it was true at least at times, and in the same vein 46% of the social scientists said the statement was always or often true of them, and a further 18% opted for true at times, only 20% of the humanists testified that the notion was always or often true of them and 29% that it was true at times. Still, the percentage of those who disagreed with the statement was quite low across the board, with relatively little difference amongst the three groups: 18% in the social sciences, 24% in the sciences, and 25% in the humanities.

In view of the above-noted possibility that the attempt to enquire as to the information component involved in the process of promotion and tenure may in fact have been regarded as irrelevant by many of the more seasoned informants, there was no point in analysing the data broken down by the combined variables of discipline and age.



The last statement proffered yet another scenario for the hypothesised linkage between the pressure under which researchers worked and their perceived need to obtain information quickly: "In my case the pressure to obtain information quickly is the result of my wish to make undisturbed progress with the development of the idea at the basis of my research. Therefore, getting promoted or acquiring professional reputation are not the primary sources of the pressure I feel in this matter". Apparently, researchers tended to agree that this scenario, more than the previous two cited, did indeed reflect their work experiences: 21% (28) of the 131 respondents to this question said the statement was always true of them, and an additional 29% (38) said it was often true, a total of 50% (66). True, for a relatively high percentage of the respondents, 18% (24) the statement was irrelevant, but the percentage of those for whom information (or lack thereof) was never or seldom associated with feeling compelled to produce and announce the results of their work quickly was relatively low: only 10% (12).

Not only were the researchers queried more enthusiastic in their support of the notion that information was needed quickly so as to allow for the researcher's thought processes to evolve without undue disruptions, but the various groups of respondents also demonstrated little differences of opinion on this. Thus, 50% of the social scientists, 59% of the scientists and 51% of the humanists, as well as 59% of the under 44s, 49% of the 45-60s, and 47% of the over 61s said the statement to this effect was always or often true of them. Obviously, with so little variance among the researchers either by age or by discipline, breakdown of the data by the combination of the two variables did not contribute any additional information of significance.

### **5.9.3 Speed of Delivery is not as Important as to Justify Making Compromises in Research Information Work**

#### **Hypothesis:**

**Even when researchers express a need to expedite the processes of obtaining information, speed of delivery is never a paramount enough consideration for them to justify their compromising on the more central attributes of a piece of information, such as its quality or intellectual level. Still, when the need for information cannot be met speedily enough, the abstract is an adequate interim solution.**

Seeking to establish whether speed of delivery was an important enough consideration for the researchers to justify their compromising on other attributes of a piece of information, the survey recipients were posed three statements. The first: "I am prepared to accept a less than optimal level of information, as long as I get it very quickly". The second: "I will see to it that I get all of the information necessary for my research, even if I have to wait or postpone getting on with my work until I do" And the third: "If I need information quickly, I'll make do with the abstract, and not read the article itself".

The first two of the above statements probed the issue by presenting to the researchers both sides of the same coin, that of compromising for the sake of speedy access to information. The responses given to the two statements underscored clearly enough the qualitative findings suggested hypothesis: apparently, researchers did indeed deny (and quite vehemently, too) that they would be prepared to settle for less than



the appropriate level information in exchange for its quick availability; they would rather wait, even if it entailed a setback to their progress. None of the 129 respondents to the first statement, the one proposing the acceptance of less than optimum level of information in return for its quick delivery, said it was always true, and only 3% (4) said it was often true. Even the option of 'at times true' brought forth agreement from only 10% (13) respondents. However, a sizable majority of 74% (96) disagreed with the statement: 33% (43) said it was seldom true of them, and 41% (53) said it was never true.

Responses to the statement, which presented the opposite approach to the issue (I will see to it that I get all of the information necessary for my research, even if I have to wait), were undoubtedly in line with the findings on the previous statement. True, about a third of the 127 respondents chose the 'at times true' option, but far more researchers agreed than disagreed with the notion: 45% (57) said the statement was always or often true of them, compared to 14% (18) who said it was seldom or never true of them.

Analysis of the results by discipline yielded an interesting, if, in view of the competitive atmosphere so characteristic of scholarship in the sciences, perhaps not all that surprising finding: the scientists were somewhat more receptive to the idea of compromising on the quality of information in exchange for its speedy delivery. Slightly more of them agreed with the statement to this effect (7% compared to 4% of the social scientists and none of the humanists), and more of them said that at times it was a possibility (21% compared to 9% of the social scientists and 7% of the humanists). Furthermore, although the majority of the scientists, just like their counterparts in the other two disciplines, disagreed with the notion of compromising, fewer of them did so: 62% compared to 76% of the social scientists and 75% of the humanists. The results on the second statement correlated with these findings: the scientists were the least likely to say they would be ready to wait for information, even if it meant a delay in their progress: 26% of them agreed with the statement to this effect, compared to 37% of the social scientists and 62% of the humanists.

Analysis by age of the data on the first statement, which talked of the researcher's compromising, showed the reluctance to trade speed of delivery for concessions with regard to the quality of information to be more or less equally characteristic of researchers of all ages, with 79% of the lower age group, 70% of the middle age group and 76% of the upper age group saying the statement to this effect was seldom or never true of them. Plainly, then, neither did breakdown of the data by the combined variables of discipline and age contribute to a further focussing of the picture. The data on the second statement, however, seemed to suggest that the novice researchers were more willing to wait for information if need be, even if it meant a delay in the progress of their research; that is, they seemed to be the least prepared to compromise for the sake of speedy delivery of information. Thus, whereas 57% of the under 44s agreed with the statement to this effect, 30% of the 45-60s and 48% of the over 61s held the same views. Perhaps not surprisingly: although the newcomers to academe are undoubtedly under the greatest time pressure, they are obviously also the ones who can least afford to compromise on the quality of the information they base their investigations on. Still, when the data were grouped concurrently by discipline and age, the willingness to wait for information was most noticeable among the young humanists, who do not work under as marked time-pressures as their contemporaries in the sciences, or even the social sciences. True, as it has been repeatedly emphasised, the small sample sizes in each of the nine groups precluded the possibility of



deriving definite conclusions, but at least as indications of emerging patterns for further investigation, it is interesting to note the percentages: 80% of the under 44s among the humanists endorsed the notion, compared to 33% and 54% respectively of their counterparts in the sciences and social sciences. As to the more senior researchers – although they all were relatively less prepared to wait for information than their younger colleagues, the discipline-rooted variation remained in place: whilst among the humanists 69% of the 45-60s and 36% of the over 61s endorsed the notion, among the scientists the comparable percentages came to 22% (in both groups) and among the social scientists to 33% and 25%.

The last statement pertaining to the speed of delivery aspect of information needs set out to establish the soundness of the suggestion, put forward at the qualitative stage, according to which the abstract could serve as an interim solution when some information was needed then and there. This time the hypothesised pattern of behaviour proved to represent the practices of a small minority of the informants only. No more than 14% (18) of the 130 respondents to this question said the statement was always or often true of them, while almost half of them, 49% (64) said it was seldom or never true of them. A further third of the respondents rated the statement as true only at times.

When categorised by disciplines, it turned out that the humanities researchers were the least likely to make do with the abstract instead of reading the article. Hardly a surprising finding, since, as it has repeatedly been noted, unlike their scientist counterparts, humanists cannot make do with the results of previous research, but rather need the whole publication in order to be able to follow the thought processes of other researchers (Bates, 1996a; Stoan, 1984, 1991); thus the abstract by no means suffices for their purposes. No wonder then, that none of the humanists said the statement to this effect was always true of them and only 4% said it was often true, compared to 14% of the scientists and 22% of the social scientists who said it was always or often true of them. And at the other end of the scale the humanists were more opposed to the notion than their scientist or social scientist colleagues: 64% of the former said the statement was seldom or never true of them, compared to 41% and 40% of the latter, respectively.

Analysis of the data by age did not show much variance among the different age groups, although the less experienced among the researchers seemed to favour the idea of relying on the abstract instead of reading the article least of all: 56% of the under 44s said the statement to this effect was seldom or never true of them, compared to 47% of the 45-60s, and 49% of the over 61s. However, breakdown of the data by the combined variables of discipline and age served to refine the emerging picture. Indeed, in each and every age bracket the humanists were by far the most likely to say that they seldom or never made do with the abstract, instead of reading the whole article, even if pressured for time: among the under 44s the percentage of humanists opting for 'seldom' and 'never true' responses amounted to 70%, compared to 33% of the scientists and 58% of the social scientists, among the 45-60s to 65%, compared to 40% and 29%, and among the over 61s to 63%, compared to 50% and 42%. Still, if in the social sciences and the humanities the under 44s were the staunchest opponents of the notion, not so in the sciences: the percentage of the respondents, who registered disagreement with the statement, seemed to slightly increase with age, possibly because the previously noted greater time-pressure in the sciences, which is

especially keenly felt at the beginning stages of a researcher's career, renders the use of such 'shortcuts' less avoidable.

## **5.10 Further Insights into the Place of Publication/ Origin Aspect of Researchers' Information Needs**

### **5.10.1 Growingly Greater Acceptance of Information Hailing from Countries on the Periphery of Scientific and Scholarly Activity**

#### **Hypothesis:**

**With the trend towards the internationalisation of research, researchers have become more global in their information needs, more readily accepting information hailing from countries on the periphery of scientific and scholarly activity.**

Postulating on the basis of the qualitative findings of the first stage of the study that the contemporary researcher was opening up to information hailing from countries beyond the Western world, too, the survey recipients were next queried as to their views on the following statement: "As far as I'm concerned it's immaterial in which country the article or the book has been published, it simply doesn't matter".

At first glance the results seemed to point to the hypothesised greater willingness of researchers to open up to information originating in countries on the periphery of scientific and scholarly activity. After all, if a researcher is prepared to consider some information regardless of its geographical origins, developing country publications must be treated as potentially equal to developed country publications! However, although almost twice as many of the informants agreed rather than disagreed that the country of publication was of no great concern, nevertheless their number came to no more than 46% (60) of the 129 respondents to this question, compared to 25% (34).

When the data had been broken down by disciplines, endorsement of the notion was found to be markedly lower among the social scientists: only 30% of them, compared to 58% of the scientists and 55% of the humanists said the statement to this effect was always or often true; also, 43% of the social scientists were against the idea, compared to 10% of the scientists and 19% of the humanists. The finding, however, was by no means unexpected: since social science research deals with human beings and their interactions in specific, given circumstances, which differ from place to place and from time to time, its results do not transcend national and/or cultural borders very well (Line, 1973), especially not when local circumstances may differ markedly, as they are bound to be where developed and developing countries are concerned.

Further to that, no noteworthy variance was found among the different groups comprising the research sample. In fact, breakdown of the data by age showed notable similarity among the three age groups: 51% of the under 44s, 42% of the 45-60s and 49% of the over 61s supported the statement which depicted the place of publication as immaterial. By the same token, at the other end of the scale 27% of the under 44s, 30% of the 45-60s, and 20% of the over 61s said the statement was seldom or never true.



Analysis of the data concurrently by discipline and age did not enhance the picture by much, beyond affirming that across the age cohorts the social scientists did indeed register markedly less support than their scientist and humanist counterparts of the notion. Thus, for example, in the under 44 age bracket, only 18% of the social scientists, compared to 55% of the scientists and 80% of the humanists, said the place of publication was immaterial ('always' or 'often true'), and as much as 63% of them, as opposed to 11% of the scientists and none at all of the humanists, said the statement to this effect was never or seldom true.

The next statement posed to the survey recipients attempted to take a closer look at the hypothesised greater readiness of the contemporary researcher to accept information originating in countries beyond the mainstream of scholarly activity. Thus, the informants were requested to report their views on the possibility of using some information without checking to see its geographic origins, even if its author was unknown to them, and therefore could not be taken as a measure of quality: "I'll certainly check to see in which country the information has been published when I'm not acquainted with the name of its author; in this case it definitely makes a difference for me if the information was published in a developed country or in a third world one". The results testified to an even more wary approach on the part of the researchers as to the country from which the information originated, when they were asked for their opinion concerning the situation in which the information was authored by somebody whose name did not ring a bell. If almost half of the researchers testified in their responses to the previous statement that in general it was immaterial for them in which country the article or the book had been published, this time only 34% (44) of the 130 respondents reported a similar lack of concern as to the place of publication, i.e., registered disagreement. By the same token, 29% (38) of the respondents said that in these circumstances it did make a difference for them if the information had been published in a developed country or in a third world one, as opposed to the 25% (34) who disagreed with the previous, unconditionally worded statement, which proposed that the country of publication was immaterial.

Here again the breakdown of the data by disciplines revealed that the social scientists were the most likely to care about the country of origin of the information: 41% of them, compared to 20% of the scientists and 22% of the humanists said that if they were not acquainted with the name of its author, they would check its country of publication.

The grouping of the results by age seemed to indicate that the younger researchers, who were born into the realities of globalisation, were somewhat more willing to accept some information without checking whether it had been published in a developed country or in a third world one, even when they were not familiar with the name of its author: 42% of the under 44s, compared to 33% of the 45-60s and 25% of the over 61s disagreed with the notion that if the researcher was not acquainted with the name of the author, he would check to see in which country the information had been published, and 18% compared to 23% and 33%, respectively, agreed with it. This may perhaps indicate an increasing willingness to open up to information hailing from the periphery of scholarly activity, although in view of the limited sample sizes, and the fact that the data on the previous statement did not lead to similar conclusions, the point certainly needs to be further investigated.



Breakdown of the data by the combined variables of discipline and age brought the picture into sharper focus. Across all age groups the social scientists were far more mindful of noting the place of publication than their scientist and humanist counterparts: for example, in the group of under 44s, 36% of the social scientists said that if they were unacquainted with the author of a piece of information they would check to see in which country it had been published, compared to 22% of the scientists and none at all of the humanists, and 27% compared to 44% and 50%, respectively, said they would not. This pattern of variance, albeit less marked, remained in place in the upper age groups, too.

#### **5.10.2 Lack of Proficiency in Languages as a Barrier to the Adequate Meeting of Research Information Needs**

##### **Hypothesis:**

**Although owing to the trend toward the internationalisation of science and scholarship, much of the research activity carried out worldwide is nowadays reported in English, considerable quantities of information are still published on the national level too; in result, lack of proficiency in languages other than one's mother tongue and English is seen as detrimental to research work, inasmuch as it constitutes a barrier to the adequate meeting of research information needs.**

Another problem in the context of the country/place of origin of research information, which the survey set out to explore, was whether researchers still considered proficiency in languages other than English necessary in today's global village of scholarship. Concluding from the reports of the informants interviewed at the qualitative stage that command of languages would be deemed important for research work, the survey recipients were posed three statements aimed at probing the issue. The first: "Command of languages other than Hebrew and English is important for the quality of my research work". The second: "In my field the research is international, and the accepted language of publication is English. Therefore, for the purposes of my research work, I don't need any other language". And finally, the third: "I don't look for articles or books in any language other than English, because I think that if a research is a significant contribution, the researcher will see to its being published in English.

Findings on the first two statements, representing the two sides of the language proficiency coin, revealed that researchers were almost evenly divided over the question of the need for languages other than their mother tongue and English. Thus, 46% (59) of the 129 respondents to the first statement registered agreement with the notion that command of languages was important for the quality of research work, and 44% (57) of the 130 respondents to the second statement endorsed the assertion that for the purposes of research work no language other than English was necessary.

Still, researchers' decision to forego the use information in any language other than English did not necessarily mean that they did so because they looked down on non-English language material, along the lines of the sentiments expressed in the third statement, according to which if a research were a significant contribution, the researcher would have seen to its being published in English. Thus, although 18% (24) of the respondents to this statement did say it was always true of them, and a further 18% (23) said it was often true, 9% (12) said it was seldom, and 31% (40) that it was never true of them.



However, when the data had been categorised by groups the picture grew to be more nuanced. Humanities researchers overwhelmingly endorsed the need for proficiency in other languages in addition to English, with 84% of them, compared to 28% and 20% respectively of their scientist and social scientist colleagues agreeing with the statement to this effect, and only 8%, compared to 49% and 50% disagreeing. In contrast, science and social sciences researchers reported that command of English was sufficient for their research work induced needs, with 62% and 68% of them, respectively, compared to a mere 9% of their humanist colleagues agreeing with the statement to this effect, and only 14% and 10%, compared to 53% disagreeing.

These inter-disciplinary differences showed up with great clarity in the responses to the third statement, which proclaimed that if a research were a significant contribution, the researcher would have seen to its being published in English. While 48% of the scientists and 53% of the social scientists supported the notion, only 11% of the humanists did so too. At the other end of the scale, 27% of the scientists and 18% of the social scientists disagreed with the statement, compared to 67% of the humanists. It seems indicated then that if in the sciences or the social sciences non-English language publications are considered second rate, it is hardly the case in the humanities, a finding which is obviously in line with the greater propensity of the latter to value command of languages other than English.

Breakdown of the data by age indicated that mastery of languages was considered more important by the older researchers. The over 61s were more likely to agree with the first statement ("Command of languages other than Hebrew and English is important..."): 57% of them, compared to 39% of the under 44s and 43% of the 45-60s opted for 'always' or 'often true' on this. By the same token, they were also more likely to disagree with the second statement ("In my field... the accepted language... is English; therefore... I don't need any other language"): 36% of them, compared to 27% of the under 44s and 23% of the 45-60s, opted for 'never' or 'seldom true' on this.

Still, here again professing to a lack of need for information in any language other than English did not necessarily mean that researchers actually considered non-English language material to be of lower quality; indeed, researchers across all three age groups differed very little on the last statement. Thus, 39% of the under 44s, 37% of the 45-60s and 33% of the over 61s said the notion of refraining from looking for articles or books in any language other than English because "if a research is a significant contribution, the researcher will see to its being published in English" was always or often true.

Breakdown of the data on the first two statements by the combined variables of discipline and age further emphasised the emerging patterns, as Table 5.10.2.1 below demonstrates. The humanists in all three age groups were undoubtedly by far the most fervent supporters of the need for languages for ensuring the quality of research work, whereas scientists and social scientists tended to say that proficiency in English sufficed. Also, whilst even in the sciences and social sciences more researchers of the old school than the novices considered mastery of languages important, in the humanities they certainly left no doubt whatsoever as to their views on the issue: all of the over 61s among the humanists agreed with the

statement on the centrality of having languages, while none of them agreed that command of English was all that was needed.

**Table 5.10.2.1: Researchers' Perceived Need for Proficiency in Languages, by Discipline and Age\***

Proficiency in languages								
Under 44			45 – 60			61 and over		
Sci N=9	SSci N=11	Hum N=10	Sci N=10	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
11%	9%	90%	30%	15%	79%	40%	42%	100%
Proficiency in English only								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=11	Hum N=10	Sci N=10	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
77%	72%	20%	60%	86%	8%	50%	34%	0%

\*as measured by the number of 'always true' and 'often true' responses given

Analysis of the data on the third statement by the combined variables of discipline and age (Table 5.10.2.2. below), limited as its results were by the small sample sizes in each group, nevertheless emphasised the greater value accorded to English language information by scientists and social scientists, and especially by the younger among them.

**Table 5.10.2.2: The Value Accorded to Non-English Language Information, by Discipline and Age\***

I don't look for articles or books in any language other than English, because... if a research is a significant contribution, the researcher will see to its being published in English.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=11	Hum N=10	Sci N=10	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
66%	54%	10%	50%	58%	13%	30%	42%	9%

\*as measured by the number of 'always true' and 'often true' responses given



## **5.11 Further Insights into the Processing and Packaging Aspect of Researchers' Information Needs**

### **5.11.1 Banalisation of Electronic Information Work in Academe**

#### **Hypothesis:**

**Electronic information work has become the norm in academia, no longer approached with instinctive reluctance, but not evoking undue enthusiasm either. Rather, electronic systems and methods are seen as a means to an end, to be chosen when deemed both the most appropriate for meeting an information need, and reasonably well-suited to individual inclinations, capabilities and circumstances.**

The tentative findings of the qualitative stage indicated that the often reserved, if not blatantly reluctant attitude towards electronic scholarship, until recently so frequently encountered in academia, had been mostly replaced by a rather matter-of-fact approach. Electronic information work seemed to have become almost normative in the academic community, a standard fact of life, so much so, that nobody appeared to give it too much thought any longer. Aiming at exploring the soundness of this finding, the first statements in the section on the processing and packaging of information presented therefore to the survey recipients two opposite stances on the issue: "In my research work, I use both paper based and electronic material; as far as I'm concerned, the format in which the information comes has no importance whatsoever" and "I'm not much of an electronics fan; I succeed in my research work very well without it too".

The results showed that many researchers were indeed comfortable with electronic information, to the point that the format in which the information came was regarded as of no concern: half of the 130 respondents to the first statement registered agreement with the statement to this effect, 25% (33) saying that it was always true of them, and another 25% (33) saying it was often true, and an additional quarter of the respondents, 26% (34) said the statement was at least at times true of them. Only 21% (27) said it was seldom or never true of them. With the majority of the respondents thus testifying to the format of the information being for them always, often, but at least some of the time of no importance, it seems that the findings did indeed corroborate the initial impression of a perceptible shift in academe to electronic scholarship.

The data on the second statement, presenting the other side of the move to electronic scholarship coin, tallied with the findings on the first one. Slightly over half of the 129 respondents disagreed with the saying "I'm not much of an electronics fan", with 16% (21) saying it was seldom true of them and 39% (50) saying it was never true; an additional 20% (26) said it was true of them at times. This time the percentage of the self-proclaimed non-users of electronic information among the researchers came to even less: 10% (13) said the statement was often, and 5% (7) that it was always true of them.



However, these findings were clearly in need of honing in view of the findings of the considerable number of studies reviewed in preparation for the present study, many of which clearly showed that both age and discipline played a part in researchers' rate of acceptance of IT based information work practices and sources. Also, the only ones among the researchers interviewed for the present study, who confessed to being less than enamoured with the novel information services at their disposal, were humanists in their sixties, including the one whose saying ("I'm not much of an electronics fan; I succeed in my research work very well without it too") was used in the survey questionnaire to represent the more reserved attitude to electronic scholarship. Indeed, breakdown of the results by disciplines pointed to the anticipated variance among the researchers.

The scientists were clearly the most likely to consider the format of the information, whether electronic or print, to be of little consequence, and, by the same token, the least likely to scorn anything electronic, with about three quarters of the informants in this group endorsing the first statement and disagreeing with the second one (72% and 76%, respectively). The social scientists, although not as keen supporters of electronic information as their scientist counterparts, did testify to its quite widespread acceptance: about half of them (54%) supported the first statement and almost three quarters of them (70%) opposed the second one. The humanists manifested the more wary attitude to information coming in an electronic format held to be characteristic of them: only about a third (31%) of the respondents to the first statement registered agreement with it, although, interestingly, even less, 27% only, registered agreement with the second. In fact, on the whole humanists were more inclined to opt for 'at times true' than their scientists and social scientist colleagues both when the statement reflected acceptance of electronic information and when it talked of the opposite view: 33% compared to 21% and 20% respectively, on the first statement, 36% compared to 7% and 14%, respectively, on the second statement.

Analysis of the data by age revealed some additional variation: although researchers of all ages were equally happy to accept information on its own merit, regardless of its format, with about half of the respondents across the different groups (51% of both the lower age brackets and 46% of the upper one) endorsing the statement to this effect, and at most about a quarter opposing it, the under 44s were nevertheless clearly much less opposed to the notion: only 12% of them opted for 'never' or 'seldom true' on this, compared to 23% and 26%, respectively, of the 45-60s and the over 61s. Also, very much according to commonly held notions, the younger among the researchers, born into the realities of a digital world, were markedly less prone to treat with disdain the electronic option: only 6% of the under 44s and 12% of the 45-60s said that the second statement ("I'm not much of an electronics fan") was always or often true of them, compared to 34% of the over 61s. Still, it is important to note that a much higher percentage of the respondents in each group disagreed with the statement, if, here again, opposition was stronger among the young: 63% of the under 44s, 54% of the 45-60s, and 48% of the over 61s.

Breakdown of the data on both statements by the combined variables of discipline and age further focussed the picture, although, as it has been pointed out over and over again, limitations of sample size rule out the possibility of treating the ensuing results as definitive conclusions. Thus, as shown in Table 5.11.1.1 below, electronic information work seemed to have become almost universal among the



scientists. In fact, the over 61s among them were the most enthusiastic supporters of the practice, with 90% of them saying that the statement on using both paper based and electronic information indiscriminately was always or often true in their case, and with only 20% of them agreeing with the second statement, which put forward that research could be conducted perfectly successfully without any need for electronic sources and services. Another interesting point to emerge was the similar rate of electronic information acceptance among the social scientists and humanists of the under 44 and 45-60 age bracket, a similarity which disappeared among the older researchers. Apparently, whereas among the social scientists the move to electronic information work seems to have become quite widespread across all age groups, among the humanists the over 61s were much slower to succumb to the enticements of electronics. Thus, for example, 45% and 40% of the young social scientists and humanists, respectively, endorsed the first statement ("I use both paper based and electronic material"), and in the same vein 9% and 0% respectively agreed with the second one ("I'm not much of an electronics fan"). However, none at all of the over 61s among the humanists registered agreement with the first statement, compared to 42% of the social scientists, and 63% of the former said the second statement was always or often true of them, compared to 17% of the latter.

**Table 5.11.1.1: Researchers' Attitude to Electronic Information Work, by Discipline and Age\***

<b>I use both paper based and electronic material; the format in which the information comes has no importance.</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=10</b>
77%	45%	40%	50%	67%	38%	90%	42%	0%
<b>I'm not much of an electronics fan.</b>								
<b>44 and under</b>			<b>45 – 60</b>			<b>61 and over</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
11%	9%	0%	10%	5%	21%	20%	17%	63%

\*as measured by the number of 'always true' and 'often true' responses given

It seems then, that the qualitative findings based hypothesis as to the normative acceptance of electronic information sources and services in academe should be amended to reflect the different pace at which

scientists, social scientists and humanists take up electronic information work practices. This is very much in line with the aforementioned conclusion put forward by Kling and McKim (2000), on the basis of their analysis of the developments taking place in a number of scientific fields in the past few years, that it is not just a matter of time until all disciplines catch up with the early adopters of electronic work practices and all fields converge on common ways to using e-media to support scholarly communication. Of course, time is not wholly inconsequential, either, as, for example, the greater willingness of the younger humanists to use electronic information testifies, but field differences do seem to play a truly crucial part in the process.

Having thus presented some evidence to support the notion that electronic information resources play a prominent part in contemporary research work, the question which still remains to be seen then is how satisfied scholars are with the present state of affairs. The following statement was posed to the survey recipients in an attempt to find an answer: "My research related information work has improved enormously ever since I have the electronic information services at my disposal." The findings left little room for doubt: of the 130 respondents to this question, only 14% (18) said that the statement was seldom or never true, whereas 68% (88) said it was always or often true of them.

Breakdown of the data by discipline again revealed that humanities researchers were the least likely to support the notion of great improvements in research related information work on account of the novel electronic services. Thus, while 76% of the scientists and 82% of the social scientists said the statement to this effect was always or often true of them, only 48% of the humanists did so too. It is interesting to note here, that whilst the scientists among the respondents were more likely than their social scientist counterparts to use both print and electronic information sources, that is, to accord no importance to the format of the information, and to disagree with the statement "I'm not much of an electronics fan", a somewhat greater percentage of the social scientists, compared to that of the scientists, found that the novel electronic services had brought about an enormous improvement in their research work. Perhaps with electronic scholarship having become almost universal in the sciences, it was seen so much part of the routine work practices, that the researchers longer thought of its advantages.

When grouped by age, the findings again indicated that the youngest among the researchers were more likely to endorse the statement than their older counterparts, if not by much: 75% of the under 44s, 65% of the 45-60s, and 64% of the over 61s agreed with it. However, analysis of the data by the combined variables of discipline and age served to clarify the picture (see Table 5.11.1.2 below): with 100% of the under 44s among the scientists agreeing with the notion that IT-based information sources and services had brought about enormous improvements in their research work, they undoubtedly were the most enthusiastic supporters of electronic scholarship, although in this age bracket even among the humanists the percentage of those who said that the statement to this effect was always or often true came to 60%. True, the older the researchers, the more reserved their attitude to the benefits of electronic information seemed to be, with more of them opting for 'at times true, and at times not' on this, but still, outright disagreement with the notion ranged from none at all to at most 17%.



**Table 5.11.1.2: Researchers' Views of the Beneficial Effects of Electronic Scholarship, by Discipline and Age\***

My research related information work has improved enormously ever since I have the electronic information services at my disposal.								
Under 44			45 – 60			Over 61		
Sci N=9	SSci N=11	Hum N=10	Sci N=10	SSci N=21	Hum N=23	Sci N=10	SSci N=12	Hum N=11
100%	72%	60%	80%	86%	43%	50%	83%	45%

\*as measured by the number of 'always true' and 'often true' responses given

### **5.11.2 Consistent Pattern in the Matching of Electronic Practices to Different Types of Research Information Work**

#### **Hypothesis:**

**There is a consistent pattern in researchers' opting for computer-mediated, text-based communication (multi-user conferencing or e-mailing) versus face-to-face communication when seeking to meet different information tasks arising in research work. Text-based communication is seen as suitable for obtaining or transmitting factual information, but the fruitful exchanging of ideas and thoughts is perceived to be contingent on face-to-face interaction.**

The qualitative findings of the previous stage indicated that electronic means, be their admittedly significant advantages what they may, were not always the answer for any and every information need. More specifically, it seemed that the ubiquitous availability and relatively low costs of text-based electronic communications media (listservs or e-mailing) had not changed researchers' insistence on face-to-face interaction for meeting some of the information needs arising in the course of their scholarly undertakings. In fact, there appeared to be a consistent pattern in researchers' opting for computer-mediated, text-based communication versus face-to-face communication when seeking to meet different information tasks arising in research work. The former were perceived as useful for meeting those information needs, which necessitated the exchange of facts. However, when ideas and thoughts, rather than facts were being exchanged, face-to-face interaction was considered vital. In an attempt to establish the soundness of this pattern of researchers' matching the different communication options with the requirements of their scholarly tasks, the survey recipients were posed three statements.

The first statement in point of fact comprised in a nutshell the whole idea being explored: "If I have to send some information to a colleague, pointers to items of interest to him or some information he wants, I prepare a file and send it off. However, for the purposes of brainstorming, of thinking together, it's vital for me that we meet and talk". The responses given supported the postulation that text-based electronic communication was suitable for meeting information needs which necessitated the exchange of facts,

whereas face-to-face interaction was more appropriate for those which required the sharing of ideas and thoughts. Of the 127 respondents to this question, 22% (28) said the assertion was always true of them and 39% (49) said it was often true of them, a total of 61% (77). A further 22% (28) opted for 'at times true of me, and at times not'. Only 10% (113) of the respondents disagreed with the notion.

When broken down by age, the data showed very little variance. 64% of the under 44s, and 59% each of the 45-60s and the over 61s supported the notion linking electronic media with the communication of facts, and face-to-face information sharing with the exchange of ideas. Neither did analysis of the findings by disciplines reveal much variance, at least not as to the extent of disagreement with the notion: 8% of the scientists, 10% of the social scientists and 11% of the humanists said the statement was seldom or never true of them. Still, the researchers seemed somewhat more divided in their affirmative responses. More of the scientists than the social scientists or the humanists opted for 'at times true' on this, 43% compared to 20% and 11% respectively, and the percentage of those among them who supported the notion was correspondingly lower: 50%, compared to 69% of the social scientists and 59% of the humanists. Incidentally, the latter tended more than their scientist or social scientist colleagues to report that the notion was irrelevant to their circumstances, with 18% of them, compared to none and 2%, respectively, of the other two groups choosing the option, a finding which may stem from their propensity to work alone and reflect the overall greater reluctance found among them to utilise electronic sources and methods.

Breakdown of the data by the combined variables of discipline and age, although contributing very little to further enhancement of the whole picture, did demonstrate yet again that the younger among the humanists were far more likely to find electronic information work relevant to their circumstances than their older colleagues: only 10% of the under 44s among them opted for 'irrelevant' on this, and 70% said it was always or often true of them, compared to the corresponding percentages of 17% and 59%, respectively, among the 45-60s, and 30% and 44%, respectively, among the over 61s.

Moving on to the second statement, the next issue on the agenda was the qualitative stage based finding, according to which face-to-face communication was especially vital for the brainstorming involved in research cooperation. The statement, which set out to probe this notion, said: "Collaborating on a joint research venture with a colleague involves face-to-face meetings, because we have to explain abstract ideas, to exchange opinions, to think together. Then the writing itself can be done with the aid of e-mails. The majority of the participating researchers agreed with the sentiments expressed in this statement: 58% (76) of the 129 respondents to this question said it was always or often true of them, and a further 17% (22) said it was true at times. Actually, since for 15% (19) of the informants the statement was irrelevant (after all, not all researchers participate in joint ventures), the percentage of those supporting the notion was in fact higher: 69% of those for whom the statement was relevant agreed with it. All in all, only 9% (12) said the statement was never or seldom true of them.

The variance discerned among the disciplinary groups, or more accurately, among the scientists and social scientists, on the one hand, and the humanists, on the other, was rather pronounced, which is hardly surprising in view of the well-known tendency of the latter to work individually. In fact, 33% of the



humanists, compared to 3% of the scientists and 7% of the social scientists rated the statement as irrelevant to them. No wonder then that only 42% of the humanists, compared to 72% of the scientists and 62% of the social scientists said the statement was always or often true of them.

The differences found among the age groups were quite negligible: 57% of the under 44s, 58% of the 45-60s and 61% of the over 61s endorsed the need for face-to-face communication for the exchange of ideas typical of cooperative research undertakings.

However, analysis of the data concurrently by discipline and age pointed to the possibility of an interesting development among humanities researchers, one which had already come up at the qualitative stage. Although obviously the limitations incurred by the small sample sizes necessitate treating it as no more than what it actually is – a possibility in need of further investigation, it is interesting to note that the younger humanists were less inclined to rate the statement on the importance of unmediated communication for collaborative research ventures as irrelevant to their circumstances: 20% of the under 44s among the humanists opted for 'irrelevant', compared to 33% of the 45-60s and 50% of the over 61s. This may indeed indicate that the younger generation of humanists are more prepared to participate in cooperative research projects, especially taking into account that the percentage of those among the humanists who testified that the statement under consideration was always or often true of them was also slightly higher in the two lower age brackets (40% and 46%) compared to that in the upper age bracket (30%).

The last statement probing the soundness of the hypothesised pattern of researchers' matching different media with the requirements of their communications tasks, focussed on the suitability of text-based electronic media (e-mail and listservs) for meeting the need for factual information. It said: "The electronic media come in very handy when I need some concrete information: I'll just post a query on a listserv or I send an e-mail to somebody who may know the answer". The results left little room for doubt: today's researchers did indeed choose to turn to text-based electronic media when in need of some facts. The statement to this effect was endorsed by the overwhelming majority of the informants: 86% (112) of the 129 respondents to this question said it was always or often true of them, and only a scanty 7% (9) said it was seldom or never true.

Still, some not unexpected variance both by age and by discipline could be discerned in the data. The over 61s among the researchers revealed a slightly less enthusiastic approach to the solution proffered, as did the humanists of the lot. Thus, 87% of the under 44s and 94% of the 45-60s said the statement was always or often true of them, compared to 77% of the over 61s; also, 93% of the social scientists and 90% of the scientists, compared to 75% of the humanists registered agreement with the statement. When broken down by the combined variables of discipline and age, these patterns proved to be more distinctive, as well as very much in line with previous ones discerned. Across the different age brackets both the scientists and the social scientists manifested extensive acceptance of electronic media, this time specifically for obtaining concrete information needed: 89% and 82% respectively among the under 44s, 90% and 100%, respectively, among the 45-60s, and 90% and 92%, respectively, among the over 61s. Not so, however, among the humanists: use of the novel techniques was far lower among the older

researchers than among their young counterparts, with 40% of the over 61s, compared to 90% of each of the under 44s and 44-60s supporting the notion.

### **5.11.3 The Pivotal Role of E-mail in Cementing Invisible Colleges**

#### **Hypothesis:**

**Informal communication among researchers has been greatly enhanced by the ubiquitous use of e-mail. Thus, despite its limitations as a communications medium (lesser degree of richness and social presence than face-to-face contact), e-mail has served to cement invisible colleges.**

The last topic the survey questionnaire set out to look into was the qualitative findings based postulation that e-mail fulfilled a pivotal role in cementing invisible colleges. Aiming to find out to if the wide availability of e-mail was indeed perceived as enabling researchers to maintain close ties and work with colleagues from all over the world, the survey recipients were posed the following two statements: "E-mail helps me a lot to maintain professional ties with other researchers, inclusive of colleagues from the leading universities in the world" and "Thanks to e-mail I'm in touch with colleagues from all over the world on an ongoing basis, we write articles together, work together".

The responses to both statements left no room for reservations as to the soundness of the hypothesised importance of e-mail in today's academe: 84% (110) of the 130 respondents to the first statement testified that the practice depicted therein was always or often true of them, and even in the case of the second statement, which could by definition be true only of those of the researchers who participated in collaborative research ventures, the clear majority, 67% (87) of the 129 respondents registered agreement. Very few of the informants, only 2% (2) of the respondents to the first, and 5% (6) of the respondents to the second statement reported that either one of the two statements was irrelevant for them, that is, that they either did not maintain professional ties or did not work with colleagues (which is very unlikely, indeed), or did not use e-mail. The percentage of those who disagreed with the statements was likewise quite low: 5% (6) of the respondents to the first statement and 16% (20) of the respondents to the second statement chose the 'never true' or 'seldom true' options. Plainly, e-mail was perceived as instrumental for keeping in touch with fellow researchers from other universities (including the first line ones), and for collaborating in research.

Analysis of the results by discipline revealed some, not unforeseeable variance among the researchers: whereas all of the scientists (100%) and an overwhelming majority (89%) of the social scientists rated the statement on the use of e-mail for maintaining professional ties with colleagues as always or often true of them, a lower, if still considerable percentage, 68% of the humanists did so too. Indeed, whilst none of the scientists and a mere 7% of the social scientists said the statement was true of them only at times, 20% of the humanists did so, too. Still, not many more of the humanists said the statement was never or seldom true of them (9% compared to none of the scientists and 2% of the social scientists), and certainly not that it was irrelevant for them (2% compared to none and 2%).



By the same token, while 90% of the scientists and 75% of the social scientists said the statement on the use of e-mail for working together with fellow researchers was always or often true of them, only 38% of the humanists said so, too; also, while 3% and 9%, respectively, of the former opted for 'never' or 'seldom true' on this, 32% of the latter did, too (this, however, can probably be accounted for, at least in part, by humanities researchers' being less inclined to take part in joint research ventures). Obviously, here again humanists demonstrated the more hesitant approach to electronic scholarship associated with them.

Contrary to popular belief, attributing greater reluctance towards electronic work methods to older people, here again breakdown of the data on both statements by age indicated only slim variance among the researchers. Thus, agreement with the first statement amounted to 85% both among the under 44s and the 45-60s and to 86% among the over 61s, and with the second statement to 78%, 62% and 68%, respectively.

Analysis of the data by the combined factors of age and discipline bore further testimony to the previously identified patterns of researchers' move to electronic work practices (even if in view of the sample size limitations its findings are to be treated only as pointers for further investigation):

**Table 5.11.3: Perceived Importance of E-Mail in Today's Academe, by Discipline and Age\***

<b>E-mail helps me a lot to maintain professional ties.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=23</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
100%	81%	70%	100%	86%	86%	100%	100%	54%
<b>Thanks to e-mail I'm in touch with colleagues from all over the world... we write articles together, work together.</b>								
<b>Under 44</b>			<b>45 – 60</b>			<b>Over 61</b>		
<b>Sci N=9</b>	<b>SSci N=11</b>	<b>Hum N=10</b>	<b>Sci N=10</b>	<b>SSci N=21</b>	<b>Hum N=24</b>	<b>Sci N=10</b>	<b>SSci N=12</b>	<b>Hum N=11</b>
100%	63%	70%	90%	72%	35%	80%	91%	20%

\*as measured by the number of 'always true' and 'often true' responses given

Among the scientists there clearly was extensive appreciation of the benefits of e-mail for keeping in touch with one's peer group: in fact, they manifested total agreement (100%) in all age brackets with the notion of e-mail being useful for maintaining professional ties, and although their support of the notion of collaboration via e-mail slightly decreased with age, it remained high among the older researchers, too.

Interestingly, among the social scientists, who, on the whole, manifested rather a firm endorsement of the uses of e-mail for scholarly purposes, if not as enthusiastic as that seen among the scientists, the extent of support accorded to both the first, and the second statement actually increased with age! Perhaps among those who have already crossed the Rubicon of joining the ranks of electronic scholars, the possibility of communicating with fellow researchers without budging from one's chair overrides any remaining doubts, especially with age, which probably accentuates the hardships of travelling whilst its novelty wears off... And finally, the humanists again manifested the much-documented hesitancy in their approach to electronic scholarship: across the different age-groups they were the least enthusiastic about the benefits of e-mail, with their reluctance clearly more marked among the older researchers.

Having thus reported the findings of the investigation at the quantitative stage of the study, we will next consider the resulting enhanced insights into the information component of contemporary research work in terms of the theoretical perspective chosen and the extant knowledge, understandings and opinion derived from the research literature.



## **6. Discussion and Conclusions: A Comprehensive Portrayal of Contemporary Researchers' Information Needs and Practices**

Chapter 2 of the present study recapped our traditionally held notions concerning scholarly work and its information component and reviewed the literature depicting the socio-cultural context of the scientific enterprise. Chapter 3 delineated the theoretical foundations of the investigation. Chapters 4 and 5 reported the field-work based insights gleaned into the information component of academic research work. This chapter will take all of the information presented so far and interpret it in the light of the research questions for a comprehensive portrayal of contemporary researchers' information needs and practices to emerge.

### **6.1 The Subject Aspect of Researchers' Information Needs and Practices**

A main, if not the most central tenet of the academic ethos is the postulation of academic freedom, whereby, at least in theory, the scholar is wholly autonomous in his choice and treatment of the subject(s) of his scientific investigations. In result, scientific research, as varied and wide-ranging as life itself, is concerned with any and every conceivable topic under the sun (as well as quite a few inconceivable ones...). There are undoubtedly a variety of factors, which influence any particular decision to embark on a specific research project, but, as Ziman (1981) contends, these decisions are merely contributory parts of a larger framework, the underlying rationale of which is the governing interest of the researcher. However, as Line (1971a) notes, the origins of researchers' scholarly endeavours may indeed lie largely in their own curiosity and awareness, but the conceptualising and contextualising of their inquiries must be based on existing information. In consequence, if subject is generally considered the most obvious and immediate of all characteristics of information need (Nicholas, 2000), it must be tenfold so for researchers. Thus, exploring the subject Aspect of Researchers' Information Needs in an era of dramatic changes underway both in the research process itself and in its environment held the promise of particularly interesting findings.

#### **6.1.1 A Focussing of Research Information Needs**

If research information needs have been considerably affected by the extensive changes taking place in the scholarly enterprise, the traditional distinction between researchers' differential information needs in their primary, secondary and peripheral fields of attention is certainly a case in point. As it has already been noted, researchers have been long held to follow the developments not only in the narrow field of their immediate research interests, but also in the broader field of which this forms a part. Indeed, Menzel (1964) sees each scientist as having an area of attention made up of several fields or sub-fields arranged in concentric circles: at the centre is the scientist's own primary field of attention, with which he feels responsible for keeping up in full detail, at varying distances from the centre are his secondary fields of attention, with which he also keeps up, if not in the same detail, and towards the periphery are fields whose progress he merely wants to know about in general. However, according to the findings of the present study for many of the researchers of today information seeking is a far more focussed activity,



aimed at locating information expressly on 'their' specific topics: only 18 percent of the study participants attest that it is never or seldom so.

Traced by the informants to the specialisation characterising these days the scholarly endeavour, a salient fact of contemporary academic life thus seems to be a focussing of research interests, and as its direct derivative, a focussing of information needs. In fact, the developments in this direction seem to form a self-perpetuating circle, for the need to cope with the huge quantities of scientific and scholarly information being constantly generated seems to dictate, as much as to originate in this ever-growing specialisation.

The participants in this study link this growing specialisation in scholarly research agendas, and in result, in scholarly information needs to the trend towards the increasing specialisation of scientific and scholarly journals (Mabe and Amin, 2001), too. Indeed, Ekman and Quandt (1995) describe a model of developments, which may very well dictate greater specialisation in research work. Since academics with poor publishing records are considered underperforming, researchers constantly seek outlets for their scholarly articles. Publishers comply by establishing new journals, but as it is difficult to create journals, which can successfully compete with the existing ones, especially when these are of a high prestige, publishers often produce journals of a more restricted scope. Plainly, researchers wishing to publish their work in these journals will thus be required to concentrate in their writing on more narrowly defined topics. Given the present-day realities of research productivity evaluations, coupled with the ubiquitous 'publish or perish' sword of Damocles forever hanging over the heads of academics, if presenting a focussed picture has thus indeed become the prerequisite of scholarly publishing, the pressure to 'play by the rules' must be overwhelming.

Another reason given by the study participants by way of explanation to their habitual focussing of interests, and therefore of information needs, is their apprehension that too much reading will stifle their creativity. This is very much in line with the findings of Barry and Squires (1995) that the wider access to more diverse sources of information afforded in an electronic environment leads to researchers' spending more time on searching for and reading literature. This, they contend, impinges on the time to think, and may further interfere with the creative process, as too much reading of other people's ideas can hamper the capacity to produce original work.

Given the pressure on researchers (be it self- or super-imposed) to be more focussed in their work, it is hardly surprising that findings of the present study do indeed indicate that they are clearly inclined to restrict the scope of their information seeking to the specific subjects they specialise in, and to refrain from following the developments in areas more marginal to their interests. Apparently then, with research increasingly focussed on ever-narrowing, ever-more specialised subject areas, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is indeed fading away. However, whilst this focussing of research interests thus appears to bring about a restriction of the scope of the information needed, it does not seem to involve a comparable decrease in the amount required, at least not in the specific context of the focussing of research interests taking place with the progress of the academic career. In fact, only about a quarter of the participants in this study link their professional



progress, and the attendant focussing of their information needs, with a reduction of the quantity of information called for in their scholarly endeavours.

Still, the younger researchers seem to be less focussed both in the scope and the quantity of the information they need than their older colleagues, and no wonder: newly introduced to academe, many of them are bound to be still in the process of fully mastering their fields, amidst searching for their professional niches of specialisation, which obviously would entail their needing more information in a wider range of topics. Thus, whereas about a third of the younger among the study informants say they only need information specifically on the topic under investigation, more than half of their older counterparts voice the same sentiments. By the same token, if among the youngest participants only 15 percent believe that as their career progresses, and they become more focussed in their interests, they need a lesser amount of information, among their older colleagues the corresponding percentages come to the double of that.

Interestingly, this gradual focussing occurring with age of the scope of research information needed, and to a far lesser extent, but also of the quantity of research information needed, seems to be more characteristic of the social scientists and humanists than of the scientists. Thus, whereas the former tend to report an increasing focussing of their information needs with age, scientists' self-professed restriction of their information needs seem to vary little over the years. By the same token, whilst among the former support of the notion of a progressive focussing of information needs resulting in a reduction of the quantities of information required increases with age, the opposite seems to be true among the latter. True, limitations of the present study allow for tentative conclusions only, but the emerging pattern looks very plausible indeed in view of Becher's (1989) and Weintraub's (1980) analyses of the different nature and scale of the problems dealt with in the different disciplines.

Thus, since the corpus of knowledge in the sciences and in the 'harder' social sciences is sequentially and hierarchically ordered, scientific investigations tend to cluster around the comparatively few salient topics at the forefront of the developments in a given field. In result, scientists have a rather clear sense of where the frontier of knowledge currently lies and what the truly significant issues at the frontier are. Not so, however, in the 'softer' areas of the social sciences and in the humanities: since the corpus of knowledge in these domains is non-linear, the ongoing research effort is dispersed over a far wider area of investigation (in terms of both time and space). Therefore, for the researchers in the 'softer' areas the whole tradition is often essential and present, the frontier is less visible, and the current concerns need not be as significant. Plainly then, it is more likely that social scientists and humanists will take longer than their scientist colleagues to grow more focussed in their research interests, and consequently, in their information needs.

To sum up, in reply to the question posed at the outset of this study, as to whether the information needs of contemporary researchers vary in accordance with the centrality of a subject area to their interests:



**A salient fact of contemporary academic life is a focussing of research interests, and as its direct derivative, a focussing of information needs. Indeed, the traditional distinction between the researcher's primary/secondary/peripheral fields of attention is fading away, and along with it the notion that information needs vary in accordance with the centrality of a subject area to the researcher's interests. This focussing of the scope of research information needed, and also (if to a far lesser extent) of the quantity of research information needed, seems to be occurring, more characteristically in the social sciences and the humanities than in the sciences, gradually, with age.**

### **6.1.2 Strategies of Coping with the Call for Information in a Sphere of Inquiry beyond a Researcher's Own Area of Expertise: Cooperation, Mastering, Making Do**

At this point in our exploration of research information needs a clarification seems to be very much in order. It would certainly be a blatant oversimplification to argue that consequent to the trend towards specialisation, researchers no longer need information outside their ever-narrowing fields of expertise. If at no other time, then at least when they decide to branch out to a new area of investigation, they surely do, and these days probably more than ever; for, as Palmer and Neumann (2002) point out, building on previous literature, most notably Klein (1996), in the past few decades inter- and multi-disciplinary inquiry has become more pervasive. Indeed, underscoring Menzel's (1964) forty-year old observation, that an important need to be met by the science-information system is of researchers' familiarising themselves with a sphere of inquiry, which was not previously included in their areas of attention, the present study has unearthed three main courses of action they utilise for the purpose. Apparently, depending on the level of 'outside' information deemed to be necessary, researchers can either embark on a collaborative research venture, or undertake to extend their knowledge bases by mastering unfamiliar areas, or try to make do with more basic level information.

#### **6.1.2.1 Embarking on a Cooperative Research Venture**

The first of these three modes of coping with the call for information in subjects outside a researcher's own area of expertise, embarking on a cooperative research venture, may not, as a rule, be undertaken with the primary purpose of meeting information needs in mind. Still, the information sharing involved is undoubtedly a significant part of any scholarly endeavour attempting to coalesce the kind of multifaceted, and often inter- or multidisciplinary expertise, which one researcher working alone cannot always provide. Indeed, this information sharing seems to achieve a synergetic effect, which is probably the greatest benefit to be derived from cooperative research, although it also serves to nip in the bud any danger of 're-inventing the wheel' by repeating work already done.

Joint scholarship has traditionally been associated primarily with the work practices of scientists and social scientists (Becher, 1989; Covi, 1999; Stone, 1982; Weintraub, 1980; Wiberley and Jones, 1994), and no wonder. As it has already been noted, the scientists, and at least those social scientists whose areas of interest are nearer the harder end of the continuum, tend to concentrate on a few relevant problems on the research frontier, in result of which they either work in fierce competition, or collaborate, whereas the



humanists tend to be more alone with their idiosyncratic problems (Becher, 1989; Price, 1986; Weintraub, 1980). Also, the humanists' primary evidence, unlike that of the scientists' and social scientists' primary evidence, is neither easily categorised and entered into a relational database, nor readily subjected to quantitative measure or statistical analysis. Therefore, the humanities research project cannot easily be divided into discrete tasks that different members of the research team can perform separately and later assemble (Wiberley and Jones, 1994). Very much in keeping with these previously established notions of the work-styles typical to the different disciplines, findings of the present study indicate that opting for cooperation for meeting the need for information beyond their areas of specialisation is far more characteristic of the information behaviour of scientists and social scientists than that of humanists. Whilst almost half of the scientists and nearly as many of the social scientists habitually choose to cooperate with fellow researchers for the purpose, and only 17 and 21 percent of the two groups respectively never or seldom do, it is the other way around for the humanists: none of them find cooperation invariably the preferred solution whenever the need for information outside their fields of expertise arises, and no more than a mere 6 percent do so often, as opposed to 55 percent of them who never or seldom do.

Very understandably indeed, the younger researchers seem to be more willing than their older counterparts to turn to cooperation for meeting any information needs arising from their branching out to knowledge areas beyond their specialties: more than a third of the former opt for collaborating with colleagues for the purpose, compared to a quarter of the latter. It is hardly surprising, of course: after all, as newcomers to the research enterprise, surely they can only stand to benefit from cooperation with a knowledgeable and experienced colleague, though the tapping of information involved may not be the sole consideration for the novice researcher; for example, getting published more easily, by virtue of the reputation of his senior collaborator, must be another forceful incentive. Still, although across the disciplines receptiveness to cooperation as the solution for the problem of researchers' needing information beyond their spheres of interest is more pronounced among the younger researchers, the social scientists, and especially the scientists clearly favour the practice far more than their humanist colleagues: for example, whereas the overwhelming majority (89 percent) of the younger among the scientists hold with the practice, only a fifth of their humanists counterparts do so too. It is interesting to note in this context that the present investigation thus seems to indicate that collaborative research ventures are no longer wholly foreign to humanists either, a finding which corroborates previous findings (Sweetland, 1992). However, since apparently for humanities researchers collaboration is no more than working 'side by side' rather than 'together', that is, writing two separate articles on two facets of a topic, and then integrating the separate parts for publication, the information needs of each participating author appear to be no different than those of a scholar working alone.

In any case, although the joining of forces is undoubtedly perceived by academics, at least in the sciences and social sciences, as an apt solution for the need to bridge over the information gaps inherent in branching out beyond the boundaries of their core research areas, it is apparently not 'everybody's cup of tea'. An individualistic style of work, a reluctance to rely on colleagues, or a disinclination to accommodate their needs and preferences all seem to counteract expertise pooling, be its admittedly considerable benefits what they may. Thus, researchers often seem to prefer an alternative solution for



meeting the need for information in areas outside their own fields of specialisation: acquiring the necessary level of expert knowledge in yet another subject area.

#### **6.1.2.2 Mastering Unfamiliar Subject Areas**

Mastering the information base of a new topic is obviously a more time- and labour-intensive choice. The entrants to a new specialty have to catch up not only with the current practitioners of the field, but also with the literature, as well as cope with the intellectual difficulty or complexity of the new specialty, inclusive of the different cast of mind required (Wilson, 1996). Entering a new field of specialty can also be a rather intimidating option, necessitating as it does that the researchers venture out beyond the knowledge domains they are already familiar with and feel safe in. However, it is also the one option, which guarantees that the researcher builds on solid foundations. After all, to use Newton's famous aphorism, each researcher stands on the shoulders of the giants who preceded him, though Simon (2001) is undoubtedly right when he suggests that in point of fact the shoulders need not belong to giants, a half dozen of dwarfs will serve just as well. That is, creative scholars need to have access to the rich, continually incremented information contributed by their predecessors (whether giants or dwarfs), so that they can further examine, analyse, experiment with, and modify it. Indeed, the researchers participating in the present undertaking seem to prefer meeting the need for information in areas outside their own fields of specialisation by acquiring the necessary level of expert knowledge in yet another subject area: close to two thirds of them attest to habitually opting for this solution, and only 7 percent of them say they seldom or never do so. It seems then that although setting out to master a new subject area in its entirety, by way of coping with the need to acquire the knowledge base of a new field, might easily be associated with problems of information overload, such considerations seem not to deter the majority of the researchers from doing so. This is the first inkling of the notion, which is probably the most interesting finding presented here, that the huge amounts of information available these days on any and every subject no longer pose any problems to researchers.

Not unexpectedly, researchers at the softer end of Storer's (1967) continuum of the disciplines reveal a greater tendency than their counterparts at the harder end to opt for mastering a whole new subject area when they embark on a new research project, which lies outside their specialities. Thus, whereas only 4 percent of the social scientists and an identical percent of the humanists find the notion of mastering a whole new area of expertise wholly irrelevant to their circumstances, 14 percent of the scientists do so. By the same token, whilst 71 percent of the social scientists and 56 percent of the humanists report that the practice reflects their ways (which, in itself, is somewhat surprising, since humanists are more readily associated with taking a broad view of a problem under investigation), only 45 percent of the scientists do so, too. This is very much in line with the differences observed by Palmer (1999) and Palmer and Neumann (2002) in their qualitative studies of the work practices of science and humanities interdisciplinary scholars. Apparently, in the sciences researchers often opt for 'information leeway', that is, a range of initiatives that make room for, or create the freedom to branch out to new specialties. Thus, they often prefer to depend on the knowledge of colleagues and collaborators rather than seeking information and learning new material independently. By the same token, they will readily rely on information professionals to provide the necessary 'information leeway' by performing cross-disciplinary searches aimed at locating the necessary 'smattering' of relevant material. In comparison, humanist



researchers are more likely to learn the whole content gamut of areas that are integral to their research, exploring across a wide array of materials to build their knowledge base. This difference in attitude is all the more interesting in view of Wilson's (1996) assertion, that in fact mastering a new field in the harder knowledge domains offers less of a burden to overcome than in the soft ones: in the former text books and serious expositions of an agreed body of knowledge will bring one up reasonably close to the research front, whereas in the latter one has to organise knowledge for oneself on the basis of the original literature of the field.

Also, the data gathered for this study indicate that as they grow older, researchers may be less and less inclined to opt for mastering a new subject when they need information outside their areas of expertise: if among the youngest group of researchers two thirds side with the notion, among the oldest group only half do so, too. It may very well be that with age the incentive to branch out to a new area of research diminishes: after all, the more seasoned researchers have already found their scholarly niches, probably with some achievements already chalked up to their names, too, and they would understandably be more wary of leaving these 'safe shores' and starting anew. Indeed, the younger researchers, even among the scientists, are far more likely to invest the time and energy needed for mastering a new subject area than their older counterparts. In fact, in the lower age group the percentage of scientists endorsing the notion is not very far from that of its most enthusiastic supporters, the social scientists (66 percent of the former and 75 percent of the latter), whereas in the two upper age groups the disparity is much more marked: 40 percent of the scientists aged 45 – 60, and 30 percent of the scientists aged 61 express preference for the option of mastering, compared to 77 percent and 58 percent of the corresponding age groups among the social scientists.

### **6.1.2.3 Making Do with More Basic Level Information**

The third strategy utilised by the researchers queried for the present study when they need information for pursuing lines of inquiry beyond their areas of expertise, making do with more basic level information, is undoubtedly the least popular one: only a fifth of the study informants attest to habitually opting for this solution. Furthermore, across disciplines and ages the pattern of findings unmistakably point to a similar level of generally held wariness of the practice. The technique, which combines, at least to some extent, the benefits of mastering and collaboration, for the researchers choosing it first anchor their problem in the information accumulated on the subject, and then complement the emerging picture by consulting an expert, has been noted by Palmer (1999) and Palmer and Neumann (2002), too, in their study of interdisciplinary academics. Asserting that boundary crossing science requires a balance between established core knowledge and the infusion of new knowledge, Palmer (1999) points out that there seems to be considerable variation among interdisciplinary researchers in the level of knowledge of subjects outside their specialties they require. Thus, whereas some interdisciplinary science researchers strive for a deeper level of knowledge in fields beyond their areas of expertise, others are highly consultative and tend to meet such information needs by asking others to explain things to them, making do with no more than an interpretive level of tacit knowledge. By the same token, as Palmer and Neumann (2002) observe, interdisciplinary humanist scholars, too, actively extend their intellectual province into new domains through information work. Their information routines thus often aim for constructing and sustaining a broad base of knowledge, utilising textbooks, handbooks, canonical works

and standard discipline-based journals, but they also turn to colleagues to get personalised explanations of unfamiliar ideas and evaluations of interpretations. However, although Wilson (1996) asserts that some of the prerequisites associated with branching out to new specialties may be simply worked around by deliberately setting out to do what can be done, notwithstanding big gaps in knowledge, findings of the present study point to researchers' viewing this ostensibly opportune solution for extending the range of their knowledge bases with considerable consternation: as it has already been noted, only about a fifth of the informants testify to ever doing so. In fact, they seem to regard it as a kind of 'information band-aid': the tactic may be good for 'staunching the bleeding', that is, for solving a minor acute problem, but not for curing the underlying malady – the lack of the solid information base needed to launch a new research endeavour.

To sum up, in reply to the question posed at the outset of this study, as to how today's researchers cope with the call for information in spheres of inquiry beyond their own areas of expertise:

**When wide-ranging and/or inter- or multi-disciplinary research ventures call for information in spheres of inquiry beyond their own areas of expertise, depending on the level of 'outside' information believed to be necessary the researchers may: collaborate with colleagues, especially at the outset of their careers, although the humanists will be far less likely to do so; extend their knowledge base by mastering unfamiliar domains, rather more so when still novice researchers, with the social scientists the most, and the scientist the least likely to choose the option. Most are, however, wary of trying to make do with more basic level information, even if consultation with an expert is to be had.**

### **6.1.3 Considerations of Information Manageability in Choosing a Research Topic**

As it has already been noted, curiosity-driven free enquiry no longer seems to be the norm in academia. Indeed, the literature of the recent decade or two reflects a growing concern at the many factors held to be extraneous to the research endeavour, which impact upon the researcher's choice of the subject(s) of his scientific investigations. If a quarter of a century ago Ziman (1981) still matter-of-factly subsumed all decisions pertaining to the topic of a research project under one main consideration, the governing interest of the scholar, these days there seem to be a host of factors over and above the researcher's professional inclinations impacting on any particular decision taken to embark on a specific investigation (Gibbons et al., 1994; Gumpert, 1997; Newell and Stone, 2001; Podgorecki, 1997; Slaughter and Leslie, 2001). Still, amidst the variety of determinants steering today's researchers in the directions their scientific work will next take, from the prerequisites of career advancement, attaining a reputation and achieving a standing in the academic community, through the stipulations of the societal insistence on accountability, to the pressures of vying for resources in a competitive environment, the obvious consideration of feasibility is certainly one which cannot be dismissed. Furthermore, one particular aspect of the feasibility determinant of research problem choices has been thought likely to come to the fore in our times of ever-increasing



quantities of scientific information: the achievability of a scholarly undertaking measured in terms of the amount of information available on it.

The possibility that information overload may impact on individual research strategy has been explored by Wilson (1993a, 1995, 1996) in a series of studies on communication efficiency in research. Maintaining that contrary to conventional understanding, non-use of relevant information in a research enterprise may not happen by accident or by mistake, but rather reflect a routine and normal tactic for coping with information overload, he suggests that researchers consistently and deliberately ignore material they are aware of, even though it may be pertinent to their enquiries. As it happens, he does not refer specifically to the role played by the availability of information in researchers' deciding on the topic of their forthcoming investigations, but his thesis should be equally applicable to this phase of a research project too. However, in point of fact findings of the present study indicate that the practice of researchers' a priori asking questions, which they deem manageable in terms of the expected quantity of pertinent information on it, reflect only marginally the prevalent custom in academe, with no more than a fifth of the informants reporting it as representative of their ways. Of course, at least some of the disagreement with the notion may stem from academics understandable reluctance to admit, perhaps even to themselves, that such an inherently scholarly decision could be dictated by a consideration so blatantly extrinsic to the knowledge generating aspirations of the research enterprise. However, the phenomenon discerned is very much in line with the finding yet to be discussed in full detail, according to which the huge amounts of information available no longer pose any problems to researchers; rather to the contrary. Seen in this light, it is hardly surprising that the quantity of information on a subject is indeed quite immaterial when the feasibility of a research project is being considered.

Still, researchers' limited support of the notion that their choices of topics for investigation might be dictated by their ability to handle a certain quantity of information seem to vary some, though not much, with disciplinary affiliation and age. Thus, scientists and social scientists seem to be more inclined to take into account the quantity of information when deciding on their next project than their humanist colleagues: approximately a quarter of each of the former, as compared to 15 percent of the latter report a favourable view of the practice. In any case, the percentage of those who disagree with the notion is almost twice as high as the percentage of those who agree with it in each of the three groups. Also, the younger scientists and social scientists seem to be more likely to choose their research topics with a mind to the quantity of information available on it than their older colleagues, whereas it is the other way round among the humanists, although limitations of the small sample preclude the possibility of definite conclusions on this. These patterns of behaviour may be tentatively traceable to the greater time pressure in the sciences and the social sciences, pointed out both by Becher (1989) and Sweetland (1992), especially when considered within the context of the aforementioned developments in today's academe towards 'cashable' knowledge production (Gibbons et al., 1994; Rhoades, 2000). Obviously, scientists and social scientists, whose Big Science investigations (Price, 1963, 1986) are far more likely to produce marketable solutions to pragmatic problems, among them some mankind has long been grappling with, such as drugs, poverty, and incurable diseases, work under considerably greater time pressure than humanists. True, the rigorous dictates of the 'publish or perish' mentality in academe, coupled with the externally imposed norms of gauging faculty productivity, enforce these days a brisk pace in every



scholarly field, but in the sciences and the social sciences the greater potential for profitable research findings, and the much greater danger of those revenue generating discoveries being 'scooped' by somebody else prescribe a more intensive – occasionally frenetic – rate of activity. It is not inconceivable then, that scientists and social scientists, and especially the young among them, who still have to prove their abilities, would be more likely to weigh among the pros and cons of a planned project the amount of information needed, which may impact on the time investment required.

To sum up, in reply to the question posed at the outset of this study, as to whether contemporary researchers' choices of topics for investigation are dictated by their ability to handle a certain quantity of information:

**The quantity of information on a subject is very likely to be deemed quite immaterial when the feasibility of a research project is being considered; indeed, the practice of a priori asking only questions believed to be manageable in terms of the expected quantity of pertinent information on it reflects only marginally the prevalent custom in academe. Still, scientists and social scientists, and especially the younger among them, are more inclined to weigh among the pros and cons of a planned project the amount of information needed, as it can have an impact on the time investment required.**

#### **6.1.4 Locating Pertinent Information on a Given Subject**

The need for structured-access to scientific and scholarly information is one of those truisms everybody seems to accept unthinkingly: after all, indexing, abstracting and cross-referencing of publications would surely not still be considered of the most basic responsibilities of all information services, as they are, for example, in Atkinson's (2001) in-depth consideration of the place(s) of the library at the dawn of the new millennium, if there was much doubt as to the veracity of the notion, would they? Indeed, research into academics' perceptions of the usability of the World Wide Web for scholarly and scientific purposes has repeatedly shown that they trace the problems encountered mainly to the lack of bibliographic description and controlled subject indexing of the information on the Web, which, they contend, calls for librarians' professional intervention to remedy the situation (Kibirige and DePalo, 2000; Massey-Burzio, 1999; Wang and Cohen, 1998; Zhang, 1999). A typical case in point is a 1997 nationwide study of the Dutch academic community, in which the findings suggest that problems of performing subject searches on the Internet might be counteracted by assigning subject headings or classification codes to Internet resources (Voorbij, 1999).

Still, findings of the present investigation seem to indicate that with the advent of electronic databases there is an evident tendency among researchers to opt for keyword-based searching as their method of choice for information retrieval. Perhaps not surprisingly: although experience often shows that it may not be the most efficient information retrieval method, yielding, as it usually does (at least when performed non-professionally), considerable amount of 'noise', it certainly seems not only to simplify the



information search most conveniently, but also to circumvent at least two major pitfalls associated with gaining access to pertinent information.

First of all, as Stoa (1984) points out, no subject heading or descriptor can adequately analyse a book or article for the researcher, since bibliographic access tools to the literature introduce another layer of human minds through which information must be filtered, evaluated, classified, and labelled. Indeed, researchers have long manifested quite some reluctance to locate the information they need on a given topic in the systematic, bibliographic tools based fashion wistfully recommended by librarians (Adams and Bonk, 1995; Line, 1971a; Stenstrom and McBride, 1979; Styvendele, 1977; Voigt, 1959; Wood and Bower, 1969). Rather, as Frost (1987) maintains, card catalogue use studies have repeatedly shown that the higher the level of education of users, the less frequent the use of the structured subject search. Indeed, although humanists are the more renowned for their propensity for serendipitous locating of information despite the wide availability of secondary searching tools (Manoff, 1997; Palmer and Neumann, 2002; Reagor and Brown, 1978; Stone, 1982; Watson-Boone, 1994; Wiberly and Jones, 1994), science and social science researchers too have been found to prefer less systematic methods of information retrieval (Belefant-Miller and King, 2001; King and Tenopir, 1999; Schauder, 1994).

Also, locating information through the use of secondary tools necessitates lighting on the 'right' subject terms, which for all practical purposes depends on the seeker's ability to second-guess correctly the indexer's choices. True, using the controlled vocabulary of a catalogue, an abstract or an index could provide an adequate solution to problems of precision in information retrieval, but this usually remains the prerogative of information professionals. Thus, for example, Markey (1988) presents evidence based on several studies, conducted in various university libraries in the US in the 1980s, to the effect that the majority of users (inclusive of faculty) did not know that the subject terms in a catalogue came from a controlled vocabulary, and in result, entered subject terms that came to mind. Under these circumstances, happening on the 'right' term is clearly difficult enough even in knowledge areas, most notably the sciences, where the information content of a publication is definable in concrete and universally accepted terms, for the cryptic representations in scientific discourse, such as mathematical notations and chemical structures, are thought to result in relatively precise information retrieval. It is obviously a far more formidable task in fields of a less predictable terminology, such as the humanities and social sciences, in which vocabulary is conventionally assumed to be 'fuzzy and hard to pin down' (Adam, 1975; Brittain, 1984; Line, 1973; Palmer and Newmann, 2002; Sweetland, 1992; Tibbo, 1994).

In any case, such feats of conjecture are no longer believed to be necessary in our era of easily searchable, electronic, often full-text databases. Mistakenly, as it happens, to quote Marcia Bates (1998, pp. 1186-1188):

"Many people in our society, including many in the Internet and digital resources environments, assume that subject access to digital resources is a problem that has been solved, or is about to be solved, with a few more small modifications of current full-text indexing systems... [However] effective, completely automated indexing and access to textual and text-linked databases eludes us still, just as 100% perfect automatic translation does, among other things... The really sophisticated use of computers will require designs shaped much more in relation to how human minds and information needs actually function, not how formal, analytical models might assume they do... In study after study, across a wide range of environments, it has been found that for any target topic, people will use a wide range of different terms..."

Still, what really matters is that people, and academic researchers are apparently no exception, seem to favour greatly what is in effect the ultimate distilling of an information need into its subject: the reduction of its main content components into a few keywords. They evidently find searching by keywords to be a far more convenient method of information retrieval than using an arbitrarily chosen descriptor or subject heading assigned by a third party: for example, in the aforementioned survey of Dutch academics' use of the Internet, 68 percent of the participants rate concept searching as a very important or important characteristic of a search engine (Voorbij, 1999). Manoff (1997) also reports that the humanists in her studies cite the ability to perform full-text word searches as the great advantage of electronic publications.

Very much in line with these findings, two thirds of the researchers participating in the present study equate successful searching of a database with finding the right keywords. Furthermore, although the aforementioned concrete and unequivocal nature of the terminology of the sciences renders controlled vocabulary based information retrieval best suited to the scientists, it by no means negates the use of keywords: indeed, they seem to be just as given to keyword based information seeking as the social scientists, whose vocabulary is unclear and ever-changing (Brittain, 1984; Line, 1973), with three quarters of both favouring the practice. Interestingly, although the social scientists' vocabulary is no less 'fuzzy' than that of the humanists' (Palmer and Newmann, 2002), the former demonstrate far greater affinity with the practice than the latter: 73 percent of the social scientists testify to keyword-based information seeking being their method of choice for information retrieval, as opposed to only 53 percent of the humanists. Perhaps then the phenomenon discerned also testifies to the disciplinary-rooted variations in scholars' appropriating electronic resources and work methods, as these will be shown to emerge from the present investigation, too.

To sum up, in reply to the question posed at the outset of this study, as to contemporary researchers' method of choice for information retrieval:

**Keyword-based retrieval, which is in effect the ultimate distilling of an information need into its subject, is the contemporary researcher's favourite approach to meeting the need for pertinent information. Still, scientists and social scientists demonstrate greater affinity with the practice than humanists.**

## **6.2 The Function/Purpose Aspect of Researchers' Information Needs and Practices**

Perhaps not wholly predictably, given the far-fetching transformations characterising so much of the contemporary scholarly scene, findings of the present study clearly indicate that the key purposes and functions to which information is put in research work have remained those previously identified in the literature: reviewing the existing knowledge on a given topic, keeping abreast of new developments,



solving topical problems as these arise in the course of a research project, and getting ideas for a new research (Menzel, 1964; Voigt, 1959). Furthermore, the disciplinary-rooted differences in the conduct of research, which have been shown to exert considerable influence on information needs and information seeking behaviour of scholars (Brittain, 1979; Ellis, 1993; Ellis et al., 1993; Garvey, 1979; Line, 1969, 1973; Menzel, 1964; Stone, 1982; Voigt, 1959), appear to hold as true as ever. Still, if today's researchers do seem to need information essentially for the same purposes they have always done, they certainly go about it very differently than their predecessors, breaking away from tradition in choosing from among the available ways and means the ones deemed most likely to provide the right amount of pertinent information suitable to the specific function they have in mind.

### **6.2.1 Laying the Information Foundations of a Scholarly Investigation**

The literature search routinely conducted in the early, exploratory stages of a scholarly investigation has been found in the qualitative stage of the present investigation to be the one task most readily associated with academic information needs, an indispensable component of a scholarly endeavour. That it should be so is hardly surprising, given the potentially dire consequences of failing to root a new inquiry in its information context. First and foremost, as Robert Merton, the renowned founding father of the sociology of science asserts, unless the scientific truth-claim is consonant with observation and with previously confirmed knowledge, it cannot serve its goal of extending the certified knowledge already in existence (Merton, 1973). Indeed, as Egan and Henkle (1956, p. 143) so aptly put it "the intensive literature search at the beginning of a research project is intended to define the precise boundaries between the known and the unknown..." Also, the culture of science is such that no researcher wants to seem less than well versed in the body of knowledge accumulated in his or her areas of expertise, for, academics, extremely concerned as they are with their reputation, depend greatly on the recognition of their peers. Thus, scientists in any field depend on other scientists to provide information to enable them to proceed with their work, so that they can earn a good reputation, and at the same time they are being depended upon by other scientists for their good opinion of them (Garvey, 1976; Merton, 1973). If we add to these considerations the more pragmatic one of researchers' circumventing competitive duplication by being wholly cognisant of earlier findings on a subject and basing their work on what is already known (Becher, 1989; Egan and Henkle, 1956), there can remain very little doubt indeed that laying the information foundations of a scholarly exploration is a key purpose of research information work.

As central as this basing a scholarly investigation on solid information foundations undoubtedly is, apparently it is not necessarily seen as accumulating all the publications existing on a subject, not even as an ideal goal to aspire to. As it has already been noted, on the individual level Wilson (1995) sees the practice of intentionally ignoring some of the information known to exist on a subject as a routine and normal strategy of contemporary research work, aimed at coping with the problem of information overload. However, on the group level there are variant views held on the possibility, since work practices of researchers stem from the very nature of the way knowledge grows in each of the knowledge domains. Harking back to the salient works on the subject, repeatedly cited in subsequent publications (Brittain, 1979; Budd, 1989; Line, 1969, 1973; Meadows, 1974; Stone, 1982; Wiberley and Jones, 1994), a picture of diverse needs emerges. Thus, since in the sciences each new increment to the existing body of knowledge is incorporated in subsequent works, researchers' need for past literature is more limited.



Indeed, Ellis et al. (1993) report that large scale retrospective searching does not seem to be characteristic of the information seeking activities of physicists, except for purposes of familiarisation when it is deemed to be necessary at the outset of work in a new or unfamiliar subject area. Conforming to these time-honoured patterns, the scientist participants in the present study are the least likely to try and locate all the knowledge to be had on their subjects when they embark on a new research project, although as many as two thirds of them do perform a thorough literature review at this stage. In comparison, since in the humanities one discovery is not necessarily the result of a prior one and will not necessarily lead to a later one, that is, information is not subsumed in later works, access to retrospective literature is of vital importance to the humanists. Therefore, humanists aim at gaining access to full coverage of the knowledge accumulated on a given topic, although as Green (2000) points out, since they often seek to add new knowledge to an area in which they are already knowledgeable and in which they have developed a close familiarity with the literature, their literature review prior to embarking on a new investigation may necessitate no more than locating the latest pertinent developments. Still, lending support to their propensity to amass as much of the information available on a subject as possible, the humanist informants in this study show the greatest inclination to try and locate all the knowledge to be had on their subjects, with their clear majority (85 percent) attesting to habitually doing so. And finally, very much in line with Line's observation (1969, 1973) that information needs in the social sciences fall somewhere between the humanities and the sciences, as a result of the social sciences' depending on, and drawing from, both the sciences and the humanities, the social scientists among the participants in the present study position themselves almost exactly halfway between their scientist and humanist colleagues with regard to the need to assemble the relevant literature on the eve of a new research project: 75 percent of the social scientists, compared to the above-noted 66 percent of the scientists, on the one hand, and 85 percent of the humanists, on the other, say they always or often do so. This is hardly surprising, for research in the social sciences, whilst often based on current data and information, heavily relies on past research findings and evidence accumulated, too, since different theories, which cannot be supported by experimentation and scientific verification, co-exist in the accepted body of knowledge of the subject area.

Furthermore, the younger researchers are more likely to perform a thorough literature review in preparation for a new research project, with about ten percent more of them professing to do so, compared to their more senior counterparts. Only natural, of course: with the passing of time researchers' familiarity with their chosen fields and their confidence in their own stores of knowledge are bound to allow them to pay less attention to other people's work. Thus, although surveying the literature on the eve of a new research project may not mean exactly the same for scientists, social scientists and humanists in terms of scope and retrospective coverage, it is invariably the younger researchers who are more inclined to take a broader view of the task.

To sum up, in reply to the question posed at the outset of this study, as to the key purposes and functions to which information is put in contemporary research work:



**The first of the previously identified key purposes and functions to which information is put in research work, reviewing the existing knowledge on a given topic, has retained its centrality in contemporary scholarship. Researchers, especially as beginners, tend to perform a thorough literature survey upon embarking on a new investigation; even humanists, who are likely to find much of the information already well known, will do so.**

## **6.2.2 Reviewing the Existing Knowledge on a Given Topic: Current Practices of Scholarly Bricklaying**

The present inquiry has already considered the way in which researchers rely on information in their scholarly endeavours, emphasising that researchers' ability to contribute to the advancement of human knowledge is contingent upon their continuous dialogue with their predecessors and peers. In fact, Palmer and Neumann (2002), building on the work of Bruno Latour (1987) describe the creation of knowledge as the process whereby information is gathered, received, acted on, and finally converted through the making of alignments of interests in its compositions into new facts. Harnad's (1992, pp. 58-59) words encapsulate this notion in an especially apt fashion:

"...surely the motive of the true scholar/scientist is to advance human inquiry. And, just as surely, such an enterprise is and always has been a collective, cumulative and collaborative one: Scholars publish in order to inform their peers of their findings and, equally important, to be informed by them in turn, to interact with them, in the cycles of reciprocal influence that constitute an evolving body of scholarly research. In a word, the purpose of scholarly publication is communication – with peers and for posterity..."

Indeed, all productive researchers read, analyse and cite past and present scholarly information of relevance to their own, which they obtain either through formal channels, which carry information that is public and remains in permanent storage, or informal channels, which carry information that is for restricted audiences and whose storage is relatively temporary (Garvey and Griffith, 1972). However, as the fifty-year old tradition of research on the subject has indubitably established, scholars' information behaviour is more often than not discipline-specific. The contemporary scholars' paths of inquiry, presented here in the context of laying down the information foundations of a new research project, by and large concur with the patterns of research associated information work practices in the different disciplines, as they have been delineated in the chapter reviewing the literature of pertinence to the present undertaking.

### **6.2.2.1 Journal versus Monograph Orientation in Researchers' Information Work**

As Tenopir and King (2000) assert on the basis of a host of studies conducted over the last four decades, scholarly reading is as strong as ever, if not increasing, in all work fields. Further to that, journal literature is still a major information source for researchers, fulfilling, amongst its other functions, a vital role in assembling the information base of a research endeavour, too. Wholly underscoring this state of affairs, the researchers participating in the present study definitely put journal articles to good use as their opening gambit when they set out to review the literature on a topic: only a negligible 3 percent of them attest to never turning to journals for the purpose, whereas more than half of them say they always or

often do. However, this is not to say that they consider journals the only suitable source for meeting this specific information need; in fact, only a quarter of the study informants say they do, whereas close to half of them testify to the contrary. Moreover, with about a third of the informants reporting that at times they favour journals for preparing the information background of a new research project, but at times they do not, it is obviously indicated that some researchers have more than one preferred way of tackling the task.

Indeed, monograph literature is also utilised for laying the information foundations of a research project, if obviously commanding a more reserved attitude: only about a fifth of the study informants consider books central for the purpose, whereas more than two fifths do not. In any case, quite a few (about a third) of the researchers say that they opt for books at least at times when setting out to assemble the information foundations of a new research project, lending further support to the above-noted possibility that researchers utilise more than one information strategy for the purpose.

However, the present findings on the journal versus monograph orientation in scholarly information seeking certainly prove yet again that scholars' information behaviour is discipline-specific. Previous research has of course long since shown it to be the case: science researchers have been found to rely on journal articles in both print and electronic forms for meeting their information needs, and to have limited use for monographs, although they do often turn to handbooks or textbooks when they need to brush up on the basics of their fields (Bebout et al., 1975; Hurych, 1986; Palmer and Neumann, 2002; Skelton, 1973; Talja and Maula, 2003; Tenopir and King, 2002; Voorbij, 1999). By way of contrast, humanities researchers have been found to focus in their information seeking on monographs more than on journals (Brockman et al. 2001; Garfield, 1980; Palmer and Neumann, 2002; Stone, 1982; Tibbo, 1994; Watson-Boone, 1994; Weintraub, 1980). And finally, social scientists have been shown to appreciate both monograph and journal literature almost to a similar extent, perhaps with a slight edge to journals over books as information sources (Bebout et al., 1975; Ellis, 1993; Folster, 1989, 1995; Guttsman, 1966; Hurych, 1986; Line, 1971a, 1971b, 1973; Skelton, 1973; Stenstrom and McBride, 1979; Tenopir and King, 2000). Very interestingly, indeed, the data gleaned in this study reveal that whereas scientists and social scientists do continue to follow the familiar patterns characterising their respective disciplinary cultures in their choices of information sources, humanists may no longer invariably take the well-trodden paths held to be characteristic of their information behaviour in this respect, at least not as resolutely as previous studies indicate. Not that we are talking here of a complete volte-face: it can hardly be expected to be forthcoming, considering that the basic dissimilarities among the disciplines concerning the role fulfilled by books, as compared to journal articles, stem from the aforementioned different nature of the scholarship characteristic to the sciences, on the one hand, and the humanities, on the other. As it has already been expounded upon, science literature is summative (to use the expression coined by Watson-Boone, 1994): that is, the data generated over time are systematically incorporated into the body of scientific knowledge. Thus, where the findings of previous generations of scientists are still relevant, they are part of the building blocks of science, and as such, they are acquired by novice scientists as part of their socialisation to the field. If need be, these basics of a scientific knowledge domain are readily available in textbooks, treatises, handbooks, etc., but they are of interest to scientists only when they branch out to wholly new knowledge domains; when they go about exploring issues in their 'normal' areas



of interest, they mainly need journal articles for learning of the new developments in their fields. In comparison, since the literature of the humanities is cumulative rather than successive in nature (again resorting to the terminology of Watson-Boone, 1994), that is, recent material may or may not include or build on a previous body of knowledge, humanists need monographs, as these alone can afford the necessary broad view of a topic (Brittain, 1979; Garfield, 1980; Line, 1973; Stone, 1982; Watson-Boone, 1994; Weil, 1973; Weintraub, 1980). True, Watson-Boone (1994), building on the journal analyses of Stern (1983), Cullars (1985) and Budd (1986), has already pointed out that although books definitely play a greater role in humanities scholarship than do journals, the researcher may use a greater or lesser percentage of articles, contingent on the subjects and periods covered by the research topic. Still, findings of the present undertaking indicate that a more fundamental change in humanists' use of journal literature may be on the horizon.

For one, with approximately half of the researchers in each of the three disciplinary groups pointing to journal literature as the starting point for assembling the information accumulated on a subject, there seems to be a noteworthy measure of accord among researchers on the advisability of the practice. Furthermore, although humanities researchers leave no doubt as to their reluctance to restrict their information gathering to journal articles when preparing the information basis of a new research project, with less than a tenth of them favouring the notion, compared to about almost four tenths of their scientist and three tenths of their social scientist colleagues, nevertheless only about a third of them voice a preference for monographs for the purpose. True, the data leave no doubt that by far more of them consider monographs more important for assembling the information foundations of a topic than their counterparts from the other disciplines, but, contrary to previous findings-based expectations, it is not their overwhelming majority either who seem to rely mostly, or at least as their opening gambit on books. This evidence of humanists' attaching somewhat less value to monographs, while at the same time showing a growing appreciation of journal articles may be taken to signal the possibility that the prevalent assumptions concerning their preferences for information sources should be tempered. Perhaps unavoidably: humanists' greater readiness to look to journal articles may be part and parcel of the new ways researchers seem to have found in order to cope with the abundance of available information, for, obviously, journals offer information in a more focussed, even compact format. Also, the move may be dictated by the changing circumstances of the scholarly enterprise: academic libraries' channelling the lion's share of their acquisitions budgets to the Sisyphean task of trying to keep up with the skyrocketing prices of the proliferating numbers of serials has been reported to result in the 'death' of the scholarly monograph in the humanities (Magner, 2000). True, Thompson (2002) finds in her study into humanists' preferred and emerging formats of publication that the scholarly monograph is still a most significant vehicle for scholarly communication in their fields; in fact, she argues that although journal articles do form an important aspect of humanities research, they are definitely no substitutes for monographs. However, as she concludes in her survey of the literature on the subject, since libraries have smaller and smaller funds available for the acquisition of non-serial publications, the emphasis in humanities publishing has indeed been shifting from monograph literature to journal literature. Thus, today's humanists may not have much of a choice but to increasingly turn for information to the latter too.



This pattern of greater reliance on journals, juxtaposed with a lessening need for monographs, re-emerges in the data gleaned for the present study when examined through the prism of the researchers' age. Thus, almost two thirds of the younger informants begin the work on a new research project by first locating the pertinent journal articles, compared to half of the researchers in each of the two older groups. Also, a third of the former, compared to a fifth of the latter report to only use journals for assembling the information needed at the outset of a new research project. Correspondingly, the centrality of books as information sources is more pronounced for the older researchers than for their younger colleagues: whereas about a quarter of the former testify to habitually focussing on books when reviewing the knowledge accumulated on a subject, the percentage of the latter who hold the same views only comes to 15 percent. It seems then that on the whole the younger the researchers, the more preference they show for journal literature, and the less for monographs, at least for purposes of laying the information foundations of a research project. Possibly, here again the explanation lies in contemporary researchers' greater need to cope with the abundance of information at their disposal: when the pressures characteristic of the beginning stages of an academic's career dictate a very intense pace of progress, they may be more inclined to turn to the more focussed information to be found in journal articles than to monographs.

However, although the sample limitations of the present study foreclose the possibility of coming to definitive conclusions on this, it seems indicated that in point of fact the above-discerned pattern of a diminishing need for monographs may only be true of the humanists, and to a somewhat lesser extent of the social scientists, but not of the scientists. Thus, whilst humanities researchers are still more inclined than their social scientist, and certainly more than their scientist colleagues to base their information gathering on the eve of a new research project on books, clearly the younger among them are not as keen to do so as their older counterparts. For example, whereas 63 percent of the over 61s among the humanist informants for the present study say that they mostly need books when they want to review the knowledge accumulated on a subject, only 38 percent of the 45 – 60s and 10 percent of the under 44s express the same views. At the same time, the scientists, who express the least need for books for reviewing the knowledge accumulated on a subject, seem to need books less and less with age, to the point where none of the over 61s among them profess to any need for monograph literature for the purpose.

That it should be the case may not, however, come as all that much of a surprise: given the aforementioned inherently summative nature of science scholarship, it is very credible indeed that the more senior scientists would profess to less of a need for books than their younger colleagues; after all, they have long since mastered the nuts and bolts of their fields, and thus have limited use for books, which, in the sciences, contain mainly the basic information known on a given subject. In comparison, neither the seasoned, nor the novice humanities researchers can as a rule wholly circumvent the need to turn to books, since the cumulative or aggregative nature of the humanities body of knowledge dictates that scholars time and time again place their investigations in their wider context, going back for the purpose to the original texts rather than counting on the information being incorporated in subsequent works. Still, considering that researchers at the beginning stages of their academic careers are almost by definition greatly pressured for time, even the humanists among them are bound to be more likely to opt for 'shortcuts', that is, for the brief and more focussed presentation of information to be found in journal articles. No wonder then that the data presented here indicate that in the humanities the older researchers



show greater inclination to adhere to the dictates of the need for gaining a broad view of the topic under consideration, using monographs for the purpose, since they are not as pressured for time and can better afford to do so than their younger counterparts.

To sum up, in partial reply to the question posed at the outset of this study, as to today's researchers' ways and means of assembling the information base of a new investigation:

**The patterns of journal versus monograph orientation, as these are discernible in researchers' information seeking behaviour when laying the information foundations of a scholarly enquiry, testify to their choices of information sources having remained firmly embedded in the conventions traditionally associated with their respective disciplines. Still, whilst scientists continue to rely on journal articles and have limited use for monographs, and social scientists go on appreciating both monograph and journal literature almost to a similar extent, humanists, although still favouring monograph over journal literature, do demonstrate greater affinity for journals than traditionally attributed to them.**

#### **6.2.2.2 Journal Literature in an Electronic Era**

There can be little doubt then that the value of journal literature may vary in degree from researcher to researcher, but overall it remains a central resource for setting the information foundations of a scholarly endeavour. However, as more journal articles are accessible earlier, if not only, in electronic forms, via electronic journals or e-print servers, the question arises whether researchers value and readily use these electronic articles for the purpose, as much as they do the traditional ones.

The answer to the question is of course grounded in the wider issue of the move to electronic scholarship, extensively surveyed in Herman (2001b), reprinted in Appendix 3. Many of the studies into the impact of IT-based resources on scholarly work practices (see, for example, Adams and Bonk, 1995; Bayer and Jahoda, 1981; Bruce, 1998; Erens, 1996; Folster, 1989; Frost, 1987; Heeks, 1987; Horner and Thirlwall, 1988; Hurych, 1986; Lazinger et al., 1997; Liebscher et al., 1997; Pullinger, 1999; Raben and Burton, 1981; Rowland, 1982; Starkweather and Wallin, 1999) proceed from the notion that the move to electronic scholarship is just a matter of time across all disciplines. Proponents of this view, as Kling and McKim (2000) explicate, typically conceptualise their vision in either one of two ways. Those who focus on the technical features of the various media maintain that all the novel electronic channels are essentially equally valuable in all disciplines; they all are said to reduce the costs of communication, expand the range of people and locations from which materials are accessible, and generally speed communications. As scholars in all scientific fields work with data, and communicate both formally and informally with other scholars, all of these electronic media forums should be adopted and used fairly uniformly. Perhaps, promoters of this stance suggest, it is an inescapable imperative even, for the adoption of various electronic communications forums in science and scholarship can be viewed as simply a small part of a much larger technologising force sweeping over society. Others of the same

mindset employ an evolutionary approach: since various fields, through somewhat random experimentation, have developed a series of electronic communication forums, soon we should expect scholars of all fields to adapt these successful discoveries to enhance their communications. Thus, it is simply a matter of time – perhaps simply a matter of waiting for today's Internet-savvy students to become working scientists – before academics of various fields will catch-up with those among their colleagues, who are already on the leading edge of an inexorable trend. True, so the reasoning goes in such analyses, first some basic problems need to be resolved, from lack of access, lack of awareness to the existence of electronic sources, lack of computer skills, lack of user friendliness of some IT based systems, to the especially knotty issue of academics' conservative attitudes. Also, humanists, popularly assumed to be technophobes, might take longer until they too 'see the light' (Crawford, 1986; Saule, 1992; Shreeves, 1992; Stone, 1982; Lougee et al., 1990; Tomney and Burton, 1998). Still, for those proceeding from this standpoint there seems to be little doubt as to the final outcome: all are bound to realise sooner or later that the advantages of electronic information work (ease, speed, convenience, etc.) are well-worth the effort of converting to IT based practices.

However, subsequent studies conducted from a social informatics viewpoint suggest that it is the idiosyncratic nature of the scholarly undertaking in the different knowledge domains which determines the extent to which electronic resources are utilised and the rate of their adoption, remonstrating that the move to novel information work practices is not just a matter of time (Covi, 1999; Covi, 2000; Fry, 2004; Kling and Covi, 1997; Kling and McKim, 2000; Mahe, 2003; Mahe et al., 2000; Talja and Maula, 2003; Walsh and Bayma, 1996a). Thus, looking at the developments from a social informatics perspective leads to the conclusion that the shaping of technology is highly specific to and emerges in reaction to the dynamic needs of particular communities.

Indeed, the specific case of electronic journal acceptance (where e-journal is defined in its widest sense, as a publication distributed either solely in electronic form, or in both print and electronic forms) seems to indicate that disciplinary-rooted differences in work practices greatly affect the extent to which electronic technologies are utilised by researchers, even as overall the trend of harnessing novel IT-based solutions both in academe and society on the whole increases. Not that this state of affairs could have been foreseen at the outset; in fact, blaming the failure of the first refereed e-journals on the general lack of readiness in academia of the 1970's and 1980's made much sense at the time. After all, the then still prevalent lack of computer literacy characterising academic researchers, on the one hand, and the rampant technical shortcomings of hardware, software, technological infrastructure and networks, on the other, could and did account for much of the wary reception accorded across the board to the electronic journal in the first decade or two after its inception (Bradley, 1998; McKnight, 1997; Peek and Pomerantz, 1998; Rowland et al., 1997).

However, with time wide availability of computers and convenient network accessibility became the rule in academia (at least in the Western world), and concurrently researchers, inclusive of the humanists among them, grew to appreciate the potential advantages of IT-based resources and services. For, plainly, the electronic journal does hold substantial advantages for the researcher, both as author and as reader of scientific articles, such as immediacy of publishing, easy accessibility, sophisticated searching and



browsing capabilities and hypertext linking. And yet, to this very day, the acceptance of the electronic journal is very far indeed from being normative in academe, a phenomenon attributed time and time again in the various studies to researchers' lack of trust in the quality and reliability of the information therein, a notion which, as it will be shown later on, clearly emerges from the present study too. Still, the rate of e-journal appropriation in academe seems to be above all discipline contingent, with scientists indisputably leading the way, and humanists (at least for the time being) still lagging behind (Bancroft et al., 1998; Bonthron et al., 2003; Brennan et al., 2002; Budd and Connaway, 1997; Gomes and Meadows, 1999; Lenares, 1999; McKnight, 1997; Peek and Pomerantz, 1998; Rowland et al., 1997; Speier et al., 1999; Tomney and Burton, 1998; Voorbij, 1999; Zhang, 1999).

Indeed, the data gleaned in the present study on patterns of researchers' e-journal use in general, and for the purpose of assembling the information background of a new investigation, in particular, concur with the above-cited findings from previous work on the subject. On the whole, researchers apparently tend to turn to the print-journal rather than to the electronic publication, be it the digital version of the traditional periodical or a 'pure' e-journal: 44 percent of the informants refrain from setting out to gather the journal articles for a literature survey via the Internet, on the assumption, whether correct or erroneous, that they will find the journals pertaining to their areas of inquiry there, which is precisely twice the share of those who do opt for this route, 22 percent.

However, in fact the inter-disciplinary differences concerning the option of turning to the journal literature on the Internet for assembling the information base of a research project are too marked to allow talking of generic practices of a 'characteristic researcher'. Thus, lending support to the patterns of use consistently arising from the above-reviewed literature, the scientists in the present study are twice as likely as their social scientist colleagues to turn to e-journals, and twenty-five times (!) more likely to do so than their humanist colleagues, of whom only 24 and 2 percent, respectively, say that the practice reflects their ways. Still, it is important to note here that although the scientists clearly favour the practice much more than their social scientist and humanist counterparts, of them too no more than a half habitually opt for e-journals as their opening gambit in gathering the necessary information on the eve of a new project.

However, contrary to expectations, based on popularly held notions as to the greater propensity towards all things electronic among the generation born into the realities of the information society, but also on previous studies (Laribee and Lorber, 1994; Fiscella and Proctor, 1995; Applebee et al., 1997; Lazinger et al., 1997; Vander Meer et al., 1997; Tomney and Burton, 1998; Maughan, 1999; Milne, 1999; Zhang, 1999), in the specific case of utilising e-journal articles for preparing a literature review findings of the present study do not point to very clear discrepancies between younger and more seasoned researchers: true, among the scientists only about a third of the oldest group of researchers favour the practice, as opposed to two thirds of both the middle and the youngest age group, but among the humanists or the social scientists researchers of all ages seem to agree on the issue of turning to the Internet in search of journals for the purpose of laying the information foundations of a new research. This finding, although flying in the face of popularly held notions, is less surprising when considered in the light of Covi's (2000) study, which explores the possibility that doctoral students, who introduce new electronic practices

they 'grew up with' into university research, change the ways scholars work. Apparently, her findings in fact "debunk the myth of the Nintendo generation", since the students' work practices reinforce existing patterns of work and resource use in their disciplines. Using the same line of reasoning to explain the picture of e-journal use for the purposes of assembling the information base of an inquiry, as it emerges from the present undertaking, the evident uniformity among researchers of different ages in a given discipline may very well be the result of the younger researchers' mimicking the established electronic communication patterns and resource usage habits of their elders. Thus, in the sciences, with their renowned propensity for electronic scholarship, the younger generation of researchers will happily apply in their work the skills they have been familiar with since childhood, whereas in the social sciences, and even more markedly in the humanities the young researchers will not be as receptive to electronic work practices, but in each case the young are no more (or at least not much more) favourably disposed towards e-journals than their more senior counterparts.

To sum up, in further reply to the question posed at the outset of this study, as to today's researchers' ways and means of assembling the information base of a new investigation:

**On the whole, when assembling the information base of a scholarly inquiry, researchers tend to turn to the print-journal rather than to the electronic publication, be it the digital version of the traditional periodical or a 'pure' e-journal. Nevertheless, scientists and (to a lesser extent, but still) social scientists are more likely than humanists to start out with the journal literature on the Internet for assembling the information base of a research project, and in each case the young are no more (or at least not much more) favourably disposed towards e-journals than their more senior counterparts.**

### **6.2.2.3 Shortcut Measures in Research Associated Information Work**

In addition to the two main sources of information utilised in the scholarly endeavour, the journal and the monograph, researchers have at their disposal the shortcut measure of relying on a few pages long summary of the knowledge accumulated on a subject for laying the foundations of a new investigation. Interestingly, although the hectic pace of life often characterising the realities of scholarly life has been leaving its mark on researchers' work practices, in general (Thorngate, 1988; 1990), and on their information seeking behaviour, in particular (Adams and Bonk, 1995; Barry and Squires, 1995; Wiberley and Jones, 2000), it does not seem to have resulted in their making do with review articles or extensive literature surveys, of the kind usually found in Ph.D. theses or textbooks, instead of reading the original publications. Although obviously of considerable time-saving capabilities, findings of the present study nevertheless indicate that these conveniently available state-of-the-art summaries are held in very low esteem indeed for assembling the information base of a new research project: no more than a fifth of the informants testify to beginning the work on setting up the information background of a new project by resorting to them.



Not that any such synopses of the research developments could reasonably be expected to be utilised equally across the different knowledge domains in any case, given the inherent differences in the manner whereby previous research is incorporated in subsequent investigations in the sciences, on the one hand, and the humanities, on the other. As Green (2000), building on the work of Stoan (1984), points out, in the sciences a publication *reports the results* of one's research, whereas in the humanities *it is the result* of one's research. Therefore, she contends, in the sciences one reads to discover the outcome of somebody else's research, whereas in the humanities, for retracing the discovery and analysis at the core of the research, that is, for all practical purposes, to participate in the research process, albeit secondhand. If so, then plainly an extensive literature survey or review article, which, aiming at presenting the state-of-the-art in a given subject area, focus mainly on results of recent research conducted, can hardly do for laying the information foundations of a new humanities exploration.

However, it should come handy for the researchers in the sciences and in the 'harder' areas of the social sciences. After all, as it has already been observed, not only do they, and in particular the younger researchers among them, often work under considerable greater time pressure than their humanist counterparts (Becher, 1989; Sweetland, 1992), but also, according to Green's (2000) distinction, for them it should be definitely feasible to do so: if in the sciences (and in the 'harder' areas of the social sciences, too) the literature is mainly needed to learn of the results of previous work done, a review article should serve the purpose very well indeed, especially in view of the typically concrete and tangible nature of the findings reported.

Indeed, although across the disciplines the informants for the present study attest to an almost equal measure of limited affinity for reviews of the information on a given topic, with 17 percent of humanities researchers reporting use of this shortcut option, almost as much as their colleagues in the other two disciplines (20 percent each), a more differential pattern emerges when the age of the researchers is also taken into consideration. Apparently, if only to the extent of pointers to trends that the analysis concurrently by age and by discipline of the data gleaned in the present study allows for, based as it is on limited samples, the younger scientists clearly seem more likely to utilise a shortcut measure for setting up the information base of a new inquiry than their social scientist or humanist counterparts, with a third of the former, compared to about a fifth of each of the latter holding with the practice. It may very well be then that the review article serves the needs of the novice researchers among the scientists particularly well: if in the sciences a good summary of advances made can suffice, it still comes most handy for those at the outset of their careers, who, as it has already been noted, work under greater time pressure. Still, the inclination to make do with a synopsis of the achievements on a topic tends to diminish with age even in the sciences: whereas 33 percent of the under 44s among the scientists testify to habitual use of review articles, 20 percent of the 45 – 60s and only 10 percent of the over 61s do so too.

To sum up, yet again in reply to the question posed at the outset of this study, as to today's researchers' ways and means of assembling the information base of a new investigation:



**The shortcut measure of utilising synopses of research developments (review articles and the like) is held in very low esteem indeed for assembling the information base of a new research project. Still, scientists, and (to a lesser extent, but still) social scientists are far more likely than humanists to make do with such shortcut measures, with the novice researchers across the disciplines manifesting greater likelihood of doing so than their more senior counterparts.**

#### **6.2.2.4 Turning to Peers for Assistance in Assembling the Information Base of a Research Endeavour**

Having seen researchers' preferences when they utilise formally recorded and communicated sources of information for setting up the information background of a new investigation, we can now proceed to that share of their information intake for the purpose, which comes to them informally, by way of direct communication with their peers. As it has already been noted, the importance accorded to the role that informally conveyed information plays in the research enterprise, especially in bringing to the attention of the scholarly community news about work in progress, cannot be overemphasised (Cronin, 1982; Garvey, 1979; Garvey and Gottfredson, 1976; Hurd, 1996; Menzel, 1964; Voigt, 1959). However, in the present context the point in need of clarification is the more specific one of the part played by informally transferred information when the researcher sets out to assemble the information base of a new scientific or scholarly undertaking.

As Voigt (1959) points out, meeting the need for performing a thorough literature search on the eve of a new investigation is dependent to a greater extent than meeting other research information needs on formal, recorded sources. In fact, he maintains, oral sources (as he refers throughout his article to information obtained via direct dialogue with other researchers) are of considerably less importance for the purpose than original research publications. Thinking very much along the same lines, Menzel (1964), too, observes that personal communication among scientists serves particularly often for obtaining news about pertinent work underway and for getting hold of detailed information about apparatus and procedures (incidentally, this last point is challenged by the findings of the present study, as it will be shown further on in our discussion). Still, Voigt (1959) notes that researchers do depend upon each other for references to pertinent sources of information in their efforts to assemble the information base of an investigation, to which Menzel (1964) adds that this is especially true where researchers need information in fields with which they are not necessarily familiar. Interestingly, the findings of the present study concur with these observations, made some forty years ago, despite the great enhancements in communication opportunities since then.

Thus, according to the data accumulated in this undertaking, when researchers set out to prepare the information background of an investigation, neither the option of asking colleagues to recommend information sources nor the possibility of asking expert colleagues for the basic information pertaining to the subject seem to appeal to them, the latter even less than the former. Thus, whilst an almost equally low percent of the respondents, 23 and 21 respectively, rate both notions as always or often true of them,



61 percent testify that asking their peers for the information itself never or seldom reflects their ways, compared to 37 percent, who rate the option of asking for recommendations similarly. This seems to hold true for all researchers, regardless of their disciplinary affiliation or age, although among the humanists the degree of reluctance demonstrated is significantly more pronounced: while 31 percent of the scientist researchers and 35 percent of the social scientist researchers prefer not to turn to colleagues for recommendations on pertinent information sources, the corresponding percentage of the humanities researchers who hold the same views comes to 45 percent. By the same token, the possibility of asking an expert colleague for the information deemed necessary for setting up the information background of a topic clearly finds less favour among the humanities researchers: almost three quarters of this group say they never or seldom opt for this solution, compared to approximately half of the science and social science researchers. This is of course hardly surprising, given humanists' oft-cited inclination to work alone (see, for example: Stone, 1982; Weintraub, 1980; Wiberley and Jones, 1989, 1994), although as Brockman et al. (2001) point out, contrary to popularly held belief, humanities researchers do maintain collegial networks. In fact, Brockman and his colleagues assert that one of the main purposes of their doing so is the sharing of citations, especially to recent books or articles that may not yet be indexed or cited, although plainly it is not necessarily only in the context of preparing a literature survey. Still, turning to colleagues for advice on pertinent sources of information or some basic explanations, innocuous as it may sound, is apparently not wholly unproblematic even in disciplines which are more cooperation oriented than the humanities. After all, in competitive fields it may mean risking the researcher's priority in exploring a 'good' topic of investigation, a price which is hardly worth paying for acquiring some information, especially as there are other ways and means for doing so.

To sum up, rounding out the reply to the question posed at the outset of this study, as to today's researchers' ways and means of assembling the information base of a new investigation:

**When researchers set out to prepare the information background of an inquiry, it is not usually to their colleagues that they turn, be it for advice on pertinent sources of information or for explanations (the latter even less than the former). Still, scientists and social scientists are not as reluctant to do either as humanists.**

#### **6.2.2.5 Reference Chasing: The Mainstay of Setting up the Information Background of a New Scholarly Investigation – Or Is It?**

A key feature of the information seeking patterns of researchers, repeatedly identified as such in a host of studies (see for example: Ellis et al., 1993; Green, 2000; Hernon, 1982; Line, 1971a; Palmer and Neumann, 2002; Stenstrom and McBride, 1979; Stieg, 1981), is the time-honoured practice of reference chasing, also referred to in the literature as chaining/citation chaining or bibliographical tracing. In view of researchers' aforementioned preference for informal information gathering practices (Adams and Bonk, 1995; Line, 1971b; Stenstrom and McBride, 1979; Voigt, 1959; Stoen, 1984; Styvendele, 1977; Wood and Bower, 1969) this is only to be expected, as Green (2000, p. 202) asserts: "...study after study has

revealed that the regular information seeking of most scholars... favour informal techniques – footnote tracing from current literature, footnote tracing from review articles, following recommendations from colleagues, consulting one's personal collection or bibliographic files, browsing the library collection – over systematic use of the formal bibliographic apparatus". Indeed, findings of the present study attest yet again that this state of affairs continues to hold, at least in the context of information seeking in preparation for a new research project: less than about a fifth of the informants totally or mostly refrain from utilising the practice, compared to two fifths of them for whom it is always or often, and an additional two fifths for whom it is at least at times the technique of choice for the purpose.

Very interestingly, and definitely flying in the face of literature-based expectations, the humanities researchers of the present undertaking are considerably less enthusiastic about the possibility of tackling a literature survey by reference chasing than either their scientist or their social scientist colleagues: only a fifth of the former report to doing so always or often, as opposed to almost half of both of the latter. However, there is reason to this 'madness'; reference chasing, as it is described and analysed in the works of Green (2000) and Brockman et al. (2001) seems to fulfil a different role in the information work of humanities research than that of science or social science research, which can account for the disciplinary rooted disparities in its usability for the specific purpose of laying the information foundations of an investigation.

Apparently, in the sciences and the social sciences researchers use reference chasing simply as a convenient way to identify literature relevant to their own investigations (Ellis et al., 1993; Folster, 1989, 1995; Line, 1971a; Skelton, 1973; Stenstrom and McBride, 1979). As such, the technique is of course eminently suitable for assembling the information background of a topic on the eve of a new research undertaking. Not so, however, in the humanities. First of all, as Green (2000) suggests, humanities scholarship is characterised by the continuity of the researchers' work, that is, by their tendency to mine already productive research veins, in result of which they develop an in-depth familiarity with the literature of their areas of interest. Thus, unless they branch out to a wholly new area of interest, humanists do not really need to find the literature pertinent to a new project; so much so, that in the Getty End-User Online searching project humanities scholars were reported to be surprised and even amused when an online search turned up one or more relevant hits with which they were previously unfamiliar (Bates, 1996b). Furthermore, as Brockman et al. (2001) point out, humanities scholars establish a context for their research by reading widely, and the demand for such a context is what makes chaining so important for them, or in Green's (2000) words:

"... in citing a source a scholar indicates the construction of a link... [which] allows other scholars to retrace the process of discovery and to examine the merit of a scholar's writing. To some extent, then, citations within the literature of the humanities fulfil the same function as methodology sections do within the standard scientific report – to permit the reader to gauge the scholarly worthiness of the research results and, if desired, to duplicate them."

Or, as Brockman et al. (2001) put it: "It is not the simple fact of citation that is important but its placement... Chaining helps scholars maintain a conceptual network of the field into which they envision their own work being placed." Indeed, 'maintain', as opposed to, say, 'initiate', is the keyword for solving the riddle of humanists' seemingly greater reluctance to utilise reference chasing for laying the information foundations of a new project: plainly, the technique is very important indeed for humanities



scholars, but for purposes beyond the mere identifying of relevant items for setting up the information background of a research undertaking, which, apparently, they do not often need in any case.

To sum up, bringing to a close the reply to the question posed at the outset of this study, as to today's researchers' ways and means of assembling the information base of a new investigation:

**Scientists and social scientists are the more inclined to use reference chasing for laying the information foundations of a new project, considering it a convenient technique for identifying literature relevant to their own investigations. Humanists, however, being intimately familiar with the literature of their fields, use reference chaining for anchoring their own work in the conceptual network of the field rather than for identifying relevant literature.**

### **6.2.3 The Value of Keeping Abreast of Developments in Contemporary Scholarship**

As Wilson (1993b) suggests in his essay on maintaining currency, for the large class of knowledge workers, among whom he enumerates researchers in their capacity as knowledge producers, keeping up to date is a matter of the utmost gravity. The requirement to keep up with one's field is an ethical requirement, sometimes even dictated by the law, with social pressure reinforcing the demands of ethics and law: one does not want to appear to one's peers to be behind the times, because that is likely to expose one to contempt. There is a kind of 'logical' pressure involved, too: keeping up with the developments in one's fields is, of course, plain common sense, vital for practicing one's profession successfully. Also, since a knowledge worker's principal asset is likely to be his or her stock of specialised knowledge, his or her 'human capital', keeping up to date is in fact a form of self-preservation. "So", concludes Wilson, "for the knowledge worker currency is not an option but a requirement, a social requirement which one has the best of private reasons for meeting."

Indeed, academic researchers' vital need to gain awareness of current investigations in their fields has been established with the first groundbreaking investigations into research practices of academics (Garfield, 1980; Garvey et al., 1970; Garvey, 1979; Line, 1969, 1973; Stone, 1982). As Garvey and Gottfredson (1976, p. 166) explain:

"Since scientific progress is so much a matter of bringing to bear all information relevant to a problem, the research scientist is continually seeking information related to his own work. Failure on his part to be aware of some existing information in his field makes the progress of his work slower than its potential. Should some other scientist be privy to this information, he then has a potential advantage in making the contribution... Consequently, the active research scientist is constantly on the alert for scientific or technical information relevant to his ongoing or planned research..."

By now researchers' habitual following of the new developments in their areas of interest has become such a well known feature of scholarship that it is almost a commonplace. So much so, that works exploring different aspects of the scholarly endeavour often refer to the practice as one would to an axiom; apparently, it is so well established a fact that it requires hardly any elaboration when referred to. Findings of the present study, too, leave hardly any doubt that for researchers the centrality of keeping

current continues to hold: an overwhelming majority of the researchers, 91 percent, testify to consistently making every effort to keep up with the developments in their areas of interest. Also, not very surprisingly, the younger researchers are keener to keep current than their older colleagues, with 97 percent of the under 44s proclaiming the need to follow the developments in one's field, compared to 91 and 86 percent among those, respectively, who belong to the two older age groups (45 – 60 and 61 and over). This, of course, is only natural: the newcomers to academe can hardly afford to fail to take notice of the new developments in their fields; neither duplicating some work already done nor revealing ignorance could do much good to their budding careers.

Still, in matters of keeping up with the developments in one's field it has long been demonstrated that all researchers are definitely not created equal. Not that they differ as to the level of importance accorded to keeping abreast of new developments in their areas of interest; it is rather the concept of keeping up which differs from discipline to discipline, and in result, so does the pace of the activities aimed at attaining currency.

Indeed, the evidence gleaned in this investigation indicates that following the scholarly advances made in one's field is considered just as important a component of the information work associated with humanities and social sciences research, as that of sciences research: 94 percent of both the humanist and the social scientist participants in the present undertaking assert that they make every effort to keep current, which is even slightly more (!) than the 86 percent of the scientist informants who testify to holding the same views. This is of course more surprising with regard to humanists, who, as it has been noted, are held to be less concerned with keeping current, although in a recent 'state-of-art' study of how contemporary humanists work (Brockman et al., 2001) it is also suggested that the activities of keeping current and preparing to teach classes are an important complement to research and that the three types of work are perceived by humanists as inextricable and complementary.

However, there can be little doubt that 'making every effort to keep current' does not mean the same for the humanists, the social scientists, and the scientists. Scientists consider keeping current an ongoing task of great urgency, and no wonder: as their fast-moving fields are characterised by rapid changes, unless they are invariably up to date, they are liable to put in jeopardy the successful completion of their research efforts. For one, not realising that some research has already been done, they may repeat it, which in their case will not only be a waste of their energies and resources, but may also slow down their progress to the point of thwarting a claim to priority of a discovery (Becher, 1989; Garvey et al., 1970; Garvey, 1979; Price, 1986).

In comparison, although in the social sciences the overall nature and form of the practices of keeping up are no different from those of the sciences (Ellis, 1993), the social scientists can afford to adopt a more relaxed attitude to the need to maintain currency, since, as Line (1973) contends, the penalty for refraining from doing so is not as severe as in the case of the science researchers; with the circumstances of the typically empirical research projects of the social sciences differing from place to place and from time to time, it is not too likely that any findings would be discarded altogether because somebody else 'got there first'.



As to the humanist researchers - they are reported to be altogether complacent about the whole issue of keeping current, far less concerned than their scientist and even their social scientist colleagues with making sure that that no new contribution in their subjects escapes their attention immediately upon publication. Thus, although they too are mindful of the need to keep pace with new developments, they are believed to contentedly adopt an 'if not sooner, then later' (or even much later) frame of mind to the whole issue (Fulton, 1991; Stone, 1982; Wiberley and Jones, 1989). As it has already been noted, Stone (1982) links this relative tranquillity attributed to the humanities researchers, with regard to following the progress made in their areas of interest, to the nature of scholarship in the humanities: since the humanist researcher's innovative contribution to knowledge can consist of different perspectives or different understandings of the same work and might not present any new 'facts', awareness that others have worked or are working in the same field is less important; there is small chance of actual duplication occurring, and it may not matter much if it does, so long as each presents an original interpretation.

Garfield (1980, p. 43) uses a telling example to demonstrate the difference in the attitude of scientists and humanists to keeping up, which he traces back to the difference in scientific research and humanistic scholarship:

"If you were a scientist trying to discover the structure of DNA when Watson and Crick published their article on the double helix, there was nothing you could do but pick up your marbles and go home. The structure had been discovered; nothing more need be said; and scientists moved on from there. But if you are a music scholar preparing a monograph on Bach and a book on the composer comes out, you are of course interested, but you do not burn your manuscript. You know that no one (including yourself) will ever be able to say the last word about Bach and his music."

Arguing along the same lines, Sweetland (1992, pp.785-786) demonstrates that this is indeed how things actually are:

"With very few exceptions, humanists rarely need to get the latest breaking developments as soon as they happen. The difference between the humanities and sciences appears in two recent controversies. On the one hand, there is the case of 'cold fusion'. Announcement of this discovery was made without even the usual peer review because of its timeliness... On the other hand, there is the case of the Dead Sea Scrolls where complaints about delay in their release finally led to a 'bootleg' version after nearly forty years..."

Indeed, findings of the present study, too, indicate that not all researchers hold the task of keeping up in an equally high priority in terms of time and effort to be expended. On the whole, about half of the researchers see keeping current as an obligation to be performed at leisure; only about a fifth of them treat it as a taxing responsibility, to be attended to with religious fervour. Amidst these intimations of an overall not too pressured tempo of keeping up, the scientists are indeed clearly more inclined than the humanists or the social scientists to translate the need to stay abreast of the developments in their areas of expertise into painstaking, day-to-day work-practices aimed at ensuring that they learn of all progress made, as soon as it is made public. Still, the differences among the disciplines are not as marked as surmised: true, the percentage of the scientists who consider the task of staying current in need of unremitting attention is about twice as large as that of the social scientists and the humanists who attest to the same attitude (31 percent, compared to 14 and 19 percent, respectively), but it should be kept in mind that even among the scientists no more than a third think so. In the same vein, although only about a third of the scientists, compared to half each of the social scientists and humanists believe that announcements of new publications are to be attended to at leisure, findings of the present study indicate that in this

respect scientists do not differ from their social scientist, and even from their humanist colleagues to the extent that previous studies would have us believe.

Also, findings of the present study leave no doubt that age (and with it typically also academic seniority) has a noteworthy effect on researchers' perceived need to keep current: whereas only 14 and 13 percent of the two older age groups consider keeping up an activity which needs to be attended to almost with religious fervour, the percentage of the researchers in the youngest age group is three times as high: 39 percent; by the same token, if to a less pronounced degree, whilst 57 percent of the over 61s and 52 percent of the 45 – 60s among the researchers assert that it is quite acceptable to put new publications aside 'for a week or two, a month even', only 41 percent of the under 44s find so too. This is hardly unexpected, of course, given that novice researchers obviously need to follow more closely the advancements made in their areas. After all, appearing less than well-versed in their own specialities could mean for them the difference between getting accepted in their professional circles or not, one hurdle which the veterans had probably long since overcome. Indeed, it is quite clear from the present data that across all three disciplines the younger the researchers, the more prepared they are to invest time and effort in keeping current.

To sum up, in reply to the question posed at the outset of this study, as to the key purposes and functions to which information is put in contemporary research work:

**The second of the previously identified key purposes and functions to which information is put in research work, keeping abreast of new developments, has retained its centrality in contemporary scholarship. Researchers, especially as novices, are keen to maintain currency, with the intensity and frequency of their keeping up determined by the level of awareness to the work of others deemed necessary in their disciplinary milieu. Thus, scientists follow progress made conscientiously and proactively, though not necessarily zealously, as do social scientists, if to a lesser extent, and whilst humanists still manifest a more complacent attitude to it all, they, too, growingly monitor developments closely.**

Whether considered a task demanding very intensive attention or not, the centrality of keeping current thus definitely does not seem to be in any controversy among researchers. And yet, the greater convenience of keeping a finger on the pulse of the developments in an electronic environment has been thought liable to encourage more passivity in research, with current awareness services covering all the important work in a given area and delivering full text to the academics at their desks (Barry and Squires, 1995). Indeed, it is not an altogether inconceivable possibility, especially now that "the comfortable stereotype of humanists as technophobic is no longer accurate" (Wulf, 1995, p.48), and even among the humanists, not to mention the scientists and the social scientists, there is "a wide adoption of technology... in ways that are enhancing many of their traditional work practices" (Brockman et al., 2001). However, findings of the present study indicate that neither the ease of maintaining contact with



expert colleagues via e-mail or the ubiquitous listservs, nor the availability of current awareness services, which nowadays more often than not see to the delivery of full-text reports to researchers' desktops, have changed the resolute, proactive manner of their going about acquiring the information needed to keep current. Indeed, on the whole only 19 percent of the participants in this study profess to rely on the ease of maintaining contact with colleagues for gaining knowledge of new publications, rather than actively search for the information on their own, and, very much in line with the findings of Brennan et al. (2002), no more than a mere 15 percent count on current awareness services for the purpose. This last finding is all the more interesting, seeing that more than a third of the informants for the present study testify that they never or seldom find fault with these services, compared to 15 percent who always or often do: apparently, although researchers consider the service satisfactory as such, many of them still prefer not to use it for keeping up. Still, corroborating Brockman and his colleagues' observation that researchers' interest in current awareness speaks to the potential of new types of selective dissemination of information (SDI) services based on user-defined needs, the data gleaned in the present undertaking suggest that a personalised current awareness service, tailored to individual needs would be very welcome: a sizeable majority (84 percent) of the informants assert so, although obviously until such a service is actually put to practice, its usability is yet to be proven.

It seems then that researchers are quite reluctant to relinquish the responsibility for keeping up with the developments in their fields to their fellow researchers by depending on 'the system' or 'the grapevine' to notify them of new work either underway or out, with all that their professional ties are as close as they are, and the electronic communication techniques as expedient as they are. That researchers thus seem to be far from adopting a passive stance to learning of the developments in their fields is probably inevitable, and not only, as Wilson (1993b) contends, because for researchers keeping up is a personal responsibility. True, as he asserts, for researchers failure to keep up is not just failure to do what one would like to do or thinks it would be useful to do; it is failure to do what one is ethically and socially obliged to do, and even worse, failure to preserve one's stock of knowledge and skill. However, there appears to be another reason, inherent to the research enterprise, which, for the researchers, negates the possibility to lean back and wait for information to land on their desks: the need to interact with information in the unpredictable, serendipitous, idiosyncratic and very subjective manner, which alone can yield creative results. Thus, for example, as de Stricker (2002) so rightly points out, since the current awareness service users can only discover new information when it is related by text strings or codes to their stated interests, they cannot possibly rely on these services to keep them updated as to the developments in their areas of expertise.

However, while researchers of all disciplinary affiliations and ages present a manifestly united front with regard to the need to take proactive measures to ensure that all new information of potential relevance reaches them, they do differ on the benefits to be derived from the novel tools at their disposal for the purpose. It is hardly surprising, of course, given the disciplinary-rooted variations in research work.

Indeed, with their previously noted inclination to work alone, humanists' more manifest wariness of depending on peers for learning of progress made in their areas of interest, even in an era of markedly convenient electronic communication options, is perhaps inevitable. Furthermore, their relatively greater

reluctance to utilise IT based work methods may also bring about their less extensive use of e-mail or listservs for the purpose of keeping current. In contrast, the scientists and social scientists who, incidentally, seem to be very much of the same mind on the subject, are far greater fans of the practice of keeping current through maintaining close ties with colleagues: whereas half of the researchers in each of these two disciplinary groups learn of developments in their subject areas in this way, only a third of the humanists habitually do so, too. Very much along the same lines, the practice is deemed irrelevant by a negligible 3 percent of the scientists and no more than 18 percent of the social scientists, compared to 28 percent of the humanists.

The same pattern of disciplinary variance emerges from the data gathered in this study with regard to the increasingly more widely available current awareness/alerting services. Thus, entirely in line with previous findings on the subject (see, for example, Maughan, 1999; Quigley et al., 2002), humanists hold demonstrably less favourable views of these services than their social scientist, and certainly less than their scientist counterparts, not that even the latter (i.e. the scientists) are too enamoured with these tools. Still, the humanists are clearly the least taken with the alerting services: more than a third of them consider these services altogether irrelevant to their work habits, as compared to a fifth of their social scientist, and a negligible 3 percent of their scientist colleagues, who hold the same views. Also, with 27 percent of the humanists, compared to 34 percent of the social scientists and 56 percent of the scientists finding the current awareness services unproblematic, and hence – useful, their affinity for the practice is clearly the least marked of all disciplinary groups. In the particular instance of humanists' more hesitant approach to the novel alerting services may again be traceable to their relative dislike of IT-based work methods, but it seems to run deeper than that, as Wiberley and Jones (1989, p. 644) contend: "...because humanists have well-developed habits for finding information in their specializations, they have little need for current awareness services that inform them of the latest literature in their areas of expertise. While they are not adept at finding information on unfamiliar topics, they can locate on their own as much and sometimes more than they need to know in their areas of concentration."

To sum up, in reply to the question posed at the outset of this study, as to whether researchers have become less active in their foraging for information, now that they can rely on 'the system' or on the ease of maintaining contact with colleagues to deliver to their virtual doorsteps any relevant scientific material:

**Although the greater convenience of keeping a finger on the pulse of the developments in an electronic environment theoretically allows for more passivity in information work, researchers of all disciplinary affiliations and ages present a manifestly united front with regard to the need to take proactive measures to ensure that all new information of potential relevance reaches them. However, they do differ on the benefits to be derived from the novel tools at their disposal for the purpose: social scientists, but especially scientists are much more appreciative of the new opportunities for keeping current than humanists.**



#### **6.2.4 Solving Topical Problems Arising in the Course of a Research Project**

As it has already been noted, another key purpose of researchers' information seeking is the meeting of specific needs arising in the course of their work. It is, as Voigt (1959) explains, the need for some specific piece of information essential to the researchers' work, a bit of data, a method, the construction of a piece of apparatus, an equation, an explanation of an observation, which comes to them regularly in their work. Palmer and Neumann (2002) depict the humanities equivalent of this type of information need in pointing out that whilst humanists' projects often emphasise primary source materials, archival collections, or the writings of key authors or theorists, many other bits of information are also consulted as these core materials are assessed and studied. Indeed, Garvey et al. (1974) have shown that once a research project is on its way, researchers' information needs become more specific, shifting from the broad-spectrum information needed in the initial stages of a research endeavour for placing the investigation undertaken in proper context with other work on the subject, to particular pieces of information needed to solve specific problems. Very much in line with these over a quarter of a century old findings, the informants for the present investigation, too, point to the need for information for solving problems necessitating some fact finding or elucidation of issues, which typically crop up in the course of a research programme. Interestingly, they appear to take these occasional disruptions to workflow in their stride, either because they can still proceed with their investigations on the basis of an educated guess, which, they hope, will be proven valid once they get the information needed to do so, or because, involved as they habitually are in several stages of a project or in more than one project simultaneously (Garvey, 1979), they can always tackle another task awaiting their attention. It is also possible that they are simply accustomed to these interruptions, which in any case usually seem to pose easily solvable problems.

True, as it will be shown presently, researchers' definitions of what an easy solution to this problem may consist of seem to vary with the disciplinary culture within which they work, but generally speaking, they look to the literature to furnish them with the clarifications needed to get them out of the temporary dead-end they seem to find themselves in: three quarters of the participants in the present study opt for this venue. Thus, running counter to popularly held notions, dropping in (physically or virtually) on a colleague is not regarded as the preferred solution when the need for a piece of specific information arises in the midst of the work on a project: only about a third of the researchers turn to fellow scholars for the purpose, be it for requesting the answer itself or the publication containing the answer. Neither is performing a quick search on the Internet, commonly held to be convenient for fact-finding, apparently regarded as a prime option when a topical problem needs to be resolved: only 38 percent of the study participants favour it. Rather, it is resorting in a time-honoured fashion to the library for the purpose, which seems to be the real star: more than a third of the informants always (!) opt for turning to the library in these cases, and all in all, as many as three quarters of them habitually do so. With all the gloomy discussions over the past two or three decades of the impending demise of the library (most notably in: Lancaster, 1983; 1985; 1993, but also in: Lynch, 1998; Martin, 2000; Miller, 2002; Noam, 1997; Riggs, 2001; Sack, 1986), this certainly comes as a surprise, even if a closer look at the findings reveals that researchers' picking the library as their first choice when they need a piece of specific information in the midst of work on a project, although definitely true for a sizable majority of them, does not negate the use of other options as well, albeit to a lesser extent.



Still, the present study does seem to point to a disciplinary-specific pattern in the ways researchers choose to cope with the call for some specific information in the course of their work on a research endeavour, thereby filling a gap in our current knowledge of researchers' information behaviour. Actually, the question of how scientists (though not social scientists or humanists) go about meeting a need for some specific information has been looked into before: both Voigt (1959) and Menzel (1964), who focus in their work on scientists, assert that for this group of researchers much, and probably most of the specific information required in the course of a research project is furnished by their colleagues. The findings of Garvey et al. (1974) also point to researchers' considering local colleagues and students as superior providers of information needed to solve topical problems, along the lines of selecting a design for data collection or planning some equipment or apparatus (in fact, these findings are probably true of social scientists, too, since both scientists and social scientists participate in their study). In addition, Palmer (1999) brings us up to date on the issue in pointing out that interdisciplinary scientists tend to rely on electronic databases for finding information about 'something specific'. However, previous literature does not seem to provide explicit answers to the question of how scientists go about tackling the problem and no inkling at all how social scientists and humanists do so. True, Line (1971a), reporting on his extensive investigation into the information requirements of social scientists (INFROSS), does point out that some social scientists refer to the literature throughout the whole duration of a project, and that for this disciplinary group discussion, too, is likely to be a continuous process, contributing in various ways at all stages of a research being carried out, but this is hardly an adequate answer to the specific enquiry posed here. By the same token, although the literature on the information needs of the humanities researchers emphasises that they turn to the literature for a variety of purposes, including the one Brockman et al. (2001) call 'digging through piles of information looking for evidence', it leaves unanswered the question of humanists' preferred solution for meeting the information need arising when the researcher recognises the lack of some specific information. Hence, the findings presented here are rather interesting.

Apparently, when they set out to meet the need for a specific piece of information cropping up in the midst of an investigation, the information seeking behaviour of scientists and social scientists by and large reveal no great differences, whereas humanists seem to be in a class by themselves. True, social scientists are more like humanists in their testifying to a greater inclination than scientists to turn to the literature in search of answers to topical problems encountered: 80 percent of both the social scientists and the humanists, compared to 60 percent of the scientists attest to habitually doing so. However, with regard to the actual techniques they use for the purpose, no fundamental differences between their information seeking behaviour and that of the scientists can be seen in the data gleaned from the present study, at least in the particular instance of topical information needs. This concurs with the general drift of the findings of a host of previous studies, reviewed by Skelton (1973) and Folster (1995), and most notably with the conclusion Ellis et al. (1993) come to in their comparative study of these two disciplinary groups.

Thus, as the findings of the present undertaking reveal, both the science and the social science researchers single out turning to the library as their preferred venue when they need some specific information arising in the course of an investigation, with about two thirds of the informants in each group testifying to doing



so always, or at least often. They may be somewhat less enthusiastic advocates of the practice than their humanist colleagues, whose great majority (90 percent) opt for this particular solution, the scientists slightly even less than the social scientists, but there can be little doubt that they, too, do prefer it. However, it is important to note that unlike the humanists, scientists and social scientists utilise quite extensively other options of locating topical information needed as well. Approximately half of both the scientists and the social scientists search for the information they need on the Internet and almost as large a percentage in each of these groups also ask colleagues to send them a relevant publication, although both groups are somewhat more hesitant when it comes to actually consulting with a knowledgeable colleague for the purpose: 34 percent of the former and 38 percent of the latter testify to an affinity for the practice.

As to the humanist participants in the present undertaking, they undoubtedly demonstrate in no uncertain terms the widely acknowledged marked preference attributed to humanities researchers for meeting their information needs via the library. Indeed, the recurrent reference in the literature to 'the library as the humanist scholars' laboratory' is probably proof enough of its centrality for humanities research work, although the notion has been repeatedly confirmed in studies exploring the information work of humanists, too (reviewed in: Stone, 1982; Watson-Boone, 1994, and confirmed recently in two state-of-the-art investigations: Brockman et al., 2001; Palmer and Neumann, 2002). Thus, despite the above mentioned concern with the library's diminishing importance in an electronic environment, it hardly comes as a surprise that humanists give it a vote of confidence yet again, this time in the specific case of topical information needs. To be sure, as it has already been noted, their overwhelming majority choose to turn to the library even when their need is ostensibly more easily met through other options. After all, requesting help from a colleague or searching the Internet could leave them comfortably seated at their desks, and yet these possibilities are utilised to a rather more limited extent than going to the library. In fact, only about a fifth of them testify to opting for a search on the Internet or for requesting expert advice from a colleague, and no more than a tenth of them to asking for specific items to be sent to them. Of course, in addition to the very special place of the library in humanities scholarship, two additional factors seem to be at play here: humanists' aforementioned propensity to work alone and their relatively greater reluctance, yet to be discussed at more detail, to opt for the electronic alternative in their information work.

Another factor, which may be more specifically at the roots of humanists' clear-cut preference for seeking answers to topical questions in the library collection (perhaps in its widest sense, as augmented by inter-library loan services), can be identified by bringing together the characteristic feature of humanities information work Palmer and Neumann (2002) encapsulate as 'divergent paths of inquiry', and the limitations of the currently available electronic information sources, pointed out by Brockman et al. (2001). Apparently, when humanities scholars search for background information and evidence connected to the core of a project, their paths of inquiry typically resemble detective work, following leads to great lengths, in terms of both time and space. However, in many of the full-text and indexing products available in the humanities, the marginal and the esoteric are frequently ignored in favour of the canonical and the influential. This may provide the key to our understanding why humanists persist in turning to the library for bits of information needed as they proceed with their research endeavour: more often than not,



their investigations necessitate diverse information resources, lesser known primary documents or unusual approaches to secondary sources, which stand a better chance of readily being found in a traditional library.

Interestingly, the findings presented here point to age-related differences in the discipline-rooted information behaviour patterns discerned. Although the repeatedly cited sample limitations, which preclude the possibility of definite conclusions, are in place here too, the pattern which seems to be emerging is nevertheless quite unmistakable. Thus, across all three disciplines the younger researchers are not as likely to opt for the traditional solution of turning to the library as their older counterparts, when they encounter a need for some topical information. However, perhaps more surprisingly, it is only among the scientists that the young researchers demonstrate enthusiastic support of the possibility of searching for answers on the Internet; the young social scientists do not seem to hold more favourable views of the practice than their humanist counterparts. And finally, although not too popular an option, especially not among the humanists, who tend to work alone, picking a solution involving a fellow researcher is almost as prevalent among the younger researchers across all three disciplines as among their older, and therefore as a rule more senior counterparts, despite the possibility that in the case of the former their network of colleagues may not be as extensive.

To sum up, in reply to the question posed at the outset of this study, as to the key purposes and functions to which information is put in contemporary research work:

**The third of the previously identified key purposes and functions to which information is put in research work, solving topical problems arising in the midst of a project, is typical to present-day research endeavours, too. However, running counter to popularly held notions, dropping in (physically or virtually) on a colleague is not regarded as the preferred solution when the need for a piece of specific information crops up, especially not where humanists are concerned. Rather, researchers tend to turn to the library for the purpose, although they are increasingly likely to opt for a quick search on the Web, instead.**

### 6.2.5 Getting Ideas for a New Research

As Schwartz (1992) puts forward in his discussion of the factors differentiating significant from routine research, the processes that lead investigators to find and formulate problems of consequence seem to be defying the attempts at systematic analysis and description. Line (1971b), too, points out that research projects have a variety of origins, and whereas some scholars can state when and how their ideas for research develop, in the majority of cases the origin of the research is less definite. Obscure and intensely personal the manner of finding and formulating a scholarly problem thus it may be, but one of its more agreed upon features seems to be its reliance on information (Ziman, 1981; Brockman et al., 2001; Borgman, 1993). Inevitably so, for, as Podgorecki (1997, pp. 26-27) asserts, "scholarly creativity... depends not only on unprecedented quality of thought and output... but also... on explaining why its



point of view constitutes the most adequate understanding of the data pertaining to whatever aspect of reality with which it is concerned". Swanson (1979, p. 116), too, argues in the same vein: "The idea that one first chooses a subject or topic, gathers data, and then synthesizes a dissertation from the data is apparently ubiquitous, though seriously mistaken... The usefulness of the data [for recognizing a problem] lies solely in their potential for conflicting with the initially held theory. If there is no conceivable conflict, there is no problem, no thesis." Bernal (1959) also suggests that conceptual frameworks and theories are sought by researchers not only to be used, but also to provide inspiration, positively by extending them or negatively by criticising them; thus, it is the absence of information, the gaps in knowledge, which often provide the most fruitful impetus to new work. Indeed, as Schwartz (1992) observes, a basic step in the process of problem recognition and formulation is sorting out the old truths, main arguments, and underlying assumptions made by leading writers in the area of inquiry considered.

No wonder then that researchers seem to be acutely aware of the role of information as a fund of inspiration, as the source whence fresh ideas for a new scholarly endeavour may hopefully spark off. In consequence, they are constantly on the lookout for information, whether from formally published or informal sources, whether originating in written records or fellow researchers, through all parts and stages of the research process as well as their habitual professional activities (Borgman, 1993; Brockman et al., 2001; Ziman, 1981). Of course, these days this relentless search for the right problem to pursue has practical aspects to it, too. With the emphasis in university research moving away from free enquiry to problem solving within the framework of specific programmes funded by external agencies for defined purposes (Gibbons et al., 1994), the present-day academic is intent on identifying those researchable topics on which little has been done, in hopes of attracting research funding or a new market.

The present study, too, highlights the central role accorded to information in the detection of significant topics for a scholarly investigation. Thus, for example, when the value of formal, recorded information as a stimulating agent is probed, none of the participating researchers deny that the literature is source of inspiration for new investigations, and very few (5 percent) say that it only seldom serves them as such. This concurs with previous findings on the subject, such as that of a survey into the information seeking and communicating behaviour of academics at the University of Zululand, according to which reading is the undisputed major source for the generation of professional ideas (Ocholla, 1999; see also: Lumande and Mutshewa, 1999; Skelton, 1973). Still, looking for inspiration in the literature is apparently far from being the whole story: although about half of the informants for this study, across all disciplines and ages, acknowledge the stimulating function of the literature, a third of them consider it a source of novel ideas only at times. Hardly surprisingly, of course, seeing that there are other stores of information with potentially inspiring capabilities, most notably, as it has already been observed, one's colleagues.

Still, if the yet again reaffirmed importance of information as a research-inspiring agent is well-known, we seem to have rather vague notions as to whether this stimulation-seeking through information is a regularly carried out, intentional and focussed element in a researcher's professional pursuits, or perhaps, a serendipitous by-product of research associated information work. Previous findings do, however, provide the context within which the answer to the question needs to be sought. Bernal (1959) points out



that the kind of information of potential use as the first germ of a new research undertaking, namely theories and ideas, is best transmitted through original papers or personal contact. Palmer (1999) broadens the picture by identifying, as one of the information strategies serving interdisciplinary scientists, the practice she labels 'probing': akin to the practice of surveying, as described by Ellis (1993), if more investigative in nature, it is a way of becoming familiar with the literature in an area, among other purposes, for generating new ideas. Probing, according to Palmer (1999), may be either sweeping, that is, skimming through a wide range of materials hoping to latch onto insights, or directed, i.e., penetrating more deeply into a knowledge area, to gain an understanding how its ideas can be applied to one's work. In any case, it is "an intentional effort to change ideas and directions by searching or browsing in new domains" (p. 249). Shedding some more light on the issue, this time focussing on interdisciplinary humanities researchers, Palmer and her associate Neumann (2002) contend that the scholars they study prime for future discoveries: by working at maintaining a high level of interaction with a wide variety of information, they develop a state of preparedness for new discoveries, a conclusion, which, of course, echoes Pascal's well-known saying, 'surprise comes to the prepared mind'.

Findings of the present study, whilst very much in accord with the general drift of things emerging from these studies, focus on the specific issues of systematic versus serendipitous, literature-based versus personal communication-based information seeking for the purpose of unearthing new research topics.

On the whole, only about a third of the researchers report to be always or often on the lookout for potential research opportunities as they go about their scholarly activities, as a routine component of both their reading and communicating with colleagues, although about another third say they do so at least at times. However, the study participants deliberately and conscientiously track down likely topics for investigation. They do so mainly by setting out to scour the literature expressly for the purpose, a practice attested to by half of them as always or often true of their ways, and by another tenth as at times true, but also, if to a lesser extent, through brainstorming with colleagues (reported to always or often reflect the habits of a fifth, and at least at times of close to another fifth of the informants). Interestingly, when they utilise formally communicated information (monographs, journal articles, conference papers) for research inspiring ideas, more researchers tend to go about the task deliberately, with 49 percent of the informants habitually combing the literature for possible topics, as opposed to relying on the serendipitous discoveries of new ideas cited by 35 percent of the study participants. However, when researchers look to their network of professional associates for inspiring ideas, they are less inclined to go about it very purposely: whilst only 20 percent say they habitually look for a new research topic together with a colleague, 32 percent report that they are likely to come across new ideas in a casual conversation with a fellow scholar. Still, the demarking lines between these two modes of getting hold of inspiration-affording information (intentional versus serendipitous) may not be all that clear-cut. It is not inconceivable that the phenomenon Palmer and Neumann (2002) point to as characteristic of interdisciplinary humanities scholars in fact holds true for researchers in general: their accidental or fortuitous discoveries are prepared for systematically enough, for it is only the ongoing constructing and sustaining of a broad base of knowledge which can account for researchers' receptiveness to new ideas.



Still, as it so often seems to prove true where information needs and work-practices are concerned, researchers of different disciplinary affiliations do tend to differ in their stimulation-seeking. True, it is not invariably so, and their deliberately setting out to find a new research topics in the literature is a case in point: although reliance on written material and wide reading are more readily associated with humanities researchers, the science and social science researchers participating in the present undertaking are just as inclined to turn to the literature for the purpose as their humanist colleagues. Quite contrary to expectations, as it happens: in those specialties Becher (1989) calls 'urban', that is, in many areas of the sciences and the 'harder' end of the social sciences on Storer's (1967) continuum of the disciplines, which are characterised by intensive activity and at times cut-throat competition, deliberate inspiration seeking appears to be rather more called for. In comparison, the less hectic work pace of the 'rural' fields, that is, of the humanities and the 'softer' end of the social sciences, seems to allow more readily to leaving the unearthing of new problems to lucky chance. And yet, as it turns out, approximately half of the participants in the present study, across all disciplines, habitually scour the literature for topics of potential research value.

However, the commonality among the researchers as to their practices of lighting on new research topics stops here: the inadvertent acquisition of stimulating information through more or less formally published material varies among the disciplines. Very surprisingly indeed, although serendipitous information locating practices are more readily associated with the work habits of humanities researchers than those of their colleagues in other disciplines, and the more relaxed work pace in the humanities obviously allows for it more readily, the humanists among the informants for the present study are the least likely to rely on chance in their quest for information meant to spark off new topics of research. Only 20 percent of the humanities researchers, compared to 48 percent of the science researchers and 40 percent of the social science researchers testify that they come by research topics in this way.

By the same token, where the source of stimulating information is a fellow researcher, there is again very little difference between the scientists and the social scientists (a finding which, incidentally, concurs with previous findings, reviewed in Skelton, 1973), whilst the humanists are clearly in a class by themselves, both when the information is found in result of an intentional effort (say, by brainstorming with a colleague) to locate a 'good' research topic, and when it is stumbled upon by luck. This is perhaps not very surprising, given scientists' and social scientists' aforementioned far greater propensity to maintaining close professional ties, not to mention cooperate in research work with colleagues (Becher, 1989; Covi, 1999; Price, 1986; Stone, 1982; Weintraub, 1980; Wiberley and Jones, 1994), although Brockman et al. (2001) claim that previous research in this area has underestimated the importance of collaboration for humanists, citing the sharing of ideas as one of the instances of humanities scholars' turning to their colleagues. In any case, findings of the present study indicate that although some humanists do derive new ideas from information imparted to them by fellow researchers, they do so to a considerably lesser extent than their scientist and social scientist colleagues: only 13 percent of the former, compared to 31 and 48 percent, respectively, of the latter report that ideas for new research projects crop up in the course of their conversations with colleagues, and, in the same vein, a mere 6 percent of the former attest to habitually looking for research topics together with a colleague, compared to 35 and 23 percent, respectively, of the latter. Moreover, where the cooperative search for a research



topic is the precursor of collaborating with a colleague on a research project, it is deemed to be altogether irrelevant to more than a third of the humanist participants in the present study, compared to 11 and 14 percent, respectively, of the scientists and the social scientists. Obviously so: even Brockman et al. (2001) admit that humanities scholars do work alone, even if there is a social and collegial dimension to the solitary activity of their research.

To sum up, in reply to the question posed at the outset of this study, as to the key purposes and functions to which information is put in contemporary research work:

**The fourth of the previously identified key purposes and functions to which information is put in research work, getting ideas for a new research, has retained its centrality in contemporary scholarship. Indeed, researchers consider both formally and informally communicated information important sources of stimulus for a new scholarly endeavour. Thus, they all regularly set out to scour the literature for potential topics, although the scientists and (to a lesser extent, but still) the social scientists also rely considerably on serendipitous acquisition of research inspiring information, either from the literature or via colleagues.**

### **6.3 The Nature Aspect of Researchers' Information Needs and Practices**

Scholarly research, intent on querying every aspect of life on earth, per force involves the use of the whole range of information types in existence: theoretical, conceptual, empirical, historical, descriptive, factual, statistical and methodological. Needless to say, however, that the nature of the information required in scholarly work is subject-contingent, that is, the kind of information varies first and foremost with the subject matter of the research underway, inclusive of the disciplinary-conventions dictated approach taken to it. Indeed, if theoretical, conceptual, factual and methodological information is probably indispensable in any scholarly endeavour, regardless of its topic and the knowledge domain in which it is embedded, other types of information are on the whole reserved for specific disciplines. Thus, for example, historical information, so central for much of humanities research, will rarely, if ever be needed in scientific research. By the same token, statistical information, the bread and butter of most social sciences research, is more often than not quite uncalled for in both scientific and humanities scholarship. In fact, even when the same kind of information is needed, the extent of its utilisation by the researcher may vary from one discipline to another. Thus, for example, Garvey et al. (1974) find in their extensive studies of over 2000 sciences and social sciences researchers, that physical scientists more frequently need information to formulate technical solutions and to design equipment or apparatus, whereas social scientists are in greater need for information to select a design or strategy for data collection and to choose a data-analysis technique. Further to that, as it has already been discussed in the chapter reviewing previous literature pertinent to this investigation, since the activities associated with the successive steps of the 'typical' research process involve different kinds of mental processing, different kinds of information are required at the different stages. During the early stages, information serves as an



aid in the perception of the research problem and in the formulation of procedures appropriate to the inquiry; in the intermediate stages specific information, such as techniques and methods is needed; and in the final stages factual and descriptive information serves to integrate the new findings in the general body of scientific knowledge (Egan and Henkle, 1956; Garvey et al., 1974; Menzel, 1964).

### 6.3.1 Research Work Associated Needs for Specific Types of Information

It seems then that the nature of the information being sought is a crucial factor in ensuring that the answer found is truly relevant to the question asked: after all, when a researcher specifically needs one type of information, say, some statistics to prove a theoretical or conceptual point, his finding any other type of information on the subject most emphatically will not do. However, findings of the present study indicate that the type of information does not play the pivotal role in researchers' information seeking that it might conceivably do: more than a third of the informants rate the notion of setting out to look for a specific type of information as altogether irrelevant to them. Still, neither it is as marginal an aspect of their information work as the first impressions gleaned in the initial stage of the investigation seemed to suggest: close to half of the researchers do testify to habitually seeking information of a given type. However, here again, the practices reported are discipline-specific.

Quite clearly, the humanists, on the one hand, and the scientists and the social scientists, on the other, display two distinctive patterns of information behaviour when they set out to look for specific types of information. Thus, the percentage of the humanists who deem the practice of searching specifically for one type of information or another irrelevant to them is twice as high as that of their science and social science colleagues: whereas only a quarter of the scientist and social scientist informants find the possibility irrelevant to their needs, more than half of the humanities participants do so too. In the same vein, the percentage of the humanists who habitually search for particular kinds of information is half as high as that of their scientist and social scientist counterparts: only a quarter of the former do so, compared to half of each of the latter groups.

The discipline-specific information behaviour discerned here is hardly surprising in view of the distinct characteristics and fundamental differences in the nature of information seeking in the humanities, as against those of the sciences and the social sciences, amply studied in the past, most notably by Bates (1994; 1996a; 1996b), Bates et al. (1993; 1995), Siegfried et al. (1993), and Green (2000). One such feature, of particular bearing to the question under discussion, seems to be humanists' "more scattershot methods" (so dubbed by Bates, 1996a) of getting hold of information. As it has been previously noted, for the scientists and the social scientists to be able to contribute to the body of knowledge in their fields they only need to know the results of other people's work, that is, the essence of achievements attained in a given knowledge domain. Not so, however, where humanists are concerned: for them the ability to achieve progress depends on knowing the actual publications pertaining to their own work. As Bates (1996a) explains (pp. 698-699, emphasis in original):

"In the humanities, in a certain sense, the '*discoveries*' of research inhere in the writing of the ultimate published text. Research is done in libraries or archives, which is then written about in the resulting paper or book, just as the scientist does research in the laboratory that is reported in the resulting article, but there is a crucial difference between the two groups of researchers. In science, the discovery lies in the event(s) that took place in the laboratory or out in the field; the discovery does not lie in the writing up of the research. The map is not the territory; the original contribution is



*reported* in the research article, it is not *contained* in, it does not happen in the research article. In the humanities, the 'discovery' is not just in what is found in the papers and manuscripts in the archives, it is also how the scholar analyzes, extracts, and develops insights about the material, then pulls that all together into a seamless whole of exposition and meaning in the published result..."

The important consequence of this situation, as Bates (1996a) goes on to say, is that the humanist is intimately familiar with a large number of particular works, whilst the scientist and the social scientist know the research, but only a few of the particular articles published on it.

This state of affairs can account for the difference in the information seeking behaviour of the scientists and the social scientists, on the one hand, and humanists, on the other. Researchers in the sciences and the social sciences, well aware of the progress made in their fields, but unfamiliar with the details given in the actual publications, are more likely to set out to search for formal, published information with an explicit purpose in mind. In doing so they may focus on one aspect or other of their information needs, of which a given type of information may very well be one. In fact, as Kircz (1998) points out, not only do they initiate an information search aiming specifically to answer a query they have, but once they obtain a publication, which seems likely to furnish them with the desired information, they go on to extract from it the particular information they need. Thus, rather than following the whole line of the author's reasoning by reading the whole piece, they scan the text and shuffle it around, browsing the pool of available information for parts that supply the answers they are looking for.

In stark contrast, humanities researchers, striving to follow the progress made in their areas of interest, read both widely and deeply (Brockman et al., 2001). In the process they constantly gather information from a variety of sources, a bit at a time, here and there, following ever-shifting trails of investigations, a pattern Bates (1989) calls 'berrypicking' (seeing that it resembles picking huckleberries in the forest). Indeed, as it has already been mentioned, an intriguing finding in Bates and her colleagues' major study of humanities scholars at the Getty Information Institute was that the scholars studied were pleased to find something of value at all through bibliographic database searching. Apparently, considering themselves experts on their subjects of interest, they did not expect to come across anything not already know (Bates, 1996b). Plainly then, humanists would hardly be as likely as their scientist and social scientist colleagues to conduct systematic searches for information meant to provide answers for specific queries, of which setting out to locate a publication containing a particular type of information is certainly a prime example.

To sum up, in reply to the question posed at the outset of this study, as to researchers' need for specific types of information:

**The type of information does not play the pivotal role in researchers' information seeking it might conceivably do, but neither is it a wholly marginal an aspect of their information needs. However, it is scientists and social scientists, rather than humanists who habitually search for particular kinds of information.**



### **6.3.2 Access to Primary Material in an Electronic Environment**

Presenting the librarian's viewpoint regarding the impact of electronic information products and services on scholarly research, Manoff (1997) argues that the Internet is radically altering the kinds of materials available to researchers. Although freely acknowledging the existence of "a considerable amount of junk on the Internet", she nevertheless sees it as a mine of an "amazing breadth of material", which allows access to information "previously excluded from intellectual debate or material simply deemed unmarketable by commercial presses" (p. 5). Thinking much along the same lines, Linda McCann (interviewed in: McDermott, 1998), also a librarian, points out the ready accessibility on the Web to very useful primary materials, such as government documents, medical information, and business information. Pelzer and Wiese (2003), too, in their study of grey literature use in veterinary medicine, suggest that the introduction and success of new information technologies, such as the Internet, have been changing the elusive character of the primary sources of information dubbed 'grey' or 'fugitive' (non-commercial literature, which is produced by government, academies, business, and industries). As Cronin (1996, p. 165) sums it up: "...grey literature is no longer the step-child of primary publishing. The Web invites and envelops semi-published, unpublished and vanity items, blissfully unmindful of provenance or pedigree – grey becomes black and white on the World Wide Web." No wonder today's researchers expect primary information suppliers to provide a wide variety of Web linked material (Boyle et al., 1999).

However, improved availability of primary material via the Internet, and even researchers' expectations to find primary material on the Internet, do not necessarily mean that they actually set out to do so. Indeed, at least at first glance, findings of the present study seem to indicate a rather limited extent of enthusiasm among researchers concerning the notion: with only about a third of the informants for this study giving evidence that they find the Internet afforded, greatly enhanced access to primary information a welcome help in their research work, whilst a quarter say they never or seldom do, and a third consider the notion altogether irrelevant, the expediency of the practice seems far from being corroborated. Still, it is only at first glance; a closer look at the results reveals that here again the information behaviour of researchers differs with disciplinary affiliation and age. Thus, there are marked discipline-specific variations even among the researchers who do find the notion applicable to their circumstances.

Apparently, social science researchers are by far the most likely to turn to the Internet in search of primary material: only a tenth of them find the practice irrelevant to their work practices, compared to almost four tenths of the science researchers and nearly half of the humanities researchers. Also, 60 percent of the social scientists find the Internet of great help in accessing primary information, twice as much as that of the scientists, 31 percent of whom hold the same views, and more than three times as much as that of the humanists, only 17 percent of whom do so too.

However, the picture thus emerging does not represent wholly unforeseeable developments, Not even because so much of the primary evidence readily accessible on the Internet is of the kind which is particularly useful social scientists, such as data sets, original archival material, and legislative, governmental and demographic information, and of the kind which is, perhaps to a somewhat lesser extent, but still quite useful for scientists, such as raw data and technical reports. After all, there is an abundance of primary information available on the Web, which appears to be potentially useful for



humanists, too, from the facsimiles of manuscripts and artefacts, through films and music recordings, to archival material.

The glaring difference of attitude discerned here is in all likelihood also, if not primarily, associated with the long since established, discipline-associated differences concerning specifically the role of primary sources of information in research work. In fact, this is the very point where the contrasts among scientists and social scientists, on the one hand, and humanists, on the other, seem particularly strong. So much so, that Wiberley and Jones (1989; 1994), reflecting on the differences among the disciplines, single out the part played by primary evidence and sources as the focal point in the distinctiveness of humanist inquiry.

In the case the investigators make to prove that it is indeed so, they point to the unique nature of humanistic primary evidence: humanists use as their primary evidence existing sources created by the subjects of their research; in comparison, scientists and social scientists initiate and participate in the creation of their sources, the former in their laboratories, and the latter in the field. Therefore, while in the sciences and the social sciences no primary evidence exists until the researchers begin to work, since the primary evidence is the product of the scientific quest, in the humanities the primary evidence is there first, for the researchers to reconstruct, describe and interpret. Moreover, since the subjects of humanistic research create the primary evidence of the humanities, these sources are the products of a specific place and time and shaped by the distinctive personalities of their creators, with primarily qualitative and aesthetic dimensions. No wonder then that the humanists, unlike their scientist or social scientist counterparts, are wary of accepting even true-to-life replicas as substitutes for the original source they are about to analyse. Therefore, the oft-heard argument that humanists would use electronic alternatives to the primary material they need, perhaps not invariably, but to a greater extent, if only their need for old, if not antique material could be met, that is, if more primary sources of theirs were digitised (Brockman et al., 2001), seems to present only part of the picture.

Not that it is wholly unreasonable to surmise that humanists would indeed use electronic editions of primary material, at least for some purposes. After all, as Stone (1982), building on previous research points out, although scholars who criticise or study the history of paintings, sculptures or buildings ought to see the original, especially since they absorb information from an original which cannot be gained in any other way, their need for access to original research reports is more questionable. This, coupled with their growing affinity for electronic sources and resources suggests that they too can and indeed do at times put electronic editions of primary material to good use in their work. For example, Manoff (1997), noting but two options, talks of the way computer facsimiles allow for the magnification and manipulation of screen images for very close scrutiny of particular documents or artefacts, and how technology allows for faster and easier ways to navigate between texts and parts of texts. However, in view of the special standing of original primary evidence in humanities research, digitisation, with all its advantages, is for humanists often no substitute for handling primary source materials in the original, as Palmer and Neumann (2002, p. 101) observe: "In most cases, the electronic resource is not a substitute for the physical item. The scholars still find it necessary to interact with original materials..."



Interestingly, although the sample limitations of the study allow for no more than identifying some tentative patterns characterising researchers of various ages in each of the disciplines, it seems indicated that both in the social sciences and in the humanities researchers of all ages are on the whole of one mind as to the likelihood of finding primary information on the Internet. Not so, however, among the scientists: the younger among them are far more appreciative of the Internet afforded access to primary information than their more senior colleagues, with 55 percent of the former, compared to 20 percent of the latter reporting the notion to be in line with their views, and with no more than 22 percent of the former, compared to 60 percent of the latter deeming it irrelevant. It seems then that although Internet use has repeatedly been found to be more prevalent among the younger generation of researchers (see, for example, Applebee et al., 1997; Fiscella and Proctor, 1995; Larabee and Lorber, 1994; Lazinger et al., 1997; Maughan, 1999; Milne, 1999; Tomney and Burton, 1998; Vander Meer et al., 1997; Voorbij, 1999; Zhang, 1999), it may not be invariably the case, at least not in the particular instance of locating primary information. Rather, here again the findings seem to lend further support to Covi's (2000) thesis that novice researchers, with all that they were born into an electronic reality, nevertheless reinforce in their information work-practices existing patterns of work and resource use in their disciplines, rather than introducing change. Indeed, the findings emerging from the present undertaking as to the utilisation of primary material to be found on the Internet can be traced to the younger researchers' mimicking the electronic communication patterns and resource usage habits of their elders. Thus, scientists' renowned propensity for electronic scholarship may serve to encourage the younger among them to put to good use the skills they have been familiar with since childhood in their information work, in result of which they may even surpass their elders in utilising the Internet for meeting their information needs, of which the need for primary material is but one. In comparison, social scientists' overall positive, though not as enthusiastic approach to electronic work methods as that of their scientist counterparts, coupled with the aforementioned wide availability of primary information of special pertinence to their work on the Internet, seem to bring about a marked affinity for the practice across all age groups, with the younger generation of social science researchers simply adopting the attitudes held by their more senior colleagues. By the same token, humanists' repeatedly re-affirmed greater reluctance to rely on electronic information sources and services appears to carry over to the novice humanists, which can account for the uniform attitude humanists of all ages demonstrating here to the possibility of seeking primary material on the Net.

In any case, findings of the present study confirm that the opportunities of accessing primary information via the Internet do not mean that the contemporary researcher can always forego actually travelling to wherever the information he or she needs is located. Although for a not insubstantial two tenths of the informants the onus of going to the information instead of having it come to them is wholly irrelevant, and for as much as four tenths it is never or seldom true, still for almost three tenths of the researchers it is always, but at least often true. However, not unexpectedly, the need to go to the primary source, wherever it may be found, is reported to be true of their ways primarily by the humanists among the study participants: whereas 51 percent of the social scientists and 55 percent of the scientists say that they never or seldom have to go to wherever the information they need is located, no more than a mere 8 percent of the humanists say so too. This is, of course, very much in line with previous findings on the subject, most recently in the study conducted by Brockman et al., (2001) and the just cited Palmer and Neumann (2002)

study, in both of which it is asserted that humanities scholars must travel regularly to work with materials in numerous libraries, archives, and museums because of the necessity to handle and study original documents, but also because they need to interact with the information specialists who are knowledgeable about the collections and other scholars who study and work on-site with the sources.

More surprisingly, despite the wide availability of primary information sources of pertinence to the sciences and the social sciences on the Internet, and despite the above mentioned potential suitability of the electronic forms of primary evidence for research in these two knowledge domains, a tenth of the scientists and a fifth of the social scientists queried for the present undertaking also find it necessary to go to the primary source of information, instead of waiting for it to come to them (electronically or via inter-library loan). Perhaps these researchers are thinking of their colleagues as sources of primary information, in which case their need to go to where the information is may stem from preferring face-to-face meetings for the purpose. Thus, although Noam (1997) is undoubtedly right in pointing out that these days, with electronic information provision growing ever-more powerful in storage, broad ranging in content and efficient in retrieval, it is more and more the information "coming" to the scholar, rather than vice versa, it is not invariably the case, and it is very doubtful indeed that it can ever be.

To sum up, in reply to the question posed at the outset of this study, as to how contemporary researchers meet their needs for primary sources of information:

**Access to primary sources of information, especially current information, has been greatly enhanced through the ubiquitous availability of Internet based resources. However, even today researchers cannot always forego actually going to wherever the primary material they need is located, above all when their source of primary information is a fellow researcher. This is particularly true of humanists, who travel to work in libraries, archives, and museums because of the necessity to handle and study original documents and artefacts, but also because they need to interact with information specialists knowledgeable about the collections and other scholars who work on-site with the sources.**

#### **6.4 The Intellectual Level Aspect of Researchers' Information Needs and Practices**

In our age of omnipresent information, this specific characteristic of information need seems to have become more prominent than ever. There is so much information everywhere, that rounding up something on any given topic rarely, if ever, poses a problem; however, finding an answer matched to an individual's needs, with all the complex combination of subjective and objective factors that enter into it, is something else again. This is nowhere more apparent than in cases when it becomes necessary to locate a piece of information fitting to the knowledge and intelligence level of the individual requiring it: obviously, for a child who needs information on the amount of food his newly acquired dog will consume



daily, to be presented with a scholarly article in a learned journal on the topic is hardly the right solution for his need, and a zoologist would likewise find little joy in a children's book on pets. Each to his own, of course, which until recently was a widely accepted and easily adhered to information behaviour norm. The academic went to his research library, and the child to the neighbourhood public library or the school library, content in the knowledge that their information needs were sure to be met on an appropriate level. However, with the easy accessibility of myriad items on the Web, the effortlessly discernible dividing lines of yore between popular/scientific, basic/in depth information may no longer be as visible as before.

#### **6.4.1 The Web as an Appropriate-level Research Information Source**

The unregulated evolution of the World Wide Web brings to the desktop of the contemporary information consumer a truly enticing array of material on every conceivable subject. True, since the sources on the Internet can be mounted by anyone at all, this abundance of information is liable to be, and in point of fact often is, of questionable authority and quality (a point to be further elaborated on in the forthcoming discussion of the quality aspect of researchers' information needs). However, knowing that the information needed may be only a mouse click away does seem to pose an almost irresistible temptation to opt for the convenience of a quick search on the Web, especially these days, when speed is so often the paramount consideration in whatever we set out to do. In fact, students' seeking such 'instant information gratification' (Roth, 1999) via the Web has already grown to be one of the more extensively discussed problems in the literature (see, for example, D'Esposito et al., 1999; Roth, 1999; Tovote, 2001; Valentine, 2001). The question is whether their professors are of the same mind, which is really the question of the extent to which they are ready to opt for convenience over scientific level, trading the guaranteed scholarly level of information obtained via traditional scholarly channels for the easy availability of the popular information on the Web.

Ashley (1995, cited in: Herring, 2001), studying the adoption of networked informational retrieval systems in an academic setting, notes that many information resources available on the Internet are neither useful to, nor needed by academics. Some are, of course: as we have already seen, the primary information sources to be found on the Web can definitely be of value for the researcher. So can, obviously, the databases of research information available via the Internet, although a recent study into university professors' information needs in an electronic environment reveals that only 22 percent of the faculty queried enumerate among their main sources for literature and data searches these commercial databases (Jankowska, 2004). However, much of the material floating around on the Web is popular level information, intended for the general public, which, therefore is not necessarily of an appropriate level for scholarly investigations, even if there is no problem with either its quality or reliability.

Indeed, findings of the present study indicate that researchers much rather turn to the traditional scholarly communication channels when they need research level information than search for it on the Web; in fact, no more than a mere tenth of the informants state otherwise. This corresponds to Herring's (2001) conclusion in her exploration of faculty satisfaction with the World Wide Web, that faculty members do not consider the Web to be sufficient as a sole source to deliver the type or quantity of research information they need (although she traces the phenomenon wholly to their questioning of both the accuracy and the reliability of much information found on the Web). Furthermore, according to the



findings of the present undertaking, this is one instance where researchers of different disciplinary affiliations and different ages see eye to eye: with approximately two thirds of the researchers in each disciplinary or age group attesting to the notion being always or often true of them, the study participants display a quite unified front in preferring scholarly information sources to the Web. Obviously, convenience is not the overriding consideration among researchers; other features of the information sought, in this case its appropriately scientific level, are apparently much more important. This is in line with Herring's (2001) contention, which she bases on Ashley's (1995) and her own findings, that compatibility with existing academic social norms is crucial to widespread acceptance of the Web in scientific and scholarly research. After all, it is not too credible that basing one's research on popular level information would go down well with any referee worth his salt...

To sum up, in reply to the question posed at the outset of this study, as to the extent to which today's researchers make use of the easily available information on the Web:

**Since the conveniently accessible material floating around on the Web is so often popular level information, researchers prefer to turn to traditional scholarly communication channels, by way of making sure that the information they find is fitting to their knowledge and intelligence level. When they do search for popular level information on the Web, it is only after careful inspection, in view of the liability that much of the information to be found in this way will not conform to their standards of quality and authority.**

#### **6.4.2 The Need for Differing Levels of Information in Research Work**

As Menzel (1964, p. 12) notes, scholarly communication channels are overwhelmingly tailored for the specialist in a given field. "Rarely, if ever", he laments, "do we find information from a given field of science packaged twice – once for the insiders and once for researchers in neighboring specialities..." A rather unfortunate state of affairs, for, as he goes on to say, the latter could benefit greatly from a different sort of selection, editing, grouping, and packaging of information than that which is most suitable for readers for whom the same field is their main concern. To meet these differing needs, he suggests the establishment of special channels of communication that would be dedicated to "information from field A for researchers in field B". True, Menzel's plan has never been realised, although probably not for a lack of need for it; it is rather the technical feasibility of constructing such a system of even the most frequently occurring combinations of 'fields from' and 'fields for' in the days before the widespread utilisation of information technology, which must have been at fault.

Indeed, when Kircz (1998), for whom the electronic environment is already a fact of life, proposes the breaking up of the classical scientific or scholarly article into modules, he too proceeds from the notion that the information should be presented to the researchers tailored to their different information needs as these evolve during the various stages of a research project. This, as it has already been pointed out, in order to cater to the different levels of information needed by the three types of scholarly readers he



discerns: the informed reader, who is well-versed in the literature of the field; the partially informed reader, who is not conversant with the specific research as such, but is interested in the general aspects that might be of use for his or her own investigations; and the uninformed reader, who is out to learn something entirely new, in a field that is either unknown to him or her, or of which he or she has only a rudimentary knowledge. However, despite its technical feasibility, his proposal has not materialised either in the six years since it was put forward. It is not inconceivable then, that after all there may be no real need for a service of this kind, a postulation which seems to be borne out by the findings of the present study.

Apparently, researchers typically want scholarly information of the highest level, even when the answer to some question they may have is not to be found within their areas of expertise. Although gaining some essential understanding of the issue at hand by locating the basic information on it, and, if necessary, supplementing the information by asking for explanations from an expert colleague seems to be an opportune solution, it is apparently considered far from being one: only about 15 percent of the informants report that the practice always or often reflects their ways. Moreover, researchers of different disciplinary affiliations and ages tend to agree as to the inadvisability of compromising on the level of the information source used. True, the humanists favour the practice least, with only 4 percent saying it reflects their ways, but then, neither do their colleagues in the other two disciplines appear to be much more enthusiastic about it all, with no more than 16 and 20 percent respectively of the social scientists and the scientists saying they always or often make do with some basic level information, even if it is supplemented by the explanations of an expert colleague. By the same token, the extent of agreement with the notion is in the vicinity of 15 percent among researchers of all ages, although the older informants seem to oppose it more categorically, with five fifths of them, compared around four tenths of their younger colleagues saying it is never or seldom true of them.

To sum up, in reply to the question posed at the outset of this study as to whether researchers require information of differing scholarly levels, depending on the centrality of a query to their areas of expertise:

**Researchers consistently want scholarly information of appropriate scholarly level. Even in areas outside their own spheres of expertise rarely do they compromise as to the level of information required.**

## **6.5 The Viewpoint Aspect of Researchers' Information Needs and Practices**

If there is a sacred scholarly norm, it must be that of scientific integrity, and no wonder: as Clark (1987, p. 132) says, summarising it all so aptly, "knowledge must be handled honestly, for otherwise it misinforms and deceives, is no longer valuable in itself and certainly of no use to society." Indeed, the scientific ethos, decreeing that the scholarly endeavour should be independent of the personal or social attributes of its protagonists, stipulates for researchers to be impartial and unbiased in their



communications. Thus, scientific and scholarly works are, as Merton (1973) asserts, truth-claims, which, having been subjected to pre-established impersonal criteria, and found to be consonant with observation and with previously confirmed knowledge, are judged to be worthy of entering the lists of science. Still, whilst in many knowledge domains there is little room for dissensions over basic theoretical stances, as the example of empiric science amply demonstrates, in other academic disciplines values may be highly charged and the incidence of major ideological disagreements proportionately more prevalent. Thus, in the social sciences and the humanities the existence of different schools of thought entails the possibility that a topic would be treated from a particular approach or with a particular perspective. So does, for that matter, the characteristic feature of the 'soft' disciplines, which Becher (1989) refers to as the diversity of criteria for, and the lack of consensus about, what constitutes an authentic contribution to a particular field. Since, as he asserts, these contributions commonly take the form of idiosyncratic interpretations, the resulting insights and understandings are obviously susceptible to subjective treatment, to the point of being made with an agenda other than the discovery of objective truth. Under the circumstances, the viewpoint from which the information is presented (overtly or covertly) is bound to be a very important feature of a publication for researchers, though, of course, the nearer to the hard end their disciplines are on Storer's (1967) 'hard' to 'soft' continuum of disciplines, the less applicable it becomes. After all, Newton's laws are Newton's laws, regardless of how they are put forward; they are hardly open to different interpretations, are they?

#### **6.5.1 The Importance and the Feasibility of Identifying Tendentious Presentation of Information**

As Sturges and Griffin (2003, p. 1045) point out, "scholars bring a lifetime of immersion in their discipline to any [information] resource, analogue or electronic". Indeed so, and the need for such intimate knowledge of one's subject field is nowhere more vital than in those instances when researchers evaluate the extent to which a particular source contains information of use for them, a process Ellis (1989, 1993) calls 'differentiating'. Differentiating, which is one of the six characteristics that together constitute the generic model of the information seeking behaviour of social scientists proposed by Ellis (1989), later found to be equally applicable to scientists (Ellis et al., 1993), and recently confirmed by Meho and Tibbo (2003), is defined as employing differences between sources as filters on the nature and quality of the material examined. Thus, in effect, researchers' differentiating activity is the identifying of those sources which they perceive as having the highest likelihood of containing material which is relevant, at an appropriate level, and of the right type. The actual process of filtering therefore involves the use of three kinds of criteria: the substantive topic of study; the quality, level, or type of treatment; and the one of our concern here, the approach or perspective adopted.

Although Ellis (1989) asserts that in practice researchers often employ these criteria together, he nevertheless points out that making use of the criterion of approach or perspective can greatly aid a researcher in establishing the worth of some material for his investigations. For, as he maintains, "often, if the researcher is coming to a topic from a particular approach or with a particular perspective, pertinent material will appear in sources which have that approach or take that perspective" (p. 191). However, as Meho and Tibbo (2003) add, in the process of differentiating, researchers also aim at detecting biased information, the product of scholarship which has a hidden (or not so hidden) agenda. At any rate, whether the non-objective nature of some information thus renders it all the more useful, or conversely



altogether unusable, an issue we will explore in greater detail presently, identifying the particular approach or perspective from which a topic is treated must be very important indeed for researchers. It is hardly by way of a coincidence that, as Sturges and Griffin (2003) point out, the key sources of guidance for Web site evaluation repeatedly include 'objectivity' among the recommended criteria for assessing the value of the information posted on the Internet.

Indeed, the present study leaves little doubt that those researchers, whose subject matter allows, if not outright calls for interpretation, consider the discerning of the point of view, approach, or angle from which some information is presented important for their work. Thus, whilst 43 percent of the scientists deem the whole idea altogether irrelevant for their circumstances, only 11 and 12 percent respectively of the social scientists and the humanists express the same view. In the same vein, whilst only a fifth of the scientists always or often find it necessary to detect if some information is presented from a given point of view, about three fifths of both the humanists and the social scientists testify to the ongoing centrality of the practice for their research endeavours. Interestingly, the humanists appear to be even more likely than the social scientists to emphasise the importance of detecting if a particular piece of information is presented from a certain point of view, at least in the younger age brackets: 70 percent of the former, compared to 50 percent of the latter among the under 44s, and again, 68 percent of the former, compared to 58 percent of the latter among the 45 – 60s; still, the small sample size in each group renders these findings leads for further investigation only.

In any case, the importance unquestionably accorded by humanists and social scientists to the discerning of the extent to which the information of potential usability for their investigations is presented objectively, it is hardly surprising to find that they routinely evaluate the material they handle for any tell-tale signs of less than impartial reporting. Luckily, detecting treatment of a subject from a particular viewpoint or perspective, not to mention any biased or one-sided approach, is apparently a rather undemanding task. After all, as it has already been noted, researchers in general, and humanities researchers, in particular, develop a close familiarity with the literature of their areas of interest, in result of which, they recognise the point of departure of the information under consideration by the sources cited and the terminology used. Since researchers thus have pre-existing knowledge of their fields, they are able to match the features of the source they are examining with those long known to represent various schools of thought, viewpoints, approaches and perspectives. Indeed, a clear majority (72 and 57 percent, respectively) of the humanists and the social scientists participating in the present study find it easy enough to identify if a particular piece of information is presented objectively or not, with more of the seasoned researchers in each disciplinary group giving evidence to this effect. Obviously so, of course, for over the years the researchers build up their familiarity with the literature pertaining to their areas of interest, and at the same time gain more and more experience, both of which cannot but contribute to their ability to critically assess information sources. Indeed, 50 and 55 percent of the researchers in the two younger groups of social scientists find it easy to detect if the information on hand is presented from a particular point of view or not, compared to 70 percent of the over 61s among them, and similarly, 60 and 72 percent of the researchers in the two younger groups of humanists find it easy to do so, compared to 82 percent of the over 61s among them.



To sum up, in reply to the question posed at the outset of this study as to how important and how feasible is it for researchers to detect if some information is presented from a particular point of view, approach or angle:

**Given the vital importance accorded in the scholarly endeavour to scientific integrity, in the social sciences and the humanities, where diverse interpretations of facts and data are possible and expected, detecting whether a particular piece of information on hand is presented (overtly or covertly) from a certain point of view, approach, or angle is an important part of research work. However, the task is considered to be easy enough, increasingly so as a researcher gains scholarly experience.**

### **6.5.2 Channelling Subjectivity: The Value of Information Presented from a Particular Point of View, Approach or Angle**

Interestingly, once the slanted approach used in presenting some information is openly acknowledged, or at least once it is identified, the information itself has its welcome uses for the researcher. Perhaps not surprisingly, for, as Tadjman and Mikelic (2003) contend, the usability of information is a matter of the intrinsic and subjective evaluation of the information user. Indeed, Ellis (1989) pinpoints the advantage to be derived from using the criterion of the approach or perspective adopted in differentiating as the ability it affords to turn up material, which is pertinent to the work of the researcher precisely because it corresponds to the particular approach or perspective he or she proceeds from. True, as it will be expounded upon in greater detail further on, the data gathered in the present study clearly indicate that first any information not vouched for by the normative, peer-review based quality control system of the scholarly world has to be verified, that is, proven authentic and accurate, and preferably corroborated by other sources, too, a finding which wholly concurs with those of Meho and Tibbo (2003). In fact, this is probably an inescapable constraint, rendered such by the realities of the wide-availability of information in today's Web-based world, susceptible as it is to misinformation and disinformation to the extent that Tadjman and Mikelic (2003) cite contemporary authors who contend that the 'Information Era' is rapidly being replaced with 'Disinformation Era'.

Another important benefit to be derived from tendentious or even skewed information, again contingent, of course, on its having been found reliable, is its contribution to the researcher's ability to construct a multi-faceted understanding of a topic. Obviously this is only true in disciplinary fields where the subject matter calls for or at least is amenable to interpretation, that is, fields nearer to the 'softer' end of Storer's (1967) continuum. Indeed, it is the humanities and social sciences researchers among the participants in the present undertaking who are clearly more likely to look for an article, which has been written from a specific point of view, on the grounds that in many instances it is possible to understand a topic only in the context of the points of contention involved: approximately two thirds of the researchers in each of these two groups, compared to a third of the scientists testify that the practice always or often reflects their ways. Also, the study results indicate that the seasoned researchers are more inclined to seek out



information presented from a certain point of view than their novice counterparts: while 63 percent of the over 61s, and 61 percent of the 45-60s say it is always or often true of them, only 42 percent of the under 44s say so too. Quite predictably, of course: as they grow to be more knowledgeable in their chosen fields, and at the same time more experienced in research work, they are bound to feel more confident that they would be able to determine whether some one-sided or biased information source represents a scientifically legitimate appreciation of the problem, which is being considered.

To sum up, in reply to the question posed at the outset of this study as to whether tendentious information can be of any use to the researcher:

**In areas where diverse interpretations of facts and data are possible and called for, once the biased and/or one-sided approach used in a publication is openly acknowledged, or at least once it is identified, the information therein has its welcome uses for constructing a multi-faceted understanding of a topic. Indeed, social scientists and humanists (though obviously not scientists) are likely to search for information presented from a specific viewpoint.**

## **6.6 The Quantity Aspect of Researchers' Information Needs and Practices**

Academic researchers have voracious information appetites, and no wonder. As it has already been pointed out, they have to make sure that they see most every new publication in their fields in order to keep up with the developments at the research front of their specialisations. Moreover, for each research endeavour they undertake, they also need to amass as comprehensively and exhaustively as possible the knowledge accumulated on their subject, first to identify the gaps necessitating further investigation and then to anchor the topic to be investigated in its information background. Some researchers may be more focussed in their research work and, in consequence, in their information needs than others, which obviously has a direct impact on the scope of their information needs, but the availability of huge amounts of potentially relevant information is indubitably a fact of academic life. This state of affairs has brought to the fore a greater awareness of the problem of information overload, at least as a threat if not a reality, as Wilson (1996) puts it. But is it a threat or a reality, or perhaps neither?

### **6.6.1 From Information Overload to Information Affluence: Conducting Research in an Era of Easy Access to Vast Quantities of Information**

The literature of the past few decades abounds with speculations as to the effects on knowledge management of "the proliferation of available data and publications and ever-more comprehensive and wide-spread automated means of access to them" (Biggs, 1989). These ruminations all seem to culminate in an ever-increasing concern that the growth of knowledge has surpassed the growth of the knowledge of how to manage it (Gaines, 1995). Bernal (1939, cited in Gaines, 1995) sums it all up in saying: "In the old ideal of science, communications were the only link between the scientists. Now the very quantity of scientific information has made its diffusion an enormous problem, with which the existing machinery



has utterly failed to cope". Some six years later Bush (1945, p. 101, cited in Gaines, 1995) gives vent to the very same sentiments:

"There is a growing mountain of research. But there is increased evidence that we are being bogged down as specialization extends. The investigator is staggered by the findings and conclusions of thousands of other workers – conclusions, which he cannot find time to grasp, much less to remember, as they appear... The difficulty seems to be not so much that we publish unduly in view of the extent and variety of present-day interests, but rather that publication has been extended far beyond our present ability to make use of the record."

Over the years since these concerns have thus been first expressed, they seem to have assumed the stature of widely accepted truisms, albeit with firm grounding in empirical evidence (see, for example: Barry and Squires, 1995; Berger and Hines, 1994; Fernandez, 2002; Haag, 1984; Noble and Coughlin, 1997). So much so, that Gaines wistfully wonders: "If ... John Bernal and Vannevar Bush presented these statements at a session of the American Society for Information Science today, would not they appear timely, significant and utterly to the point?" Surprisingly enough, they may not, as the evidence gathered in the present study indicates.

Actually, today's researchers seem to revel in the abundance of information unabatedly accumulating in their areas of interest. Not only do they consider this state of affairs unproblematic, they deem it eminently satisfactory. In fact, more than half of the researchers participating in the present study report that they always or often find the large quantities of information flooding them a veritable blessing, of great help in making life easier for them, and another third say that it is indeed so at least some of the time; furthermore, less than a tenth of the informants disagree with these sentiments. Apparently, with all their patent awareness that an attempt to read everything, which may be relevant to their interests, is perforce doomed to failure, today's researchers are nevertheless very happy indeed with the wealth of information at their disposal.

This apparent contentment with the availability of huge quantities of information seems to be true, according to findings of the present undertaking, across all disciplines and ages: no less than half and up to as much as three quarters of the researchers in the different age/disciplinary groups say that the abundance of information at their disposal makes life easier. Still, humanities researchers manifest a somewhat less enthusiastic attitude regarding the matter than their scientist or social scientist counterparts: in each and every age bracket the percentage of humanists supporting the notion is among the lowest. By the same token, whilst approximately two thirds of both the scientists and the social scientists across all ages consider the availability of large quantities of information a blessing, only about half of the humanists hold the same views. Perhaps not surprisingly, for the difference discerned seems traceable to the previously noted, disciplinary rooted differences in the conduct of research.

As Wilson (1995; 1996) notes in two articles centring on different aspects of the phenomenon of information overload, researchers become conscious of the amount of information available to them either in the context of their endeavours to maintain currency or when they are working on specific projects. Thus, to use Wilson's terminology, if they encounter problems of information overload, it is one of two kinds: 'upkeep overload' or 'task overload' (although the two kinds will frequently overlap). As it has already been noted, neither keeping current nor assembling the information base of a specific inquiry



poses too great a challenge to humanist researchers, in result of which they are inevitably less appreciative of the abundance of information available in contemporary academe. More specifically, since for the variety of reasons previously detailed, humanists are far less concerned than their scientist and social scientist colleagues with making sure that that no new contribution escapes their attention (Fulton, 1991; Garfield, 1980; Stone, 1982; Sweetland, 1992; Wiberley and Jones, 1989), they are less overjoyed at the easy accessibility of a wide array of information either: their need to learn what is going on in their fields is less pressing, and in consequence, their appreciation of today's improved opportunities and capabilities of doing so is correspondingly lower. By the same token, humanists' different information needs in the context of particular inquiries or projects are such that their rejoicing in the amount of conveniently obtainable information is bound to be more subdued. After all, as it has already been elaborated on, humanists, unlike their scientist and social scientist colleagues, develop intimate familiarity with previous work in their areas of attention (Bates, 1996a; Bates, 1996b; Green, 2000); thus, they are less likely to value wide access to information, as most of it is already known to them in any case.

**To sum up, in reply to the question posed at the outset of this study as to contemporary researchers' attitude to the abundant availability of scholarly information characterising our times:**

**Although vast amounts of information are a fact of life in today's scholarly environment, problems of information overload in research work are considered virtually non-existent. Rather to the contrary, the exposure to huge quantities of information is seen as highly satisfactory, a veritable blessing even. Still, humanists manifest a somewhat less enthusiastic attitude to the abundant availability of information than their scientist or social scientist counterparts.**

### **6.6.2 Coping with the Profusion of Scholarly Publications Characterising the Contemporary Academic Scene**

It seems then that there is an out-and-out change of heart among contemporary researchers concerning their perceptions of the abundance of information at their disposal. The question is, of course, how researchers cope with the situation, which is, in effect, the question of how information overload has become information affluence.

As Wilson (1996) asserts, conventional standards of rationality call for the use of all available relevant information in research work. Indeed, the chief criterion of success in information retrieval has traditionally been the provision of all and only relevant information. However, over the years scholars' tacit definition of 'all relevant information' seems to have undergone quite some transformation, to become, in effect, 'all relevant information of appropriate quality'. This transformation seems to have been brought about by the ever-more pervasive doctrine of 'publish or perish' in academe. Originally coined by Logan Wilson (1940), the term has become the commonly accepted shorthand for the onus on academics to publish copiously, as Schauder (1994, p. 82), summarising Wilson's thesis, describes:

"...because publication is one of the main measures of academic productiveness, there is pressure on authors to fractionise their research projects into as many separate articles as possible to 'add yardage to the author's bibliography'... [Since the] publishing of articles... [is] a principal means by which academics can achieve visibility, and therefore, advancement..., [these] situational imperatives dictate a 'publish or perish' credo within the ranks."



Unfortunately, the 'publish or perish' system, focussing as it does on the quest for quantity of publication, may lead to inconsequential publications: 'salami publications', wherein material adequate for a single paper is sliced into several 'least publishable units', or 'meat extenders', i.e. papers re-issued with no new data or papers which are in fact two previously published papers merged into a new one (Brandon, 1996; Lubans, 1987). Ziman (1970, cited in Schauder, 1994) is especially eloquent, though certainly not alone (see, for example, Sykes, 1988) in blaming the 'publish or perish' culture for the decline in the quality of the information: "Not only is there too much scientific work being published; there is much too much of it... the need to get recognition by publication forces each of us to shout a little longer and louder so as to be noticed at all in the gathering, swelling crowd of voices... The result has been a proliferation of semi-literate, semi-scientific, half-baked and trivial material which threatens to swamp the system."

No wonder then that the days of treating scholarly information with deference bordering on reverence seem to be long gone. Sykes (1988), for example, admittedly representing a very extremist view of the entire research system, talks about professors' getting away with publishing nonsense, but the far more moderate views expressed by Newell and Stone (2001), in their article tellingly titled "Punishing Excellence / Rewarding Mediocrity" also lament current academic practices, which skew research toward what is 'acceptable' rather than toward what may be important. It does not appear to be very likely then that many people in contemporary academe would abide by the sentiments expressed by the Polish art historian, Zofia Kossakowska, who said: "Science is like a spring; if you want to drink from it, kneel" (quoted in Podgorecky, 1997, p. 120).

This change of attitude to information seems to be at the roots of the much more pragmatic attitude of contemporary scholars to the information component of their research work. Since information is no longer treated with deference bordering on reverence, it is apparently appraised for its merits just like any other commodity, and of the more easily available and plentiful variety too. Therefore, selection is now the key to effective information consumption, with researchers using the time-honoured practice of selective reading as their primary, if not their only strategy to cope with the quantities of information of potential importance to them. Indeed, only 5 percent of the researchers participating in the present study say that careful selection is not the strategy they employ to deal with the 'publish or perish' culture generated information, which may be abundant, but not necessarily of appropriate quality. Correspondingly, only 11 percent of the informants disagree with the notion that the exponential increase in the quantity, albeit not the quality of information generated in result of the 'publish or perish' mentality in academe, is best dealt with by applying many more filters to information.

Not that this strategy, which researchers opt for to deal with the profusion of scholarly and scientific publications, is a novel one. It is, in fact, the previously noted 'differentiating' component of Ellis's (1989) model of researchers' information seeking patterns: utilising the differences between sources as filters on the nature and quality of the material examined. However, since these days researchers' differentiating activities are often aimed at preventing problems of information overload, these seem to have assumed the stature of a deliberate policy of non-use, of the kind pointed out by Wilson (1995): the adoption of particular rules or habits of prioritisation of incoming information as part of one's individual research



strategy. Participants in the present study testify to the use of exactly such a strategy: taking information overload for granted, for a given fact of contemporary scholarly life, their strategy adds up to Wilson's "deliberate accumulation and scanning of much more information than can possibly be used, then prioritizing it and using as much as is allowed by competing demands on the use of time and one's judgement of the relative productivity of alternative usages of time" (p. 49).

Still, here again the findings gleaned in the present undertaking lend further support to what appears to be the recurrent theme in studies of scholarly information needs and behaviour: researchers' responses to the challenges they encounter in the course of their work often vary with their disciplinary-rooted approach to research and/or with their seniority. In this case, scientists are considerably less likely than their social scientist or humanist colleagues to perceive the 'publish or perish' associated escalation in the quantity, and concomitant corrosion in the quality of information as necessitating coping measures, or to point to careful selection as the strategy for doing so. Thus, whereas more than half of the social scientists and the humanists believe that consequent to the 'publish or perish' syndrome induced decline in the quality of scholarly information, it habitually needs to be appraised and vetted carefully, and more than two thirds of them assert that selective reading is always, but at least often the prime strategy for doing so, only about a third of the scientists think so too, or opt for the same solution. This more relaxed attitude of scientists to the need to cope with the present-day profusion of not invariably adequate-quality publications, which is especially pronounced when it comes to the option of doing so by careful vetting of the information, seems to be traceable to the very nature of research in the sciences, as opposed to research in the humanities and in the social sciences. As Garfield (1980, p. 43), encapsulating the essence of the previously noted differences between the characteristics of research in the different knowledge domains, puts it:

"Scientific research is preoccupied... with the study of the impersonal processes of the universe. Scientists... look for new facts which are revealed through reproducible experiments. Once a fact or datum is confirmed, science moves on to new discoveries... with new developments unfolding from previous research... [In contrast,] scholarly work in the humanities does not develop from previous work... the humanities change sometimes by preference or perceived relevance, and sometimes by thesis or antithesis, as scholars react against the perspectives, attitudes, and theories of earlier generations."

These discipline-associated differences in the manner whereby previous research is built upon in the generation of new knowledge can account for the differences in attitude concerning the need to cope with the vast quantities of possibly inadequate quality information available in present day academe: scientists require mainly results of previous work, the latest reports of research outcomes of relevance to their own, whilst scholars want the whole gamut of anything and everything written on their topic (Stoan, 1991). Therefore, scientists, and especially the experienced researchers among them, can afford to be less concerned with the quantities of information at their disposal than their social scientist and humanist counterparts; after all, they only need the original article reporting on any new breakthrough of relevance to their own work, and in any case, establishing the validity of scientific information, with its highly factual contents, is relatively easy.

It seems then, that it is indeed the change in scholars' attitude to information, which is at the roots of their apparent victory over the avalanche of information. For, as Wilson (1995) suggests, given that nowadays



the individual researcher's problem is more likely to be a surfeit of relevant information rather than a scarcity, effective information management is screening, evaluating, and filtering, not just to distinguish relevant from irrelevant, but to separate dispensable from indispensable relevant material.

To sum up, in reply to the question posed at the outset of this study as to how contemporary researchers cope with today's profusion of scholarly publications:

**The lowering of academic standards associated with the present-day profusion of scholarly publications (the 'publish or perish syndrome') has brought about a change in attitude to information in academe. Perceived to be declining in quality, information is no longer treated with deference bordering on reverence; rather, it is customarily appraised for its merits, just like any other commodity, and of the more easily available and plentiful variety too. Therefore, the key to contemporary researchers' effective information consumption, their strategy for coping with the vast quantities of information incessantly flowing to them is selective reading.**

## **6.7 The Quality/Authority Aspect of Researchers' Information Needs and Practices**

In an era characterised by ever-present information of unprecedented volume, the quality of information, at all times of crucial importance for scholars, is bound to come to the fore. After all, if selection is indeed the key to effective information consumption, as it seems to be indicated, it stands to reason that quality will function as one of its major criteria. As Garvey and Gottfredson (1976, p. 173) asserted at that point of time in history when the substantial amounts of information characterising contemporary scholarship were as yet merely threatening to become the torrent it is now, "...without quality control... scientists will be faced with such a mass of undifferentiated information that much information of quality therein would be lost."

True, the more information there is around, the more tempting it is to grab the first item that seems to meet one's needs: why bother with wading through masses of information when you already have some answer? However, scholars seem to be very aware indeed of the importance of paying attention to the quality/authority issue, and no wonder: they simply have too much at stake to neglect doing so, given that the inevitable prerequisite of every new scientific and scholarly progress made is its firm anchoring in previous knowledge. After all, who would want to base his research efforts on unstable foundations or be sent on wild goose chases? This is all the more true nowadays, with the aforementioned publish-or-perish associated doubtful quality of some of the information seeing light, the consequence of what an editor of a history journal described as "... far too much publishing and not enough perishing" (quoted in Garner et al., 2001, p. 253). By necessity, then, scholars need to be considerably more expert and competent at the task of evaluating the information on hand than most people, which inevitably brings us to the question of how they go about it in today's research environment of plentiful information.



### **6.7.1 Coping with the Need to Single Out from the Abundance of Available Information the Items of Appropriate Authority and Quality**

In her exploratory study of the criteria used by academics when evaluating the information within documents in information need situations, Barry (1994) identifies a host of situational factors, beyond the inherent topical appropriateness of documents, which influence the judgement process. Park (1993), too, points out that users' selecting the information they deem relevant to their needs involves multiple layers of interpretation derived from their experiences, perceptions, and private knowledge related to the particular information problems at hand. To which Kling and McKim (1999) add that the perceived trustworthiness of a scholarly document rests on a mix of highly personal knowledge, tastes, and interests. Indeed so, which is probably why the researchers interviewed for the present study insist that the best way to assess the quality of some information is simply reading it to see what it says... However, the massive increase of available information of potential relevance for a researcher renders the attempt to do so unrealistic, especially in these days of research assessment exercises and comparable institutional evaluation measures, which, as it has already been mentioned, exert ever-increasing pressure on academics to produce as much research output in as short a time as possible. Thus, present-day researchers are bound to be more inclined than ever to resort to longstanding props for picking out as efficiently as possible the worthwhile items from among the huge amounts of information at their disposal. Bearing out this postulation, findings of the present study indicate that researchers do indeed base their initial evaluations of some material on several criteria: the reputation of the channel used to communicate the information; the presence or absence of peer reviewing prior to the dissemination of the information; and the author's professional reputation and institutional affiliation.

A major marker of the reliability and the quality of a scholarly or scientific information source is thus the reputation of the journal or publishing house carrying it (Ellis, 1989; Ellis et al., 1993; Kling, 2004; Kling and McKim, 1999). Each discipline has its fairly well defined hierarchies of journals, with some journals being perceived as of a higher quality than others (Ellis, 1989; Ellis et al., 1993). By the same token, the relative standing of the various scholarly publishing houses is so well-known in academic circles that the houses depend on their reputations to attract significant works (Massey and Webster, 1997). Thus, researchers are capable of assessing at a glance the appropriate quality and trustworthiness of some publication on the basis of their tacit knowledge of their fields, as Ellis (1989, pp. 191-192) explains: "Different periodicals in a field have different reputations, and there is frequently a good perception of the relative prestige or quality of journals in an area. Differentiating between sources, therefore, may be employed to assess the probable quality of the material". Park (1993) contends that the perceived quality of the publication may even become a sole source for negative or positive decisions taken in the course of the selection process. Indeed, almost 70 percent of the informants participating in the present study say that looking for articles published in journals of good reputation is always, but at least often the way to ensure that the information to be used in one's research endeavours is of appropriate quality and authority, and another 20 percent of them find that it is so at least at times.

Another important indicator of the quality and reliability of some scholarly information is its having been peer reviewed. Indeed, peer review/refereeing has been repeatedly found to be held in high esteem by



scholars for the purpose of sifting out the wheat from the chaff in the information of potential relevance to their work. Thus, for example, Cronin and Overfelt (1995) note in their study of current standards and criteria for evaluating electronic publications for purposes of granting promotion and tenure that 'quality of publication' is most frequently operationalised as 'refereed/peer reviewed'. Indeed, Rowland (2002) cites a number of studies, all of which come to the conclusion that scholars regard the maintenance of peer-review systems as a top-priority requirement, with virtually no difference in the importance they accord to the practice either as authors or readers. That it should be so is hardly surprising, in view of the intended purpose of peer review, as defined by Weller (2000) in her comprehensive work on past and present peer-review practices: the determining of the value to researchers and the scholarly community of a piece of research or scholarly communication, mainly on the grounds of its likely importance and its scholarly quality, thereby filtering out the bad, the unimportant, or the uninteresting. Obviously, given today's vast scale of scholarly research, peer review has become more important than ever, as Harnad (1999) elucidates: "...without it, no one would know where to start reading in the welter of new work reported every day, nor what was worth reading, and believing, and trying to build one's own further research on".

Not that peer review is a sure-fire defence against bad science or scholarship: the process has been extensively criticised and found lacking (see, for example, Becher, 1989; Cole, 1978; Cole and Cole, 1967; Cole et al., 1977; Cole et al., 1981; Gorman, 2001; Meadows, 1979; Schauder, 1994; Zuckerman and Merton, 1979). In fact, Ginsparg (quoted in Gorman, 2001, p. 77) says it all in asserting that "when an article appears in a peer reviewed journal, that doesn't mean that it's correct..., it means only that it's not obviously wrong". Actually, recent years have seen attempts to restructure the peer review process, in order to overcome its pitfalls through harnessing the capabilities of the new emerging electronic environment for the purpose. These proposed changes to the status quo boil down to making the process more open, by replacing reviews with readers' comments (signed or anonymous) on articles, in order to help authors make necessary changes, and inform other readers about the quality of the articles (Kling and Callahan, 2003; Weller, 2000). However, as Weller (2000) emphasises, a solid, workable new model that replaces editorial peer review has not yet emerged, although post-publication review has in cases been layered on top of the traditional model of peer review, perhaps because, as Schauder (1994) contends, researchers do not seem to be very concerned about the perceived weaknesses of the system. Apparently, Meadows' (1979) a quarter of a century old observation still holds strong, despite the far-fetching changes in the research environment: the drawbacks of the peer review system are normally borne by authors with a degree of resignation, since they are perceived as a moderate price to pay for the advantages of quality control.

Thus, it is hardly surprising to find that that the scholars participating in the present investigation employ a rather wary approach to the kinds of Web-based scholarly information perceived to be unvetted, of the sort Cronin (2000) dubs 'promiscuous publishing': self-publishing on a personal or institutional Web-site, self-publishing on an institutionally maintained or disciplinary e-print server, a traditional article in a pure electronic journal struggling for legitimacy, or perhaps a working paper which is still being dynamically revised. Obviously, in these cases, unless the paper is posted on an institutional or disciplinary e-print archive, which is known to exercise some trustworthy form of quality control, the researcher cannot



possibly take into account, not to mention rely on the publication channel to vouch for the quality and the authority of the information at hand. Indeed, findings of the present study indicate that not many researchers habitually turn to these Web-based information resources. In fact, only about a third of the informants say they always or often use the information accessible on the Web; also, in view of the liability that much of it will not conform to their standards of quality and authority, they only do so after careful inspection. Moreover, researchers of different disciplinary affiliations and ages seem to be of one mind with regard to the practice: 39 percent of the humanists, 34 percent of the scientists and 31 percent of social scientists, as well as 36 percent of the under 44s, 34 percent of the 44-60s, and 35 percent of the over 61s attest to judicious use of Web-based information. Still, the percentage of those who consider the possibility wholly irrelevant to their circumstances is the highest among the humanists, 18 percent compared to 10 percent among the scientists and 9 percent among the social scientists, which is probably another manifestation of their overall more reluctant attitude to electronic scholarship.

Still, if the channel of dissemination is not always a trustworthy measure of the value of the information at hand, luckily it is but one criterion of its being up to par; there are other indicators of quality and authority to be invoked. As Kling and McKim (1999) observe, scholars look to other evidence, too, when assessing the value of a document. Indeed, another important factor in determining the trustworthiness or quality of some information is its author's reputation and institutional affiliation, as perceived by the reader. This is of course another manifestation of the phenomenon Becher (1989, pp. 56-57) singles out as one of the striking features of academic life, whereby "nearly everything is graded in more or less subtle ways... the leading journals in... [a] discipline, about which there is virtual unanimity... the institutions and departments..." In the same vein, as he goes on to say, "...there is a constant process of implicit and explicit ranking of individuals (the outstanding scholar, the student with the 'first class mind', and, more often by implication or omission, those who are less well regarded)". Indeed, as one of the participants in the present study observe, academics "walk around with invisible ranks...they all look the same, not even wearing suits or ties, or [perceptible] ranks...and yet, whoever has to know, knows without any doubt who's leading and who's led, who makes the decisions and who follows..." It is hardly surprising then, that academic researchers readily base their assessments of the quality of a given piece of work on the reputation and institutional affiliation of its author. So much so, that, as Park (1993) notes, the author's status plays such a distinctive role in the evaluation process that a prominent scholar in the field tends to become an independent decision source regardless of the subject matter of the publication being considered (along the lines of 'anything he writes is bound to be good'). In fact, as Kling and McKim (1999) assert, a non peer-reviewed posting on a Web site by a high status and well-respected scholar may well be trusted more than a peer-reviewed journal article by someone not well-known in the community.

Furthermore, previous connection with an author seems to evoke the interest of researchers in the process of information seeking, a finding which is consonant with Park's (1993) observations on the subject. Knowing the author personally may not be a consciously formulated rule or criterion for passing judgment on the quality/authority of some information, but apparently researchers almost intuitively single out from the information available to them the pieces authored by their personal acquaintances. With good reason, too: after all, if they know the author personally, they can easily predict the relevance and the worth of the information at hand. Indeed, according to the data gleaned in the present

investigation there is a far better chance that researchers will choose something written by a colleague they know in person: almost half of the study participants report that the publications of their personal acquaintances are always or often their first choice for meeting an information need, whereas less than a fifth say it is never or seldom true of them. Moreover, researchers of all disciplines seem to hold with the practice to a comparable extent, with 48 percent of the social scientists, 42 percent of the scientists and 47 percent of the humanists finding it reflects their habitual ways. Still, favouring information originating with a personal acquaintance seems to be more characteristic of the senior researchers: 59 percent of them, compared with 39 percent of the middle age group and 44 percent of the lower age group attest to giving preference to publications authored by scholars they know. Not very surprisingly, though: plainly, since the veteran researchers are bound to have established more extensive networks, as well as tighter professional ties over their longer years in academe, they are bound to have more personal acquaintances whose work they know intimately enough to be able to foresee the quality and reliability of their publications.

This obvious preference of academics for information originating with fellow researchers underscores the enduring importance of attending professional events, convenient as today's computer-mediated communication opportunities are. True, it is not inconceivable that the researchers participating in the present study may be somewhat wary of admitting to the social purposes of attending national or international conferences, knowing full well that academics' frequent trips abroad are often viewed with a jaundiced eye. Still, a third of the informants consider the opportunity afforded in these gatherings to form ties with other researchers in the field the primary purpose of their attending, with another third reporting it to be the case at least occasionally.

Having slightly digressed from the main topic of our discussion here, the conclusion to be derived from all that has been said heretofore is that scholars have more than one indicator of value at their disposal when they set out to single out from the abundance of available information the items of appropriate authority and quality. In point of fact, as Kling and McKim (1999) assert, they often use all these available indicators in combination. Indeed, findings of the present study leave little doubt that establishing the authority and/or determining the quality of scholarly and scientific information is for many researchers the time-honoured, two-tiered process of first selection made on the basis of authorship and channel of publication, followed by more in-depth scrutiny of the items, which have been found to merit further consideration. Nearly half of the informants say that they always or often assess the value and trustworthiness of some information by first noting who its author is (where he teaches, what his academic degree is, etc.), and the journal it is published in, and if by this stage the article looks worth their while, they devote some time to a more in depth scrutinising of its contents. An additional quarter of the study participants testify that they do so at least at times. Still, a closer look at the findings highlights here again the variegated nature of the information needs and information behaviour of academics.

Apparently, the scientists and the humanists consistently manifest a surprisingly similar extent of support of the notion of banking on indicators of value and trustworthiness extrinsic to the information itself, with about two thirds of the informants in each group saying they take into consideration the reputation of the journal in which the information appears, and approximately a third of the informants in each group



voicing the same view as to the value for the purpose of the combined measures of authorship and venue of publication. However, it appears to be likely that the similar patterns of behaviour the two disciplinary groups thus manifest stem from different incentives, a point soon to be elaborated on. Very interestingly indeed, it is the social scientists who demonstrate a greater reliance on the time-honoured 'props' of authorship and channel of publication for evaluating the quality and authority of some information. More than three quarters of the social scientists deem the reputation attributed to the scholarly journal, and over half of them the option of relying on authorship and channel of publication, important for the purpose. These variations in the information behaviour of researchers may be associated with differences both in the extent of agreement on standards of scholarship in the various disciplines, as described by Becher (1989), Meadows (1993), and Zuckerman and Merton (1979), and in the way in which ideas are transmitted, as pointed out by Bates (1996a), Becher (1989) and Stoan (1991).

At the hard end of Storer's (1967) continuum of disciplines, the criteria for judging what constitutes adequate scholarship are clear enough. Claims to new contributions, derived as they are through rigorous observation and analysis of relationships between carefully controlled variables, simply need to be correct (or at least to seem correct). Not so, however, in the particularistic, interpretive and overtly value-laden domains nearer the soft end of the continuum, where there is a diversity of criteria for, and a lack of consensus about, what constitutes an authentic contribution to a particular field. In these areas, where new offerings commonly take the form of enhanced insights into, or new understandings of familiar objects of knowledge, a piece of work needs to be not so much 'correct', in the aforementioned sense of complying with the results of rigorous observation and analysis, as representing a significant step forward in understanding.

Furthermore, as it has been repeatedly emphasised, knowledge in the 'harder' domains is summative, with new findings typically generated by a linear development from the existing state of awareness. The research process is thus the accretion of knowledge, which focuses on clearly defined and circumscribed questions at the cutting edge of the scientific developments. The resulting newly generated information is routinely communicated through personal contacts at conferences, and through the exchange of papers, technical reports and preprints that precede the appearance of the information in a refereed journal. Therefore, the journal article, when it appears, reports unequivocal results, which, in consequence, are effectively communicable in a short space, especially as the reader's acquaintance with the background argumentation and the standardised symbol system of the field are taken for granted. In comparison, in the 'softer' domains, where the pattern of development is predominantly reiterative and academic work is characterised by the scatter of problems investigated at any given point of time, the reporting of research results is not only contingent on context building, but will also typically include competing explanations and interpretations of the facts (Wilson, 1980, cited in: Stoan, 1991). Moreover, the high degree of ambiguity of results dictates a more detailed presentation of how the research has been undertaken, its purpose and implications, to justify the particular information being put forward. Thus, in the 'softer' areas the published results of research contain a detailed account of the process whereby the scholar arrives at the new contribution (Bates, 1996a).



The different patterns of reliance on markers of value for assessing the quality and authority of information, as they are discernible in the present study, can be tentatively ascribed to these disciplinary-rooted differences in the standards and reporting of research. Thus, the nearer a knowledge domain is to the 'hard' end of the continuum of disciplines, the easier the task of the researchers working in it when they set out to determine the quality or reliability of some information. The criteria for determining if some information is of value are likely to be clear-cut, and the document itself brief, which means that the researchers can more easily forego the utilisation of any 'props' for judging the worth of the information at hand; since it is quite feasible to read the document itself without exerting too much effort, these props may at times be simply expendable.

As to the researchers affiliated with knowledge domains at the opposite, 'soft' end of the continuum - they are not very inclined to accept some information on faith, either, but for a very different reason. Where the standards of what consists 'good' or trustworthy scholarship are more flexible, and where, as Bates (1996a, p. 698) puts it, the 'discoveries' in fact inhere "in the unique vision of the scholar – the particular way in which evidence is marshalled, the particular insights developed and expressed...", it may be necessary to assess the value of some information by judging it on its intrinsic merits as these fit in with the researcher's private state of knowledge and perceptions. Also, reading the typically longer humanities expositions plainly takes longer. It seems then, that if scientists do not really *need* external measures for evaluating information, humanists are often simply *unable to use* them. It would seem reasonable then that social scientists, located as they are mid-way between the 'hard' and the 'soft' ends of the continuum, would *need* to utilise markers of value for assessing information more than the scientists, and would also *be better able to put them to good use* than the humanists, which, in fact, is the conclusion the findings of the present study lead up to.

To sum up, in reply to the question posed at the outset of this study as to how today's researchers single out the items of appropriate authority and quality from among the abundance of information at hand:

**Today's researchers continue to rely on the time honoured, two-tiered process of establishing the authority and/or quality of scholarly information. First selection is usually made on the basis of external measures: the reputation of the communication channel; the presence/absence of peer validation; acquaintance with the author; the author's reputation and institutional affiliation. However, there seem to be different disciplinary patterns of reliance on these markers of value for assessing the quality and authority of information, with social scientists needing them more than the scientists, whilst also being better able to put them to good use than the humanist. The items of potential value thus singled out are then judged on their intrinsic merits, as these fit in with a researcher's personal state of knowledge and perceptions.**



### **6.7.2 The Perceived Quality and Authority of the Scholarly Information to be Found via More Marginal Publishing Venues: The Case of the Journals Not Considered Top Quality**

As it has already been noted, each discipline has its fairly well defined hierarchies of scholarly journals and publishing houses, with some publishing venues considered of a higher quality than others (Ellis, 1989; Ellis et al., 1993; Massey and Webster, 1997). Thus, in the realm of periodicals "every major... field has a few high status journals whose content is controlled by a small set of gatekeepers and is widely read within its scholarly community[, whereas] other journals that are believed to be of lesser quality and at the bottom tier are 'write only journals' that few scholars read regularly" (Kling and Covi, 1997). Therefore, as Harnad (1990, 1999) contends, the archiving of scientific ideas and findings is in fact on a continuum, with varying degrees of formality, reliability and peer validation, from the most prestigious and rigorously reviewed at the top, to what is virtually a vanity press, at the bottom. Since scholarly readers obviously need trustworthy and high-quality publications, it seems to be a foregone conclusion that they will give much more weight in their information seeking to the publications they consider to be as near as possible to the top end of the continuum.

In point of fact, however, the researchers participating in the present study maintain that information of appropriate quality and authority may be found in more marginal journals too: 61 percent of the informants testify that they never, or at least seldom, limit their information seeking to the top journals only, as opposed to 10 percent, who say that they always or often do. However, as it so often seems to be the case where scholarly information needs and information behaviour are concerned, researchers of different disciplinary affiliations do not see eye to eye as to the possibility that information of value is to be found in more marginal journals too. Apparently, the scientists are somewhat less inclined to turn to more marginal journals when they search for information than their humanist or social scientist colleagues: 51 percent of the scientists, compared to 56 percent of the humanists and 66 percent of the social scientists testify to habitually doing so, and slightly more of the former, 13 percent, compared to 11 and 6 percent, respectively, of the latter say they never or seldom do. True, the inter-disciplinary differences in the extent to which the practice is reported to be characteristic to the researchers' information work are not very striking, but the trend discerned fits in with the interesting evidence presented by Zuckerman and Merton (1979) as to discipline-associated differences in rejection rates of manuscripts submitted for publication. Having found substantial variation in rejection rates, which amount to 20 to 40 percent in the physical sciences, and 70 to 90 percent in the social and behavioural sciences and in the humanities, Zuckerman and Merton ascribe these to a considerable extent to the aforementioned variation in consensus across fields with regard to standards of adequate science and scholarship. Although the possible sources for the wide variation in rejection rates have been hotly debated in subsequent studies (see Cole et al., 1988; Hargens, 1988a; Hargens, 1988b), longitudinal data on journal rejection rates show that they have been very stable over time (Hargens, 1988a). Given academics' intimate familiarity with the rules of the publishing game in their disciplinary milieus, there can be little doubt that they are well aware of the rejection rates typical to their fields. Therefore, it is only to be expected that humanists and social scientists would be more likely to expect to find information worthy of their attention in marginal journals than their scientist counterparts: after all, they know only too well how difficult it is to get published in the most respected journals in their respective subject areas, and therefore have a very good notion of the likelihood of high-quality and/or authoritative information



finding its way to less than the most prestigious journals. As one of the interviewees for the present study (a philosopher) put it: "If an article is not published in a first rate journal... it hasn't been accepted in one, which, however, doesn't mean that it's no good... I know of excellent articles which were published in truly marginal journals... "

To sum up, in reply to the question posed at the outset of this study as to the extent to which today's researchers are ready to accept more marginal scholarly journals as information sources of appropriate quality and authority:

**Maintaining that information of appropriate quality and authority may be found in more marginal scholarly communication channels, too, on the whole today's researchers do not limit their information seeking to the top journals only. Still, humanists and especially social scientists are more likely to turn to journals not considered first rate than scientists.**

### **6.7.3 The Perceived Quality and Authority of the Scholarly Information to Be Found via Novel, Web-based Publishing Venues: The Case of the Pure E-journal**

There seems to be wide agreement in the many studies exploring the three decades old electronic scholarly publishing initiatives that the common denominator at the roots of the overall reluctance of academics to embrace the electronic journal is a lack of trust in the quality and reliability of the information therein (Budd and Connaway, 1997; Rusch-Feja and Siebeky, 1999; Zhang, 1999), a notion which clearly emerges from the present study too.

Perhaps inevitably so: as long as scholars fear that the academic establishment will not consider the pure e-journal of the same calibre as a traditional journal, they understandably exhibit a disinclination to submit their best work to electronic media (Budd and Connaway, 1997; Cronin and Overfelt, 1995). Also, the as yet unresolved problem of assuring the integrity and availability in perpetuity of digital publications is another strong deterrent for doing so (Singleton, 1994; Tenopir et al., 2004). Furthermore, although peer-review is medium-independent, as Cronin and Overfelt (1995) so rightly point out, and indeed, many of the pure electronic journals are peer reviewed in the traditional manner, or at least undergo some sort of informal, so called 'open', pre- or post-publication peer commentary procedures (Rowland, 2002; Weller, 2000), they are commonly held to be presented to their intended audiences without any quality filtering (Tomney and Burton, 1998). No wonder then that many studies, inclusive of some which do not differentiate between pure e-journals and identical, electronic versions of paper journals, testify to a tendency in academe to view e-journal articles as second-tier publications, inferior in quality to traditional ones, and as such – of considerably less appeal (Anderson et al., 2001; Bell, 1997; Bonthron et al., 2003; Brown, 1999; Butler, 1995; Harter, 1998; Speier et al., 1999; Voorbij, 1999). Indeed, pure e-journals seem to be held in a category by themselves, way down below on Harnad's archiving continuum. Still, findings of the present study indicate that researchers, and especially the younger ones among them, do not hold pure e-journals in as a low esteem as rumour would have it.



True, almost a fifth of the informants rate the whole notion of journals published only in an electronic format altogether irrelevant to their circumstances, a finding which can probably be taken to indicate that they are non-users of pure electronic journals. However, overall, although only 32 percent of the study participants think that the pure e-journals are on the same level as the traditional ones, they nevertheless slightly outnumber the 27 percent who hold the opposite view. Still, it is important to note that since theory and practice do not necessarily always go hand in hand, it is not inconceivable that even those researchers who consider the quality of the articles in pure e-journals to be the same as in traditional journals, do not necessarily integrate the information to be found therein into their scholarly work. Indeed, for example, in a readership survey of the *Interpersonal Computing and Technology Journal* (IPCT) into authors' and readers' concerns with the credibility, access, and permanence of a pure electronic journal, conducted by Berge and Collins (1996), whilst 84 percent of the respondents do characterise the information in the pure e-journal studied as the same or better quality compared with that found in scholarly, refereed, print journals, only 14 percent of them say they have actually cited the journal's articles in their work.

Interestingly, there do not seem to be any marked discrepancies in the views held by academics affiliated with different knowledge domains as to the quality of information in pure e-journals, with about a third of the researchers in each disciplinary group endorsing the alleged inferiority of pure e-journals, and another third taking the opposite stance. Still, not unexpectedly, considering their more sluggish move to electronic scholarship, the humanities researchers are somewhat more likely to deem pure e-journals irrelevant to their information work practices than their scientist and social scientist colleagues: 20 percent of the former compared to 10 and 13 percent of the latter, respectively, report to this being the case.

The relatively unified front presented across the disciplines concerning the quality and reliability of information to be found in pure e-journals is all the more interesting considering the aforementioned discipline-specific patterns of electronic journal use when researchers gather information for a literature survey: apparently, scholars carry over their patterns of journal use to e-journals, as long as they perceive them as traditional publications, that is, print journals which happen to have electronic formats too, but not to pure e-journals. However, although limitations of the present study allow for tentative conclusions only, it seems that across the disciplines the younger researchers are less inclined to consider pure e-journals inferior to traditional journals with electronic versions than their more senior counterparts: for example, the extent of agreement with the notion comes to 11 percent of the under 44s compared to 30 percent of the over 61s in the sciences, 25 percent compared to 33 percent respectively in the social sciences, and 40 percent compared to 50 percent respectively in the humanities.

To sum up, in reply to the question posed at the outset of this study as to the extent to which today's researchers are ready to accept pure e-journals as information sources of appropriate quality and authority:

**Today's researchers reveal an increasing, if as yet limited tendency to deem the quality and authority of articles in pure e-journals on par with traditional ones. Still, humanists are more likely than scientists or social scientists to consider the information to be found in e-journals wholly irrelevant to their research needs.**

#### **6.7.4 The Perceived Quality and Authority of the Scholarly Information to Be Found via Novel, Web-based Publishing Venues: The Case of the Unrefereed E-print Repositories**

As Kling and Covi (1997) observe, if researchers at times dismiss the value of journals for communicating the results of their investigations, it is because the publishing delays of one to three years between the time that an article is accepted and it appears in print render them purveyors of 'old news'. Indeed, in many specialties, but in particular in the fast moving, 'urban' fields, there is a clearly discernible preprint culture, which, as Becher (1989, p. 80) describes, "...involves a fairly large scale, semi-private circulation of photocopies of papers in typescript before they appear in orthodox journal form (as a sizable number subsequently do). This practice has the advantage of helping to establish the priority of the authors' findings without the delay often attendant on formal publication..." Actually, over the years, academic departments and research laboratories in a number of fields have even developed institutionally organised, semi-formal, paper-based processes for exchanging manuscripts and technical reports (Kling et al., 2002; Kling, 2004). Thus, the popularly held belief, noted by Kling (2004), according to which the systematic exchange of refereed research manuscripts began with the Internet, and even more specifically with Paul Ginsparg's development of an e-print server at Los Alamos National Laboratory in 1991, is in fact erroneous. It is, however, undeniable that the development of the Internet and the World Wide Web has facilitated the electronic exchange of draft versions of research papers (e-prints or e-scripts), which allows for much more timely and convenient access to the most recent research findings. Originally culminating in authors' self-posting on personal websites (Hibbitts, 1996, 1997; Okerson and O'donnell, 1995), by the late 1990s scholarly communication via e-prints has taken on the form of organised publishing models: field-wide, disciplinary e-print repositories, of which the most visible is Ginsparg's ArXiv.org (Crawford et al., 1996; Harnad, 1999; Hurd, 2000), or institutionally organised e-print repositories, dubbed by Rob Kling 'guild publishing', such as the Web site of the series of working and research papers devoted in its entirety to writings of the Berkeley Roundtable on the International Economy (BRIE) members (Kling et al., 2002; Kling, 2004).

The advantages of the electronic preprint systems are of course indisputable: rapid and inexpensive dissemination of research results to a broad audience, speedy input from peers from all over the world, and enhanced features of communication, for example, the inclusion of large data sets in research reports (Garner et al., 2001; Gorman, 2001). At least in theory, there seems to be just one point of contention concerning the dissemination of research results as e-prints posted on the Internet: the scholarly value of the information to be had. After all, anyone can post research to electronic servers, which, unlike most scholarly journals, disseminate information without pre-publication, peer-review contingent selection. Thus, for example, Lucky (2000) sees as a major obstacle to researchers' widespread utilisation of e-print



repositories the lack of rigorous expert review of the information posted therein, for, "in a world increasingly filled with questionable and irrelevant material, the guidance of peers regarding what is genuinely worth our time to read and examine has become more critical than ever" (p. 263). Perhaps so, although Cronin (2000) contends that the significance of the development of e-print archives is precisely that it challenges historical assumptions about the usability of unvetted information. Still, Paul Ginsparg's claim (quoted in: Gorman, 2001) that "the advantages of having the information immediately available outweigh any disadvantages" certainly do not seem to be reflected the prevailing practice in academe. Rather to the contrary: as Kling (2004) testifies on the basis of his comprehensive review of the attempts to advance scholarly communication via unrefereed e-scripts, individual postings of research papers on personal, institutional or disciplinary Web sites are confined to a minority of academic disciplines. Findings of the present study, too, indicate that on the whole personal or institutional websites and e-print archives are hardly popular options for meeting research information needs: 42 percent of the informants never or seldom use them, and 10 percent find the notion altogether irrelevant to their work, as opposed to no more than 28 percent who habitually check them out when they look for information.

The question is, of course, why. Why is it that the academic community does not as one flock to these promising-looking solutions to the communication of research information? The literature cites a host of obstacles to the massive migration to unrefereed publishing on the Web: authors fear that publishing an e-print will preclude later publication in a peer-reviewed journal, which might jeopardise their prospects for promotions and grants; authors are understandably wary of exposing raw, unrefereed work to the research community at large; authors may be reluctant to post their papers on the Web for fear of accidental or malicious alterations or plagiarism; authors worry that papers disseminated via these unorthodox channels will never be found through conventional bibliographic tools, and in result, they will have more difficulty reaching their intended audiences (Garner et al., 2001; Harnad, 1999; Kling, 2004).

True, some analysts of the role of e-scripts in scholarly communication brush these difficulties aside as stemming from "the sluggishness of human nature and its superstitious cleavage to old habits" (Harnad, 1999). Therefore, their reasoning goes, it is just a matter of time until scholars in all disciplines realise that some form of e-print based on-line publishing is the "best way to communicate knowledge, and hence to create new knowledge" (Ginsparg, 1999). However, other experts studying the phenomenon put forward an alternative scenario, maintaining that it is more likely that we will see field-specific or even sub-field specific variations in the adoption of e-print based information dissemination systems (Cronin, 2000; Hurd, 2000; Kling, 2004; Kling and McKim, 2000). Inevitably so, they contend, for these variations, stem from fundamental differences in the very nature of the research enterprise in the different fields, whether in a print or an electronic environment. After all, as Harnad (1999) points out, the reluctance manifested by some researchers to embrace the new model of e-print based information dissemination cannot invariably be explained by their not having taken to the Net and the Web, for it is discernible even among those who take full advantage of e-mail, online discussion groups, online storage and exchange of data and the like. Rather, as both Kling and McKim (2000) and Cronin (2000) suggest, electronic forums must suit the practices of a field, otherwise they will not be socially acceptable. Thus, for example, in some fields, where there is a time-honoured pre-print culture, the adoption of e-print based information dissemination seems to be much more widespread than in areas, where pre-print

exchanges are less normative, especially the ones with patenting opportunities (Gorman, 2001; Hurd, 2000). Also, as it has already been noted, the reliance on unrefereed work varies among the different fields, in consequence of which the dissemination of research results without formal peer review procedures may or may not be deemed acceptable (Cronin, 2000; Gorman, 2001). The findings of Brennan et al. (2002), indicating striking variations across the different specialties within the basic and health sciences on the issue of preprints, and the authors' conclusion that the high-energy physics communication system that relies on preprint databases will not necessarily serve as a model for other fields, seem to underscore this line of thinking.

It seems then that the findings of the present study as to researchers' perceptions of the quality and authority of the scholarly information to be found via the novel, Web-based, unrefereed publishing venues can only be taken to reflect the general drift of developments. Apparently, attempting to draw the picture of the prevailing attitude by differentiating between the sciences, the social sciences, and the humanities is using too wide brush-strokes for the purpose, for these cannot possibly reflect faithfully enough the field-specific, rather than discipline-specific idiosyncrasies characterising the developments in this area of research information needs. Thus, although the scientist participants in this study, and especially the younger ones among them, do reveal a greater willingness to utilise these novel, e-print based opportunities for meeting their information needs than their social scientist or humanist counterparts, the discipline-level differences found are not as polarised as they are popularly believed to be: whereas 34 percent of the scientists report that they always or often opt for the practice, so do 18 percent of the social scientists and 28 percent of the humanists. Indeed, Massey-Burzio's (1999) finding concerning her humanist interviewees' sceptical attitude to the Los Alamos pre-print project as a model for themselves has not been borne out by subsequent developments: in recent years we have witnessed the development of e-print servers in humanities fields, too, among them, history and philosophy. It seems to be indicated then that the divide between fields is indeed on a more specific level, perhaps, as Kling and McKim (2000, p.1315) suggest, "between fields where researchers share unrefereed articles quite freely ('open flow fields') and those where peer review creates a kind of chastity belt ('restricted flow fields')".

To sum up, in reply to the question posed at the outset of this study as to the extent to which today's researchers are ready to accept unrefereed e-print repositories as information sources of appropriate quality and authority:

**Scientists, and especially the younger ones among them, reveal a greater willingness than their social scientist or humanist counterparts to turn to disciplinary or institutionally organised e-print repositories of unrefereed information. However, the discipline-level differences do not seem to be as polarised as they are popularly held to be, probably because the developments in this area of research information needs are field-, rather than discipline-specific.**



## **6.8 The Date/Currency Aspect of Researchers' Information Needs and Practices**

As it has already been pointed out, researchers by and large consider keeping informed of new developments an essential part of the scholarly endeavour. However, their notions of what exactly constitutes 'current' information, and how far back in time information may still be relevant to their ongoing work have been shown in a host of studies to vary greatly with disciplinary affiliation (reviewed in: Budd, 1989; Hurych, 1986; King and Tenopir, 1999; Rothenberg, 1993; Tenopir and King, 2000; Wolfe-Thompson, 2002). Thus, whereas in the 'hard' knowledge domains researchers rely primarily on recent work and set great store by the very latest information, inclusive of information on research still in progress, in the 'soft' knowledge domains researchers use materials from a much broader age spectrum and do not approach the need to gain awareness of new developments with nearly the same degree of urgency. Still, with the Internet setting new standards for the accessibility to both new information generated and past information in existence, there seem to be some, admittedly (as yet?) very slight intimations of possible changes in these differential patterns of currency needs.

### **6.8.1 Discipline-Specific Patterns of Maintaining Currency**

Noting that 'current' is as ambiguous a concept as 'now', which can mean a time span from 'this very instant' to 'these days', Wilson (1993b) contends that one may claim to be current without claiming to have information about what is happening in 'real time' – i.e., right now. Indeed, although maintaining currency is, as a rule, perceived by researchers to be mandatory rather than optional, the level of currency to be maintained is in fact dictated by the different nature of research, and its attendant social norms of what is considered 'required' behaviour, in the 'hard' versus 'soft' knowledge domains.

As it has been repeatedly noted in the course of this discussion, in the 'hard' knowledge domains "researchers tend to occupy a narrow area of intellectual territory and to cluster round a limited number of discrete topics..., [whereas in the 'soft' domains, researchers] span a broader area, across which problems are thinly scattered and within which they are not sharply distinguished" (Becher, 1989, p. 154). Thus, if competition, stemming as it does from the importance accorded to gaining a professional reputation, is a characteristic feature of academic life as such, it is tenfold so at the 'harder' end of Storer's (1967) continuum. In fact, scientists often find themselves in a race for the solution to the current problem at the frontier of the field, which, therefore, as Gaston (1971) puts it, resembles more than anything a contest "between runners in the same track and over the same distance at the same time" (quoted in: Becher, 1989, p. 92). Plainly then, the nearer their areas to the 'hard' end of the continuum of disciplines, the greater the likelihood that researchers will define their currency needs as more pressing, both in terms of timeliness and speed of access. Furthermore, here again the aforementioned summative nature of science information, as opposed to the cumulative or aggregative nature of humanities information (Budd, 1989; Meadows, 1974; Price, 1963; Stoa, 1991; Watson-Boone, 1994) comes into play: since each new scientific discovery is based diametrically on a prior one, learning of new developments as soon as they occur is frequently an indispensable prerequisite of a researcher's making progress with his or her own investigations. Not so, however, in the humanities, where, new additions to the corpus of knowledge do not directly stem from previous ones, or to use Becher's (1989) metaphorical description, where knowledge evolves like an organism or meanders like a river. Therefore, it may be very important indeed



for researchers in the 'softer' domains to be well acquainted with scholarly work of pertinence to their own, but in their case there is less of a time pressure in doing so: after all, their immediate progress with their own endeavours does not depend on learning of new developments as soon as they are made known.

Stemming as they do from the idiosyncratic nature of research in the different knowledge areas, it is hardly surprising therefore to find that the previously established patterns of discipline-specific currency needs among researchers are wholly re-affirmed by the data gleaned in the present investigation.

The scientists informants for this study undoubtedly express the most pressing need to learn of progress made in their areas of interest, although, interestingly, even in the sciences keeping up with the latest developments apparently does not invariably mean having to learn of them as soon as they happen (or at least as soon as they are publicised). Thus, even in the sciences no more than half of the researchers state that because of the dynamic nature of their fields the need to keep up with current developments is always or at least often present for them, and only a quarter of them claim that they are actually 'addicted' to starting each day with checking out new information posted overnight on the Web. In comparison, the social scientists seem even less pressured, if not by much, to keep up with any new pertinent research results available, with slightly more than a third of them saying that they always, but at least often see to it that they keep current, although they do manifest an unambiguously far less unenthusiastic attitude to the possibility of being 'addicted' to maintaining currency: only a negligible 4 percent of them testify to habitually starting the day with checking for new information which may have been posted overnight. As to the humanists among the participants – they register considerably less interest than their scientist or even their social scientist colleagues in following closely the progress made in their fields: only 15 percent of the humanists say that they really need to keep up, and no more than 6 percent of them consider keeping current an 'addiction'. Still, the possibility, raised by the researchers interviewed at the qualitative stage of the present undertaking, of today's humanists increasingly demonstrating a greater need to follow more closely the developments in their areas of interest, cannot be ruled out altogether, considering that the novice humanists seem more currency-minded than their senior counterparts. Thus, for example, the percentage of the under 44s testifying that in view of the dynamic nature of their fields the need to keep current is true of them is almost twice that of the 45-60s, 20 percent compared to 12.5 percent, and, in a similar vein, whereas only 10 percent of the under 44s among the humanist informants hold the opposite view as to the need to keep current, 21 percent of the 45-60s and 18 percent of the over 61s voice the same opinion. By the same token, whilst 10 percent of the humanists in the under 44 age bracket declare that keeping up is for them an 'addiction', none of the 45-60s and the over 61s say so too. Of course, the support accorded in the humanities to the need to keep current is overall quite low, certainly a far cry from the sciences, but even from the social sciences. Still, the findings may be the first signs of the very beginnings of a possible change of approach among humanists to maintaining currency, although obviously the point needs to be investigated for any definitive conclusions to be reached, especially considering that the novice researchers manifest an overall more marked willingness to seek out current information. Hardly surprisingly, of course: as the newcomers to academe are often still in the process of finding their own scholarly niches, their need to learn of any new developments in their areas of interest is especially pressing; and as they are also as yet less widely networked in their disciplinary communities, they also need to go about it more proactively.



Furthermore, the ease of electronic access to current information may have changed the standards of 'being up to date' in academe. Thus, today's norms of 'appropriate' scholarly behaviour seem to entail following more closely the progress made in one's field, though only in relative terms, within the boundaries of discipline-specific notions of what 'keeping current' entails. Indeed, the just-cited quantitative findings seem to underscore the qualitative-stage based reasoning that humanities researchers can no longer afford to rely solely or even mostly on older material, especially not if they are still at the beginning stages of their careers, for fear of risking being branded 'behind the times' or old-fashioned, and in consequence, impeding their chances of getting published. No doubt this state of affairs presents a strong incentive for humanists, too, and especially for the more junior researchers among them, to be increasingly mindful of the new publications coming out in their areas of interest. Still, since the data presented here yield only intimations of a changing attitude among the humanists towards maintaining currency, the possibility needs to be investigated further.

To sum up, in reply to the question posed at the outset of this study as to the level of currency contemporary researchers strive to maintain:

**Although the standards of 'being up to date' in academe seem to have changed in our era of easy electronic access to current information, keeping up with the latest developments does not invariably mean having to learn of them almost 'in real time'. Still, today's norms of 'appropriate' scholarly behaviour may entail following more closely the progress made in one's field, though only in relative terms, within the boundaries of discipline-specific notions of what 'keeping current' entails. Thus, social scientists and especially scientists exhibit the pressing need for current information they always did. Their humanities counterparts, however, demonstrate a lesser degree of the complacency traditionally ascribed to them as to the need to keep up-to-date.**

### **6.8.2 Discipline-Specific Variations in the Time-Depth of Information Needed**

According to Line and Sandison (1974) in their seminal article on changes in the use of literature with time, there are two periods in the life of a publication: an early period, in which it is read mainly for purposes of gaining awareness of new developments, and a 'basic' one, extending over its whole life, in which it is subsumed in subsequent research. Further to their contention, conventional wisdom holds that an information source is at its peak of use during the first period of its life, becoming less and less frequently used with time. True, Rothenberg (1993), reviewing the body of literature testing the notion, argues that studies have failed to show the expected measurable decline in use, but King and Tenopir (1999) cite ample evidence in support of the thesis (at least in the sciences and the social sciences). Either way, whether there are demonstrably fewer readings of older materials or not, they are rated more important than new articles, more time is spent reading them, and a higher proportion of them are consulted to prepare a formal publication, such as an article or a book (King and Tenopir, 1999; Tenopir and King, 2000). Moreover, Odlyzko (2000) claims that the shift towards electronic formats based

scholarly communication brings about a much wider usage of older materials. Apparently, on average, an electronic article gets downloaded most frequently within one year of its submission, with the largest number of downloads to articles from the current month's issue; in subsequent months accesses drop, but whereas for print journals usage continues to decrease with time, for electronic information it appears to increase. "This", says Odlyzko, "supports the thesis that easy online access leads to much wider usage of older materials" (p. 13).

In any case, one point which does seem to have been established beyond doubt is that obsolescence, the decline in the use of published material over its lifetime, is very much a discipline-specific phenomenon: obsolescence of primary ('raw') material occurs (if it occurs at all) more slowly towards the 'softer' end of the continuum of knowledge domains, and whilst secondary works, which interpret the primary material, may very well age and become obsolete as new scholarly advances are made in the 'soft' disciplines too, the process is likely to take far longer. Thus, the time-depth of information required in the 'softer' areas is far greater than that of the 'harder' domains (see, for example: Bates et al., 1995; Budd, 1989; Garfield, 1980; Line and Sandison, 1974; McCain, 1986; Walker and Atkinson, 1991).

This difference in the time-depth of information needed in the 'hard' versus the 'soft' disciplines is undoubtedly a reflection of the inherently different nature of research at the opposite ends of Storer's (1967) continuum of knowledge domains. As it has been previously noted, at the 'hard' end of the continuum, researchers must have the result of previous work pertaining to their own, but much less the particular writings reporting it. In stark contrast, in disciplines at the opposite, 'soft' end of the continuum, scholars cannot incorporate prior knowledge in their own research, unless they get hold of the specific documents which convey it, for the unique insights of the author form a vital part of the breakthrough reported (Bates, 1996a; Stoa, 1984, 1991). The very nature of the research endeavour in the different knowledge domains dictates, therefore, the aforementioned differences in the levels of reliance on past information, whereby humanists use materials that are older than those non-humanists use. It is hardly surprising then that the present study confirms the previously established discipline-specific patterns of time-depth needed in research information work.

As anticipated, the scientists participating in the present investigation, and to a lesser degree the social scientists, are more likely than their humanist colleagues to consider research conducted a few years back actually obsolete: of the former, slightly over a third and a quarter, respectively, say so, compared to a negligible 6 percent of the latter. Still, even among the scientists and the social scientists only the minority claim that information becoming obsolete in a few years is always or even often the case, although in both groups even more of the researchers oppose the notion: a quarter of the scientists and more than a third of the social scientists. Still, it is only among the humanists that the clear majority of researchers (62 percent) declare that in their fields of information never or seldom becomes obsolete in a few years, and a fifth of them even consider the idea altogether irrelevant to their circumstances.

Furthermore, although the scientists and the social scientists, unlike their humanist colleagues, can rely in a pinch on a review article and/or a good literature review in a new publication to provide them with a concise summary of the salient developments in a given field, they still express a need for the original publications. Indeed, about half of the informants in either of these disciplinary groups consider original



publications as always or often vital for a thorough appreciation of a subject, and almost as many of them say it is the case at least at times.

Interestingly, the younger researchers across the different disciplines are invariably more likely to think that research becomes obsolete in a few years than their more senior counterparts: for example, two thirds of the under 44s among the scientists, compared to less than a third of the 45 – 60s and no more than two tenths of the over 61s say so. Possibly, the younger generation of researchers, who, as it has been noted above, are the more mindful of the need to keep current, are also more attuned to progress made in their fields, inclusive of paradigmatic changes in the current thinking characterising their areas of expertise. If so, they may very well be quicker to consider publications reporting previous knowledge obsolete. Still, here again the finding is based on limited sample sizes, which necessitate its further exploration.

To sum up, in reply to the question posed at the outset of this study as to whether the previously established discipline-specific patterns of time-depth needed in research information work continue to hold:

**Very much in line with the previously established, discipline-specific patterns of time-depth needed in research information work, today's scientists voice a need for the latest works mainly, whilst social scientists and humanists need both current and retrospective information. Still, although scientists are more likely than their social scientist, and certainly more than their humanist colleagues to consider research conducted a few years back actually obsolete, it is hardly the prevalent view even among them. Interestingly, the younger researchers across the different disciplines seem to be more inclined to think that research becomes obsolete in a few years, possibly since they, being the more mindful of the need to keep current, are also more attuned to progress made in their fields.**

## **6.9 The Speed of Delivery Aspect of Researchers' Information Needs and Practices**

The easy availability and effortless accessibility of the host of resources, channels and facilities which enable the transferring of information from one end of the world to the other in a matter of seconds have certainly set new standards for the speed with which information is counted on to reach us. The Internet based commercial information services, the Web, and the omnipresent electronic information communication tools, the e-mail, the fax, and recently even the mobile phone, just to name the most popular, seem to add up to a boundless capacity to satisfy every information appetite on the spot. Indeed, it is one aspect of information needs where customer expectations are by now plainly sky-high, as Nicholas et al. (2003, p. 28) assert: "Total access and speed of delivery appear to be the consumers' key information needs requirements... Nobody today wants to wait; nobody wants to queue – even if they could. Time is plainly a rare commodity... Real-time information, once the exclusive and treasured

domain of journalist/stockbroker, is open to all and is now what everyone wants, it is the benchmark". Indeed so: 'everyone' is truly everyone, and academics are no exception. However, if with regard to their expectations as to the speed with which their information needs are to be met, scholars are no different from those of their contemporaries from all walks of life, when it comes to their actual information needs and information behaviour, they are, apparently, in a class of their own.

#### **6.9.1 Researchers' Expectations as to the Speed with which Their Information Needs are to be Met**

As it has repeatedly been pointed out in the course of this study, the creation of new knowledge is contingent upon the availability to the researchers of the rich, continually incremented information contributed by their peers well as by their predecessors. In result, the tempo of scientific and scholarly progress is, and has always been greatly affected by the speed with which information reaches the researcher, as Lucky (2000, p. 259) elucidates: "In the 16<sup>th</sup> century, science progressed at the pace of the postal system. Often it would take 6 months for one scientist to learn of the ongoing results of another. [Therefore], it took even more time for scientists to build on one another's accomplishments..." In comparison, today's "instant access to a billion documents from the comfort and privacy of our office or laptop" (p. 263) is rich with the promise of unprecedented speeding up of the progress of science and scholarship, on the communal, as well as the individual level. No wonder then that contemporary researchers expect swift and prompt delivery of information, no less, a notion wholly corroborated by the findings of the present study.

Apparently, in these times of electronic access to information, researchers do indeed count on an instantaneous response to their information requirements: 57 percent of the informants for this study testify that when the need for some information crops up in the course of their research, they always or often want immediate solutions, and only 16 percent say they never or seldom do. Interestingly, however, there seems to be reason to believe that the expectations thus voiced are not so much intrinsically important features of the research enterprise as expressions of 'the right thing to say'. Thus, if willingness to pay for obtaining necessary information more quickly is a measure of the value accorded to the speedy delivery of information, the researchers queried do not seem to be all that supportive of the notion, after all: no more than a fifth of them are prepared to spend any of their hard-to-come-by research moneys on speeding up the process. However, here, too, researchers manifest differential, disciplinary-culture and/or stage of career associated information needs. Clearly, the scientists and the social scientists are more anxious than their humanist counterparts to have their information needs met promptly: 69 percent of the scientists and 61 percent of the social scientists, compared to 49 percent of the humanists say that when they need some information, they want an immediate response, and even the unpopular option of paying for speeding up access to information is accorded relatively greater importance by the scientists and the social scientists: 24 percent of the former and 20 percent of the latter are willing to expend money for the purpose, compared to 15 percent of the humanities researchers. Also, across the disciplines the younger the researchers, the more importance they accord to speedy delivery of information. Thus, whereas 100 percent of the young researchers among the scientists, three quarters among the social scientists and nearly two thirds among the humanists require prompt meeting of their information needs, only about a half of their over 61 counterparts do so too. The younger generation of researchers, again across the disciplines, are also (relatively) more willing to pay for speeding up their access to information, with



approximately three tenths of them agreeing to doing so, compared to about a tenth of the senior researchers.

Quite plainly then, today's researchers do indeed have high expectations as to the speed with which their information needs are to be met. However, it seems that these expectations are often just that: expectations, as opposed to genuine needs. Thus, when the professed expectation is translated into practical terms (paying for speeding up the delivery of information), there is clear evidence that speedy access to information is not so much of a concern, after all. In any case, the level of concern manifested consistently follows discipline- and age-specific patterns, which clearly indicates that the determinants of researchers' perceived need for attaining information rapidly and promptly should be traceable to both inter- and intra-disciplinary differences.

To sum up, in reply to the question posed at the outset of this study as to contemporary researchers' expectations regarding the speed with which their information needs are to be met:

**In these times of easy availability and wide accessibility of a host of resources, channels and facilities, which enable the transferring of information from one end of the world to the other in a matter of seconds, researchers have high expectations as to the speed with which their information needs are to be met. Indeed, they count on an almost instantaneous response to their information requirements, especially as novice researchers, although humanists tend to feel less strongly about it all. However, it seems that researchers' expectations as to the speedy delivery of information are often just that: expectations, as opposed to genuine needs. Thus, when the expectation is translated into practical terms (paying for speeding up the delivery of information), prompt access to information turns out to be less of a concern, after all.**

### **6.9.2 The Determinants of Researchers' Perceived Need for Attaining Information Rapidly and Promptly**

Anyone familiar with the inner workings of the research enterprise can surely testify that the information work component of the scholarly investigation is nothing if not time-consuming. Indeed, King and Tenopir (1999), reviewing a number of studies investigating researchers' time expenditure on reading the literature, conclude that an appreciable amount of time is involved in doing so. It is, of course, an indicator of the value of information for the research enterprise that academics are willing to spend considerable time on locating and utilising it. However, in the realities of contemporary academe, extensively depicted in the literature survey chapter of the present work, this willingness is increasingly tested against the unprecedented time-constraints with which researchers are faced. Within the unalterably restricted amount of time at their disposal (after all, the 168 hour week is not expandable), present-day academics need to invest more time than ever in fulfilling their responsibilities: faced with relentlessly mounting demands for accountability, they are required to teach more, to devote more of their time to advance the interests of the institutions they are affiliated with, to 'reach out' to society at large, and

above all, to publish as much as possible, as quickly as possible (Delanty, 1998; Rhoades, 2000; Rice, 1996). In his study of chemists' information behaviour, Flaxbart (2001, pp. 7-8) encapsulates in a particularly perceptive fashion the challenges faced by contemporary researchers:

"The work of a chemistry professor is multi-faceted and time-consuming. In addition to regular teaching and committee duties, the professor must oversee a group that might be quite large. This administrative role involves obtaining and dispersing funding, obtaining equipment, carrying out myriad administrative tasks, mentoring students, supervising dissertation research, and attending many meetings. An assistant professor seeking tenure must juggle these jobs – often without much experience, guidance, or administrative support or funding – and still find time to excel and make a name for himself or herself in an extremely large and competitive international academic community... Obligations can pile up because the new professor needs to stay in the good graces of senior colleagues everywhere, making it difficult to say 'no'. The life of a professor can be very stressful."

Furthermore, perhaps paradoxically, achieving all this in an electronic environment necessitates an even greater expenditure of time. For example, as Shedletsky and Aitken (2001) rightly observe, the IT-based innovative teaching initiatives require both more preparation and greater teacher involvement, and therefore – more time, than traditional instruction. In the same vein, coping with the huge amounts of electronic information incessantly flowing to the scholar of today may be a blessing, but it is undeniably very time-consuming indeed.

No wonder then that time (or, more precisely, the lack thereof) is a paramount consideration for today's researcher, as Young and Von Seggern (2001, p.164) emphasise when reporting the findings of their study into current information seeking methods in academe:

"The concept of time, its importance and undersupply, was... mentioned by almost everyone. In addition to the lack of time, a specific measure of time was often used to express satisfactory or adequate task fulfilment. A certain amount of time might be set aside for a search, or a search session might be judged as effective or ineffective based on the amount of time it took.... [Thus,] time is an overriding criterion in the choice of information selection and delivery."

Indeed so, as several studies corroborate (see, for example: Barry, 1997; Jankowska, 2004; Lipow, 1999; Quigley et al., 2002). However, if lack of time thus seems to be a common denominator in contemporary scholarship, it is bound to come all the more to the fore when the researcher is under duress to demonstrate concrete achievements, which, in academe, inevitably means publishing, and preferably publishing copiously.

Nonetheless, findings of the present study indicate that even in circumstances when researchers do indeed have strong extrinsic, or even intrinsic incentives to arrive at demonstrable and publishable results as quickly as possible, the need to expedite the access to information is not necessarily seen as an element in endeavouring to do so. In fact, no more than slightly over a quarter of the informants testify that they need to obtain information very quickly, so as to avoid being overtaken by their professional rivals, although another quarter of them maintain that they do so at least at times. By the same token, only 30 percent of the participants profess to need speedy access to information when considered for promotion and therefore obliged to produce and announce the results of their work quickly, and a further 21 percent even consider the idea altogether irrelevant to their past or present experiences. Perhaps not surprisingly: since a researcher usually works on more than one project at any given time, as well as on different elements of the different projects, he or she can always tackle another task until the information is procured.



True, the data gathered in this study do indicate that in the fast moving, competitive, 'urban' fields, where there is high mutual visibility of research conducted by one's peers (Kling, 2004), and researchers are anxious "to win first place in a sprint to the finishing post", as Becher (1989, p. 84) so aptly puts it, the prompt availability of information is considered more imperative. Apparently, in the overall scheme of things, when the coveted rapid pace of progress is of overriding importance, time may be more at the forefront of a researcher's concerns. Of course, in 'rural' specialties, where competition tends to be less prevalent because there is not as much of overlap of topics and little consequent concern with priority, the need for obtaining information rapidly is nowhere as central, or as Case (1986, p. 99) puts it, "humanists rarely work under the time pressure of scientists, so rapid retrieval of literature is not of great importance." Indeed, requiring speedy delivery of information for fear of being overtaken by one's professional opponents is clearly more characteristic of highly competitive disciplinary cultures: 45 percent of the scientists, compared to 32 percent of the social scientists and no more than 17 percent of the humanists say that they must obtain information quickly, so as to prevent somebody else's achieving and publicising results ahead of them.

By the same token, although the stage of career the scholar has reached influences his or her perceptions of the time-pressures involved in making further progress (Wiberley and Jones, 2000), it does not often seem to be perceived as entailing a need for speedy delivery of information. True, the results of this study indicate that across all disciplines the novice researchers, for whom the struggle to attain promotion or tenure is more often than not very much of current pertinence rather than some distant memory, are more inclined than their seasoned counterparts to agree that obtaining information without undue delays is important for their productivity: 77 percent of the under 44s among the scientists find so, compared to only 20 percent of the over 61s; 33 percent of the under 44s among the social scientists find so, compared to only 9 percent of the over 61s; and finally, 40 percent of the under 44s among the humanists find so, compared to only 18 percent of the over 61s. Still, it is only among the scientists that the percentage of the young researchers, who feel strongly about getting the information they need quickly, amounts to the majority of the age-cohort.

It seems then that the need to obtain information rapidly and promptly is only partially driven by motivators extrinsic to the research endeavour, as such. However, neither do motivators more intrinsic to the quest for knowledge itself seem to bring about a greater need for speeding up the process of obtaining information. Apparently, not even the lack of some information, without which work cannot proceed, is invariably considered to be a compelling enough reason for endeavouring to hasten its delivery. Across all disciplines and ages, only about half of the study participants decree that they need information very quickly in order to allow for their thought processes to evolve unhampered. Perhaps not very surprisingly: as it has been mentioned before, researchers easily circumvent any problems of an information gap encountered in the course of research work by forming temporary hypotheses until the problem is solved.

To sum up, in reply to the question posed at the outset of this study as to the determinants of researchers' perceived need for attaining information rapidly:



**Even in circumstances when researchers have strong extrinsic, or even intrinsic incentives to arrive at demonstrable and publishable results as quickly as possible, the need to expedite the access to information is not necessarily seen as an element in endeavouring to do so. Still, researchers are likely to require speedy delivery of information to enable unhampered thought processes, and, as novice academics, looking to be promoted, to find it important for producing research results quickly. Scientists and (to a lesser extent, but still) social scientists are also likely to deem it important for overtaking professional rivals.**

### **6.9.3 Compromising for the Sake of Obtaining Information Quickly**

As it has already been noted, unlike today's students, notorious for their happy sacrificing of high-quality information for the sake of immediate gratification, scholars do not seem to hold convenience to be the highest priority in their information seeking. True, as Flaxbart (2001) rightly notes, convenience is important enough for them too; so much so, in fact, that it accounts for their growingly embracing an alternate mode of access to information – the electronic one. And yet, as it has been repeatedly observed in the course of this work, even in the case of the migration to electronic scholarship, convenience, the ability to obtain information faster, without the hassles and obstacles involved in doing library research in the printed world and without leaving one's office, is not the only, or even the overriding consideration. If the convenience factor is not the most crucial one in determining a researcher's choices of information seeking methods and resources, the speed of access component in it must be even less crucial: after all, as we have just seen, the time-constraints increasingly characterising the academic enterprise do not translate into an all-embracing urgency in research-associated information work. Seeing that some researchers seem to feel the need to expedite the processes of obtaining information more keenly than others, and even the same researcher may perceive the need for speedy access to information differently under different circumstances, it is hardly surprising to find that the need to obtain information quickly is rarely, if ever, a paramount enough consideration for researchers to justify their compromising on what they see as the more central attributes of a piece of information, say, its quality or intellectual level.

Indeed, findings of the present undertaking leave no doubt whatsoever as to researchers' reluctance to trade the guaranteed scholarly value of information in exchange for the capability to obtain it quickly. Apparently, not only are the sizable majority of the study participants (74 percent) unwilling to pay the price of accepting a less than optimal level of information in return for speedy delivery, but almost half of them (45 percent) are even prepared to suffer a setback to their progress by waiting for necessary information to arrive. In fact, they are even wary of using an interim solution to the problem of needing some information promptly: although the abstract, often more quickly and conveniently accessible than the full-text publication, provides the researcher with the gist of the information, only about a tenth of the informants testify to habitually making use of it instead of reading the article, whereas half of them never or seldom do.



Still, very much in line with previously noted patterns, science researchers, typically under greater duress to advance in their investigations at a more rapid pace than their social scientists or humanist counterparts, reveal a somewhat greater readiness to compromise on the scholarly worth of information in return for its prompt availability. Thus, whilst 76 and 75 percent, respectively, of the social scientists and the humanists renounce the option of accepting less than optimal level information at the price of getting it very quickly, 62 percent of the scientists express the same views. The scientists are also the least prepared to wait for information, if it means delaying the progress to be made: only a quarter of them profess to habitually doing so, compared to a third of the social scientists and nearly two thirds of the humanists. By the same token, they are relatively less opposed to the notion of making do with the abstract, instead of reading the article itself, although in this case the greater feasibility of their doing so is certainly an important factor to contend with, too. After all, as it has repeatedly been noted, unlike their humanist counterparts, who need the whole publication in order to be able to follow the thought processes of other researchers (Bates, 1996a; Stoa, 1984, 1991), scientists and social scientists only need the results of previous research, so that when they are pressured for time, using the abstract in lieu of the whole article is less of a compromise. Indeed, whilst 64 percent of the humanists say they never or at least seldom opt for the solution, only 41 percent of the scientists and 40 percent of the social scientists say so, too.

Apparently then, time-pressure associated information needs, universal as these may be, are nevertheless mitigated by an individual researcher's idiosyncratic circumstances. Another manifestation of this seems to be the evidence gleaned in the present undertaking as to the novice researchers' relative reluctance to forego quality considerations in return for speedy delivery of information. Thus, the younger among the informants, who, for obvious reasons, work under considerable time-constraints, manifest no more willingness to compromise on the quality of the information for the sake of speedy access than their more senior colleagues, and at times less. They are no less reluctant to trade speed of delivery for lower quality, with 79 percent of them opposing the notion, compared to 70 and 76 percent of the two groups of seasoned researchers. Furthermore, they are the least prepared to compromise for the sake of speedy access to information: 57 percent of the under 44s, compared to 48 and 30 percent, respectively, of the 45 – 60s and the over 61s say that they are prepared to wait for information of appropriate scholarly worth, even at the price, which, at the beginning stages of one's career is of special significance, of hindering the progress of their investigations. Also, the less experienced among the researchers are the ones to least favour the idea of relying on the abstract instead of reading the whole article: 56 percent of them never, or at least seldom opt for the solution, compared to 47 and 49 percent of the two groups of older researchers. Perhaps inevitably, for they are hardly in a position to risk basing their forthcoming scholarly endeavours on shaky foundations! Still, those among the scientists, who are in the beginning stages of their careers, seem to be walking an especially tight rope: whilst their disciplinary culture dictates a very fast rate of progress, they must beware of unsound underpinnings just as much as their peers in the social sciences or the humanities. Thus, whereas in the humanities, for example, there is little evidence of age-related changes of attitude to making do with the abstract in order to speed up the process of obtaining some information, in the sciences the novice researchers are less opposed to the practice than their more senior colleagues.

To sum up, in reply to the question posed at the outset of this study as to the possibility of researchers' compromising for the sake of obtaining information quickly:

**Although researchers may express a need to expedite the processes of obtaining information, speed of delivery is seldom a paramount enough consideration for them to justify their compromising on the more central attributes of a piece of information, such as its quality or intellectual level. Even scientists, typically required to advance at a rapid pace in their research endeavours, are likely to renounce the option. Still, whilst humanists are unlikely to make any compromises whatsoever when the need arises for immediate access to some information, not even if its lack can delay the progress to be made, scientists and (to a lesser extent) social scientists may, especially as novice researchers, simply make do without the required information, or use the abstract in lieu of the whole article.**

## **6.10 The Place of Publication/Origin Aspect of Researchers' Information Needs and Practices**

The term 'global village', by now a rather worn out cliché, nevertheless captures particularly well the essence of the borderless world of contemporary academia, with its vibrant scholarly discourse flowing unimpeded by technical barriers. True, as Luukkonen et al. (1992) note, research activity across national boundaries has long been a characteristic feature of the scholarly enterprise, but the trend toward the trans-nationalisation of academic research has been increasing both in volume and importance throughout the twentieth century (Crawford et al., 1993; Elzinga and Landstrom, 1995; Horvath et al., 2000), as part and parcel of general globalisation trends as well as policy initiatives on national and supranational levels (Smeby and Trondal, 2003). However, as Hakala et al. (2002) suggest in their review of the literature pertaining to their study of Finnish university participation in European collaboration, the profiles of internationalisation differ between 'hard' and 'soft' fields. The 'hard' fields are more international because they use a highly codified language, direct their research to specialised audiences, and study topics that have universal relevance, whereas the 'soft' fields have fewer incentives and more impediments to becoming international, such as nationally specific topics. Still, Smeby and Trondal (2003) find a process of harmonisation in the degree of internationalisation taking place over time between the different fields of learning.

The question is, of course, whether this clear-cut trend toward the internationalisation of research, coupled with the ever-growing opportunities for world-spanning scholarly communication, do indeed herald an era, in which the place or country from which the information originates no longer matters, the English language is the veritable Esperanto of the global research community, and the isolation of scholars on the periphery is fast becoming a phenomenon of the past.



### **6.10.1 Opening Up to Information Hailing from Countries on the Periphery of Scientific and Scholarly Activity**

With all that internationalism has thus become almost the norm in academe, Arunachalam and Singh (1992) maintain that the actual distribution of scholarly and scientific research among different nations is rather skewed. A small number of countries producing much of mainstream research are at the centre, and a very large number of countries in the periphery contribute very little to the generation of knowledge. In ample proof of this point, Arunachalam (1999, p. 467) points out that of the more than 140,000 titles listed in *Ulrich's Directory of Scientific Serials*, close to 80 percent are published in North America and Europe. Further to that, she asserts, even those developing country publications which do exist, are by and large overlooked: "The world over, both librarians and end-users prefer to subscribe to, and read, journals produced in North America and Europe and ignore developing countries' journals. Most of the current awareness and abstracting services, as well as numeric and factual data bases, are compiled and produced in the advanced countries and they index only a few developing countries' journals..."

As Russell (2001) observes, in principle the shift to electronic scholarship could bring about a change in this state of affairs, seeing that these days, researchers in the developing world can interact with their colleagues in any part of the world unhindered by geographical constraints. However, even if information poverty were not the barrier it undoubtedly is to developing country academics' assuming a more central position in international scholarship (Arunachalam, 1999; Russell, 1991; Sadowsky, 1993), it is still questionable to what extent today's Western researchers are prepared to take note of valuable work done and published outside their limited circle.

The problem does not seem to be a dearth of aptitude, knowledge or skills on the level of the individual researcher. After all, international research collaboration is especially prevalent between scholars hailing from small countries or countries on the periphery and their colleagues in the wider academic world (Thorsteinsdottir, 2000). The phenomenon of 'brain drain', the significantly increased mobility of academics in the global knowledge society from low to high knowledge intensity places (Meyer et al., 2001) also speaks against such a possibility. And yet, as Arunachalam (1999) contends, developing country scientists find it very difficult to get accepted into mainstream country science: they can rarely get their research published in well-known journals, and even when they do, their work may not be quoted in subsequent work as often as papers published in the same journal by scientists from the advanced countries. Thus, the genuine inequities in opportunities, from less developed infrastructures for electronically mediated research, through a shortage of research funds, to inadequate statutory and organisational environments both at the government and institutional level probably do not tell the whole story. Rather, as Russell (1991) suggests, there are also social and cultural barriers that prevent academics from the developing world taking their rightful place in the international communities of scholars, bringing about a subjectivity in scientific evaluations, which can only be eliminated when those responsible for the decision-making believe that the geographic origin of the scientific work is of little consequence for its quality. Until neither the objective conditions for its conduct, nor the subjective perceptions of its quality measure up to Western standards, the scholarship of the developing countries is bound to be approached warily in global academe, as indeed the findings of the present study show it to be. However, here again, owing to inherent differences in the nature of different knowledge domains,



researchers of different disciplinary affiliations do not see eye to eye in their manifest perceptions and attitudes.

Overall, the researchers queried for this investigation do not appear to be overly enthusiastic to open up to information hailing from countries on the periphery of scientific and scholarly activity. True, nearly half of them do claim to be prepared to consider information without checking out its geographical origins, which testifies to a readiness to treat developing country publications as potentially equal to developed country publications. However, this evidence of open-mindedness is mitigated by researchers' greater reluctance to accept information of unknown authorship on the same terms: only about a third of the informants are willing to consider a publication, which is not vouched for by the reputation of its author, without checking to see where it hails from. On the whole, then, contemporary researchers seem to exhibit a rather limited measure of readiness to accept information originating in countries beyond the mainstream of scholarly activity.

Still, as it has already been noted, the extent of researchers' willingness to accept some information entirely on its own merits, be its country of origin what it may, seems to be decidedly discipline-specific. To be more precise, the social scientist informants demonstrate a by far greater concern with noting the country whence some information hails than either their scientist or humanist counterparts: no more than 30 percent of the former, compared to 58 and 55 percent, respectively, of the latter say that the country of publication is immaterial for them. This, however, is probably traceable to a more deep-seated reason than the aforementioned reluctance to consider information hailing from countries on the periphery of scientific and scholarly activity. In fact, their evident need to pay attention to the geographical origins of the information they think of using seems to be rooted in the very nature of social science research, as Line (1973) and Brittain (1984, 1986) observe on the basis of the data gathered in the course of the two renowned studies into the information requirements of the social sciences carried out during the 1970s at Bath University, INFROSS (Information Requirements of the Social Sciences) and DISISS (Design of Information Systems in the Social Sciences). Apparently, the social sciences transcend national boundaries much less well than either the sciences or the humanities. The sciences cross national frontiers readily by virtue of their universality ("an atom in New York is an atom in Moscow", says Brittain, 1984, p. 11), and so do the humanities, concerned as they are with the unique, such as an event, a person or a work of art, literature, or music (Tibbo, 1994). Not so, however, the social sciences, which, as Line (1973, pp. 29-30) asserts, are characterised by an inherent instability, the result of their concern with human beings, particularly in their interactions with one another, whether this interaction be social, political, or economic. Thus, he maintains, "... however carefully a particular study or experiment is carried out, and however valid the data that may come from it, a similar study of a different population – in a different town or country, or at a different time – will almost certainly give different results". No wonder then, as Brittain (1984, 1986) demonstrates, that the social science disciplines tend to be much more parochial in their information needs and information behaviour than the science or humanities disciplines. In fact, he claims, North American, British, French, German, and Eastern European social science is developing independently, often unaware of developments elsewhere. Plainly then, findings of the present study pertaining to the greater importance accorded by the social scientists to the country whence some information originates reflect first and foremost the local self-sufficiency characterising research work in



the field. It seems that social scientists' insistence on checking out the geographical origins of some information seems to be too firmly anchored in their disciplinary culture to be easily influenced by present-day trends of increasing globalisation.

To sum up, in reply to the question posed at the outset of this study as to the extent to which today's researchers have been opening up to information hailing from countries on the periphery of scientific and scholarly activity:

**With all that internationalism has become almost the norm in academe, contemporary researchers seem to exhibit a rather limited measure of readiness to accept information hailing from countries beyond the mainstream of scientific and scholarly activity. True, aside from social scientists among them, they tend to pronounce the geographical origins of information immaterial, but nevertheless will not readily use a publication without checking out where it is from, unless it is vouched for by the reputation of its author.**

#### **6.10.2 The Need for Proficiency in Languages in Today's Global Village of Scholarship**

Part and parcel of the universal trends of globalisation and internationalisation is the dominance of the English language in contemporary international communication, as Jorna (2002, p. 158), who builds on data cited by Knowles (1999) and Tsuda (1997), asserts:

"English is the geographically most widespread language of the world... [It] is the official language of relatively affluent and influential countries in North America, the British Isles and Australia, and has special status as a second language in over 70 countries... Across the world there are about 350 million native speakers and 250 to 350 million people who speak English as a second language... [although] if the most basic level of English is included, one might count up to 1.5 billion English speakers... Also, three of the most important international organisations communicate primarily in English: the United Nations, the World Bank, and the European Community."

However, contrary to her claim that "international conferences and scholarly publications are also mainly, or even solely, conducted in the English language", Oard and Diekema (1998) maintain in their review of the literature on cross-language information retrieval that much of the world's scholarly information is not available in English. Thus, for example, they cite Meadows (1974), whose review of a number of studies suggests that in the early 1970's about half of the world's scientific literature was published in English. More recently, Yitzhaki (1998) approximates that between one third to one-half of world social sciences literature is published in languages other than English, and Egghe et al. (1999) even contend that these days the foreign language barrier is probably the greatest impediment to the free flow and transfer of information, as scientists of more and more countries publish in their own languages.

However, researchers' language preferences are not so much information availability dictated, as need-driven. Indeed, as it is more often than not the case where scholarly information behaviour is concerned, needs inherent to the nature of the research endeavour shape the requirements for information, which, in result tend to be very much discipline-specific. In fact, here again the needs of researchers in the various disciplines along the 'hard' to 'soft' continuum seem to be associated with the previously noted differences

in the utilisation of information for generating new knowledge. Thus, at the 'soft' end of the continuum, where the primary evidence used is the product of a specific place and time, shaped by the distinctive personality of its creator (Wiberley and Jones, 1994), and where the new contribution to the corpus of knowledge actually 'happens' in the research article, inheres in the way the scholar analyses, extracts and develops insights about the material (Bates, 1996a), reading the original language publication can be absolutely crucial. It is very different indeed at the 'hard' end of the continuum, where the new discovery is reported in the research article, not contained in it (Stoan, 1984, 1991). Since researchers in the 'harder' knowledge domains only need to learn the results of the progress made by their peers, without attempting to get inside their thought processes, they can more easily afford to save the time, effort and money costs of mastering any other language, bar the de facto lingua franca of international discourse, English. For the social scientists, with their aforementioned parochial information needs, it must be even more so than for the scientists. Anyhow, for both the scientists and the social scientists the need for information exchange across linguistic barriers can be met these days via a host of convenient translation services at their disposal. Thus, for example, the World Translations Index offers cover-to-cover translations of 269 journals and hundreds more that are selectively translated on a regular basis (Oard and Diekema, 1998). Another possible solution to the need to transcend language barriers are the many English language international state-of-the-art reviews in existence, but, as we have already seen, review articles are not considered to be adequate substitutes for reading the original publications.

In any case, findings of the present undertaking concur with previously established patterns (Brittain, 1984; Hurych, 1986; Line, 1973; Skelton, 1973; Slater, 1988; Stone, 1982) in demonstrating that social scientists manifest the least need for command of languages other than English, and humanists – the most. Indeed, whilst the humanities researchers participating in this study plainly endorse the need for proficiency in languages, with 84 percent of them proclaiming that command of languages is important for the quality of their scholarly endeavours, only 28 and 20 percent, respectively, of the science and social science researchers hold the same views. By the same token, whereas 62 percent of the scientists and 68 percent of the social scientists find that having English is sufficient for meeting their research work induced needs, no more than 9 percent of the humanists think so, too. Another point of interest is that appreciably more researchers of the old school consider mastery of languages important compared to their younger colleagues; thus, for example, the support accorded to the notion by the over 61s among the humanists amounts to a full 100 percent of the informants, compared to 90 and 79 percent of their younger counterparts, and even among the scientists it comes to 40 percent of the seasoned researchers, compared to 11 percent of their junior colleagues. Not very surprisingly, of course, for having foreign languages was until a few years ago considered the hallmark of 'a real scholar'.

Still, a lack of interest in non-English language publications does not necessarily reflect a derogatory attitude to the scholarly value of the information to be found therein, a finding which lends further support to the notion that mastery of languages is driven by research-work dictated needs. True, a not inconsequential 36 percent of the informants do maintain that if a research is a significant contribution, it will be published in English, but just as many, 40 percent, think otherwise. Of course, it is the humanists, with their manifestly greater propensity to use non-English language information, and therefore to value command of languages other than English, who reveal the least inclination to believe that research of



importance will invariably be communicated in English: only about a tenth of them think so, compared to about half of the science and social science researchers who hold the same views.

To sum up, in reply to the question posed at the outset of this study as to the need for proficiency in languages other than English in today's global village of scholarship:

**Although, owing to the trend toward the internationalisation of science and scholarship, much of the research activity carried out worldwide is nowadays reported in English, the need for proficiency in languages is very much discipline-specific. Thus, in the humanities, where a new contribution to the corpus of knowledge inheres in the way a scholar analyses, extracts and develops insights about the material, which renders the reading of the original language publications crucial, researchers maintain that information of importance appears in languages other than English, too; therefore, they consider having languages important for meeting information needs. In the sciences and the social sciences, however, where a new contribution reports the results, rather than the thought processes involved in the progress made, researchers maintain that information of importance appears only in English; therefore, they consider having English sufficient for meeting their information needs.**

## **6.11 The Processing and Packaging Aspect of Researchers' Information Needs and Practices**

These two inseparably intertwined and overlapping aspects of information need, concerned with the different ways and formats in which ideas are presented to potential users, have been the focus of untold studies, articles and books ever since the first attempts to harness novel electronic technologies to information management wrought irrevocable changes to our information environments. Unavoidably so, of course: with information figuring higher and higher on our inventories of 'bare necessities', its processing and packaging could not but come to the fore; after all, the way a piece of information is geared up for consumption is crucial for determining its accessibility and usability, though with so much talk centring on the mechanisms of information use and management, it does look from time to time as if it is the tail wagging the dog...

Naturally, the technological innovations of the modern day information scene, which seem to chase each other at a truly breathtaking pace, did not bypass academia, could not possibly bypass academia, given the centrality of information to the scientific endeavour. In fact, the whys and wherefores of the scholarly information consumer's behaviour probably drew more than their proportionate share of the attention given in the professional literature to the changing habits of information users in this fluctuating setting. The one conclusion emerging crystal clear from the truly countless studies devoted to the subject over the years, some of which are reviewed in the literature survey section of this study, is that academics as a rule seem to be taking a somewhat cautious stance vis-à-vis the many initiatives utilising IT in scholarly work.



They can and do appreciate the technological innovations, increasingly so with time, for, to use Russell's (2001) apt turn of phrase, these give them the type of "information empowerment" that they have long been looking for. Still, the process Mahe (2003) dubs 'technical acculturation' – the full integration of computer and electronic resources in the scholarly activity, not to mention the out-and-out conversion to electronic scholarship, is yet to come to its successful conclusion in academe.

### **6.11.1 The Uptake of Electronic Information Work in Contemporary Academe**

As the literature reviewed in preparation for the present undertaking and in its course plainly indicates, electronic scholarship is day by day becoming more of a universal fact of life in academe. One particularly telling example confirming this state of affairs is put forward by Tenopir et al. (2003): apparently, at least among the scientists and the social scientists (humanists are not included in their report), electronic access to scientific journals is fast replacing the use of traditional print versions. Thus, in the early phase following the introduction of electronic journals (1990-1993), only 0.3% of the readings by scientists (inclusive of social scientists) were from electronic sources. By the second phase of the scientific journal system evolution, referred to by the authors as the evolving phase (the late 1990's through the current time), in which a majority of scientific journals are available in electronic format, new features are added to some journals, and some individual articles are made available through e-print archives, author Web sites, and the like, the percentage of readings from electronic formats increases to 38.8%. And finally, in the present advanced phase, in which searching capabilities, advanced features and individual articles are integrated in a complete system, along with full text of core journals available back to their origin, as much as 79.5% of the readings are from electronic formats. Concurrently, access to electronic library collections becomes more important through the evolutionary phases: 0.9, 20.0 and 87.3 percent of readings of library collections are in electronic format through early, evolving, and advanced phases. True, studies conducted in the past few years leave little doubt that humanists' relatively more hesitant appropriation of IT-based research work practices goes on, but these late-comers to electronic scholarship, too, are increasingly showing appreciation of digital resources and electronic communication opportunities, even as they continue to rely heavily on traditional practices and materials (Brockman et al., 2001; Massey-Burzio, 1999; Palmer and Neumann, 2002; Talja, 2002; Wiberley and Jones, 2000). Indeed, the data gathered in the present study clearly concur with previous findings in indicating that electronic information work is becoming more and more conventional, even normative in academe, a process Mahe (2003) so aptly refers to as 'banalisation'. In fact, the often reserved, if not blatantly averse attitude towards IT-based scholarship, frequently encountered in the past among scholars, seems to be growingly replaced by a rather matter-of-fact approach: present-day academics no longer seem to give the new information and communication technologies too much thought, but then, nobody glories in being able to breathe either, at least until something goes amiss. Thus, as the results of the present undertaking indicate, many researchers are very comfortable indeed with electronic information, so much so, that they actually take no account of the format in which the information comes in the process of selecting the information suitable to meet their needs: as a matter of fact, only a fifth of the study participants do claim it is of importance for them, the rest say it is never, seldom, or only at times of consequence. By the same token, only 15 percent of the informants profess that they are no fans of electronic information sources and methods. Further to that, more than two thirds of the researchers even pronounce their research



related information work 'enormously improved' thanks to the wide availability of electronic information services.

True, more often than not a researcher's willingness to exchange traditional modes of communication and information work for novel ones is determined by his or her idiosyncratic circumstances, for, as Barry (1995), Barry and Squires (1995), and Manoff (1997) point out, scholars do not make productive use of new tools just because these are available to them; rather, e-resources are seen as a means to an end, to be chosen when deemed both the most appropriate for meeting an information need, and reasonably well-suited to individual inclinations, capabilities and circumstances. Indeed, Mahe et al. (2000) separate into two clusters the factors they identify as playing an important part in the way research practices integrate the use of electronic sources: factors which render the social and material environment conducive or not conducive to the use of electronic material, such as the availability of facilities, equipment and resources, or local work-practices, and more subjective factors, related to personal circumstances, such as age, seniority, experience and individual preferences for paper or electronic media. It is in consideration of this that, as Okerson (2000) rightly notes, within the real changes taking place in scholarly communication over the past few years, the users and their choices and strategies are increasingly becoming information providers' focus of attention. Still, of all the many factors comprising the idiosyncratic circumstances which influence a researcher's take-up of electronic systems and work methods, disciplinary culture seems to be particularly crucial.

As it has been previously noted, early research into the nature of technology change tends to argue that once a machine has been invented, its ability fundamentally to transform social relations is only a matter of time. Arguing strongly against this technological determinism, subsequent theories maintain, however, that since social organisations operate on an internal logic, ruled largely by the existing normative order and its ideological underpinnings, all technological changes are weighed against a normative order, so that new technologies are either not adopted, or are modified to fit with the existing social structure. Approaching the incorporation of technological innovation into scholarly research from the perspective of the latter of the two theories, recent studies find that the impact of technology is highly discipline- or even sub-field- concerned (Fry, 2004; Thelwall and Price, 2003; Walsh and Bayma, 1996a).

Thus, in their seminal work exploring the relations between social context and technology in the academic realm, Walsh and Bayma (1996a) trace the substantial differences they discern between four scientific fields in computer network use to their different social structures and work organisations. Arguing that it is not that organisations adapt to reflect the new technology, but rather that work groups adopt technology that fits with their existing organisation and development, they propose that differences in network use are due to a combination of technical limits and different work arrangements across fields. Accordingly, they find that fields that consist of tightly coupled but geographically dispersed work groups tend to adopt computer mediated communication more heavily than those where work is performed within relatively autonomous groups. By the same token, fields that are more buffered from the market tend to use informal computer mediated communication (CMC), while those more tightly linked to commercial markets tend to limit use to formal CMC.



Kling and McKim (2000) seem to think much along the same lines in their afore-cited contention that it is *not* only a matter of time before all fields catch up with the early adopters of electronic work practices and all fields converge on a stable set of electronic forums. Rather, they maintain, field differences in the willingness to convert to electronic scholarship stem from the social practices that support trustworthy communications in each field. Thus, for example, productive scholars in some fields are more aware of the work that others in the field are doing than are scholars in other fields. If the on-going work in a field is relatively transparent to others in the field, the risks associated with sharing reports prior their formal publications are less, and the willingness to base the scholarly communication of the field on e-prints will be correspondingly higher. Other examples are high research project costs, which may tend to increase the motivation to utilise electronic media for collaboration, or a high degree of industrial collaboration, especially of the kind that may readily result in income from patents and trade secrets, which puts pressure on academics to be more conservative about sharing data or making public one's methods or results.

Approaching the study of academics' work and communication practices from a domain-analytic perspective, Talja and Maula (2003), too, identify and define domain-specific factors to account for the major variations among the scholarly disciplines in the use of networked information. Their findings suggest that e-journals and databases are likely to be used most heavily in fields in which directed subject searching (for example, in periodical index databases) is the dominant search method and topical relevance the primary relevance type, and less in fields in which browsing and chaining are the dominant search methods and paradigmatic relevance, i.e., relevance based on the theoretical and/or methodological approach used in the treatment of a subject, the primary relevance type.

Most recently, Fry (2004) suggests on the basis of an ongoing ethnographic study within corpus-based linguistics, that the appropriation of information communication technologies (ITCs) is determined by a field's specific cultural identity. Building on the work of Whitley (1984), who considers both epistemological and social structures within disciplines in explaining cultural difference across science, she shows that cultural elements influence the appropriateness of a specific ITC infrastructure for a particular scholarly specialist community. Thus, for example, she maintains that fields that have a highly politicised and tightly controlled research culture, as is the case with high-energy physics, will develop a coherent field-based strategy for the uptake and use of ITCs. In contrast, domains that are pluralistic and have a loosely organised research culture, determined at the level of individual research groups, rather than on a community-wide basis, will adopt ITCs in an ad-hoc localised manner.

It seems to be the current understanding then that for a variety of reasons (all of which can easily co-exist) the conversion to electronic scholarship is very much field-contingent, with the novel electronic information resources and practices appropriated differently across diverse scholarly communities. Confirming yet again this state of affairs, the present study shows the evolving trends discernible in academics' conversion to electronic information work to be decidedly discipline-specific. Thus, whilst almost three quarters of the scientists use both paper based and electronic material, claiming that as far as they are concerned, the format in which the information comes has no importance whatsoever, only about half of the social scientists and a third of the humanists hold the same views. Very much in keeping with



these sentiments, more than three quarters of the scientists and just slightly less of the social scientists, but only about a quarter of the humanists find that 'not much of an electronics fan' in no way reflects their attitude to IT-based information work. Furthermore, whereas the clear majority (in the vicinity of three quarters) of both the scientists and the social scientists maintain that their research related information work has improved enormously ever since they have electronic information services at their disposal, less than half of the humanists think so too.

Within this disciplinary research conventions dictated picture of variation in researchers' propensity to join the ranks of electronic scholars, the rate by which e-media are adopted to support their work are by no means divorced from generational differences as well. At least at first glance, the results of the present study concur with previous findings (Applebee et al., 1997; Fiscella and Proctor, 1995; Larabee and Lorber, 1994; Lazinger et al., 1997; Maughan, 1999; Milne, 1999; Tomney and Burton, 1998; Vander Meer et al., 1997; Zhang, 1999) in indicating that older faculty are not as likely to have adapted to the changing information environment as their younger counterparts: for example, approximately a quarter of them deem the format of the information at hand of importance, as opposed to slightly more than a tenth of their younger colleagues, and markedly more of the former, a third, compared to a negligible six percent of the latter, consider themselves no great fans of electronic information work. This is, of course, very much in line with the aforementioned, commonly held belief that the adoption of technological innovation is 'generational': children are believed to adopt technology more readily than adults, and in result, technology is presumed to transform society chiefly by the mechanism of children growing up with skills their parents did not develop. Thus, in the university research arena the novice scholars of today are thought to bring about the shift to electronic scholarship in their disciplines as they apply new electronic communication skills they grew up with.

However, a closer look at the emerging picture, as it is discernible in the present study, shows it to be more nuanced: the move to electronic scholarship does not invariably seem to follow the popularly held patterns of generational differences in the appropriation of electronic sources and services. Actually, the emerging patterns seem to be more in keeping with Covi's (2000) findings in her abovementioned study into the role of doctoral students in the integration of IT based research work practices, according to which, rather than acting as agents of change, students adopt the research work practices and resource use of their advisors. Indeed, although owing to the limitations of sample sizes it is only possible to talk here of tentative trends, the data gathered in the present undertaking indicate that at least in the case of the scientists and the social scientists, the younger researchers' attitude to novel research work practices resembles those of their senior colleagues: thus, if in the sciences 90 percent of the seasoned researchers use information in whatever format it comes, so do 77 percent of their novice colleagues; and if only 20 percent of the former testify that they are no fans of electronic work, so do 11 percent of the latter. In a similar manner, if in the social sciences 42 percent of the seasoned researchers use information in whatever format it comes, so do 45 percent of their novice colleagues; and if only 17 percent of the former testify that they are no fans of electronic work, so do 9 percent of the latter. Evidently, as Covi suggests, novice academics mimic the established electronic communication patterns and resource usage habits of their elders, with the senior researchers seeming to be just as energised as their younger counterparts about electronic information work practices.



Not so, however, in the humanities. The younger humanists queried for this undertaking profess to be markedly happier with the beneficial effects of IT based sources and services, and far less prone to treat with disdain the electronic option than their elder counterparts. Thus, whilst 40 percent of the novice humanists claim that they use both paper based and electronic information indiscriminately, none at all of their seasoned colleagues testify to doing so; and whilst as much as 63 percent of the seasoned researchers among the humanists say they are no great fans of electronic scholarship, none of their young colleagues say so, too. Perhaps not very surprisingly: with humanists, unlike their scientist and social scientists counterparts, being still in the midst of the process of adapting to the realities of an electronic information world, it is obviously the younger generation of humanists, born into the digital environment, who would be relatively more likely to feel more at home with the novel practices. At the same time, the humanist informants in each age group are relatively less supportive of electronic work practices than their contemporaries from the sciences and the social sciences, manifesting their adherence to humanists' above-noted inherently lesser need for electronic services and sources. It seems then that whilst the intra-disciplinary gap in humanists' appropriating IT-based practices may close, indeed will probably close, the inter-disciplinary gap, that is, the gap between humanists, on the one hand, and scientists and social scientists, on the other, is likely to remain in place.

To sum up, in reply to the question posed at the outset of this study as to the uptake of electronic information work in contemporary academe:

**Electronic information work has become quite normative in academia, certainly no longer approached with instinctive reluctance. Indeed, today's researchers maintain that electronic sources and services have improved information work enormously, with even the humanists, who still tend to see themselves as 'not much of electronics fans', increasingly happier with the electronic option. Still, whereas scientists and, to a lesser extent, social scientists are likely to use both paper-based and electronic material indiscriminately, considering the format in which the information comes of no importance, humanists are far less inclined to do so. Also, whereas scientists and social scientists are equally energised as novice and seasoned researchers about electronic information work practices, humanists are still in the midst of the process of adapting to the realities of a digital environment, with the younger among them clearly more at home with the novel practices than their older colleagues. To be sure, humanists of all ages are relatively less supportive of electronic work practices than their contemporaries from the sciences and the social sciences. It seems then that whilst the intra-disciplinary gap in humanists' appropriating IT-based practices is about to close, the gap between humanists, on the one hand, and scientists and social scientists, on the other, is still firmly in place.**



**6.11.2 Choosing the Appropriate Communication Mode: Computer-Mediated, Text-Based Information Exchange versus Face-to-face Interaction in Contemporary Academic Research Work**  
Communication has been dubbed 'the life-blood of academia' (Becher, 1989) and 'the essence of science' (Garvey, 1979), and for very good reasons too, as Harnad (1999) elucidates:

"... it has always been characteristic of our planet that, besides eating and sleeping and squabbling and reproducing, we are also producing knowledge, sometimes only as a means to these more primitive ends, but often also as an end in itself, or an open-ended investment in future ends. This is what we call 'Learned Inquiry', and it transpires mostly in our universities, where scholars and scientists, apart from imparting existing knowledge to successor generations, create new knowledge through their research activities. But creating new knowledge is not enough; even to serve as an open ended investment, knowledge must be communicated, ultimately to the next generation, but in the first instance to one's fellow researchers, to one's peers, so they can apply, test, and build upon it."

Arguing much along the same lines, Becher (1989, p.77) highlights another facet of the importance accorded in academe to the communication of research results:

"Communication is central to the academic enterprise. The validity of that claim is readily established, in that both the promotion of knowledge (the main cognitive concern) and the establishment of reputation (the key social consideration) are necessarily dependent on it. A fresh insight, a new discovery, a novel invention, unless made available to others in the public domain, will remain no more than a piece of intellectual property, fated to accompany its owner to the grave. That owner in turn, unless he or she is able both to establish first ownership and to relinquish possession to others, will be given no credit for its origination".

To be sure, Tenopir and King (2000), basing their claim on a host of studies conducted over forty years (1958-1998), estimate that academics spend as much as fifty percent of their time communicating through a variety of modes (observing, reading, listening, talking, writing, creating images) and channels (journal articles, books, conferences and their proceedings). Happily, for several decades now access to computer-mediated technologies has been dramatically extending scholars' informational and interactive capabilities, although as Haythornthwaite (2002) points out, reviewing the studies on the subject, new computer media have been portrayed in contradictory ways. Often characterised as integrative, connecting disparate others, increasing the involvement of peripheral players, consolidating existing connections, and supporting rich online communities, they are also seen as providing a reduced cues environment that is ill-suited to emotional, expressive or complex communications, and responsible for longer decision times, anti-social 'flaming' behaviours and decreased social involvement.

Indeed, although a perusal of the literature leaves little doubt as to the extent to which text-based electronic communication, particularly e-mail, is by now embedded in the academic community (see, for example, Applebee et al., 1997; Budd and Connaway, 1997; Covi and Kling, 1996; Erens, 1996; Lazinger et al., 1997; Liebscher et al., 1997; Reid et al., 1998; Voorbij, 1999; Walsh et al., 2000; Zhang, 1999), findings of the present study plainly indicate that the new media cannot provide a universal communication tool to satisfy all and every scholarly information need. Rather, as the researchers participating in this undertaking report, their choices of communication modes are contingent on the perceived interactive and informational potential of computer mediated technologies compared to those of traditional face-to-face exchanges. Thus, for obtaining or transmitting factual information, the overwhelming majority, 86 percent, of the researchers queried tend to opt for computer-mediated, text-based communication modes (electronic discussion groups/listservs or e-mail). However, when the research task at hand involves explaining abstract ideas to a colleague, exchanging opinions and thinking together, the majority, 58 percent, prefer to accomplish the task via face-to-face communication (actually,



since 15 percent of the informants, most probably the ones who as a rule prefer to work alone, deem the notion wholly irrelevant to their circumstances, the percentage of those favouring the practice from among the rest in fact comes to 69 percent). That this should be so is perhaps not very surprising in light of what we have learned in recent years concerning the determinants of communication media use.

As Minsky and Marin (1999) note, current thinking offers two major theories to explain the selection and use of communication media: the rational choice theory and the social influence theory.

The rational choice theory posits that individuals choose communication media by matching the medium's inherent objective characteristics and the objective requirements of the communication task. Indeed, in the particular case of the informants for the present study, their choosing text-based electronic modes of communication for conveying concrete, factual information, whilst preferring face-to-face interaction for 'thinking together', the differential communication requirements are clearly matched by the characteristics of the different media chosen. In fact, their behaviour seems to be consistent with Papacharissi and Rubin's (2000) observation, that the extent to which a communication medium is perceived as giving the feeling that others are psychologically present and that the communication exchange is warm, personal, sensitive, and active, affects its utilisation for a given purpose. Indeed, 'the impoverished nature of text-based electronic communication', to appropriate the umbrella phrase used by Kies et al. (1998) to encapsulate the relative depersonalisation of text-based systems and their lack of visual and audio cues, has been found to be less appropriate or useful for emotionally laden exchanges, for creating a sense of 'being there', and, of particular concern to our purposes here, for the delivery of complex or intellectually difficult information (Haythornthwaite, 2002). More specifically, as Hiltz et al. (1987) report, text-based systems have been found to be more useful for tasks in which the visual cues were not critical, most notably the exchange of information, while tasks, which relied on the transmission of gestures and facial impressions, such as persuasion and problem resolution, were better accomplished in a face-to-face session.

However, as Haythornthwaite and Wellman (1998, p. 1102) point out, "information exchanges, whether face-to-face or computer-mediated, are more than individual human-computer interactions. They are social interactions. The nature of information exchanges is constrained by the types of relationships people have as well as the types of media available, the kinds of information to be exchanged, and the norms that are in operation". Indeed, the other theory purporting to explain the selection and use of communication media, the aforementioned social influence theory, argues that beyond the objective characteristics of the medium or the task, channel choice involves individual perceptions as well, as these are conditioned by the social context of media and task. According to Minsky and Marin (1999), although the social influence theory does not deny that choosing a medium may be rational and reasonable, given communicators' perceptions, whether objectively or not, of the characteristics of communication media and tasks, the social context and its situational variables also come into play in the decision making process. Thus, "the communicator is not merely matching communication task and media, but is influenced, consciously or unconsciously, by social relationships, organisational structures, and local norms in the selection and use of communication media" (p. 4).



Indeed, findings of the present study point to disciplinary-culture associated, social-norms influenced patterns in researchers' communication media choice, along the lines of the previously identified field-specific patterns of behaviours and attitudes in academe. In fact, lending support to the probability of communication media choice being affected by the normative social context, humanists' propensity to work alone, coupled with their relatively less enthusiastic acceptance of electronic work practices seem to result in their decidedly greater tendency to disregard considerations of task-media match in their choices of information channels. Thus, 75 percent of the humanist informants opt for text-based electronic media (e-mail and listservs) when in need of some concrete information, compared to 90 percent of the scientists and 93 percent of the social scientists, which, of course points to the humanists' oft-cited relative reluctance to utilise IT-based work methods, as well. Also, only 42 percent of the humanists, compared to 72 percent of the scientists and 62 percent of the social scientists express a need for face-to-face communication when the task at hand involves explaining abstract ideas, exchanging opinions or thinking together. This, however, may at least be partly accounted for by humanists' propensity to work alone (indeed, as many as a third of them, compared to negligible percentages of the scientists and social scientists, find the notion wholly irrelevant to their work practices).

It is not surprising to find then that the humanists are not as inclined to match the medium with the task as the scientists and the social scientists: whilst 70 percent of the former attest to always, often, but at least at times using text-based electronic media for the communication of facts, but insisting on face-to-face meetings for the exchange of ideas, 93 and 89 percent, respectively, of the latter do so, too. Incidentally, the findings here corroborate the previously discerned phenomenon of the younger humanists' closing the intra-disciplinary gap in the shift to electronic scholarship: more than twice as many of the under 44s than either of the 45-60s or of the over 61s report that when they need some concrete information, they post a query on a listserv or e-mail a colleague.

To sum up, in reply to the question posed at the outset of this study as to the extent to which IT-based sources and services are perceived as suited for meeting the different types of information need arising in research work:

**There is a consistent, disciplinary-culture associated, social-norms influenced pattern in researchers' matching the communications media with the information task: computer-mediated, text-based communication (multi-user conferencing or e-mailing) is seen as suitable for obtaining or transmitting factual information, but the fruitful exchanging of ideas and thoughts is perceived to be contingent on face-to-face interaction. Still, humanists' propensity to work alone, coupled with their relatively less enthusiastic acceptance of electronic work practices seem to have resulted in a greater tendency to disregard considerations of task-media match in their choices of information channels, although this appears to be changing.**



### **6.11.3 Scholarly Networks in an Era of Effortless Connectivity: The Impact of E-mail on the Invisible College**

As Berghel (1995) points out in a remarkably insightful article, which, having been written almost a decade ago is almost visionary in its contentions, it is the social dimension of the cyberspace revolution that makes it unique, for it has in effect created a new sense of community – the digital village. Brought about by "the real-time, interactive and participatory capabilities of cyberspace" (p. 26), the digital village, not unlike its material counterparts, connects individuals with shared interests and objectives. As such, it is, of course, particularly well suited to the needs of the scholarly community, as Cronin and McKim (1996, pp. 168-169) assert:

"Scholars were the earliest homesteaders on the World Wide Web, and have been among the most active digital village builders. The number and diversity of [Web-based] discussion forums (from listservs through e-journals to home pages) that physically scattered scholars now use to debate and share ideas (and expose formal representations thereof) is a massive scaling up of the ideas embodied in classical times in Plato's academy, or architecturally enshrined in Thomas Jefferson's design of the 'academical village' at the University of Virginia. Academic disciplines are communities with common interests. Indeed, the ties that bind scholars to their disciplinary peers are often stronger than those that link them to their parent departments or universities. Scholarship depends in no small measure on the conduct of conversations within and between communities with common concerns. The Web, with its unparalleled capacity to link scattered (and increasingly heterogeneous) communities, acts as a powerful catalyst for highly intensive and participatory exchange across national boundaries and disciplinary borders..."

Undoubtedly so, as the actual developments 'in the field' amply prove, for Price's (1975) 'invisible colleges', those "small societies of everybody who is anybody in each little particular specialty" (p. 126), have by now become 'cyberspace colleges': informal communication networks functioning as scholarly in-groups within specialisations, with crosscutting ties between academic researchers, be they low-status or high-status, from the core or the periphery, established or novice (Gresham, 1994).

True, the notion of the invisible college opening up to a much wider circle of peers, beneficial as it may be for disadvantaged researchers in affording them unprecedented opportunities for creating new contacts (Walsh and Bayma, 1996b), is not accorded an invariably enthusiastic reception in academe. Indeed, from the perspective of an individual author, too much feedback, especially from those with little depth of knowledge in a field, may not be an advantage (Tenopir, 1995). Furthermore, academic snobbery is not an unheard of phenomenon, either. For example, Stix (1994, quoted in Tenopir, 1995) says of Harnad: "[he is] no populist... The best thinkers in a field, he believes, should have access to one another, undisturbed by the noise of crowds milling outside the ivory tower." Still, the transformation of the invisible college into its present-day, Internet-based reincarnation, be its name the scholarly digital village or the cyberspace college, seems to be well underway, very much owing to the unprecedented connectivity afforded by the ubiquitous use of electronic mail in academe. As Koku et al. (2001, p. 1755), in their review of the previous research pertinent to their exploration of the process they call 'the etherisation of scholarly networks', suggest:

"E-mail supports easy accessibility, leading to a levelling of perceived hierarchies, with all believing they have access to all. The ease of sending messages to large numbers allows scholars to remain in direct communication with many others, without mediation by a core person or oligarchy. The ease of sending messages to focussed lists of others allows scholars to be members, perhaps unobtrusively, of multiple groups... E-mail is especially useful for maintaining contact with weak ties: scholars and scholarly networks with whom one does not have close relationships of information exchange, collaboration, or friendship... E-mail's accessibility, ubiquity, velocity, and multiple-message characteristics potentially can connect the entire scholarly world... "



Indeed so, although the pivotal role popularly believed to be fulfilled by Internet-based communication media, most notably e-mail, in enhancing scholarly interpersonal relationships has in fact been found to be somewhat overstated. Thus, for example, in his analysis of the role of Internet discussion groups, Matzat (2004) shows that beyond their clearly valuable information effects (greater awareness of other researchers' work) and contact benefits for the researcher, they do not seem to reduce inequalities in the opportunities to access informal communication channels. By the same token, Koku et al. (2001) find in their exploration of the effect of the Internet on the ways in which scholars communicate that although the Internet helps scholars to maintain ties over great distances, physical proximity still matters: frequent contact on the Internet is a complement to frequent face-to-face contact, not a substitute for it.

Still, findings of the present undertaking clearly demonstrate that despite its aforementioned limitations as a communications medium (lesser degree of richness and social presence than face-to-face contact), e-mail is perceived as fulfilling a truly pivotal role in cementing invisible colleges. The unambiguous majority of the participants in this study, 84 percent, perceive e-mail as most helpful in enabling them to maintain close work ties and collaborate with colleagues from all over the world, inclusive of their peers from the leading universities. Also, despite the fact that not all researchers work in collaboration, 67 percent of the informants find that e-mail is instrumental for working together with colleagues. True, the humanists, being, as it has been amply demonstrated, neither very fond of electronic work methods, nor inclined to work in cooperation with fellow researchers, are on the whole relatively less appreciative of the advantages of communicating with their peers via e-mail than their scientist and social scientist counterparts: whereas a 100 percent of the scientists and an overwhelming majority, 89 percent of the social scientists find the use e-mail most helpful for maintaining professional ties with colleagues, a lower, if still considerable percentage, 68 percent of the humanists state so too; and while 90 percent of the scientists and 75 percent of the social scientists appreciate the capabilities afforded by the use of e-mail for working together with fellow researchers, only 38 percent of the humanists think so too.

And yet, here again there seems to be some evidence of a change of attitude among the humanists being underway: although the trend discerned is tentative, based as it is on small samples, the younger generation among them do seem to demonstrate a more positive attitude to the interactive opportunities afforded to them by the use of e-mail than their elders. In any case, the appreciation expressed here of the enhanced communication capabilities afforded by the ubiquitous use of e-mail, coming as it does from Israeli researchers, perforce geographically removed from the mainstream research activity, serves to strengthen the aforementioned postulation, that the Internet has brought spatial peripheries closer to the centre.

To sum up, in reply to the question posed at the outset of this study as to the impact of the ubiquitous use of e-mail on scholarly networking and the invisible college:

**The unprecedented connectivity afforded by the ubiquitous use of electronic mail in academe has served to cement invisible colleges. Indeed, although physical proximity is still seen as crucial for the fruitful exchange of ideas and thoughts, e-mail, with all its limitations as a communications medium affording a lesser degree of richness and social presence, is greatly appreciated and extensively used by researchers for maintaining close work ties and collaborating with colleagues from all over the world. Even humanists, who are neither very fond of electronic work methods, nor inclined to cooperate with fellow researchers, are increasingly enthusiastic of the advantages of communicating with their peers via e-mail, if less so than their scientist or social scientist counterparts.**

This chapter discussed and interpreted the results of the field-based investigation, undertaken for the purposes of the present study, in the context of extant knowledge and understandings. In result, a detailed picture of the information component of present-day research work emerged, on the basis of which it is now possible to come to all-encompassing conclusions as to the changes wrought by the transformed realities of the present day academic enterprise to individual research information needs. The next chapter will endeavour to come to such conclusions.



## **7. Concluding Remarks: Researchers' Information Needs and Practices in an Era of Upheavals in the Scholarly World and Its Information Environs**

The previous chapter showed how the theoretical perspective at the basis of this study and the insights offered by the published literature in the field combine with the data collected for the present undertaking to inform the research questions. The resulting comprehensive, state-of-the-art appraisal of the information component of the scientific enterprise needs now to be further examined to determine if and how the changing realities of the present day academic enterprise have been shaping individual research information needs. To what extent has the suspected possibility, if not probability of changes in the information component of the scholarly endeavour, materialised? Where, if at all, should we go on basing the thinking which goes into the planning and provision of scholarly information services on customarily held concepts, and where, if at all, are we required to change our outlook?

The consideration of scholarly information needs and practices presented in this study had as its key premise the likelihood of changes in the information component of the scholarly endeavour. After all, the host of societal demands driven developments in the organisation, values and practices of scholarly knowledge production of recent years, coupled with the technology-enabled, rapidly evolving opportunities for creating, accessing and communicating information suggested that neither researchers' information needs, nor their attempts at meeting these needs could conceivably remain untouched. Indeed, many elements of contemporary research-associated information work, as they emerge from the findings of this investigation, comprise changed or changing features. Nevertheless, the overall picture presented here bears testimony to the continued existence and relevance of those core scholarly information needs, which are dictated by the basic professional values of academics and their discipline-specific research work conventions. Thus, today's researchers may define their information needs in terms of the changing realities of conducting research in academe of the knowledge society, may more or less happily embrace information work practices, which involve novel responses to the new challenges posed to them, but their fundamental information needs seem to have remained by and large unaffected by the recent upheavals in the scholarly world and its information environs.

This state of affairs is all the more surprising given that scholars' efforts at maintaining professional integrity have been increasingly challenged in the past few decades by far-fetching changes in the academic world. Culminating in the trends towards the 'marketisation', 'commercialisation', massification, instrumentalisation and bureaucratisation of scholarship, these changes exert increasing pressures on academics to produce measurable research output of demonstrable quality, whilst adopting entrepreneurial patterns of academic research intent on cashable knowledge production. In an attempt to comply with these ever-growing requirements for quality, performance, value for money and economic relevance in their scholarly endeavours, today's academics are coerced into steering their research away from curiosity-driven, free enquiry, initiated with the sole purpose of contributing to the advancement of human knowledge, to institutional policies motivated investigation into both academically and commercially attractive issues, which bear the promise of qualitative, quantifiable, but at the same time marketable outcomes. And yet, with all that factors extrinsic to the scholarly enterprise indubitably play a significant role in their research related decisions, scholars still seem to abide by the academic core values

of professional integrity and personal commitment, at least judging by the choices they make in the course of their information work.

Perhaps the clearest indication of researchers' keeping to the dictates of their professional ethics is their consistent opting for quality over convenience in their information work. Thus, although convenience must be of overriding importance for the academics of today, faced as they are with unremitting demands for demonstrating scholarly productivity, they time and time again choose from among the information options available to them the ones deemed intrinsically best suited for solving the scientific problem under consideration, rather than those, which could speed up their work processes or render them more efficient.

A prime illustration of this point is the uptake of electronic information work in academe: while the integration of computer and electronic resources in the scholarly activity is by now quite conventional, even normative among researchers, their out-and-out conversion to electronic scholarship is yet to come to its successful conclusion. Apparently, the ability to obtain information faster and more conveniently, without even leaving one's office, is not the most crucial determinant of researchers' choices of information seeking methods and resources. Rather, the extent of individual researchers' appropriation of IT-based research work practices is very much contingent on their perceptions of the suitability of these initiatives to their idiosyncratic circumstances: researchers seem to choose the electronic option if they believe it to be the best way to meet the specific information need encountered, but also the most appropriate both in terms of their field-specific research work conventions and their individual inclinations and capabilities.

A case in point is the reluctant attitude of today's researchers to the information communicated via Internet-based information dissemination channels: institutionally maintained or disciplinary e-print servers, pure electronic journals, and personal or institutional Web-sites. Clearly, these novel publishing venues hold substantial advantages for scholars, such as immediacy and ease of accessibility to the most recent research findings, sophisticated searching and browsing capabilities and hypertext linking, speedy input from peers from all over the world, and enhanced features of communication (for example, the inclusion of large data sets in research reports), all of which can contribute greatly to their ability to work effectively. In fact, the 'instant information gratification' thus available no more than a mouse click away poses an almost irresistible temptation to opt for the convenience of a quick search on the Web. And yet, researchers manifest a patently wary approach to the possibility of turning to these non-traditional channels, attributing their lack of enthusiasm primarily to a lack of trust in the quality and reliability of the information to be found therein, which they perceive (whether rightly or wrongly) to be unvetted, that is, not vouched for by the traditional quality control measure of peer reviewing.

By the same token, although in the realities of contemporary academe the importance researchers accord to basing their scholarly undertakings on solid information foundations is repeatedly tested against the unprecedented time-constraints with which they are faced, professional integrity dictated considerations clearly triumph over pragmatic ones. Thus, the need to obtain information quickly is rarely, if ever, a paramount enough justification for scholars' compromising on the quality or intellectual level of the



information they incorporate in their work. Researchers are clearly unwilling to trade the guaranteed scholarly value of some information in exchange for the ability to make progress with their investigations. Not only are they categorically disinclined to pay the price of accepting a less than optimal level of information in return for its speedy delivery, but many of them are even prepared to suffer a setback to their progress by waiting for necessary information to arrive. In fact, they are even wary of using an interim solution to the problem of needing some information promptly: although the abstract, often more quickly and conveniently accessible than the full-text publication, provides the researcher with the gist of the information needed, making use of it in lieu of reading the publication itself is a very unpopular practice indeed.

Another indication of academics' favouring the directives originating in their professional set of values over practical considerations of advancing their research enterprises is their restricted utilisation of shortcut measures in their information work. Despite the hectic pace of life characterising the present-day realities of scholarly life, the extensive literature surveys, of the kind usually found in Ph.D. theses, textbooks or review articles, although obviously of considerable time-saving capabilities, are held in very low esteem indeed for assembling the information base of a research endeavour. Perhaps inevitably: after all, to resort yet again to Newton's famous aphorism, researchers stand on the shoulders of the giants who preceded them. That is, their ability to contribute to the advancement of human knowledge is contingent upon their access to the rich, continually incremented information contributed by their predecessors, so they can further examine, analyse, experiment with, and modify it. Obviously, then, basing scientific enquires solely or even primarily on synopses of research developments is building on shaky foundations. Indeed, researchers demonstrate very limited affinity to the practice of making do with reviews or summaries of the information accumulated on a given topic, instead of reading the original publications. Even in the sciences, where it should be definitely feasible to do so, for in the 'harder' knowledge domains one reads to discover the outcome of somebody else's research (as opposed to reading for retracing the discovery and analysis at the core of the research in the 'softer' areas), a summary of advances made is rarely taken to suffice for laying the information foundations of a new exploration. Still, the more pressured the researchers are, the greater is the likelihood that they succumb to temptation. Thus, if in the sciences the race for the solution to the current problem at the frontier of the field dictates a fast work pace in any case, it is the novice researchers, intent on advancing their careers and therefore working under the greatest time pressure, who are relatively more inclined to utilise a shortcut measure for setting up the information base of a new inquiry.

Furthermore, be the pressures contemporary researchers face what they may, this construing of a solid information base in preparation for launching a new research endeavour is apparently not to be dispensed with even in circumstances which ostensibly allow for doing so. Thus, although researchers can easily circumvent the need to attain a deeper level of knowledge by deliberately setting out to do what can be done, notwithstanding big gaps in knowledge, they view the possibility with considerable consternation. Gaining some essential understanding of the issue at hand by locating the basic information on it, possibly through a scientifically valid, if popular level information source, and, if necessary, supplementing the information by asking for explanations from an expert colleague, may seem to be an

opportune solution, but, apparently, it is considered far from being one; at most, it can serve to solve a minor, acute problem.

Yet another point bearing further testimony to researchers' jealously guarding their professional principles, despite the constant pressures stemming from the need to come up with tangible proofs of their productivity, is their careful noting of the extent to which some information at hand presents information (overtly or covertly) from a particular point of view. Obviously, scholars do so for very good reasons indeed. If a new contribution is to advance human knowledge, if it is really to inform, rather than mislead, it has to be built either on scientifically objective truth, or, in fields which allow, if not outright call for the interpretation of data, on information which openly represents specific approaches or perspectives. Indeed, tendentious or even skewed information, contingent, of course, on its having been found scientifically sound and reliable, has its very welcome uses in scholarly investigations, enabling as it does the construing of a multi-faceted understanding of a topic. And yet, given the quantities of information today's researchers habitually peruse, as well as the chronic shortage of time they have to contend with, it is still a mark of researchers' giving precedence to considerations of scientific integrity that they conscientiously note the angle from which a topic is treated, considering the task a routine element of their information work. Luckily, detecting treatment of a subject from a particular viewpoint or perspective, not to mention any biased or one-sided approach, is apparently a rather undemanding task. Apparently, as they build up their familiarity with the literature pertaining to their areas of interest over the years, researchers find it progressively easier to match the features of the source they are examining, such as the sources cited and the terminology used, with those long known to them to represent various schools of thought, viewpoints, approaches and perspectives.

Perhaps the most convincing proof of contemporary scholars' adherence to the traditional ideals of the academic enterprise is their insistence on proactive information seeking in an environment, which as obviously encourages passivity in research as the electronic one does. Indeed, today's researchers could lean back comfortably and simply wait for the information to land on their desks. Current awareness services cover all the important work in a given area and deliver full text to researchers as potential information consumers; electronic repositories post draft versions of research papers, allowing researchers timely and convenient access to the most recent research findings; the ubiquitous use of e-mail and listservs enables scholars to exchange information in real-time. The ease of maintaining contact with expert colleagues, coupled with the steady stream of electronic information flowing to scholars, might have conceivably resulted then in their adopting a more passive attitude to information seeking, especially with the aforementioned time pressures rendering the possibility all the more enticing. Plausible the possibility may be, but in point of fact, it does not approximate reality: today's academics determinedly resist the temptation to rely on electronic systems or the IT-enabled grapevine.

Thus, for example, researchers are quite reluctant to relinquish the responsibility for keeping up with the developments in their fields either to their fellow researchers, relying on 'the grapevine', or to the ever-more effective systems of scholarly information dissemination, with all that their professional ties are as close as they are, and the electronic information provision techniques as expedient as they are. They are far more inclined to go about acquiring the information they need so as to keep a finger on the pulse of



developments in the resolute, proactive manner traditionally attributed to them. Thus, they tend to work actively at keeping current, rather than counting either on their close ties with colleagues or on current awareness services or e-print repository notifications for gaining knowledge of new contributions to their fields. Perhaps inevitably: following the developments in their professional areas of attention is one which researchers justifiably tend not to leave to others; after all, nobody else can substitute for them in the unpredictable, serendipitous, idiosyncratic and very subjective interaction with information which, alone, yields creative results.

In the same vein, researchers do not wholly bank on fortuitous coincidence in their pursuit of new research topics. True, they do look to existing information to provide them with suitable problems to tackle next, and therefore the detection of potential research opportunities forms a routine, almost reflex part of both their reading and communicating with colleagues. However, many go about stimulation-seeking in a much more proactive fashion, too, deliberately and conscientiously tracking down likely topics for investigation, either by setting out to scour the literature expressly for the purpose, but also, if to a lesser extent, through brainstorming with colleagues. In fact, it is quite possible that researchers light on accidental discoveries of new ideas precisely thanks to this systematic priming of theirs for such an eventuality, thanks to their having developed a state of 'information attentiveness' for new discoveries, a conclusion, which, of course, echoes Pascal's well-known saying, 'surprise comes to the prepared mind'.

This insistence of contemporary researchers' on retaining close control over their scholarly pursuits in all probability provides the key to our understanding researchers' changed attitude to the vast quantities of information available to them, which is easily the most intriguing finding emerging from the present study. Thus, flying in the face of popularly held notions, the possibility, not to say probability of drowning in a sea of information, once a major concern much debated in academic circles, no longer seems to be a cause for worry among researchers. Apparently, the ever-growing abundance of information at their disposal poses contemporary scholars no problems of overload; very much to the contrary, they plainly hold the easily obtainable masses of information very beneficial indeed to their scientific endeavours. Indeed, as today's researchers seem to perceive it, information overload has definitely turned to information affluence.

Academic researchers are typically characterised by voracious information appetites, and no wonder: the scholarly enterprise is collective, cumulative and collaborative in nature, with scholars basing their efforts to contribute new information to the evolving corpus of human knowledge on both previous and ongoing scholarly research. Indeed, the present investigation reaffirms the importance academic researchers accord to the judicious use of all available relevant information in research work, but apparently, their tacit definition of 'all relevant information' has become, in effect, 'all relevant information of appropriate quality'. That is, today's scholars, very much aware of a 'publish or perish' culture associated decline in the quality of the information at their disposal, no longer treat information with deference bordering on reverence; rather, they appraise it for its merits just like any other commodity, with selective reading serving as their primary strategy for effective information consumption. Thus, they rely on the time honoured, two-tiered process for picking out as efficiently as possible the worthwhile items from among the huge amounts of information at their disposal: first selection made on the basis of authorship and



channel of publication, followed by a more in-depth scrutiny of the items which have been found to merit further consideration.

Thus, it is indeed researchers' proactively working at their retaining close control over the information component of their scholarly pursuits, which enables them to manage the profusion of scholarly and scientific publications. In fact, they cope with the abundance of information so effectively, that it poses no problems whatsoever, so much so, that they discern no need to gauge the feasibility of a new undertaking by the quantity of pertinent information expected to be available on it. No wonder they seem to revel in the abundance of information unabatedly accumulating in their areas of interest, deeming the situation eminently satisfactory, a blessing even.

It seems then, that contemporary scholarly information work is characterised by a clearly discernible, generic framework of professional ethics dictated principles. Plainly, although factors extrinsic to the scholarly enterprise do impact on their research related decisions, academics still seem to abide by the core values of professional integrity and personal commitment, at least in their information work. Perhaps inescapably: members of the academic community are strongly motivated to network themselves both professionally and technically with their peers in other universities and research organisations, a phenomenon wholly borne out by the findings of the present study, too. Indeed, as it has been repeatedly noted in the course of this report, scholarly interaction, both on the formal and informal level, is such an essential part of research activity that these networks, the invisible colleges, are in many ways more visible to academics than the physical campuses where they organise their places of work.

Furthermore, part and parcel of this notion of the scientific enterprise as a social system is its salient feature of interactive communication and exchange of information and ideas among similarly interested colleagues. Indeed, academics live in two worlds: a scientific world with its special norms, conventions and communication structures and a separate 'outside' world. Given that scientists in any field depend on other scientists to provide information to enable them to proceed with their work, so that they can earn a good reputation, whilst at the same time being depended upon by other scientists for the same purpose, they obviously need such an infrastructure of common norms and work conventions to base their communications on; they simply need to speak the same language for the effective exchange of ideas and information.

Indeed, the present study re-affirms yet again that the inter-disciplinary differences in analytic processes and research work-habits, stemming as they do from the very nature of the way knowledge grows in each of the knowledge domains, entail discretionary information needs and uses both on the inter-individual and the intra-individual level. These needs, summarised below as a generalised profile of scientists, social scientists, and humanists, whilst clearly indicative of changing elements in contemporary research-associated information work, nevertheless bear testimony to the ongoing vital importance of heeding the research-work conventions rooted specific information needs of the different communities comprising the academic population.



It seems then that the portrayal of contemporary researchers' information needs and practices, presented here, poses an interesting challenge for today's information service providers. It clearly behoves the need for custom-made, personal information infrastructures, tailored to the distinctive needs of individual researchers, which is, of course, more feasible than ever in the present-day electronic environment. However, it also indicates the need to consider researchers' idiosyncratic information requirements within a basic framework of fundamental-values driven, generic information needs. Thus, they undoubtedly have to monitor closely if and how the changing realities of the present day academic enterprise shape individual research information needs. However, in defining or redefining their responses to the information needs of their scholarly costumers, it is imperative that they never take transformation for granted or implement new solutions for meeting information needs without looking into their suitability for the purpose.

## 8. By Way of Summary: A Generalised Profile of Scientists', Social Scientists' and Humanists' Information Needs and Practices

Needs/ Practices	Scientist	Social Scientist	Humanist
Scope of information work	Restricts scope of information work to areas of own immediate research interests.	Both restrict scope of information work to areas of own immediate research interests; both take longer into their careers than the scientist to grow focussed in their research interests, and consequently, in their information needs.	
Coping with the need for information beyond own area of expertise	<p>Tends to opt for information sharing via cooperative research ventures, especially as a novice researcher.</p> <p>When branching out to a new area, may, though not very likely to set out to master it, especially when still a novice researcher.</p> <p>Wary of making do with more basic level information, even if augmented by consultation with an expert.</p>	<p>Tends to opt for information sharing via cooperative research ventures, especially as a novice researcher.</p> <p>When branching out to a new subject area, likely to set out to master it, especially when still a novice researcher.</p> <p>Wary of making do with more basic level information, even if augmented by consultation with an expert.</p>	<p>Unlikely to opt for information sharing via cooperative research ventures, although more likely to do so as a novice researcher.</p> <p>When branching out to a new subject area, likely (if less so than the social scientist) to set out to master it, specially when still a novice researcher.</p> <p>Wary of making do with more basic level information, even if augmented by consultation with an expert.</p>
Time-depth of information needed	Needs mainly the latest works, as these subsume previous information. May consider a few years old material obsolete, especially as a novice researcher.	Needs both current and retrospective information. May consider a few years old material obsolete, especially as a novice researcher, if less likely to do so than the scientist.	Needs both current and retrospective information. Unlikely to consider a few years old material obsolete. However, more likely to do so as a novice researcher.
Accessing information	May find it necessary to go to the information site, especially where the information source is a fellow researcher.	May find it necessary to go to the information site, either for obtaining recorded information or for consulting with a fellow researcher.	Needs to go to sites of primary sources of recorded information, even if available electronically.



Needs/ Practices	Scientist	Social Scientist	Humanist
Turning to colleagues for meeting information needs	<p>Both maintain close ties with colleagues for learning of new developments.</p> <p>Both tend to derive stimulation/ ideas for research from information imparted to them by fellow researchers, whether in chance conversations or through deliberate brainstorming together.</p> <p>Both reluctant to ask colleagues for recommendations on pertinent sources of information, and even less for the information itself.</p>		<p>Keeps in touch with colleagues for learning of new developments. Markedly less likely than the scientist and the social scientist to derive stimulation/ ideas for research from colleagues. More reluctant than the scientist and the social scientist to ask colleagues for recommendations or for information.</p>
Value of attending conferences	<p>Tends to prefer information authored by a personal acquaintance, increasingly so with seniority. Likely to attend conferences primarily for socialising.</p>	<p>Tends to prefer information authored by a personal acquaintance, increasingly so with seniority. And yet, not very likely to attend conferences primarily for socialising.</p>	<p>Tends to prefer information authored by a personal acquaintance, increasingly so with seniority. And yet, not very likely to attend conferences primarily for socialising.</p>
Laying the information foundations of a scholarly enquiry	<p>Both tend to perform a thorough literature review upon embarking on a new research project, especially as novice researchers.</p>		<p>Although likely to find much of the information already well-known, also tends to perform a thorough literature review, especially as a novice researcher.</p>
Maintaining currency	<p>Likely to follow developments closely, though not necessarily zealously, and to work at it proactively. More so as a novice researcher.</p>	<p>Tends to follow developments closely, if not as much as the scientist, and likely to work at it proactively. More so as a novice researcher.</p>	<p>Growingly inclined to follow developments more closely, if as yet far less so than the scientist and even the social scientist, and likely to work proactively at it. More so as a novice researcher.</p>
Utilisation of current awareness/ alerting services	<p>Likely to find the alerting services of use.</p>	<p>Not very likely to find the alerting services of use.</p>	<p>Unlikely to find the alerting services of use.</p>

<b>Needs/ Practices</b>	<b>Scientist</b>	<b>Social Scientist</b>	<b>Humanist</b>
Meeting topical information needs arising in the course of research work	Tends to prefer turning to the library, but increasingly likely to search the Web, too. Also likely to ask a colleague for the publication. May consult with an expert colleague.	Tends to prefer turning to the library, slightly more so than the scientist even, but increasingly likely to search the Web, too. Also likely to ask a colleague for the publication. May consult with an expert colleague.	Greatly prefers turning to the library. May also search the Web and ask a colleague for a publication, but only rarely will consult with an expert colleague for obtaining the information.
Sources of ideas/stimulus for research	All consider both formally and informally communicated information important sources of stimulus for research.		
Obtaining research stimulating information	Likely to set out to scour the literature for potential topics, but just as likely to rely on serendipitous acquisition of research inspiring information, either from the literature or via colleagues.	Likely to set out to scour the literature for potential topics, but also likely (if somewhat less than the scientist) to rely on serendipitous acquisition of research inspiring information, either from the literature or via colleagues.	Likely to set out to scour the literature for potential topics, but not very likely to rely on serendipitous acquisition of research inspiring information either from the literature, or, even less so, via colleagues.
Attitude to the present-day abundant availability of scholarly information	Considers the abundance of information highly satisfactory, a blessing even. Still, may hold with a need for a careful appraisal of the information, perceived to be declining in quality consequent to the 'publish or perish' syndrome.	Considers the abundance of information highly satisfactory, a blessing even. Still, likely to hold with a need for a careful appraisal of the information, perceived to be declining in quality consequent to the 'publish or perish' syndrome.	Greatly inclined, if less so than the scientist or the social scientist, to consider the abundance of information highly satisfactory. However, also likely to hold with a need for a careful appraisal of the information.
Perceived manageability of the present-day profusion of information	Inclined to consider the profusion of information manageable, more so as a seasoned researcher. Indeed, not very likely to take into account the amount of information when deciding on a new research project, although more likely to do so as a novice researcher.		More inclined (at any age) than the scientist or the social scientist to consider the profusion of information manageable. Quite unlikely to take into account the amount of information when deciding on a new research project.



Needs/ Practices	Scientist	Social Scientist	Humanist
Coping with the present-day profusion of information	Appraising information for its merits, all consider selective reading the key to effective coping with the profusion of information.		
Use of journal versus monograph literature	Relies on journal articles for laying the foundations of a scholarly enquiry; has limited use for monographs, less and less with age, although does often turn to handbooks or textbooks for brushing up on the basics of the field.	Appreciates both monograph and journal literature almost to a similar extent, perhaps with a slight edge to journals over books, for laying the information foundations of a scholarly enquiry.	Favours monograph over journal literature for laying the information foundations of a scholarly enquiry, although these days demonstrates more affinity for journals than traditionally attributed to humanists.
Establishing the authority and/or determining the quality of scholarly information	Likely to use a two-tiered process: first selection on the basis of the channel of publication and authorship, then a more in-depth scrutiny. Tends to prefer information authored by a personal acquaintance.	Likely to use the same two-tiered process. More than the scientist or the humanist tends to rely on the channel of publication and authorship. Tends to prefer information authored by a personal acquaintance, too.	Likely to use the same two-tiered process, demonstrating as much of a reliance on the channel of publication and authorship as the scientist. Tends to prefer information authored by a personal acquaintance, too.
Perceived value and usability of information published in more marginal journals	Inclined to turn to more marginal journals, too, maintaining that information of appropriate quality and authority may be found there.	More inclined than either the scientist or the humanist to turn to more marginal journals, too.	Slightly more inclined than the scientist to turn to more marginal journals, too.
Perceived value and usability of Internet-based journal literature	Likely to start out with the journal literature on the Internet for assembling the information base of a research project.	Less likely than the scientist to start out with the journal literature on the Internet for assembling the information base of a research project.	Far less likely than the scientist to start out with the journal literature on the Internet for assembling the information base of a research project.
Perceived value and usability of pure e-journals	All reveal an increasing, if as yet limited tendency to deem the quality of articles in pure e-journals on par with traditional ones, although the humanist is more likely than the scientist or social scientist to consider e-journals wholly irrelevant.		

Needs/ Practices	Scientist	Social Scientist	Humanist
Perceived value and usability of the unrefereed information obtainable via disciplinary or institutionally organised e-print repositories	May turn to e-print repositories; the extent of use is likely to be field- or even sub-field specific. Somewhat more willing to do so than the social scientist or the humanist.	May turn to e-print repositories; the extent of use is likely to be field- or even sub-field specific. Somewhat less willing to do so than the scientist or even the humanist.	May turn to e-print repositories; the extent of use is likely to be field- or even sub-field specific. Somewhat less willing to do so than the scientist, but slightly more than the social scientist.
Perceived value and usability of primary material to be found on the Internet	Not very likely, though increasingly more so, to turn to the Internet for primary material, far less so than the social scientist, although more so than the humanist.	Likely at all ages to turn to the Internet in search of primary material.	Quite unlikely at all ages to turn to the Internet in search of primary material.
Perceived value and usability of Web-based, popular level information	All equally not very likely to turn to the Web in search of popular level information. When they do, it is only after careful inspection, in view of the liability that much of the information to be found in this way will not conform to their standards of quality and authority.		
Perceived value and usability of information hailing from countries on the periphery of scientific and scholarly activity	Tends to consider the country whence some information hails immaterial, although unlikely to use a publication, which is not vouched for by the reputation of its author, without checking out its geographical origins.	More concerned with the country whence some information hails than either the scientist or the humanist. Unlikely to use a publication without checking out its geographical origins, even if it is of reputable authorship.	Tends to consider the country whence some information hails immaterial, although unlikely to use a publication, which is not vouched for by the reputation of its author, without checking out its geographical origins.
Perceived value and usability of information presented from a specific point of view, approach, or angle	Unlikely to search for or to check if information presented from a specific point of view, since the subject matter of the sciences is rarely amenable to subjective interpretation.	Likely to search for/ to check if information is presented from a specific viewpoint, deemed important for a multi-faceted treatment of a topic. Likely to find the task easy, increasingly so with seniority.	Likely, especially when a novice researcher, to search for/ to check if information is presented from a specific viewpoint, deemed important for a multi-faceted treatment of a topic. Very likely to find the task easy, increasingly so with seniority.



<b>Needs/ Practices</b>	<b>Scientist</b>	<b>Social Scientist</b>	<b>Humanist</b>
Expectations for speedy delivery of information	Very likely to want an information need met promptly, invariably so as a novice researcher. However, reluctant to pay for speeding up access to information, if less so as a novice researcher.	Very likely to want an information need met promptly, markedly more so as a novice researcher. Still, at all ages slightly less so than the scientist. However, nearly as reluctant as the scientist (at all ages) to pay for speeding up access to information.	Likely to want an information need met promptly, markedly more so as a novice researcher. However, reluctant to pay for speeding up access to information, relatively more so at all ages than the scientist or the social scientist.
Purposes and perceived importance of speedy delivery of information	Likely to require speedy delivery of information to enable unhampered thought processes. Also likely to deem it important for overtaking professional rivals. As a novice researcher, looking to be promoted, very likely to find it important for producing research results quickly.	Likely to require speedy delivery of information to enable unhampered thought processes. May also deem it important for overtaking professional rivals. As a novice researcher looking to be promoted, tends to find it important for producing research results quickly.	Likely to require speedy delivery of information to enable unhampered thought processes. However, unlikely to deem it important for overtaking professional rivals. Still, as a novice researcher looking to be promoted, tends to find it important for producing research results quickly.
Compromising in information work: accepting less than optimal level information in return for its prompt availability	Although typically required to advance at a rapid pace, likely to renounce the option. Still, if lack of some information can delay the progress to be made, may even, especially as a novice researcher make do without it.	Very likely to renounce the option. Still, if lack of some information can delay the progress to be made, may even, especially as a novice researcher, make do without it, although less inclined to do so than the scientist.	Very likely to renounce the option. Even if lack of some information can delay the progress to be made, unlikely to make do without it, although more likely to do so as a novice researcher.
Compromising in information work: utilisation of shortcut measures	Likely to consider the original publications vital, although may reluctantly make do with review articles or literature surveys, especially as a novice researcher. If pressured for time, quite likely to use the abstract in lieu of the article.	Likely to consider the original publications vital, although may, if more reluctantly than the scientist, make do with review articles/ literature surveys, especially as a novice researcher. If pressured for time, quite likely to use the abstract in lieu of the article.	Likely to consider the original publications vital; only rarely will make do with review articles or literature surveys instead. However, more likely to do so as a novice researcher. Even if pressured for time, unlikely to use the abstract in lieu of the article.

Needs/ Practices	Scientist	Social Scientist	Humanist
Information retrieval: searching for specific types of information	Likely to search for particular kinds of information		Unlikely to search for particular kinds of information
Information retrieval: keyword-based search	Very much inclined to opt for keyword-based information retrieval.	Very much inclined (if slightly less than the scientist) to opt for keyword-based information retrieval.	Inclined to opt for keyword-based information retrieval; markedly less so than the scientist or the social scientist.
Information retrieval: reference chaining	Tends to use reference chaining for laying the information foundations of a new project, considering it a convenient way of identifying literature relevant to own investigations.		Tends to use reference chaining more for anchoring own work in the conceptual network of the field, rather than for identifying relevant literature.
Proficiency in languages other than English	Both likely to maintain that research of importance will be communicated in English, and thus to consider having English sufficient for meeting information needs Still, as seasoned researchers, both more inclined to appreciate proficiency in languages other than English.		Scorning the view that research of importance will be communicated in English, considers having languages important for meeting information needs.
Converting to electronic scholarship: the format of the information used	Very likely to use paper-based and electronic material indiscriminately, considering the format in which the information comes of no importance.	Likely to use paper-based and electronic material indiscriminately, considering the format in which the information comes of no importance.	Tending to adhere to a self-image of 'not much of an electronics fan', not very likely to use paper-based and electronic material indiscriminately.
Converting to electronic scholarship: the perceived importance of e-mail	Greatly appreciates and extensively uses e-mail for maintaining close work ties and collaborating with colleagues from all over the world.	Greatly appreciates and extensively uses e-mail for maintaining close work ties and collaborating with colleagues from all over the world, if slightly less than the scientist.	Increasingly appreciates and quite extensively uses e-mail for maintaining close work ties with colleagues from all over the world, if less than the scientist or the social scientist.



Needs/ Practices	Scientist	Social Scientist	Humanist
Attitude to electronic information work	Both maintain that electronic sources and services have improved information work enormously. Equally energised as a novice and as a seasoned researcher about electronic information work practices.		Likely to consider electronic sources and services a vast improvement. Increasingly happier with the electronic option: far less prone to treat with disdain electronic information work practices as a novice researcher.
Matching the communications media with the information task	Clearly mindful of considerations of task-media match in choosing the appropriate communications channel: opts for text-based electronic media for conveying concrete information, and for face-to-face communication for sharing abstract ideas.	Clearly mindful of considerations of task-media match in choosing the appropriate communications channel: opts for text-based electronic media for conveying concrete information, and for face-to-face communication for sharing abstract ideas.	Not as likely as the scientist or the social scientist to be mindful of considerations of task-media match in choosing the appropriate communications channel, neither for conveying concrete information, nor for the sharing of abstract ideas. Still, demonstrates an increasing tendency to do so.

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