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Appendix 3:

The Published

Papers

Appendix 3: The Published Papers

#	ShortName	Title
1	Eteaching92	Rich, Martin (1992) "The use of electronic mail and conferencing systems in teaching management students". City University Business School working paper, 1992.
2	GroupWork94	Rich, Martin, (1994) "Building computer supported group work into an MBA programme" International journal of computers in adult education and training, 4(1/2): 3-25
3	CaseStudy95	Rich, Martin (1995) "Supporting a case study exercise on the world wide web" in Cornell, Richard and Murphy, Karen (1995) From Smoke Signals to Satellite II, University of Central Florida, 1995. 121-127
4	Community97	Rich, Martin (1999) "A learning community on the Internet: an exercise with masters students" AMCIS conference, Indianapolis August 1997. 390-392
5	TechTeach97	Holtham, Clive and Rich, Martin (1997) "Learning information systems through a mail-enabled business simulation: the case of Trent Engineering" in Lloyd, Les: Technology and Teaching. Information today inc. 1997. 139-156
6	Weblessons99	Rich, Martin (1999) "A learning community on the Internet: some lessons from using the web" AMCIS conference, Milwaukee August 1999. 942-944
7	Virtual00	Rich, Martin (2000) "Teaching and learning about the virtual organisation" EDEN research workshop, Prague, March 2000.
8	Barriers01	Holtham, Clive and Rich, Martin (2001) "Barriers to academic take up of computer mediated communications and video technologies – the comfort factor" technology in education and training (TET) Prague, May 2001
9	ResLinking02	Holtham, Clive; Murphy, Ciaran, and Rich, Martin (2002) "Business information systems: can relevance link teaching and learning to research?" Scholarship of teaching and learning (SOTL) conference, London, June 2002
10	21stCSpace02	Holtham, Clive and Rich, Martin (2002) "Making space for twenty first century management learning" Educational Innovation in Economics and Business (EDINEB 2002), Guadalajara, June 2002
11	InfoLiteracy03	Rich, Martin, Brown, Ann, and Holtham, Clive (2003) "Information literacy for starting MBAs: issues and dynamics" Business Education Support Team (BEST) conference, Brighton, April 2003
12	ActionRes03	Brown, Ann, Rich, Martin, and Holtham, Clive (2003) "Supporting information literacy for starting MBAs through action research" Electronic journal of business research methods2 (1)

Paper 1:

Rich, Martin (1992) "The use of electronic mail and conferencing systems in teaching management students". City University Business School working paper, 1992.

WORKING PAPER SERIES

THE USE OF ELECTRONIC

MAIL AND CONFERENCING SYSTEMS IN

TEACHING MANAGEMENT STUDENTS

Martin Rich

City University Business School, London

Abstract

Information technology is increasing in importance within business, and this increase must be matched with an increase in the importance of information technology within business education. To be effective the use of information technology must be taught in a way which encourages links with other parts of the course.

Information technology is also a valuable tool for teaching group working skills. The two areas can be combined by using case studies carried out using electronic mail. A series of such case studies has been implemented at City University Business School, London.

The case studies have been well received by many students, although they suffer severely if there are faults in the computing infrastructure and have proved hard work to implement. The technique is now being developed to include a set of tools for accessing case studies, and studies that rely on international collaboration.

A particular advantage of the method is the speed at which student feedback can be gathered. The emphasis on group work is such that it is difficult for students, working within groups, to under-participate. Therefore the cases ensure that the students have genuine experience of a group environment and that there are few 'freeloaders'.

The aim is to create an artificial business environment where students can experience some of the real pressures to which managers are subject. The case studies and tools are components of such an environment.

Author's Biography

Martin Rich is Lecturer in Information Management at City University Business School, London. He has a BSc in Applicable Mathematics from Birkbeck College, University of London, and an MBA in Information Technology Management from City University Business School.

Before taking his MBA he worked for over ten years in an Information Systems environment. Particular responsibilities included:

- Project management for implementation of data communication software

- Liaison between Business and Academic participants in the Alvey project.

Since completing his MBA he has worked for City University Business School as a Lecturer, concerned both in teaching and research with the use of Information Technology in education.

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1.INTRODUCTION

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Two of the most important skills that managers must acquire are an ability to work effectively within groups, and an appreciation of information technology. For many years the relationship between these two skills would have seemed tenuous:information technology was a tool for automating repetitive tasks, and as such was most appropriate to individual work. And for many years the popular perception of information technologists has been of solitary scientists, working alone and communicating more comfortably with machines than with other people.

In recent years the rôle of information technology has changed. Computers have become universal tools, screens and keyboards have become as appropriate on managers' desks as on those of scientific or clerical staff. And because managers interact constantly with other people, computers, as management tools, are now essential for group work. Two principal developments in technology have enabled the transition:

- As hardware has become cheaper computers have become commodities, everyday items that need not be procured for particular tasks

- Networking has become an integral part of most information systems, so it becomes possible for computers to be used to facilitate discussions, and to send messages beyond the historic constraints of space and time.

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At City University Business School, London, group work and information technology skills have both been taught through a set of electronic case studies and tools. These take the case study method that is at the core of much business education, and combine it with a coverage of computer skills. These case studies allow group exercises to be devised, that limit scope for under-participation by some members of the group. They encourage a broader appreciation of information technology than alternative methods of teaching computer skills.

The approach is most appropriate to management students (undergraduates in Business Studies and MBAs) to whom information technology can be taught either as a core competence, or a mechanical skill. As information technology becomes central to business, it becomes increasingly appropriate to teach it as a core competence.

This paper describes some of the case studies and attendant tools that are being used. As well as explaining the approach it also examines some of the issues addressed in devising the case studies, and examines some of the lessons that the business school has drawn from their implementation.

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2.TARGET USERS

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Two groups of students within the City University Business School were targets for the approach described. The business school offers a range of MBA (master of business administration) courses, of which the *Day MBA* is basically a one-year full-time course, although there are a few part-time students who spread the course over two years. Students follow one of five specialisms (including information technology management - ITM) and divide their time almost equally between the *core* subjects, common to students following different specialisms, and the specialist subjects. The introduction of the ITM MBA in 1989 was part of a move to increase the importance of information technology in the business school as a whole, and the MBA syllabus includes a one-term core computing course that is taught to students other than the ITM specialism.

There are about 200 students in total on the day MBA course. The sheer volume of students makes it difficult to adopt a small group approach in teaching any core subjects. Computing case studies have been used both as part of the core computing course and with the ITM students, of whom there are about 30 each year.

The business school also offers a BSc (bachelor of science) course in Business Studies. This course is highly selective; it attracts students with very high grades in their A level examinations, and although an undergraduate course has in recent years had up to 25% of students with some business experience. It is a three year course although students have the option of taking a year out in business before their final year. In 1992-3 the second year

students are using a case study within their computing course. There are about 70 students in this group. These students have already had an introductory computing course.

Earlier applications of computer-based discussions amongst students, notably those described in *Mindweave* by Mason and Kaye (1989) have formed part of an attempt at providing distance learning, of removing the need for cohorts of students to work in one place. But Wilson and Kaye, in their foreword, include a transcript of a conversation between students around Britain who also talk about the advantages of contributing in the middle of the night, or the ease with which otherwise shy people could contribute.

The City University Business School application had as its target full-time students; therefore it needed to rely on advantages other than the removal of distance. Such extensive use of electronic mail among a community working at one site is novel.

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3.GOALS AND MOTIVATION

3.1.Learning Objectives

The educational objectives of using case studies can be summarised as follows:

- To give students practical experience of using information technology, and particularly data networks, to communicate and gather information

- To teach students about the value of information in making decisions, and thus the importance of including decisions about information technology in formulating business strategy

- To ensure that groups of students participated, and produced work to which every member of the group had contributed

- To simulate the decision making and communication processes involved in actually running a business.

3.2.Underlying Hypotheses

- Information technology is a means to assist organisations in carrying out their tasks, not an end in itself. The pattern of use of technology, certainly since the advent of the personal computer, has altered so that there is an emphasis on complete business

Enabling Technology and Applications:

Note:
Enabling technology
alone has no effect.

Direct manipulation
does not inevitably
lead to ease of use.

Different users have
different needs.

Cheap Personal Computing • Direct Manipulation (WIMPS) • Networking

Faster
processing
Cheaper
memory
Smaller chips
Standards
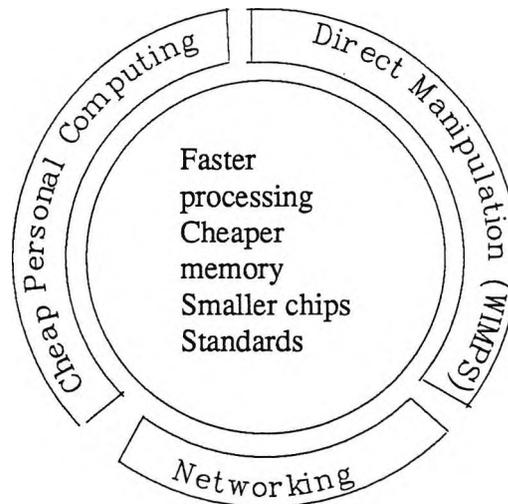
processes, not merely the automation of clerical tasks. This places a demand on management education, to match this shift of emphasis with a change in the approach to teaching technology. *As technology becomes more closely integrated into business, it needs to be increasingly integrated into business education. In teaching the use of technology, it is becoming essential to cover organisational and strategic issues.*

• The key enabling technologies for recent developments are cheap hardware (and therefore affordable personal computing and affordable graphics for user interfaces) and increased use of data networks. Personal computing is now so familiar that it is part of most students' personal experience, certainly on MBA courses which are aimed at those with some business experience. Use of networks remains an unknown area to those who do not have the opportunity to join a community of network users. And

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the widespread use of personal computers, which provide a simple, safe, environment to work in, can encourage suspicion of networks. So *use of a network is a practical way in which students can learn about the potential of technology.*

3.3.Theoretical Background

Why the emphasis, in management education, on information technology and group work? First, look at the importance of information technology. Scott Morton (1991) in the Management in the 1990s programme identifies familiarity with information technology as a key requirement for managers. He sees technology as enabling *business process redesign*, that is changes in the processes by which organisations, and those within them, relate. In Scott Morton's model this is one of five levels of involvement of technology: the upper three levels are revolutionary whereas the lower two are evolutionary. Business process redesign is the lowest of the evolutionary levels. Above it are business network redesign and, at the top, business scope redefinition.

Looking at Scott Morton's model, two factors that distinguish the evolutionary from the revolutionary levels are:

• At the revolutionary levels the technology has a direct impact on an organisation's strategy; therefore for the transformation to be effective, senior management must have a commitment to using and understanding information technology

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- The revolutionary levels depend on integration, and the existence of appropriate links, between different organisations; in effect therefore they require open systems, not dependent on particular users or suppliers.

Senior management appreciation of technology is matched by the integration of computing case studies into a broader management syllabus. Openness and networking is achieved if the case studies include participation between students on different courses, and at different institutions.

Second, look at group work. One of the most comprehensive definitions of what managers actually do from day to day is Mintzberg's set of managerial rôles (1973). Mintzberg's rôles are categorised as interpersonal, informational, and decisional. These are predominantly rôles that depend on liaison with other people; while managers often complain that the pressures of meetings leave no time for administration, time spent with other staff is usually an indication of a conscientious manager.

Managers are usually concerned with fuzzy, difficult decisions where there is no clear right or wrong outcome. If there is a clearly defined *correct* solution to a problem, there is rarely a need for a highly paid senior manager to identify it. Different tasks are more or less susceptible to being carried out by groups. The *ambiguity* of a task is a key determinant of its suitability for group work: decisions without clear outcomes are best made collectively. And as these are the decisions that occupy managers, group working skills should be a vital part of management teaching.

The distinction between ambiguous and unambiguous tasks has a parallel in the theory underlying the use of data communications. Fulk and Steinfield (1990) draw a distinction between *equivocal* and *unequivocal* messages. Equivocal messages demand a *rich* communication medium, that is one that adds a lot to the bare verbal information provided by, for example, a simple office memo. A *lean* medium is better for an unequivocal message where extraneous information would only introduce confusion.
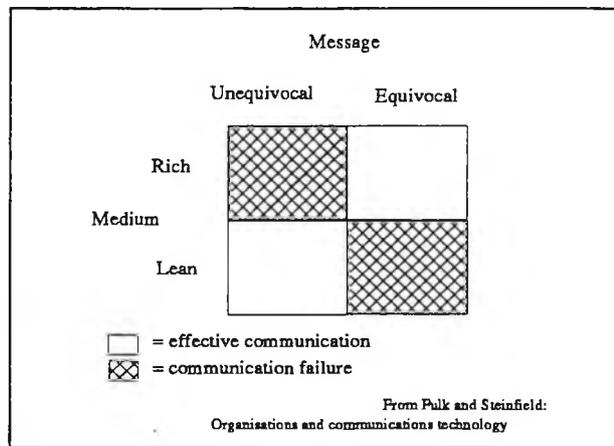
Matrix of Equivocal Messages and Rich Media

How rich a medium is electronic mail? As used in the academic community it only permits text to be sent, and text with very limited formatting. So there is no ability to see remote participants, no ability to send anything but the simplest diagrams. But in this context it became quite a rich medium. Information on cases was circulated by staff who were often present at the business school, albeit not in a conventional lecture setting. The immediacy of reply meant that there were tangible ebbs and flows of discussion. Electronic mail has developed its own language to convey emotions - for example :-) to represent a smile, turned through 90o - apparently to satisfy its users' needs.

Use of videos of people, involved in the cases, and sending mail messages written in the style appropriate to different participants, helped students to build a picture within their minds of both cases and characters by detecting some of the subtler points than would be raised by the initial data.

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3.4.Reasons for the Cases

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Introduction of the case studies was a direct response to feedback from students. Information technology is a practical field, even in the management context, and MBA students repeatedly demanded a practical approach to teaching it. This led to a wish for experiential learning which could be met by an electronic mail-based case study. BSc Business Studies students found the quantitative subjects - mathematics, statistics and computing - dry and only saw a tenuous connection to the rest of their course. Often they would suffer in their final year because they had paid insufficient attention to quantitative subjects early in the term. Unless the computing was closely tied to (at least) other quantitative areas, it was perceived as a slightly eccentric topic on the fringe of the course. As such only the students with past computing experience (who therefore needed least to learn more) were attentive in computing sessions. Use of a case study offered an opportunity to bind information technology much more closely into the degree.

At the same time there was concern about MBA students' abilities to work as groups. Both the computing course and an operations management course within the MBA had assessed coursework to be carried out by groups, of 5-6 students. Groups were allocated by the university, usually after a straw poll to find out students' views. The operations management assessment was through an elaborate case study, and it was recognised that in most groups there were gross discrepancies in the effort put in by different members. Historically the computing coursework comprised a set of loosely related questions which, in practice, were distributed among the group so there was no real discussion of the issues.

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Different MBA specialisms often went with different levels of ability at group work, and different aspirations to learn more. Several of the ITM specialists had a system development background: they were used to group work and very adept at forming teams for particular projects. Students with a background in the City, working in the financial community, were more used to individual work. Often they were skilled at interpersonal contact, but not with fellow workers on the same task. And many of these students were keen to develop their group working skills as part of their move towards management.

Introducing electronic case studies, then, satisfied a need for experiential learning and also offered a framework in which group activities could be closely monitored. Electronic mail could be sent to one member of each group, replies could always be traced to one originator. When groups used workstations at the university, they relied heavily on both academic and computing staff for assistance. That provided opportunities for the dynamics of the groups to be observed by staff. The case studies also used a complex marking scheme which allowed marks to be allocated for both group and individual efforts.

3.5.Components of the Courses

An effective way of viewing the case studies is at the centre of a circle. While the case studies form the core of what students are required to *do*, they depend on a surrounding framework of information and support that the business school must *offer*. The first level of support comes from

- the computing infrastructure at the university

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- special software, such as that for synchronous conferencing, to assist students in navigating the system

- hands-on tuition in computing skills early in students' MBA or BSc careers.
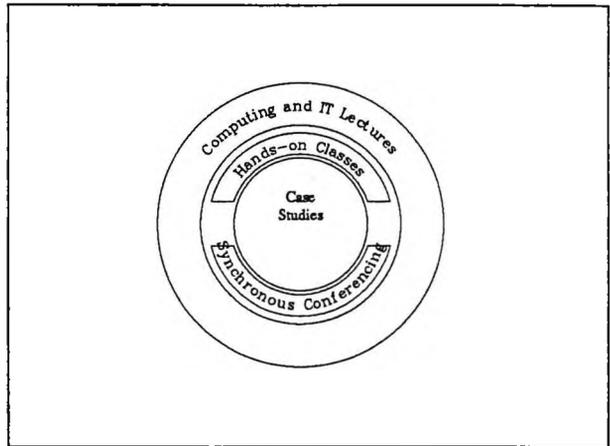
The second level comes from the series of lectures in information technology issues and strategy. These lectures are crucial in their own right, especially for MBA students who receive ten weekly, two-hour, lectures concurrently with their case study. Although this pattern encourages the separation of assessment and formal teaching, it was emphasised that students were expected to apply the concepts covered in the lectures in using the case study.

4.TYPE OF APPLICATION

The cases and tools described here grew out of an original concept of an electronic mail based case study. Using electronic mail, the intention was to create an artificial environment in which students would experience the tensions and dilemmas faced by real managers.

Electronic mail remains the principal means of communication, and remains attractive because its concepts are accessible to those without expertise in data communications, and because in the academic community it offers great scope for connectivity and so for collaboration nationally and internationally. But it also became apparent that other means of communication could be used in parallel to give a richer flow of information.

The two other forms of communication described here are:

- access to a conferencing system provided by the university

- access to background interviews on videotape.

All the cases and tools run on a network of Sun workstations, covering the entire university and linked via the UK joint academic network (JANET) to the Internet. Although the business school is remote from the main part of the university most of the same software is accessible from workstations at both the main site and the business school.

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5.DETAILED SCENARIO

5.1.Cases and their Context

The cases and tools referred to in this paper are:

- *Trent Engineering* was the initial electronic case, first run for MBA students in early 1992, using electronic mail as the principal communication medium. Trent describes an engineering company, based in the Midlands, with an established base in valve manufacturing. Trent has already dabbled in information technology, and is now faced with difficult strategic decisions about both its internal technology and the products that it offers to customers. Although fiction, Trent is based on events that happened in other, different, organisations. Groups of students had to act as executive directors of Trent, so there was a strong emphasis of cohesive group work

- A *business simulation* using a commercially available package to model the running of a company was set up in parallel with Trent. The intentions were to give the students experience of working together as a group, and to reinforce the value of accounting data

- *Sphere Consulting* adapts the principles of the Trent case for use by students working individually. Whereas in Trent students assume the rôles of executive directors, in Sphere they assume the rôles of partners faced with similar decisions, but an emphasis on individual decision making instead of group work. Sphere is being used by second

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year BSc Business Studies students, who have had a thorough grounding in the use of computers in their first year but should now be addressing broader issues around information technology

- The *Nancy and Sam* case was devised by Ralph Lewis at California State University, Long Beach, to promote electronic discussion of human resource issues. It is a case of potential sexual harassment set in a bank in California, and provokes discussion of Anglo-American differences as well as interpersonal relations at work. During Autumn 1992 the MBA students following the ITM specialism took part in this case along with students from several American universities

- *Synchronous Conferencing* is used to give students access to information, case material, and external services. The City University Business School conferencing system is based on a package written internally, called *Monochrome*, and originally intended for use as a student bulletin board. The use of this conferencing system has been built into the initial computer teaching for the 1992-3 MBA students, not only by including its use in the syllabus but by using the system to book places on classes.

All these components encourage a holistic view of information technology, and of the course, by linking the case study material to other management skills taught elsewhere at the business school. This holistic view should encourage students to see technology as an essential part of an organisation, not as something to be bolted on as convenient.

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Table I - Management and IT Issues

Case or Tool	Management Issues	IT Issues
Trent Engineering	Group work Corporate strategy	Use of communication media Use of external data services Multi-user and distributed systems
Business simulation	Value of accounting data Forecasting and decisions	
Sphere Consulting	IT in the business context Strategic decisions	
Nancy and Sam	Power and people at work International differences	
Synchronous Conferencing	Collaboration between students Use of information sources	

5.2.Approach to Cases

The case studies used ran over varying periods, up to a complete academic term of ten weeks. So for the longer case studies, such as Trent Engineering, a primary objective was to maintain some dramatic tension from week to week, enough unresolved issues to maintain students' interest at the end of each stage.

One way of achieving this is by responding quickly to inputs by students. The dialogue shown is a slightly light-hearted example from Nancy and Sam. One of the City MBA students has suggested that responses, including his own, have all seen the case from Nancy's viewpoint. Could somebody speak up for Sam's perspective? A few hours afterwards some new case material was issued on the network, reporting what had happened as Sam had seen it.

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```
From: N.Bowler@UK.AC.CITY
X-To: zzz@zzz.edu
To: Multiple recipients of list
Status: R


Subject: Discussion - Sam's just misunderstood!

I just seem to be agreeing with everyone. Can't someone play devil's
advocate and  argue the case for Sam. Can't someone say something like:

    'Isn't it his right to take an employee out!'
    'Call me old fashioned, but I like women...........'
    'I think Nancy is overpaid...'

Bye!

From: M.G.Rich@UK.AC.CITY
Subject: DISCUSSION - Sam's story
X-To: zzz@zzz.edu
To: Multiple recipients of list
Status: R


It's funny that Nick should have asked about Sam's side of the story.
The thing is that Sam phoned me at home late last night (after I got
back from the cinema around midnight our time) and seemed quite keen
that I should pass on a few of his feelings. Parts of the conversation,
of course, are strictly off the record.

Thanksgiving is actually a tough time for Sam, since his
divorce all those years ago.  He usually spends the holidays alone, and
gets the more lonesome as he has an estranged family that he can't see,
and everybody else  perceives  him  to  be  supremely  confident  and
successful.  That's quite an image to live up to and Sam is conscious
he doesn't always match it
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Dialogue about Nancy and Sam

Interest can only be sustained if there is a constant flow of information, sufficient to introduce a critical mass and ensure that students use the system. To involve students throughout a term there should be 2-3 electronic mailings per week. This has the additional benefit of encouraging students to check their mail frequently, and introducing a level of social, or at least casual, use of the system.

MBA students work in a particular environment, under a lot of time pressure. Most live away from the university and many commute far enough to discourage them from travelling in, except when they need to attend lectures. Therefore individuals' time management is critical,

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and the student feedback from the Trent case indicated that there was insufficient guidance about how much effort would be demanded at each stage. So it became difficult to reconcile

MR:	People talk of building an IT culture: will this happen in Trent?
Latham:	I think it's absolutely necessary... coordination and communication is extremely difficult.... high levels of quality and product integrity are the prices of admission to world markets
MR:	We're giving [Trent] staff the opportunity to say on video what they feel about the company
Goldie:	[the staff] are faced with uncertainty when there is not a need for change in methodologies.... how can we have confidence in these computers?

Transcripts of Videotape Dialogues

the need for dramatic tension with the need to tell students when their deadlines would occur. This will be resolved in the future by giving students a detailed timetable for their assignments in advance. But to maintain the principles of the case, information will still be fed to the students in stages and the elements of surprise and spontaneity in the electronic mailings will remain.

At City the structure of the MBA, with students from five different specialisms, creates particular difficulties in the scheduling of the core subjects. Historically there has been a concentration of assessed coursework towards the end of each term, once most of the material in a course has been covered. With careful administration, case studies such as Trent can be used to redress the balance by introducing tasks early in the term.

To supplement the information distributed by electronic mail, a series of videotapes was started. The videos used managers and academics to play the rôles of senior staff in Trent. The two initial interviews were with Derek Latham, chairman of a holding company that had

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acquired Trent, and with George Goldie, a manager with a strong engineering background and an extreme suspicion of technology. By bringing the key players in the scenario to life, the videos prompted students to think further about political forces and to shift their sympathies between the characters.

The videos were unscripted but based on a detailed preliminary discussion about the character with the interviewer (always Martin Rich). The participants were chosen so that their business experience had some relevance to that of their characters.

Students could view the videos in the business school library. The videos created a lot of interest in the human issues within Trent.

5.3.Use of Media

Electronic mail was always central to the distribution of mail to the case studies. But it has already been mentioned that to be effective it must be allied with other media.

The Trent case study was initiated by two (paper) documents distributed to all students at the start of term. One was a case outline giving some background of the company, the other was a set of instructions to be read in conjunction with the teaching of basic computer skills.

Further information was distributed by electronic mail messages. These could be:

•   Hard information about the company

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- Soft information, such as transcripts of memos about accounting policies or car parking, that could be interpreted as noise or as useful background

- Questions that needed either a short (electronic mail) or long (paper) answer from the students.

A dedicated computer account and mail address were created for the case administrator to send and receive mail about the case.
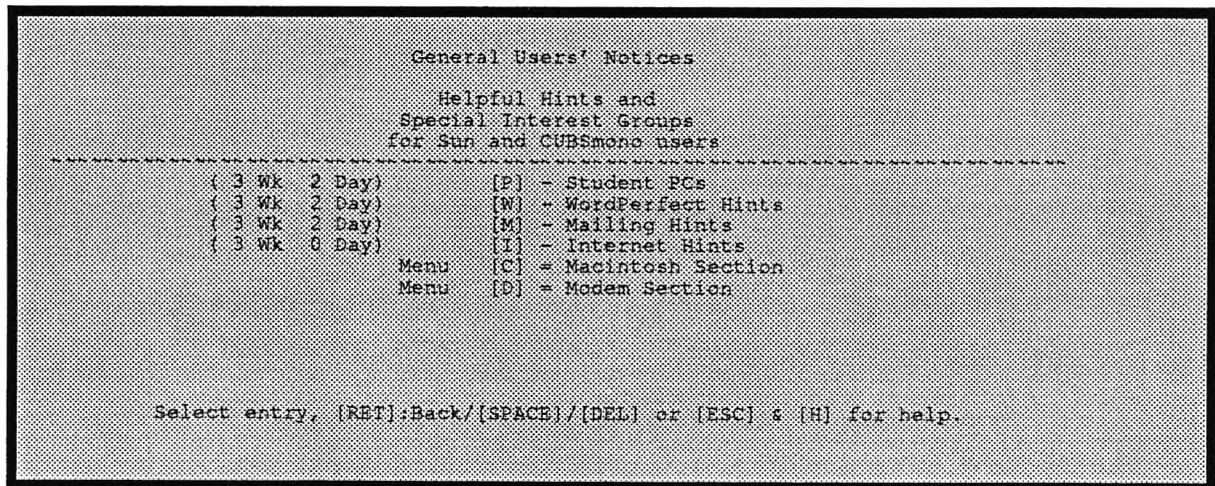
Noticeboard on CUBS Monochrome

The video interviews were one means of providing supplementary information. Use of the synchronous conferencing system (called CUBSmono because it was derived from the original Monochrome system) was another. All MBA students registered for 1992-3 have their computer accounts set up to give a dedicated window, on Sun workstations, for the CUBSmono. The system has three purposes:

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- To allow discussions to be set up, to which students can add their own points which are then visible to all other users of the system

```
                        ┌──────────┐
                        │  Main    │
                        │  Menu    │
                        └──────────┘
        ┌───────────────┬────┴─────────────┬───────────────┐
┌────────────┐  ┌────────────┐   ┌────────────┐   ┌────────────┐
│ Utilities  │  │ Users'     │   │ Academic   │   │ Software   │
│ (ESC)      │  │ Noticeboard│   │ Noticeboard│   │ and Services│
└────────────┘  └────────────┘   └────────────┘   └────────────┘
 Show            Useful           Course            Useful
- Users         - Hints          - Notices         - Functions
 Examine         Special          Hands-on          External
- Users         ⌐ Interest Areas - Bookings        - Services
 Send                             Case              Software
- Messages                       ⌐ Information      ⌐
```
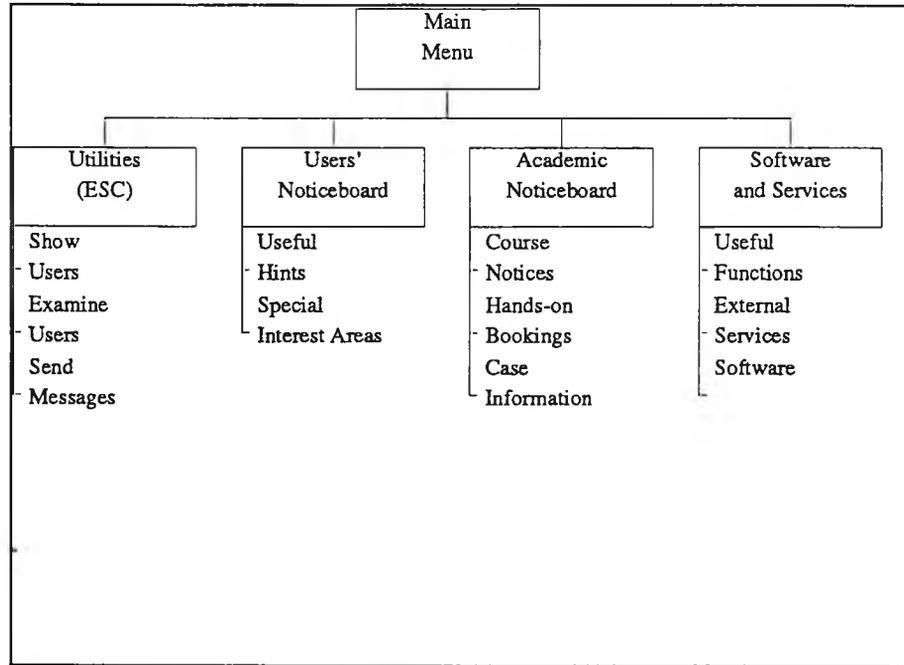
Simplified CUBSmono Structure

- To give access to background information, for example the original text of case studies, or answers to frequently asked questions about the system

- To run programs and access external facilities without recourse to obscure Unix commands.

External services accessible from CUBSmono included the university's on-line library catalogue, public services such as the public domain software archive based at the University of Lancaster, and the archie servers which could be used to locate resources around the world. Other useful functions included one to change users' passwords. All accounts are initially allocated a password so obscure that users should feel that they have to change them.

```
|\/|                          Mailing Hints                          |\/|
|  |------------------------------------------------------------------|  |
From: Martin Rich (sf309)

Subject:Maintaining copies of your mail

If you use Mailtool to send electronic mail you will find that any mail that
you send disappears from the screen.  Two precautions, then that you ought to
take:

-       get into the habit of sending a copy of any mail to yourself

-       you can set up mailtool to automatically log any outgoing mail.  To do
        this you need to put the following into a file called .mailrc

                set outfolder
                set record=+mailsent

        and all outgoing mail will be saved into a file called +mailsent.

The simple commands to look at files within a shelltool window (all are in
lower case) are:

-       to list files in your directory - ls (equivalent to dir on a PC)

-       to view a file a page at a time - more (equivalent to type on a PC)
        then use the space bar to get each successive page

-       to delete a file - rm (equivalent to del on a PC).

Please don't leave excessive quantities of old mail (sent or received) lying
around on the system as you only have a limited allocation of disc space.

        Press [Q]:Exit, [SPACE]:Next Screen, [H]:Help. (30%)
```

Help Text Within CUBS Monochrome

A general noticeboard on the CUBSmono system was used to provide useful background information, in effect an on-line manual specific to the facilities at the business school. This information included sections aimed particularly at users of modem dial-up lines into the university, and users with Apple Macintosh computers at home, two groups that had expressed particular anxiety about use of the university's facilities.

A vital feature of the conferencing system was the ability to restrict access to sections of the system to a set of named users. This could be used to set up private conferences, including discussions among all students to which staff could have no access. It meant that case material could be made available but would only appear on menus for users who needed access to a particular case.

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```
|\/|  _____  Nancy and Sam  _____  |\/|
|  |                                                                        |  |
       ( 6 Day 20 Hr)         [J] - Joining Instructions
       ( 1 Wk  2 Day)         [I] - Introduction to Comconf
       ( 1 Wk  2 Day)         [T] - Text of Case
       ( 1 Wk  1 Day)         [B] - Martin Rich bio
       ( 1 Wk  0 Day)         [O] - Old US Responses to Case
       ( 1 Wk  0 Day)         [S] - Survey (optional)


     Select entry, [RET]:Back/[SPACE]/[DEL] or [ESC] & [H] for help.

                            External services

         For Ftp options, remember to login as 'anonymous'.
_____
                    Menu   [I] = Internet Services
                    Menu   [A] = Archie Servers
                    Run    [N] * NISS Window
                    Run    [S] * US Stock Market (login quest)
            *       Run    [L] * Library Window
                    Run    [H] * Hensa.Pdsoft Ftp Window
                    Run    [W] * Wuarchive Ftp Window
                    Run    [l] * Hosts Lookup Window (^D to stop)



     Select entry, [RET]:Back/[SPACE]/[DEL] or [ESC] & [H] for help.
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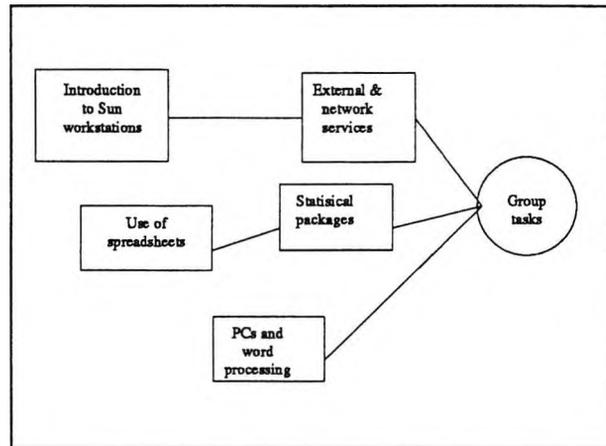
Special Menus in CUBS Monochrome

Use of electronic mail among all students was only possible because a user-friendly front end (mailtool) was installed on the Sun workstations. The more standard mail programs used the difficult vi text editor to create messages, and early experience with students suggested that this was too inaccessible for universal use.

Students were encouraged to acquire modems for remote access to the system (though this placed an obligation on the university to provide reliable modem links). Functions that use an additional window on the workstations at the university can also be carried out over a simple terminal link.

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6.PEDAGOGIC APPLICATION

6.1.Hands-on Classes

Participating in any of the case studies demanded a level of competence in using the infrastructure at the business school. This could only be reached, for many students, with the aid of a series of intensive hands-on classes. There were several con-

flicts in running such classes. They had to be scheduled in the limited amount of time when students were free, difficult for the MBA students where different specialisms had different timetables. Some students had considerable computer experience and wanted to use the sessions to play with the university's facilities; other had none and needed assistance with the most basic points. Hands-on classes could only work effectively with several tutors available to provide reassurance and to resolve individual difficulties, but there was a severe limit on the number of people who could attend a session at once.

To assist in these running smoothly:

* Students were streamed informally according to the amount of general computing experience that they had (not specific experience in topics being covered). In the 1992-3 year MBA students were asked to book places on classes using the CUBS-mono system for a course according to their ability

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- Relevance was essential, both looking ahead by emphasising that a mail-based case study was forthcoming, and looking back to students' use of PCs by emphasising that they could bring work to the university, for example for high quality printing of documents.

Notes are given out as a bound volume, at the start of term, structured where possible as a series of exercises that students can follow directly. MBA students joining in 1992 received their notes in exchange for handing in a simple questionnaire about their computing background. Students were usually reluctant to admit to any computing experience on this form.

Each year, there is a tangible stage where students reach saturation and become unwilling to learn about any additional computing facilities. When the present system was first installed, there was a reluctance to use any multi-user systems. Now a reluctance remains to use external services, a pity because the range of external services available to the UK academic community is exceptionally wide but understandable because of the pressures on MBA students. The most effective way of encouraging use of these services is by linking them to information requirements elsewhere in the course.

A simple and graphic measure of whether a hands-on class had worked was the extent to which students stayed behind to exercise their new-found skills.

6.2.Student Feedback

An attraction of this approach is the ability to gather valuable feedback from students. Students have been encouraged to report their views to staff, and after the business simulation, an exercise was set specifically to get feedback. Students had to send, by electronic mail, a brief account of what made the simulation and the group work effectively, and what had hindered the task. The question was carefully worded so that students did not need to give absolute measures of the effectiveness of the exercise.

The result revealed a remarkable unanimity of view, even between students who had liked the exercise and those who found it of limited use. Many of the concerns have been taken into account in running the business simulation, again, with a smaller group later in 1993.

Table II: Response to Student Feedback

Student Criticisms	Actions
Groups too large to work around a single workstation	Groups of three students for simulation
Hands-on briefing hard to follow, too many distractions	Briefing as lecture, using OHP tablet
Simulation took excessive time from other activities	Run over limited time, first decision on first day
Insufficient clarity of relevance to other parts of course	Learning objectives presented at outset
Could become too much of a mathematical game.	Choice of realistic technical objectives

Some interesting problems arose when equipment failed. By far the most severe problem in practice was a software failure that affected the printer, mostly because students' reactions to receiving electronic mail was to print it out. But the usage of the system was such that any technical problem became serious.

It was made clear in the instructions for all the exercises that any failures must be

reported to the computer support staff. But there always remained a blurring, in many students' perceptions, between the rôles of the computer staff and those of the academics. Managerially, it remains the academics' responsibility to ensure a reliable infrastructure, so it is also the academics' responsibility to work as a team with the computer staff.

Printing out vast quantities of electronic mail indicated a lack of confidence in the technology among the students; so did retaining mail in the incoming mailbox to the irritation of the computer unit. Students became much more disciplined with mail as the term proceeded. The increasing use of modem links for students to access the system from home, also reduced the dependence on the printer.

Curiously, most of the students found the Sun workstations less user-friendly than the simple PCs. There were three factors here:

• Use of a multi-user, distributed, system which had to be logged in to offered much less 'ownership' of the technology than, apparently, a free-standing PC. Students would sometimes enquire where they could find a complete menu of functions offered by the workstations

• The Suns used a conceptual model of different windows taking the place of different screens that one might need to use. This meant that each window (for example mail, Unix commands, PC emulation, and synchronous conferencing) had its own style of working and the consistency of approach that usually marks an effective user interface was lost. Further, the mouse had very limited functionality *within* most windows

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although it had to be used for manipulation between windows. A particular problem was that the (extremely user-friendly) conferencing system used the escape key to bring up a utilities menu, whereas packages such as Lotus 1-2-3 used the same key to exit from a function
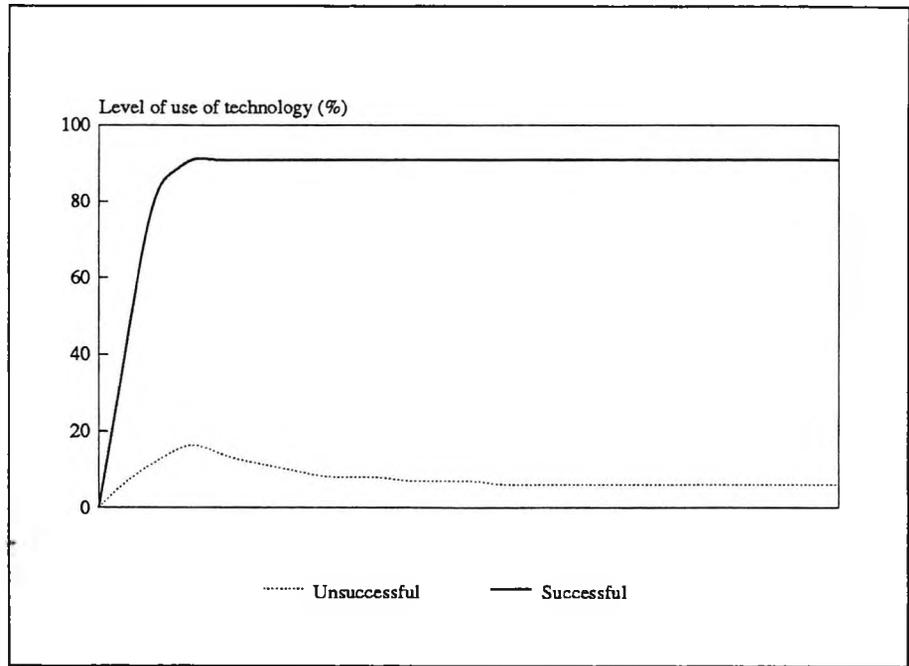
- PC emulation used a window (DOS window) of limited size that generally provided a less comfortable environment for using DOS programs such as WordPerfect than a free-standing PC.

Several points about human factors design of computer systems are relevant here. Shneiderman (1987) is a useful reference book in this area. The approach to use of a system must be consistent across various functions. It is often impossible to predict how users will respond to a system, so prototyping is an essential part of the design process. Within the business school there remains some scope for creating an effective computerised learning environment.

6.3.Level of Use

The *critical mass* theory, referred to in Fulk and Steinfield (1990) suggests that the adoption of a computer of communication system will be successful once a proportion of potential users accept it. Once about 20% of users are on a system, most potential users will at least have some contact with actual users. It becomes realistic to rely on using the system for particular functions, the core of users start to have power to influence the remaining potential users.

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In terms of level of use, then, the case studies are successful if they can ensure a critical mass of users, though there is a difference between *voluntary* users and those coerced by an exercise such as the

Level of use of technology (%)

```
100 ┤─────────────────────────────────────────
    │    ┌──────────────────────────────────────
 80 ┤   │
    │   │
 60 ┤  │
    │  │
 40 ┤ │
    │ │
 20 ┤│    ....
    ││  ..    ....
  0 ┤└──────────............................────
```

          .... Unsuccessful   ——— Successful

Trent case. There is always a core of experienced computer users who will immediately explore any system to which they are given access, and a rather different core of users with overseas academic contacts who use electronic mail as a convenient way of communicating with them.

Even with 200 users, the staff were able to observe group dynamics at work in the computer room. The groups which appeared most cohesive, and especially those who managed their time with most skill, usually produced the best results. They became dedicated users and often entered into complicated dialogues with the case administrator. At the other extreme, one unfortunate student, asked about his group, simply asked 'what group?'.

6.4.Relation to Business Issues

Keen (1991) sees management as having a responsibility to provide a stable information technology platform. But this only becomes relevant when IT becomes more than an individual tool; only then do Keen's concepts of the *reach* and the *range* of a business relate to IT.

In Keen's terminology (although his books are written in a style directed at managers, he concentrates on the use of telecommunications) reach is a measure of the people who can use a system. Range is a measure of the system's effect on the services that an organisation provides. Within the business school the range of the computer system is immense. It is accessible to every student, and every member of staff, and on some courses at least it is used by every student. The reach is more limited. There is some integration between information technology and other areas, but still only limited use of academic computing facilities in many fields.

If a university is to teach its students that IT is essential for their future work, then it should demonstrate the value of IT in its own work. Universities have long been in a privileged position for this because of the availability of extensive networks, and because computers have been used to process experimental data for many years. The Trent case study, in particular, served a purpose by introducing staff and students alike to benefits of IT which they would have been unfamiliar with; it generated a lot of interest among staff not directly connected to it.

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6.5.Experience and Developments

As a pedagogic exercise the case studies have been successful. They have motivated students to use electronic mail and workstations. They have created a level of interest in group work among the students. They have generated a great volume of feedback, including a some criticism that is nevertheless useful and will assist as the cases evolve in the future. Criticism that students have generated has usually been constructive and mostly aimed at details of the execution, not at the principles of the cases.

None of the cases has been easy to administer. Any system failures place an overhead on the academic staff responsible for the case. Deadlines have needed to be changed to avoid clashes. Because the case study work falls outside the normal pattern of the timetable each week, there are difficulties in arranging appropriate times for students to meet and to work together.

Conventional lectures are a long-established approach to education, refined and understood over centuries. Computer-based discussions are still a very new approach and should be a learning process as much for the staff as for the students. Because the staff are learning, the cases will be administered with less effort in the future, but students still demand a lot of personal contact and attention.

There were two major written questions for each group, for the Trent case. Both were deliberately phrased so that students could recommend Trent to make alternative decisions (an

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equivocal message) but marks were awarded on how effectively the case was argued. The overall standard of reasoning and presentation in these answers was very high.

Student feedback has already been successfully built into the business simulation. Further information has been added to the conferencing system to help students to navigate the computing environment. An additional international exercise, with students in Cork, Ireland, is starting and others are envisaged for the future.

6.6.Relation to Original Hypotheses

How well did the case studies bear out their original intentions? In raising interest among students in strategic IT issues they were very successful. The 'soft', organisation-oriented Trent case assumed an important part in MBA students' activities and connected well with other, concurrent, management lectures. The business simulation was less successful at first, mostly because its relevance to other courses was less clear. So linking IT strategy closely to other business issues is essential.

In encouraging use of networks, the level of success has been mixed. It has been limited in places by the reliability of equipment, or by areas in which instructions are still unclear. The best acceptance of the value of networks comes when remote, particularly international, sites can be involved as in the Nancy and Sam case.

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7.RELEVANT LITERATURE

Some of the literature is referred to above, and a complete set of references appears below. It is appropriate to study both literature about the use of IT in teaching and about the transformation of management by IT.

In the UK the inter-university committee on computing (1991) looked at the level of use of IT in different universities and different subjects. The committee discovered considerable differences between universities and subjects. In places IT is seen purely as a tool for scientists, in others as a universal tool. At City University the present system was installed in 1989-90. When it was planned almost every member of staff had at least one PC but only about 10% made appreciable use of the network.

This is matched by differences in the extent to which institutions *intend* to build up a computing infrastructure. An example from the USA of an institution highly dependent on computers and communication is Carnegie-Mellon university, as described by Kessler and Sproull (1987). Introductory teaching in computing is offered to all students, and workstations and terminals are available throughout the campus.

Weissman (1989) identified several requirements for a 'scholar's workstation'. It had to be centred around available data (the conferencing system is a move towards this approach at City), must be task-oriented and must allow for configuration for different users and different disciplines. Standardisation is essential; even though the Unix operating system is becoming accepted as a standard enough variations remain to cause concerns in adopting one standard.

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Moon (1988) has made a similar analysis of requirements, but concluded that the barriers to producing effective workstations are not technical. All the necessary data is available; the problem is merely one of making it accessible at an appropriate time.

Hewton (1987) pointed out that technology could not be viewed purely as a means of reducing educational costs. It required time and investment to introduce and staff had to be convinces of its benefits.

Burley and Mabbett (1991) have looked at the maturity of IT, whether it is sufficiently accepted as a tool for widespread pedagogic use. They particularly emphasise the use of wide area networks which were regarded with some scepticism by the students at City.

The introduction of electronic case studies represents a step towards building a university which is highly dependent on IT. The same transition takes place in many organisations, and must be handled in a way that enhances, not constrains, individual tasks. Zuboff (1988) draws a distinction between *automating* tasks, without using the power of IT to share information, and *informating* tasks, using IT to transform patterns of work. The informated organisation averts the effect of IT in reducing people's power over their working environment.

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8.IMPLEMENTATION PLAN

All the case studies and tools described above have been implemented during 1992. The Trent case study will run again during the first term of 1993. The chart below summarises the implementation of each case on different courses.

Term:	Spring 1992		Autumn 1992	Spring 1993
BSc Business Studies			Sphere Consulting	
MBA	Trent Engineering (core)		Nancy and Sam (ITM)	Trent Engineering (core)

Synchronous conferencing was set up over the summer of 1992 and available to all students from October. Hands-on classes for all MBA students took place in October 1992. Student feedback suggests that these should be carried out as early as possible in the academic year.

In the 1993-4 academic year the MBA core courses will be redesigned, to give more cohesion to the core subjects and to develop a series of *block weeks* for all MBA students. The details remain to be finalised, but it is envisaged that one block week will be designed around themes of both IT and group work. This will offer further scope for using the electronic case study approach.

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This paper is largely based on experince of introducing the Trent case study to MBA students early in 1992. The case study was devised by Professor Clive Holtham of City University Business School and implemented by Professor Holtham and myself.

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Building Computer Supported Group Work into an MBA Programme

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Abstract:

This paper describes the use of electronic mail and conferencing systems to support group work within a full-time MBA programme. The group tasks are centred around a case study which is run over a ten-week academic term. Introduction of the case study was a direct response to student requests for more experiential learning in information technology. After the initial case description is distributed, additional information is made available through electronic mail. A certain amount of background data is available, some on the computer system and some in a series of supplementary videotapes. Throughout the term the flow of information is controlled to maintain a level of creative tension: at every stage students have some anticipation of the next stage.

Two themes run through the case itself: the role of information technology in a changing business, and the dynamics and tensions that arise in collaborative groups.

Students need to answer a series of questions, some demanding answers by electronic mail, some demanding more formal, paper, answers. There are some diagnostic questions intended to gauge students' understanding of the issues. The case, and the dissemination of information, are structured to make it difficult for groups to work effectively unless all their members make a contribution.

The case is now running for the second successive academic year, and has been modified both to take account of comments last year and to introduce a new international dimension.

Keywords: Management teaching, electronic mail, group work, simulation.

1. Introduction

This paper describes an electronically enabled case study, which has now run for two successive academic years. Although it represents a fictitious company the case is based on actual events, and forms part of a full-time MBA programme.

The case is notable because:

* It emphasises the importance of information technology, while at the same time ensuring that the students use this technology

* It was introduced in response to comments by students, and has evolved to take account of further comments

Paper 2:

Rich, Martin, (1994) "Building computer supported group work into an MBA programme" International journal of computers in adult education and training, 4(1/2): 3-25

* It has evolved to become the core of a set of tools for the use of information technology in teaching management students.

2. Educational Context

City University Business School (CUBS) offers a range of MBA courses. These are all aimed at students with some business experience (the average age is 29) who wish to broaden their knowledge of management.

Of these the day MBA is a one-year, full-time MBA offered in five different specialisms. Students divide their time, approximately equally, between their specialist subjects and core management subjects. One of the five specialisms is an MBA in information technology management (ITM). This takes as its starting point the value of information to an organisation, and examines how information technology can be used as a force driving organisational change.

Core courses are taken, either by students following all five specialisms, or by four of the specialisms, as students do not take core courses which focus on their specialism. Therefore the core computing course, including the case described here, is taken by all MBA students except those specialising in ITM. Core computing is influenced by the learning approaches followed in the ITM course, and its aim is to teach the strategic issues raised by IT. Like other, concurrent, core courses it is assessed by coursework for which students work in groups.

When the core computing course was introduced students were assessed by a series of written written questions. Apart from the use of a single case, there were no linkages between the questions. This approach attracted two criticisms:

* For a group, the most straightforward strategy was to divide the questions between its members. So although technically a group exercise it did not require any interaction amongst the group

* Students demanded experiential learning: they wanted to demonstrate to potential employers skills that they had acquired by using technology.

Fitting a computer-enabled case study in the second term was only feasible if students were offered training in using, for example, electronic mail in the first term. But this led to a logical progression between the IT teaching during the two terms:

* In the first term use of technology was emphasised. Students learned about the infrastructure to which they had access. This constituted a service for other parts of the course and for students' future careers

* In the second term the emphasis was on strategic issues. Students were expected to gain an appreciation of the power of IT.

The Trent case itself is distributed, as a conventional paper case study at the end of the Autumn term. During the spring term a succession of

electronic mail messages are sent to the participants, most providing additional information about the case, but some asking questions to which students, usually in groups, must respond. Group questions may demand either a paper document as a response, or a response to be sent to an administrator's address by electronic mail. In general group questions evaluate students' abilities to deal with problems within the case study, and individual questions evaluate the students' learning process.

Although electronic mail is the principal method used for communication, it is supplemented by a series of videos, some face-to-face meetings, and a synchronous conferencing system (Monochrome). Students used Monochrome in their briefing session and were encouraged to use it for discussing issues to do with the case.

Examples of the case materials are given in appendix.

3. Educational Objectives And Benefits

Most full-time MBA students return to study at their own expense. Invariably they are keen to get value for their investment, in time as well as money. Usually they want to know what the focus of each part of the course is; often they are apprehensive about assessment - especially if returning to study after a long break - and want to understand what the university expects from them.

Research by the Association of MBAs (1992) has suggested that there can be a mismatch between employers' demands of MBA graduates, and at least the popular perception of what Business Schools teach. MBAs are often seen as boorish, preoccupied with accounts, and inadequately trained in the social skills demanded of good collaborative workers. Emphasising group work within a course is one way of redressing the balance. Simulations (not necessarily computer-based) are established as a way of reducing prejudice between members of a group (Jones, 1988), in this case by improving the balance between more or less arrogant students.

The overall objective of an MBA is to discuss different subjects - business policy, accounting, and so on as well as computing - as they are likely to affect managers. Therefore it is inappropriate to teach computing as a purely technical discipline. Most frameworks for analysis of the role of technology in business identify a very significant shift in approach. For example the Management in the 1990s project (Scott Morton, 1991) identifies both evolutionary and revolutionary levels of change introduced by technologies.

In these terms, the core computing course sets out to make students aware of the potential of the revolutionary levels. These are characterised by the importance of networks, instead of the local implementation of

technology. Students learn best, then, about how as future managers they will implement the revolutionary levels of this framework, if they use networks within their computing courses. A core course devoted purely to technology would be inappropriate as most students already have some exposure to IT. But using networks and examining business issues does mean that students used to personal computers have something new to learn.

Where learning objectives are stated, both staff and students have a clear framework within which to work. Beard and Hartley (1984) discuss the benefits of stating learning objectives, as well as the difficulties in setting them. Within the MBA students are discouraged from seeing individual courses in isolation. Core computing runs concurrently with core courses in operations management and the management of organisations, and common issues exist between the three. At first sight this appears to hamper the definition of learning objectives; in practice it dictates that the learning objectives should cover skills, notably group work, that do not obviously fall within the realms of a computing course.

A case study, called Trent Engineering, has been devised for the core computing course. Its objectives are:

*   to confront students with issues of information technology strategy, in a changing business

*   to ensure that every student participating needed to use two basic forms of data communication: electronic mail and an electronic conference

*   to assess and improve students' abilities to work in small groups.

Trent Engineering is an imaginary company but the events related within the case study are real, if disguised. Students are assessed for the course using the case study.

There are two particularly relevant benefits:

*   Students are encouraged to use computers, and so overcome any phobia of technology that persists. Although this sounds brutal, the mail and conferencing systems that are used are most daunting for those who have never tried to work with them

*   Students use information technology for interpersonal processes, not merely to automate repetitive tasks. This is analogous to using technology to transform a business process, not merely to remove the drudgery within it.

Both these benefits move the course's focus away from the technology itself, and towards its innovative use in business.

If an exercise were set where students needed to carry out (for example) a spreadsheet application they would be forced to use the technology. But such an approach would be incompatible with the em-

phasis on business issues, and compromise the idea that teaching in the use of applications is purely a service to other parts of the MBA. A written case study, as used in the core computing courses in the past, would have covered strategic issues but was criticised by the students for being too abstract and including no exposure to the technology. Examples of course material are given in section 5 and appendix A.

4. The Demands Of Management Education

Students, especially mature and business-oriented students, learn in different ways. One valuable and widely used division is between deep and surface learning:

* deep learning depends of seeing, and understanding, certain underlying concepts from which the facts can be deduced

* surface learning depends on learning facts without necessarily understanding the reasons for them.

At its most effective (and idealistic), deep learning means that students need retain little information, but must have highly developed analytical skills. Conversely surface learning places little emphasis on analysis but relies on the capacity of students' (usually short-term memories).

There is a third approach, especially among MBA students. Strategic learning (Solomonides, 1992) represents the adaptation of learning styles to different subjects and different forms of assessment. It is important, in this context, that strategic learners gain a deep understanding of subjects that are central to their course.

What influences learning styles? Different people have different preferences, but particular approaches to learning are also encouraged by different environments, different ages of students, and different teaching styles.

Paul Ramsden (1992) identifies three theories of teaching:
* Theory 1: teaching as telling or transmission
* Theory 2: teaching as organising student activity
* Theory 3: teaching as making learning possible.

Historically university courses have combined theories 1 and 2, with a strong emphasis on theory 1 in the conventional didactic lecture. But theory 3 is particularly important in management education.

Examining the characteristics of the three theories suggests some alignment between the theories, the patterns of learning, and the basic tools available for teaching. But while lectures generally align with theory

1, two categories of lectures which are widely used in business schools align better with theory 3:

* lectures based around formal case studies

* lectures by prestigious visiting speakers.

Both have their greatest value where they encourage students to learn from real examples, but to learn by linking the examples to the theoretical or background knowledge acquired during the course. In the same way MBA students with business experience can bring their own background knowledge to bear on the course.

There are parallels between different learning styles and decision, or task, styles in business. Shaw (1976) discusses tasks which are most susceptible to being carried out by groups. One of the key characteristics is task ambiguity - in the context of decision-making this would be a decision where there are several valid outcomes. The questions within the case study requested such ambiguous decisions, both to encourage group work and to ensure that students were assessed on the process and not the outcome.

Group work has another important element: to allow students to identify the rôle within a team that suits them best. There is a danger that management courses, and management training, can set out to mould students to become an ideal, robotic, manager with a predefined set of characteristics. Labier (1987) suggests that a lot of stress at work is caused because staff are coerced into tasks which are inappropriate for their personality. Labier uses, critically, Maccoby's (1977) different types of manager, each of whom would be best in a particular environment and faced with a particular dexision.

In Bloom's Taxonomy (Bloom, 1956), the term internalisation of learning is used: students are said to internalise knowledge as they use it themselves, and develop their own values and judgement of where and how that knowledge can be applied. Any form of experiential learning, such as the use of case studies, encourages the internalisation of knowledge. Groups are best at tasks which require some consensus (Shaw, 1976) - especially where there is some ambiguity of acceptable outcomes.
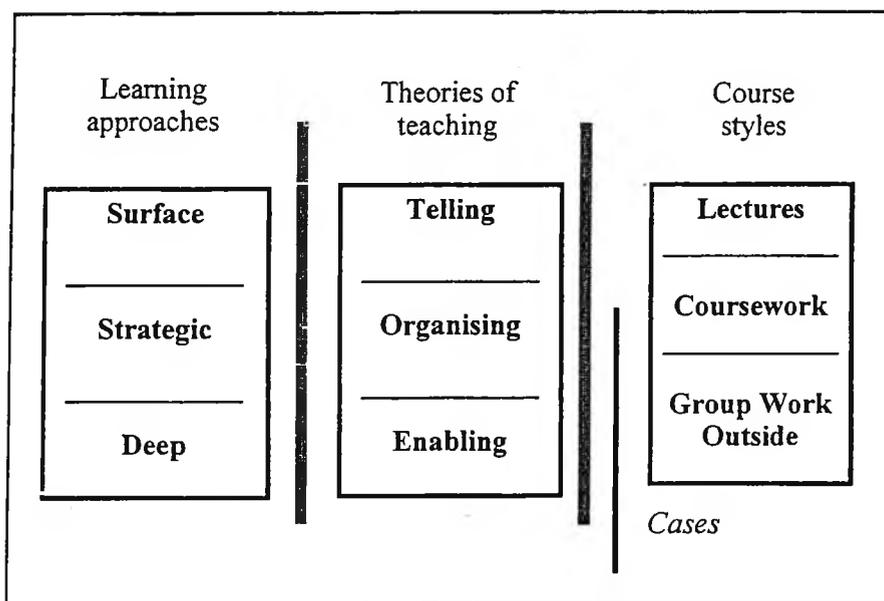
In Information Technology there is another dimension. The technology used from day to day is changing at a rate that means that skills taught by rote may well be obsolete within ten years (the first IBM personal computers were sold in the UK in 1983). But knowledge about the principles, capabilities, and applications of technology is likely to be durable.

This was the context in which students demanded further experiential learning. The feedback solicited, and expressed, by course representatives suggested a need for both:

* some practical experience of using information technology
* opportunities to deal with the sort of strategic problems discussed in the course.

Figure 1 shows an approximate alignment of styles, theories, and approaches.

Fig. 1. Styles of Teaching and Learning

Learning approaches	Theories of teaching	Course styles
Surface	**Telling**	**Lectures**
Strategic	**Organising**	**Coursework**
Deep	**Enabling**	**Group Work Outside**

Cases

The Trent case study should set out to foster a deep understanding, and to fit Ramsden's theory 3; thus its lessons would remain fixed within the students' understanding and it would encourage student involvement. In practice, however, when students use computers there are difficulties in providing a reliable infrastructure, in ensuring that students know what technology they need and how to use it. If the planning of the exercise, or the initial trainingof the students in IT skills is insufficient, then, there is a danger of a case study tending towards theory 2, of the task of organising the students' participation eclipsing the aim of enabling students to learn.

The emphasis on deep learning, in the Trent case study, is provided by the parallels with other courses in the MBA, and by raising issues other than those directly concerned with the use of technology. At the peak of activity, students receive a steady stream of electronic mail, some of which superficially seems to be irrelevant but all of which includes clues about how the company within the case study works.

Students' perceptions of the peripheral information, which included comments about car parking and friction between different personalities among the staff, varied. This information set out to be valuable by:

*   encouraging the view that they can learn about a company from the style of communication among its staff. This is a point about the value of information itself, not about information technology

*   forcing students to examine the styles of organisation within Trent, and so building associations with the management of organisations course.

To broaden the exercise even further, students had access to a series of videotaped interviews with characters described in the case study, filmed by the university and using real managers as actors.

On the evidence of the first year when the case study was run, the responses - especially those submitted on paper - were produced by the most cohesive groups and by those whose interests span the broadest range of issues. Cohesion and breadth of interest are hard to measure objectively. However the staff running the course spent some time with students in the computer laboratories, and the diagnostic questions included questions of what had made the groups work effectively. Examples of encouraging responses were:

*   descriptions of decisions being taken in effective, well-organised, group meetings - often with references to group members socialising as well, indicated cohesive groups

*   descriptions of individual group members contributing in their own fields of expertise, and past experience, indicated breadth of interest.

In response to an informal poll among students at the end of the Autumn term, groups were allocated at random by the staff for the Spring term. Some informal trading between groups took place at the start of the spring term, but with the constraint that each group needed to contain a cross-section of students from different specialisms.

Groups, especially when using electronic communication, have their own patterns of working (Kiesler, 1991). The initial, forming, stage is expensive in time and early indications are that students taking the case study in 1993 are particularly slow in forming their groups. Using technology, there is a danger of groups spending an excessive time on particular tasks. Where one member of a group is familiar with the technology there is a danger of that member being overburdened with administration - and sometimes of that member's intellectual contributions being ignored.

5. Assessment Within The Course

Within the core computing course, the teaching part of the course, a series of weekly lectures, has not changed radically though it has evolved (and

10

improved its evaluation by students) over the years. But Trent Engineering is a radical departure from the previous assessment method.

Given the objectives of the case study, the students must be marked on their ability to meet these. So, using the objectives identified in section 3, students should be assessed on their understanding of IT in business, on their ability to use technology, and on their ability to work cohesively as a group. The last of these has to be assessed by setting group exercises and marking the entire group.

While the Trent exercise allows for messages to be sent to one member only of each group, so that the message is only responded to if the communication among the groups is effective, it is impossible to be certain that all members of a group are contributing. All students attend an interpersonal skills workshop which includes practical exercises in group work. Group dynamics are discussed theoretically during the first term of the MBA course.

Students taking the Trent Engineering case receive the following information. This describes the 1992/3 case - there are slight variations from year to year but the principles remain the same:

* Initial case study (on paper, distributed before Christmas to students starting the case in January)

* Case study instructions (rules for using mail, etc) in course handbook distributed in January

* 23 mail messages sent to all students by the case administrator, at intervals from late January to early March. These include 4 assessed questions about the case

- 2 knowledge/optimism surveys

- 1 diagnostic survey on group effectiveness

    The others provided background information and feedback on the case

* One mail message sent by a Spanish student, representing the management of Trent's customer in Spain, to one member of each group

* 3 videotaped interviews made available in the library at different stages during the term.

    Examples of the course material actually used are included in appendix A. For comparison the assessment before Trent was introduced was based on a single case study (based on abank but covering similar issues to those in Trent) and 6 questions on the case, all distributed at the start of term. Examples of these are:

*Suppliers and Standards:*We have a variety of hardware suppliers for historic reasons. Is it sensible to use one main supplier, to rely on international standards, or should we be more concerned about the systems than the boxes they use?

Smart Cards: We have all been aware that some organisations are experimenting with 'smart cards' where substantial amounts or data can be held on a customer's plastic card. Does the group feel we should be experimenting in this area?

Note that each question (in the earlier approach) addresses a completely independent field of IT so there is little incentive for students to work collectively - in fact it would be hard to fault any group that did divide the work independently between its members.

What purpose does assessment serve in this context? Bear in mind that the Trent exercise is aimed at students with considerable, and diverse, business experience. In an undergraduate course assessment appears as a means of weeding out students who lack the intellectual ability to obtain a degree. At MBA level, the emphasis is subtly different: the assessment should be a means of encouraging students to work, and think, and contribute, hard enough to justify their year of study. A particular concern with group work is ensuring that all members carry their weight: often a group with one weak member will take a pragmatic decision to carry that member as a passenger.

Assessment is also a means of providing feedback to questions. Slow return of assessed coursework is a perennial complaint among students: unfortunately the sheer effort involved in running Trent during 1992 made rapid marking of questions impossible. However a digest of students' views on their groups was sent very quickly after it had been solicited.

Derek Rowntree (1977) identifies differences both in types and purposes of assessment. A crucial distinction is between:

* *product assessment,* conventionally more widespread in higher education, where students are assessed on a particular piece of work

* *process assessment,* where the processes by which students reach results are observed.

The Trent exercise encourages process assessment, partly because of the emphasis on group work, partly because questions are usually phrased so that there is no obvious 'right' answer. Instead contributions must be measured on the standard of reasoning and co-operation that is shown.

In conventional management training, feedback is important but assessment in the academic sense is not (Mumford, 1988). Assessment of individuals is part of an appraisal process, separate from formal training, and ultimately an individual's success can be measured by promotion. Combining assessment with training courses only introduces anxiety and reduces participants' abilities to contribute openly. Given that an MBA course is aimed primarily at experienced managers, there is a case for applying similar criteria to those in management training, to an MBA course. While it is impracticable to separate teaching and assessment in

the core computing course, the division between the lecture programme and the case study retains some separation between the two.

6. Evaluation

Student feedback from the 1992 Trent case study was gathered by three principal means:

* a formal consultation process, including anonymous questionnaires and regular meetings between staff and student representatives, which applies to the entire MBA programme
* diagnostic questions set as part of the case study
* informal contact between students and staff.

Within the MBA programme questionnaires for formal consultation have been used for some years. These ask students to rate each course on 14 areas, and to give one of five different values in each area. Not all of the 14 marks are direct linear scales: for example coursework can be manageable/relevant or manageable/irrelevant. Only a digest of the statistics, and specific comments typed to ensure anonymity, are made available to the academic staff.

In 1993 the Trent case study and the core computing lectures have been separated in the anonymous feedback questionnaires. Figure 3 shows the resultant (1993) student ratings of the Trent case study, the core computing lectures, and the mean of the other lectures, in key categories.

Figure 3 - Results of students questionnaires Student ratings of Trent case, IT (core computing) lectures, and mean of ratings for other core courses for key factors.			
Subject	Trent	IT Lectures	Other core
Overall rating	2.29	3.11	2.74
Delivery	2.80	3.94	3.10
Course structure	2.96	4.46	3.21
Degree relevance	2.88	3.19	3.43
Stimulation of ideas	2.97	3.40	3.16
Note: Scale is 1 (very poor) to 5 (very good). Figures are mean values of all students who responded. ITM students are not included in any figures.			
100 students responded out of 144 taking the course.			

Consistently the Trent exercise falls slightly below the mean for the core courses, the core computing lectures fall above. The low ratings for Trent can be ascribed to:

* suspicion of a novel method of learning

* practical problems still not fully overcome.

As well as a formal evaluation, students used an electronic voting system on one occasion to rank different styles of teaching, by voting on questions of which of two different methods they would prefer. Electronic cases were preferred to lectures in the (200-seat) Oliver Thompson lecture theatre, but were less popular than conventional interactive seminars.

The high ratings for the computing lectures seem partly to reflect a course that has become quite mature, but also indicate approval, among the students, of covering the strategic issues surrounding IT. However even for the computing lectures the ratings for degree relevance seem to be low.

What can we conclude here? Cynically, one could suspect that the computing lectures were rated highly because there was no direct assessment of students. In fact students' specific comments, notably those from students with significant previous computing experience who had expected to learn nothing new from the course, suggested that the approach of teaching about computing in its management context was very popular.

The computing lecture course has had very high ratings, from students, in the two years that Trent has run - another vindication of the approach. But there remains a concern about the relevance of information technology to the course as a whole.

The diagnostic questions asked students to identify strengths and weaknesses in the group processes. They deliberately did not solicit a judgement of the value of the case study and it was made clear that students would not get awarded high marks merely because they had been polite about the exercise. This approach was chosen because the formal consultation process already provided a method for gauging the absolute worth or popularity of a course, but gave few indications about what would make particular methods more effective.

Some remarkably consistent themes arose. In 1992 these were judged by taking responses from students, setting aside any assessment of the absolute value of the exercise, and listing specific points which had caused difficulties:

* The exercise placed considerable demands on the infrastructure. Any failure at a critical time would have a severe effect on students

* Students were often unhappy about using the (Sun based) system. It was rarely intuitive and was unpopular among committed users of personal computers

* Towards the end of term there was particular pressure, largely the combined effect of several courses.

Analysing these themes also helped in creating a structured approach to generating evaluation questions.

In 1993 the same diagnostic questions have been used. They have been analysed by taking key points and counting the number of responses in which each point was raised. Again, the assessments of the overall value of the exercise have been discounted except where responses specifically said 'change nothing' or 'do not use'; these absolute statements have been taken into account. A summary is given in figure 4.

Figure 4 - Results of diagnostic questions	
Background improved realism	36
Background detracted from realism	17
Repetitive questions	16
Poor quality videos	7
Characters unconvincing	9
Combine cases (computing and operations management)	8
Only public (ie at CUBS) terminals accessible	7
No hard financial data	10
Don't change	4
Don't use but supportive of aims	4

The peripheral information divided the students. Some thought that it improved reality, some that it did not. But, significantly, none of the feedback indicated that students consciously used the background information to draw inferences about the organisation - although some referred to the background information, perhaps light-heartedly, in some answers to questions. This range of responses suggests a range of learning styles between different students, and emphasises the nature of a group as a collection of individuals, with their own strengths and weaknesses.

Note that the ability to obtain constructive criticism has been one benefit for the staff running the exercise. In addition to the criticisms which were supportive of Trent's aims, 3 students felt that computing within an IT course should be limited to teaching technical skills.

Additionally a question has been introduced to assess the value of core computing as a whole. Students need to give their understanding of IT, and their optimism about its use in business, both on a scale of 1 to 10. The same question is asked at the start and end of term. Although it was made clear that we aimed to increase students' understanding, and not necessarily optimism, there was a marked increase in both over the term.

Two more areas where anecdotal evidence has pointed to scope for further evaluation:

A3.59

*   Different specialisms have different reactions to the course: there may be pointers here to whether certain specialisms need more help in, for instance, group work

*   Students visiting CUBS after completing their course have said they found the exercise more useful (in retrospect) than they did at the time; it would be interesting to measure their views a year after the case study

An interesting point about specialisms is that students with an Information Technology background are often good group workers – despite the popular image of the introverted and socially inept computer scientist. In fact modern approaches to software design and development (Ould, 1990) place a great emphasis on collaboration, and checking and validation of others' work. Some resistance to group work was observed among finance specialists, partly because the Finance MBA at City has a very strong element of formal teaching, partly because people working together in a financial environment often do so in a purely competitive, not a collaborative, framework.
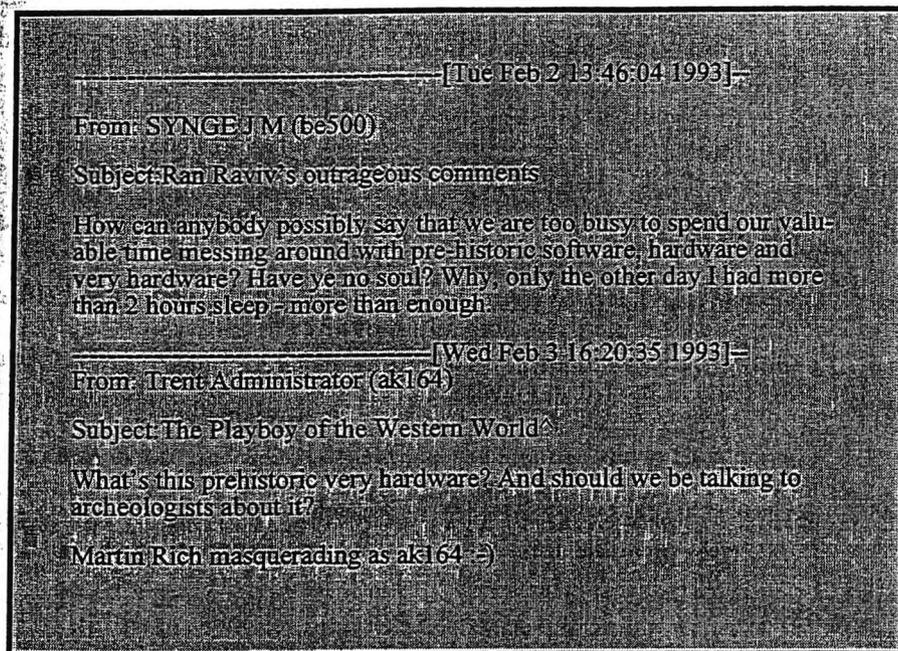
7. Response To Student Feedback

For 1993 a much greater emphasis has been placed on initial training in using the computer infrastructure, and the skills required for the case study have been emphasised. Although the Sun workstations use a windowing system, it is non-standard and has proved difficult to explain to students without experience of computer use.

It is easiest to explain how to use computers if an appropriate metaphor exists: paper on a desktop for windows on a screen, paper mail for electronic mail, a conversation or debate for an electronic conference (Sorensen, 1991). Metaphors were introduced early in training students to use the facilities, and enough tutors were arranged for each session that individuals with difficulties could be given particular attention. Training is vital; at the start of the term a simple survey of computing skills is carried out, and the proportion of MBA students admitting to any familiarity with IT has always been less than 40%.

In parallel with the Trent case the same groups work on a conventional case study for operations management. This requires a written report at the end of term. Initially Trent demanded a lot of work towards the end of term: for 1993 to avoid clashes between the two subjects the Trent questions are being set, and answers required, about two weeks earlier.

To monitor the group process at certain points, process tutors have been introduced. There are six process tutors, each responsible for a few groups. Groups send notes, of discussion among members, to the tutors to provide an indication of the processes taking place.

Students and staff have been encouraged to discuss the coursework and the infrastructure using an electronic conference. Figure 2 is a (light-hearted) fragment of such a discussion.

```
                                              [Tue Feb 2 13:46:04 1993]
From: SYNGE J M (be500)

Subject: Ran Raviv's outrageous comments

How can anybody possibly say that we are too busy to spend our valu-
able time messing around with pre-historic software, hardware and
very hardware? Have ye no soul? Why, only the other day I had more
than 2 hours sleep - more than enough

                                              [Wed Feb 3 16:20:35 1993]
From: Trent Administrator (ak164)

Subject: The Playboy of the Western World?

What's this prehistoric very hardware? And should we be talking to
archeologists about it?

Martin Rich masquerading as ak164 =)
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8. An International Connection

Connection to the UK joint academic network (JANET) offers connectivity, via the Internet, across the world. International business is one of the specialisms within the day MBA course and the Internet offers a means to build an international element into the case study.

Fig. 2. Example of dialogue in conference.

Tapscott and Caston (1993) talk of 'open systems for an open world'; they see the emergence of international networks as a spur to international business. Extending the Trent case study across frontiers is an attractive way of putting this into practice for students.

Two international tasks have run in parallel with the Trent case study. The first, in conjunction with California State University, involved the ITM students in a case study. Contributions to this from both British and American students were distributed by electronic mail to participants at several American universities.

The second international exercise requires Trent engineering to forge links with a fictitious customer in Spain. Initially the Spanish customer is

being represented by a group of Spanish students staying in Britain on an exchange visit: each student acts in the role of the customer's information technology manager.

Because the Internet includes a wide range of information sources around the world, it is intended that students will, in future, be required to search for data across the network.

9. Conclusion

Implementing the Trent case study has been a useful learning process for both staff and students in CUBS.

* For students it has provided a broader view of technology than before, and enabled self-analysis both in use of information technology and in group work. It has highlighted links between the computing course and other parts of the MBA syllabus.

* For the staff it has provided direct feedback that can be incorporated into the course in subsequent years. It has also offered an insight into students' perceptions of both technology and group work: the importance of initial training and group forming, and the hazards of obscure or unreliable facilities.

For 1994 the questions are being revised to reduce repetition and to improve the links between the case study and the computing lectures. The video interviews will be revised to be up to date and to ensure that the technical quality is high. Although there will be an international connection, the ground rules will be stated more clearly so that students are less confused by it. If practicable, some hard financial data will be included.

A more ambitious step is to introduce some interactivity into the case study. This will improve its realism and be a move towards the use of a much more complex business simulation in the future.

How much learning has taken place? Trent has been a useful learning experience for its initiators, for those running it. But the biggest hurdle to learning by students is an understanding of its relevance - and that hurdle needs to be overcome by more thorough marketing within the Business School. Only once the case is perceived as an integral part of a course, not merely as a pleasant game, can it be really effective.

No simulation can ensure that every group works cohesively. In extreme cases, any group will carry a freeloader, who could only be involved with an extreme effort from other members. But such extreme cases exist in business, and coping with them is an instructive, if cathartic, process. And despite the threat of legal sanctions, there were undoubtedly cases of students using other people's identities on the computer, and

certainly some groups which (sometimes surreptitiously) refused to work together.

How accurate should a simulation be? Specific feedback on Trent suggested that students were irritated by being tested on topics just before they were covered in lectures, as though they wanted Trent to be a clinical environment in which they could run a business without the restrictions of ordinary life. Peter Senge (1990), among others, talks of a microworld as an environment for training managers, which is basically realistic but allows parameters to be adjusted to provide a desired learning environment.

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Building
Computer
Supported
Group Work

MBA CORE COMPUTING

COURSEWORK Q1: UNDERSTANDING/OPTIMISM
SURVEY

This is individual coursework, and the deadline for its receipt is:

23.59 on 3rd February 1993

It must be sent by e-mail to account name:

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Based on the matrix below, assess your personal position at the present.

X axis - Your current understanding of IT (0 low, 10 high)
Y axis - Optimism about beneficial impact of IT in business in the future (0 low, 10 high)

```
HIGH10
O       9
p       8
t       7
i       6
m       5
i       4
s       3
m       2
        1
LOW     0
        0 1 2 3 4 5 6 7 8 9 10
        LOW         HIGH
           Your understanding
```
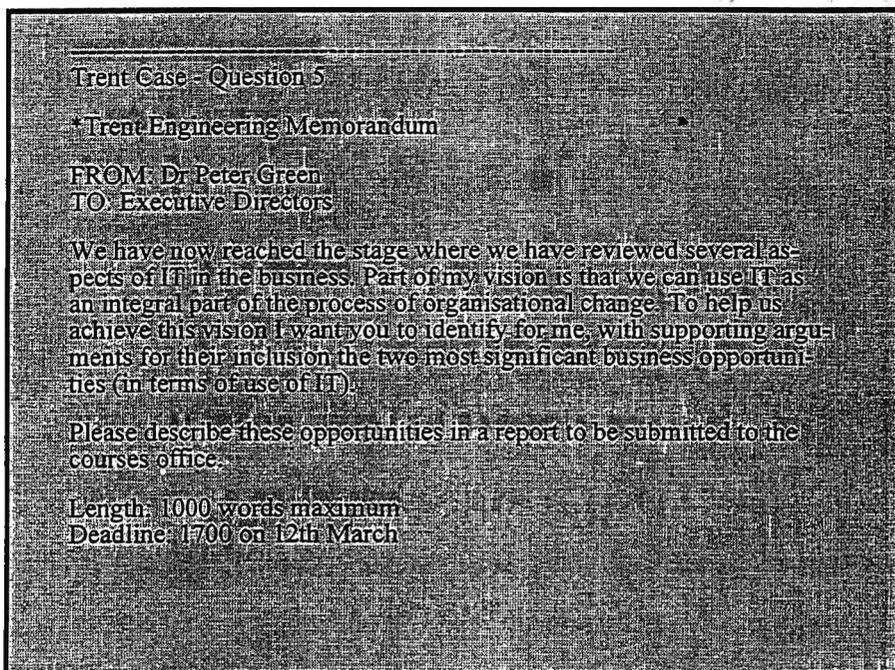
Do not try to "mark" the answer on the matrix. Just send a one-line e-mail message of the type:

(X,Y)
where X is the understanding score, and Y the optimism score.
The individual answers will not be seen by academic staff but will be collated by a researcher.

A3.65

Explicit objectives:
* Gauge students' familiarity with IT
* Declare a pragmatic learning objective: to increase understanding and not necessarily optimism.

Hidden objectives:
* Identify students unable or reluctant to use electronic mail
* Prepare students for asking the same question again at the end of the course.

II. MAILINGS ABOUT TRENT

Trent Case - Question 5

* Trent Engineering Memorandum

FROM: Dr Peter Green
TO: Executive Directors

We have now reached the stage where we have reviewed several aspects of IT in the business. Part of my vision is that we can use IT as an integral part of the process of organisational change. To help us achieve this vision I want you to identify for me, with supporting arguments for their inclusion the two most significant business opportunities (in terms of use of IT).

Please describe these opportunities in a report to be submitted to the courses office.

Length: 1000 words maximum
Deadline: 1700 on 12th March

Explicit objectives:
* Establish the character of George Goldie as a reactionary, resistant to change
* Simulate the (often irrelevant) flow of information that managers receive.

Hidden objectives:
* Establish corporate culture as one where senior staff were obsessed with their parking spaces
* Articulate managers' suspicion of contemporary values (represented by the presence of the horticulturalists).

Explicit objective:
* Establish interest in and importance of international issues.

Hidden objectives:
* Prepare students for exercise along with Spanish colleagues
  Introduce an interest among students in EDI, as a

technology, in advance of its being covered in lectures.

III. QUESTION SET FOR STUDENTS

Feedback on Trent Question 6

Thank you all (well, almost all) for providing the feedback requested in Trent question 6. Here is an instant digest of some of the points raised.

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This year all the grief to do with groups came in the forming process. Early in the term there was a lot of friction, many groups disintegrating and looking for other members. So the extent to which groups, once they formed, did work together was a pleasant surprise. This seemed to reflect a strong element of personal choice in joining groups - not necessarily a close simulation of business.

Groups were effective where the personalities were complementary, where the split of time between Trent, Wragg and the other

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Students were divided over whether the fringe messages lent the case authenticity, or whether they were merely a distraction. Some said that senior managers within an engineering company wouldn't be troubled by moans about car parking (really), and

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Although most people enjoyed the videos, the technical quality was lacking and distracted from the message: for next year I think it worth inviting the 'actors' back to produce better and updated videos. If we can find a suitable site (grim Midlands background, heavy engineering,

~~~~~~~

A handful of people did tell us not to change anything, another handful felt that Trent was really a waste of effort. But the people who found it worthless were generally eloquent about saying why, and though we are committed to the idea of business simulations, they gave us particular clues about what we might do next.

Explicit Objective:*   Test group's collective ability at producing a proposed solution and constructing an argument to support it.

A3.67

Interviewer:	People talk of building an IT culture: will this happen in Trent?
Latham:	I think it's absolutely necessary... co-ordination and communication is extremely difficult... high levels of quality and product integrity are the prices of admission to world markets.

IV. FEEDBACK AS RETURNED TO STUDENTS

Trent Engineering
Memorandum

From: Sales Manager (Fuel valves)
To: George Goldie
Date: 9 February 1993

The problem with car parking at our factory is getting ridiculous. I need to shuttle back and forth, to head office and to clients' premises, and it's imperative that I can get parked safely when I return. Last week I had to park on the main approach road, and my car was damaged by a lorry. I've only just got the car back from the repairers. The lorry belonged to a firm of horticulturalists with some trendy name: why do we need the office looking like a greenhouse anyway?

V. EXTRACT FROM VIDEO INTERVIEW WITH DEREK LATHAM (CHIEF EXECUTIVE OF THE COMPANY THAT OWNS TRENT)

Trent Engineering
Memorandum
Corrosive Valves Division

From: Michael Gunn
To: Peter Green

You will be aware of the work that we are doing on new valves for organic chemicals. This is a critical area of new business and, as it entails building closer links with European companies in 1993, I trust that you will see it as part of your vision of a Europe-wide leader in our field.

The continentals are all keen on the integration of their technology. So far we've had this from two sides. One is working with the French, where we have a potential customer, AXXOR, who insist that all their suppliers use EDI. I know little about EDI but assume that we must be using it somewhere in the group. The other came about talking to a Spanish customer who deal in the raw materials for things like paints, and so on. We talked about the difficulty in catching executives at their desks, and mentioned your enthusiasm for electronic mail. But is was embarrassing to have to say to them that none of us know, at a practical level, whether or how we could set up an electronic mail link to Spain. These Spaniards use a machine called an AS/400, made by IBM. Their IT people assure me that it conforms to all the usual standards.

Can we identify the core problems here? There is a question of locating technical expertise, especially now we have the whole of Derek Latham's empire to draw on. And there's the question of putting forward ideas for new systems, enhancements, better applications. Any technical support that we get for our (apparently simple) systems seems very flimsy, and my views on how the systems should be developed apparently count for nothing.

A3.69

Paper 3:

Rich, Martin (1995) "Supporting a case study exercise on the world wide web" in Cornell, Richard and Murphy, Karen (1995) From Smoke Signals to Satellite II, University of Central Florida, 1995.

Supporting a Case Study Exercise on the World Wide Web

Martin Rich
Lecturer in Information Management
City University Business School
London, UK

Topic: Distributed/Collaborative Learning Environments
Subtopic: Computer Networking in Education

Since early 1994 there has been considerable interest, notably in the mass media, in the growth of the Internet. This reflects a number of factors. One is a growth in use of Internet-based services such as Compuserve and Cix. Another is the emergence of Internet services such as the World Wide Web which are attractive and simple to use, even for those with limited experience with technology.

The emergence of the Internet, and particularly the World Wide Web, has opened new possibilities for the use of the Internet to distribute course materials. It allows students spread around the world to browse through the same materials, and encourages students to work through a hierarchy of topics.

This paper describes how an existing network-based case study has been adapted to use the World Wide Web, and places it in its educational context. It also considers where, using this technology, university based students can benefit from some of the concepts generally associated with distance education.

Key words:

Internet, World Wide Web, collaborative learning, management, IT strategy.

Note for broader applications:

This paper describes an educational application of the Internet, which draws on some of the ideas generally associated with distance education. But in this application the students are university based, and the contact with other students at the university is an important part of the course: electronic teaching is used here as an adjunct to conventional teaching and not as a substitute for it.

Such an approach stems from an interest in what the Internet can do best, and also in the reasons for students' choice of a postgraduate course based, as the one under discussion is, in a capital city. It raises issues - especially as this application is relevant to management learning - that could be relevant to the use of the Internet, within organisations, for in-service management training. Managers, like MBA students, are based in one place but usually value flexibility in how they organise their own patterns of learning.

Introduction

This paper describes the implementation of a case study using the Internet and the World Wide Web as a medium. The World Wide Web (referred to in the rest of this paper purely as *the Web*) is an application, provided over the Internet, that allows users to browse through information held at various sites around the network. There are several instances of the Web being used to make existing, paper based, cases available to users of the network. Some cases have been published on the Web, more have used the Web to provide indices and an ordering mechanism, because information retrieved directly via the Internet is usually entirely in the public domain. This case (Trent Engineering) is developed from an IT management case originally devised to use electronic mail as the principal medium (Rich, 1994). But the application described is novel in its use of the Web to encourage new ways of learning.

Trent is designed for use of full-time, university based, students. While it uses some of the principles of distance education, to distribute course materials when students may not have access to them by conventional means, it uses the Internet as an adjunct to conventional lecture-based learning. Using the network encourages students to explore further resources across the network, and in particular permits them to take part in international dialogues.

Although some pedagogic issues are discussed, this paper is essentially descriptive. There is an underlying hypothesis that scope exists for the use of the Internet with students who are following a university based (not distance learning) course.

Background to the Trent Case

Trent Engineering is a case first developed in 1992, for use by a group of MBA students working in the UK. It was introduced in response to student demands for more experiential learning, and constituted the assessed coursework for an Information Management module within the MBA course. Its overt objectives were to introduce students to a series of problems encountered in the management of IT in business, but the structure of the case also placed a strong emphasis on students' group working skills.

Every event described in the case study has happened, although the company itself is fictitious. An element of drama was introduced into the case study, to maintain students' attention from week to week and to introduce characters who students could recognise and identify with. Trent Engineering itself is a valve manufacturing company, based near Birmingham in England, which has diversified through its skills in IT but has also encountered severe IT management problems.

In its original form, Trent used electronic mail as the principal distribution medium. An initial paper, describing the case, was given to students at the start of a term, and further information was distributed and questions asked by electronic mail.

Evaluation questions were included in the case study exercise. Two criticisms that were frequently voiced by students (often by people who were generally very supportive of the exercise) were:

- The questions that had to be answered were repetitive

- Students felt swamped by electronic mail, to an extent that devalued information circulated by this method.

By the end of 1994, the original Trent exercise had been used in three successive academic years, and it was thought appropriate to revise the exercise.

Addressing the Concerns

Redesigning the Trent case offered opportunities both to address the concerns raised by students, and to adapt the case to a new set of IT management issues that had emerged in the intervening years. This was achieved by the simple dramatic device of describing how Trent Engineering might change, three years after the events described in the original case.

At the same time, the questions were structured so that one student within a group had responsibility for each question, and was awarded a composite mark derived from his or her individual mark for that question, and from the average mark of the group as a whole. While the move away from pure group work was made with some reluctance, it reflected a change in the other pressures on students - in 1994 most students were involved in enough other group work that in practice the Trent exercise was delegated to a single member of a group. Assigning questions to individuals also made it difficult for students to avoid working on the Information Management course entirely.

Because the earlier questions had been deemed repetitive, a new set of questions was devised. Five questions were set during a university term, each addressing a distinct issue and each related to one or two of the lectures that the students were to attend. Not all the questions were released at the start of term, but the topics and their relationship to particular lectures were listed at the start.

Since the original case study had been devised, the Web had emerged as an important tool for distributing and gathering data on the Internet. Widespread use of the Web was a contributory factor in the Internet gaining the sort of attention, in the mass media, that it attracted in the UK during 1994. Graphical tools for browsing the Web were easy to use and looked attractive, in sharp contrast to electronic mail across the Internet, that was limited to text alone and generally carried long and daunting headers on each message.

Perception is an important consideration in a communication medium gaining acceptance; literature on this suggests that *perceived* characteristics are more important than actual characteristics (Olaniran, 1993). Within the overall MBA program, it was important to avoid any portrayal of the Information Management course as a technical subject, and use of an accessible and straightforward medium such as the Web was an element in this. The Web provided such a medium, and was satisfying for students with a very broad range of computing expertise. Once a graphical browser had been installed, students with little expertise or interest in using IT needed only to know how to click a mouse over some hypertext to reach the course materials. Students with more expertise could use the case as a starting point to navigate around the whole Internet.

Use of this simple point and click access to the data was placed no requirements on the students to understand any computer applications. Workshops were run for MBA students to teach them mechanical computing skills, but these were all optional.

By providing a different style of access to the network, use of the Web also addressed the students' concern about excessive amounts of electronic mail. Mail was still used as a communication medium, but only to disseminate news and to facilitate international work. The Web offers a more passive way for students to reach information; it is there when they look for it rather than being sent to students whether they want it or not. But because it encourages students to search for information locally, it can indirectly encourage students to look elsewhere for information as well.

The Educational Context - Other Activities

When first introduced, the Trent case study was one of a set of related exercises that used computer networks to provide learning materials for full-time business students. This remains the case even though Trent itself has evolved.

The Trent case is run during the Spring term from mid January to late March of each year. During January, all MBA students participate in a week, with information in management as its theme, where students run a mathematically based business simulation and devise their own case study based on the simulation.

In addition one group of students, during October and November, works on a case study jointly with students around the world, using an electronic mailing list for the discussion. For this a sexual harassment case is used, set in the US but with both US and European students taking part. In October/November 1994, for the first time, both British and French students represented the European presence in this case study. The students taking part were subdivided, some looking at the case itself and some looking at different aspects of the process by which the case was discussed. In 1994, both British and French students used the same subdivisions and the same topics.

An exercise such as this depends on traffic on the mailing list reaching a critical mass (Markus, 1987). Once the critical mass is reached, traffic on the list should continue with no intervention from the administrator of the case.

This exercise prompted a vigorous discussion. Every participant made a contribution and many related their contributions to personal views and experience. The UK based students taking part raised some interesting issues about how complex the case could become, and about the momentum that was built up within an electronic mail discussion.

A further attempt was made in December 1994 to introduce an international discussion, this time about a textbook case and with British, French, and Finnish participants. The discussion was planned to continue into early 1995, and to include a number of British students taking a part time, but university based, MSc course. These students attended lectures on 2-3 evenings per week.

It proved difficult to involve these part-time students in the electronic discussion. They had limited access to computer facilities, and even those for whom it was technically feasible to gain access to the university system from their employers were reluctant to do so. Few of them were users of the university's mail system and the case discussion was insufficient incentive to learn a new set of computer applications. Worse, they showed little motivation to overcome any of these problems.

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Eventually this dialogue was only salvaged (from the UK viewpoint) by bringing a number of other MBA and

undergraduate students into the discussion. The part time students did take part in a valuable (face-to-face) discussion which raised some relevant points about the relationship of the network to such students. Most of them had considered, and consciously rejected, the option of a distance learning course to combine learning and employment. They had chosen a course which was based around lectures, albeit in the evenings, and were not attracted by the use of networks as a learning tool. This observation is relevant to the later discussion of the use of networks as an adjunct to face to face teaching.

By comparison, the full time students, with more time to experiment and less conscious of distance learning as an alternative approach, liked using the mailing list and built up a critical mass of use very quickly.

Workshops on the practical use of IT - including the use of the Internet - were offered during October and November as part of the MBA course. These were not compulsory and their emphasis was deliberately different from the subsequent core Information Management course.

Implementing Trent on the Web

It is worth summarising here what the Web offers. It comprises a large number of pages, which are linked by hypertext, that is on each page there can be portions of text, or pictures, which constitute links to another page. A user of the Web can move from one page to another by clicking a mouse over the hypertext that forms a link to another page. What differentiates the Web from other hypertext applications is that it is spread around the Internet: a link on a page held at one university in the UK may point to another page at the same university, or to a page somewhere else in the world. For the same reason, information that is available on the Web is usually accessible from any Web user around the world.

In the Web the concept of a home page for a person, an institution, or an activity has emerged. Typically a home page contains a set of links to other related pages, and conveys a limited amount of information itself. For the Trent case study a Trent home page was set up, with pointers to the individual questions about the case and to a few related issues.

As with the original mail-based version of the Trent case study, students received a paper description of Trent Engineering, and the key issues within the company, at the start of the case. A copy of the same paper was made accessible through the Web, as one link from the home page. Other pointers included one to a statement of the case's learning objectives; to study some issues relating to information management in business and to give students experience in using the Internet.

Five principal questions were posted on the web during the term. Each question was the responsibility of one student, but within groups of 3-5 students no more than one student could answer any question (the students worked in these syndicate groups for several subjects within their MBA). To retain some of the flow that had been introduced in the mail based study, and to reinforce the relationship between particular questions and the relevant lectures, these questions were set, and were due in, at different times through the term. This encouraged a group decision about who should attempt which question within a group. The Trent home page was edited during the term to add additional questions and other relevant links. Deadlines for questions were set so that there were always ten clear days between the last relevant lecture and coursework being due.

The questions were phrased to encourage students to follow further references. Most of them contained one or more reference to a book or paper - not all of the papers easy for students to obtain - and some contained links to other web pages outside the case study. For instance one page which referred to the possibility of setting up a commercial web site included links to web pages belonging to IBM and J P Morgan.

In addition to the questions, some background information was provided on the Web about organisations and people involved. An example is the parody of an article, from London's Evening Standard. Despite its light hearted tone, this page was used to give students important information about the case.

Even without introducing any international links, the Web and the Mosaic browser software constitutes a convenient way of making this sort of case available to students. The software is in the public domain, is well proven and needs little training to use, and it is straightforward to put information into the appropriate format using HTML (Hypertext Markup Language).

Three alternative methods were offered to hand in coursework:

- It could be handed in as a paper document in the usual way

- It could be handed in as a word processed document, sent as an attachment to a piece of electronic mail

- Students could design a Web page for themselves.

In addition every student was asked to answer a questionnaire, particularly about their attitudes to group work and searching for other references, and to submit the answer by electronic mail. When the last submissions from the Trent case are received (by the end of April 1995) it will provide a valuable mass of data about students' responses to the case.

International Rôle Playing

Had the Web been used purely to provide information about the case to students based in Britain, little of the power of the Web or of the Internet would have been apparent. So it was important to build some sort of international connection into the exercise.

This was done initially by including a question, about Trent and accessible on the Web, that could be answered by students working on the case study from elsewhere in Europe. Because the Web is international, students across Europe had access to exactly the same case materials.

There was, though, also perceived to be a need to build a dialogue about the case between students in different countries. Such a dialogue had already taken place in the previous year, about the sexual harassment case. Trent was being used by full-time students of whom a proportion were already regular users of electronic mail.

A rôle playing exercise, using electronic mail, was introduced between teams of British and French students. The French students, to answer the question set for participants outside the UK, had to assume the rôle of a continental European distributor of Trent's products. Their British counterparts had to assume the rôle of consultants, advising Trent on a future strategy to pursue.

Some structure was necessary to start the dialogue. This was incorporated into one of the early questions for the British students, who were asked to draw up a set of Critical Success Factors for the use of IT in Trent. Critical Success Factors (Ward, Griffiths and Whitmore, 1990) provided a starting point for determining future IT strategies. Each group of British students was asked to appoint a representative, who would send their set of Critical Success Factors to their French counterpart. British students were allocated to French partners, at random, by the teaching staff.

The British and French students worked in environments with different areas of research expertise. Again, to encourage the dialogue, the questions included references to fields that students might like to ask their counterparts in the other country about.

Whereas international case studies using a mailing list were easy to monitor, because staff could join the mailing list, those using individual group discussions were harder to evaluate. One representative from every group, in Britain, was asked to send a copy of their initial mailing to France to the case administrator. Beyond that, though, the international dialogue was presented as another source of information for students to use if they wanted.

Topics for the Questions

In 1995, it is impossible to discuss the management of IT without considering Business Process Re-engineering (BPR). Like the Internet, this is a term that has attracted considerable attention in the media. Hammer and Champy (1994) writing about their definition of BPR, point out that BPR is not about IT, but that its does rely on IT as an enabler, and that it is a response to a transition from an industrial to an information society.

Hammer and Champy present a very brutal view of BPR; they advocate the shedding of staff who are unable to adjust to a new environment, they repeatedly remind managers that BPR is expected to be tough, and they admit

themselves that many BPR projects fail to fulfil their expectations. Conti and Warner (1992) are pessimistic about the effectiveness of BPR, and see it as a (possibly inappropriate) transfer of mechanistic ideas to management. Tapscott and Caston (1993) talk of BPR in different terms from those used by Hammer and Champy, seeing it as one element in a progressive transformation of a business.

At the end of the core Information Management course, the MBA students were invited to participate in a debate which also included both academic and business protagonists. Subjects addressed included the difficulty in achieving benefits in productivity with personal computers, and the sort of data networks that might be necessary to support business in the future. A key subject which united different, often disparate, participants in the debate, was a recognition of the importance of the human aspects of the use of IT. These aspects appear neglected in much analysis of BPR. Two objectives in setting the questions, then, are to foster an interest in the human issues and to encourage students to view BPR critically.

Outsourcing (engaging an outside organisation to run an entire IT function) is another current issue in IT management. In the 1995 version of Trent, most IT functions have been outsourced, to another fictitious company called Infoplug, and the principal activity that remains within Trent has run into difficulties, to which students will need to apply themselves to searching for a solution.

Fitzgerald and Willcocks (1995) described a number of issues discovered in a survey of outsourcing, notably that outsourcing was not successful when motivated by desperation, nor when there was insufficient communication between the partners in an outsourcing agreement.

The five questions that were set for British students focused on a transformation in Trent Engineering's business, and its relationship to the outsourcing contractor. As well as the immediate issues raised by outsourcing, students were asked to examine the potential for building a strategic alliance between Trent and the contractor, and to look at the creation of a virtual organisation within the outsourcing contractor.

One question also referred to the use of information as a corporate resource. As a business resource, information has particular characteristics that are often neglected. In particular it is difficult to value, and when it appears in accounts it is often valued only according to the infrastructure needed to handle it (Eaton and Bawden, 1991).

The Internet within a Full Time Course

Most current work about the use of the Internet in learning refers to its use in distance learning. In practice, most applications of distance learning have been in places where physical or economic geography works against traditional patterns of learning. For instance Moran and Mugridge (1993) in their selection of case studies of open learning, take no examples from Europe. Canada and Australia, both countries with large sparsely populated areas, figure largely. There is little evidence that distance learning will supersede conventional universities to any great extent.

The social constructs surrounding a university remain very important. For undergraduate students university is not merely a place to learn, but a place to make friends and, particularly in Britain, a first opportunity to move away from the parental home. And students do not learn merely by reading books or attending lectures; they need to work amongst themselves and alongside their tutors. There is a powerful analogy between the emergence of new media for learning and the use of new media for entertainment. The availability of the compact disc has introduced many new listeners to classical music, but it has not reduced the demand for live performances by classical musicians.

Laurillard (1993) puts a compelling argument for the use of technology in a movement away from the established view of a university as a community of learning. But she says little about open or collaborative learning. The distance learning movement is seen to have little relevance to full time students.

Most city-based universities still rely on their location to gain competitive advantage. But their is a demand, in such universities, for experience in using global networks and in building international contacts. The Trent case study provides a way in which the Internet can be used constructively to add an international dimension to a full time course.

It remains interesting that this type of exercise was difficult to implement with a group who were studying part time, but university based.

Conclusions

Trent Engineering is a practical application of the Internet to full time students. The revision of Trent for 1995 has provided opportunities both to use recently available technology for the delivery of the course, and to address comments received from earlier participants in the case.

Although it is too early to draw any firm conclusions, the case study does include some tools for evaluation and anecdotal evidence suggests that students have taken part actively and enthusiastically.

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Paper 4:

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A Learning Community on the Internet:
An exercise with Masters Students

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Abstract

This paper looks at experience with an exercise that has been carried out over several years, in which a group of MBA students in Britain use the Internet to work alongside students in other parts of the world. It places the changes in students' perceptions of the exercise in the context of the evolution of the Internet and the need to build a learning community, and looks at different models of communication which might be appropriate..

Keywords: Internet, collaboration, case study, pedagogy, management learning

Learning On The Internet

Each year since 1992, a group of MBA students based in London has participated in discussions of a case study with students elsewhere in the world. The discussion takes place using e-mail and is based around a case study originally used for class discussions by a university in California (Quinn, 1992), which is deliberately written to encourage discussion of its protagonists' thoughts and values. It was chosen for an electronic discussion because, in the classroom environment, students seemed only to see one viewpoint within the case. To quote a professor from California involved with the exercise: 'It was only when we started to run the case in an electronic media that the case took off with a varied set of opinions. Only then did students start to explore the legal and social as well as ethical issues the case presents.' The case has been run many times since 1992, using an open discussion between students linked by an electronic mailing list (Hacker et al, 1996). A mailing list was chosen because the technology was available and accessible to all the universities involved.

While the case has remained unchanged over the years, students' reaction to it has varied considerably between different cohorts. This may be influenced by:
- The way that the exercise itself is structured
- Students' perceptions of the technology used
- Learning objectives and the pedagogic context.

Structure of the exercise

The learning objectives of the exercise were to offer students some experience in managing through a virtual community, and to engage them in the process of using a network to discuss business issues, and to give students the benefits of working with another cohort from another country without the cost and commitment entailed in travel.

For students based in London, the structure of the exercise changed after the first year. In 1992 the case study was run purely as an open discussion on a mailing list. From 1993 the British students were divided into groups, each looking at a different aspect of the dialogue: in effect the students were asked to carry out some action research on electronic communication. From 1994 the students working in France, on a Masters programme, used corresponding groups, so it was possible to build learning groups with members on both sides of the English Channel. Argyris and Schön (1991) point out some of the problems in reaching rigorous conclusions as a result of participative action research such as this.

Anecdotal evidence suggests that introducing this structure increased the acceptability of the exercise to students. In particular it transformed it from an 'interesting case study' to an 'exercise in using electronic communication to manage'. To quote one student from the 1994 cohort, 'it really made it clear how electronic networks could be used to discuss business issues'.

The technology and students' perceptions

In recent years the Internet has become a widely used tool both in business and in education. While the Internet has its origins in the 1970s, and the Joint Academic Network which links UK universities to the Internet has been in place since 1984(Cooper, 1994), widespread business use of the Internet can be traced to the evolution of the World Wide Web since 1992. Until the Web was introduced communication over the Internet was predominantly text-based. Such a lean (text only) medium should be most appropriate for plain, unequivocal, messages conveying simple information or instructions (Trevino, Daft, and Lengel, 1990). More subtle messages, or the sort that would be used to discuss a case study in business, would require a richer medium. By comparison, the richness of the Web makes it an attractive medium for advertising, and the 'browsing' model of communication that it uses ensures that users are not bombarded by unsolicited messages. Therefore commercial advertising on the Web has become acceptable, in a way in which it remains unacceptable on other parts of the Internet (Hammond, 1996).

While the Web is now widely used as a resource for browsing information, electronic mail remains important for one-to-one communication. All students at the participating universities needed to use e-mail in their day-to-day studies, so it was a readily available technology. However it lacks any ability to 'thread' messages, discussed in the literature on the use of computer-mediated communication in education (eg Mason and Kaye, 1989). The importance accorded to threading suggests that either an alternative technology, or a mailing list where the threading effect can be provided by the use of certain subject titles, should have a rôle in the pedagogic use of the Internet.

Therefore, in two important respects - the lack of threading and the leanness of messages, electronic mail was chosen despite its apparent unsuitability for the exercise. But until 1995 the convenience and the familiarity of e-mail compensated for this.

Laurillard (1993) emphasises the importance of introducing innovative approaches to teaching in higher education, and in doing so building a community of learning. She identifies the use of 'discursive media', which bring people together in discussions. While the students in Britain enjoyed exchanging views with students elsewhere in the world (at different times including France, Finland, and the US) they did not feel that they had built a 'community of learning' with their counterparts. This was one theoretical concept underpinning the exercise, that was not fully recognised by students.

Hiltz (1995) describes one instance in which such a community of learning has been built, using asynchronous communication to build an electronic learning environment. Hiltz's example emphasises the importance of the asynchronous (different time) effect of electronic communication, and again supports the use of electronic means even where there is no need for students in different places to interact. Although she observes that 'one cannot segregate the on-campus and distance markets', universities' markets are influenced by their geography.

One way in which electronic mail can add a new dimension to the on-campus market is by permitting discussions with students in different universities around the world. The MBA students who participated in this exercise from London were committed to on-campus learning, but were happy to be offered an extra dimension using an electronic network.

The only cohort of students who were reluctant to accept participation in the exercise were a group who were studying (part-time) in the evening. Their explanation was that they had explicitly rejected the idea of distance education, and were reluctant to use the tools of distance education even as an adjunct to their on-campus course. During a (face-to-face) class discussion with this group, the group expressed a strong resistance to using, and learning, a new computer system as part of their course when they needed to use technology all day as part of their employment.

The 1996 cohort of students reported much less interest in the case than their predecessors. Although every group has different personal characteristics, there was one very important difference between this and previous years' cohorts. Until 1995 the proportion of students who already had Internet access, through a service provider independent of the university, at the start of their course, was always less than 10%. In 1996 it increased to 35% - reflecting an increase in the use of the Internet among the population as a whole. For this group the Internet held much less excitement than for their predecessors, and e-mail was seen as an uninspiring technology. In particular, the manifestation of this reported by the students was that they saw insufficient structure to the exercise.

Outcomes of the Exercise

Learning objectives and pedagogy

The (stated) learning objectives of the case were to give the students an opportunity to discuss a case over an electronic network, and to raise some of the international, and cross-cultural, issues that the availability of such a network might

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create. Inevitably responses to these issues are subjective. Underlying these was a belief that information technology could be used as part of a full-time, face-to-face, course provided that it offers some sort of tangible benefit. In this case the tangible benefit was the international dimension offered by use of a network.

There are some parallels between the approaches that students take to material and the approach that a reader might take to a book. For over twenty years, the study of literature has concentrated on the response of a reader to what has been written. It has encouraged different people to describe what they see in particular works (Rosenblatt, 1976). This fosters a debate between different critics, without begging questions about the author's intentions, and it recognises the validity of different perspectives

The concept of an individual response is consistent with a view of communication, which depends on the interaction of information being communicated, with the prior knowledge and experience of the person who takes in the information. It is a model of a dialogue in which listening is as important as talking (because part of the process of listening is to analyse the information, and to relate it to its context).

This is important with postgraduate students, because it presents a model of learning in which prior experience plays an important part. In an electronic discussion, it is possible to gauge the effectiveness of learning material, by looking for evidence of students generating responses which derive from their past experience. These could be
• Messages which relate the issues discussed to the sender's own background
• Messages which dispute a different contributor's perspective, without denying its validity.
The experience of work with MBA students and the case study was that students were very prepared to introduce their experience, but reluctant to draw any analysis from it. A useful tool for investigating this is based on the ideas of Winograd and Flores (1986). This has been widely used in analysing contributions to computer-mediated discussions. It remains an appropriate tool for analysing a discussion across the Internet, because it focuses on explicit communication. In this environment, all communication takes place electronically and is recorded; there is a minimum of tacit communication. Applying this analysis to the students in the case study, there is a large number of 'assertives' (messages which say something) which are not followed by other messages which carry out any analysis.

Johnson-Lenz and Johnson-Lenz (1982) identify a groupware system, called 'Tours' where there are clear components - text, voting mechanisms, and so on -to support different aspects of the group process. A deficiency

of electronic mail discussions is the absence of the same sort of delineation between stages of a process. One problem observed with computer-mediated work is a tendency to provide responses at an inappropriate stage in a discussion. In many cases, the stages are implicit, so in analysis we need to identify contributions which delineate different stages. One of the principal problems reported by students using the case study was that of messages being sent at an inappropriate stage in the dialogue.

Indications for the future

The most pressing issue in developing the case is compensating for the familiarity of the Internet - perhaps by providing some other element of novelty. To facilitate this, the case will be run using a web-based interactive system with the next cohort of students. This will be more intrinsically suitable for the discussion as well as a more attractive technology.

At first, this appears incompatible with an exercise which is driven by pedagogy, not by technology. But the pedagogic emphasis, and the international focus, dictated the use of a technical platform that was familiar to students, and widely available to them. Electronic mail is fundamentally a one-to-one method of communication, and is thus based on a model very different from that of a discussion forum. New systems, such as COW (conferencing on the web) (Klavins, 1996) provide forums for discussion that are accessible to anybody with a web browser. The structure of the COW, with distinct threads to the discussion, is better suited to case analysis than a 'flat' e-mail discussion.

Students also reported a lack of sufficient structure in the timing of the discussion. With an e-mail based system, this structure could be imposed by only permitting discussion on certain topics at certain stages. With a web-based system, this may be unnecessary because the same structure could be provided by separate conferences; in other words the discussion would be separated by space and not time. But the students reported a need for a structure, if they were to arrive at a conclusion, so it is unlikely that a division by time can be abandoned completely.

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Paper 5:

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Learning Information Systems Through a Mail-Enabled Business Simulation: The Case of Trent Engineering

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MANAGEMENT EDUCATION AND INFORMATION TECHNOLOGY

There is discussion in most societies of the problems of management education, concerning its nature, quality, or quantity, and in particular whether it is relevant to the global and regional challenges faced by most industrial and commercial based societies. Most societies perceive they face nothing short of a crisis in the education of their managers. Increasing international competition and rapidly changing market technologies, customers, and workforce all contribute to a feeling that management is constantly trying to catch up, with many of the areas involved being largely outside its direct control.

In particular societies or organizations, there are a whole variety of solutions advocated and this is not the place to debate their merits. Two fundamental threads however are likely in redeveloping management education:

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1. It will have to be achieved in most societies without significant (or any) increases in per capita funding of management education; indeed per capita funding may fall in the United Kingdom, for example, because all political parties are committed to much higher participation rates in higher education as a first priority.
2. It will have to be based on the principle that managers and prospective managers will behave differently (i.e., "better") as a result of their management education, compared to what they would have done had they not received it.

Since this latter statement appears trite or even trivial, what it is attempting to stress is that management education cannot be seen *solely* as a further stage of the general education process. It cannot and should not serve only this purpose. It must also serve more instrumental goals.

There is considerable debate about precisely what managerial skills can or should be taught or learned. For present purposes it is assumed that there is some definable group of management competencies, in which managers can increase their skills through management education. It is not difficult to identify clear-cut areas such as negotiating, marketing, planning, and financial management where such competencies are definable and where specific education goals can be set.

What then is the potential for information technology (IT) in this? It is argued in this chapter that its major potential comes from its ability to create an artificial environment in which students of management can develop and test their skills and can experiment and make mistakes.

It is the ability of IT to process information in increasingly vast quantities and rapid speeds that offers the greatest opportunities in management education. This represents a significant extra dimension, on top of the largely ad hoc use of specific PC-based packages that characterizes most business students' use of IT at present.

There is current software that can be used to assist in this, but which—because it is based on what *was* possible or available in the past—may be misleading as to the future. There are, for example, many computer-based business games and simulations. These (as well as noncomputerized games and simulations) clearly provide an important opportunity for creating an artificial environment. The computer-based business game will continue to be useful for developing skills in specific, often quantitative, areas. But the term "business game" is far too limiting to describe the concept of the artificial environment.

Much closer to the concept of the "artificial environment" is the flight simulator training given to airline pilots since the World War II. These have become increasingly expensive but working with them can, for certain purposes, be deemed a substitute for actual flight experience. The flight simulator is a totally artificial environment except for the cabin unit which is a replica of the real aircraft cabin. The simulator provides external graphic displays (the view out of

the cabin) which have become increasingly lifelike. There is a monitoring, recording, and assessment system so that student and tutor can replay the flight and analyze what happened.

OBJECTIVES OF CASE

Even the most sophisticated and expensive flight simulators cannot cope with every possible situation. At present neither can any business simulation, and it is not claimed that the one discussed here—Trent Engineering—is able to do so. It is, in fact, geared to analyzing one specific area, namely the more effective use of information systems in business. However, it is argued that there is an increasing need to develop material which can provide those in management education, and specifically MBA students, with a much more realistic type of artificial environment than has typically been available to date, even if this relates to specific areas.

The Trent Engineering case has been specifically developed to meet two parallel objectives:

1. To test business studies students' understanding of information systems and technology concepts and to test their ability to relate these to real-world problem situations.
2. To involve students directly in the use of electronic mail, nonpaper-based communications, and remote database access, since these are of increasing potential for business efficiency and effectiveness, but often underutilized.

The distinctive feature of this case study is the way that it is substantially based around electronic mail ("mail-enabled") in such a way as to simulate some of the real managerial interactions faced by senior executives.

There has been a wide variety of experiences in using electronic mail in distance education, including in management education: Mason and Kaye, 1989; Hardy, Hodgson, McConnell, and Reynolds, 1991. However, there is much less application to full-time courses, as outlined in this chapter.

THE IMPORTANCE OF MANAGEMENT SIMULATIONS

The concepts involved are not in themselves new. The case study model addressing the first objective has been in use since the early days of formal management education at the Harvard Business School (McNair, 1954). There are also an increasing number of mail-enabled simulations.

Rawson (1989) describes the International Business Negotiation Simulations (IBNS) project, developed by the University of Maryland. It involves three half-day workshops "built around a country-specific simulation which allows U.S. business executives acting as members of a mock U.S. company, to perform a negotiation (via computer conferencing) of a specific business venture with their peers from a chosen foreign country."

The International Negotiation Project uses electronic mail to conduct simulated legal negotiation exercises between students from around the world. It originated in the Universities of Warwick and Hawaii (Clark, 1990). The approach taken was to create message files using the standard word processing package on the law school network and then transfer these files to the UNIX system for onward transmission via JANET and BITNET to Hawaii.

IMI-Geneva has developed an extensive simulation (Smiley, 1989):

> In the Integrated Management Exercise, there is no written case study providing pre-digested "knowledge" of a given situation. There is, however, a vast amount of company and industry information and data contained in a computerized information file. The "infofile" not only includes the "numbers," but also narrations which can unfold the history, background, and culture of the organization plus descriptions of the people within it. All are taken from a real international company.

In the United Kingdom, Shaoul (1991) has pursued an accounting-oriented simulation at Manchester University:

- A computerized simulation of the management accounts, production plan, and budgets of a carpet manufacturing company over a five-year period
- The contextual information relating to the industry, market trends, the company itself, and its competitors

Perhaps the major business simulation that also has a strong mail-enabled element is the Proteus simulation, initially funded by IBM. This work was focussed on a group of universities: Aston, Sheffield, Strathclyde and Manchester Business School. Subsequent development work to translate the software to a local area network (LAN) environment has been continued at Manchester Business School, based on funding from the Department of Employment, entitled Network Proteus.

The Proteus simulation has considerably advanced the British business academic community's experience and understanding of the capabilities of this type of holistic simulation and gave direct inspiration and insight to the developments of the Trent Engineering case. We would like to note the stimulus provided by Dr. Raul Espejo of Aston University, who with colleagues has developed the use of Proteus in a particularly imaginative way for the Aston M.B.A. course.

There has also been a wide variety of experiential learning simulations for management development based on "in-tray exercises," some of which have been developed into computer-based formats.

THE CITY UNIVERSITY BUSINESS SCHOOL AND INFORMATION SYSTEMS

Each academic institution has its own needs, environment, and resources. The Trent Engineering case has developed out of the specific situation at City University Business School, whose driving forces may (or may not) be relevant to other institutions.

The school has a very large full-time, one year M.B.A. course (the Day M.B.A.) with over 200 students from a very wide range of backgrounds, and with a strong international dimension. The Day M.B.A. is organized around five specialisms: finance, human resources management, information technology management, international business and export, and marketing.

All the core courses and the Business Policy course are taught to the combined student body, but because of the centers of gravity provided by the specialisms, it is always important to look for devices which provide integration of disciplines within the core courses. This has always been done through the creation of teams for group work, with members from each specialism involved. However, given the intense pressures and heavy workloads faced by the students, not all group exercises have really succeeded in combining disciplines synergistically. Work is perhaps totally delegated within the group and simply assembled together to produce the final product.

There is also an intrinsic problem in team structures that it is rarely possible for marking schemes to reflect the differential efforts of individual team members. Various techniques have been developed to address the problem of the under-participating team member (the "free-loader"). For example, systems have been created in which students can allocate a fixed quota of marks differentially to individual team members depending on perceived quality of individual inputs. However, such schemes are not always easy for students to manage; there is a natural tendency to support individual group members, especially if their chances of graduating may be affected.

The school, unlike several other leading business schools, has for many years had a compulsory core course in computing for all M.B.A. students. This is in addition to the formal hands-on training in Term 1 to ensure that the basic ability to use essential software packages is present. Virtually all the M.B.A. students have access to a PC at home as strongly recommended by the business school.

The compulsory M.B.A. core course is a eight-week course taught in Term 2. Although this course is entitled Core Computing, it has paid decreasing attention to the mechanics of computing as such and has increasingly addressed the issue of successful application of information technology and systems at the strategic level.

As with almost all the taught courses, student feedback concerning these M.B.A. courses suggested an increasing need for less time in the lecture theater

(the one used for core courses is the university's largest) and more on group and experientially based work. At the time of this writing, Core Computing took a slot every Friday morning in tandem with Core Operations Management, and after the January-March course in 1991, it was decided by the two lecturers to teach these two courses in a more integrated fashion, using a combined case study. Unfortunately due to a lengthy absence of one of the lecturers in the second half of 1991, it proved to be physically impossible to collaborate on the revision of the case, so a decision was made in late November 1991 to continue to teach the courses separately.

University Information Technology Strategy

City University has, across all its schools, one of the highest proportions of its academic staff teaching IT or closely related subjects and also has a heavy use of IT in teaching and learning in virtually all its academic disciplines.

In 1989 the university reviewed its IT strategy as part of the review by the government funding body, the Computer Board. Three key decisions were made by the university and supported by the Computer Board:

1. The central IT service would support the needs of virtually all disciplines, not the few who had tended to predominate in its use before.
2. The service would be decentralized physically to four "clusters," each cluster to be in one of the university's major buildings and to consist of one or more servers and a group of high-powered workstations. This was the procurement funded by the Computer Board, and for approximately £1m the university obtained the servers plus nearly 200 scientific workstations and associated peripherals.
3. The university itself would fund the installation of a high-speed backbone campus network across all the campus except in some of the outlying buildings.

One cluster was located in the business school and had twenty-nine DOS/UNIX workstations, one SparcStation and two file servers. Unfortunately, these fell short of the specification set by both the university and the school in a key respect. This was that the business school was some 1 kilometer from the main campus, and its old 9.6-kilobyte link was only upgraded to a 64-kilobyte line. The main campus used a fiber-optic backbone, capable of 10 megabytes routinely. Given the integrated nature of the network, this meant that the response times of the workstations were significantly slower at the business school than at the main campus.

Initial use of electronic mail had been piloted in the winter of 1990-91 with a group of forty students and proved generally satisfactory. However, the mailer used—cmail—proved to be unstable, and the quality of the link to the main campus also made use of the system too slow.

However, the electronic mail front-end—elm—adapted as standard by the university for 1991-92, required the use of the UNIX vi or similar text editor. This proved to be a major deterrent and difficult even for IT professionals who were by now used to PC-type packages.

The Decision to Introduce the Simulation

Against this background the prospects of using a simulation-type exercise for the 1992 Core Computing class looked slim. However, perhaps by some good forturfe, and despite the decision in November 1991 not to innovate, several events in December 1991 proved to be pivotal in enabling the simulation to proceed:

1. A new member of staff was appointed who was an M.B.A. by background and able to make an immediate and direct impact on the development of the material, as well as the training that was necessary.
2. Investigations of another mail front-end, mailtool, proved very positive and even though it was not "supported" by the university computer unit, a decision was made to abandon elm, except for these who needed access via modems, and to focus on what was hoped to be a more acceptable front-end.
3. As part of the implementation of a new telephone network for the university a 2-megabyte link was installed to the main campus, and from January 1992 there was a dramatic improvement in the speed of accessing the network, particularly the e-mail element of it.
4. A decision was made by staff of the accountancy division of the business school in December to use the Plan-It business simulation for undergraduate teaching. This had been in use for two years with only eight copies of the software. The decision triggered the need to upgrade to a site license, which in turn meant that the simulation could be available in the numbers required for M.B.A. group work.
5. At a meeting of the M.B.A. Staff-Student Liaison Committee in December 1991, the student representatives made a strong call for more experiential learning situations. Because by now it seemed that this was logistically possible, this meeting finally precipitated a decision to proceed with the simulation, which had by then been made physically achievable.
6. Due to a reorganization of the M.B.A. core courses, one of the other courses had reduced its class contact time by a half-day per week. This happened to be on a Friday afternoon, while the Computing Core was on a Friday morning. This meant it was possible to schedule the additional training sessions as well as the three half-days needed for the Plan-It business simulation, without causing other courses to be disrupted.
7. A suitable case had already been developed in a traditional format (Holtham, Slattery and Watson, 1990), which could, with only minor

amendments, serve as the basis of the new business simulation, entitled Trent Engineering, and based on a valve manufacturing company in the English Midlands.

Training

The first major hurdle to overcome was training some 200 students in routine use of the workstations, particularly electronic mail. Their initial brief introduction in October had in most cases been insufficient to develop actual skills, and many had been deterred by the unfriendly mail system then used.

Work started in December to develop new training material, based around a 2.5-hour "crash course." Two pilot sessions were held with students in the week before term started, and even further simplification and focus was made, plus the development of a worksheet which literally showed step-by-step what to do.

The great bulk of students were trained over five sessions in weeks one and two of the term. Positive feedback resulted from these sessions:

1. The groups were "streamed" by self-selection into more PC-literate and less PC-literate. Although in practice there appeared to be relatively little difference between the two groups, students clearly perceived they were being allocated to an appropriate level of class, and this perhaps improved their confidence before they even started. With four to six tutors per class of twenty to thirty students there was a reasonable level of direct moral and physical support.

2. Much had been learned from previous experience about how to teach the workstations both in detail, and by setting their use within an overall environment. In detail, the worksheets had been redesigned so students in a large class could work at their own pace to some degree. Also, it had proved impossible, for technical reasons, to project the workstation image on a large screen monitor; therefore, a video camera pointed at the tutor's workstation screen, which could be connected to the large monitor screen, was used. Despite flicker and the illegibility of much of the text even on the large screen monitor, this at least gave a reference point to students. High-quality OHP slides were made of points requiring detailed explanation and reproduced in the worksheet.

The pilot sessions provided good insight into what students actually found useful. They wanted not only to use the workstations in themselves, but also to see how they could be an adjunct to their home PCs. In this respect a PC was used in the class to simulate a student's home PC, and output from that was saved to floppy disk to be either mailed from the workstation or used as input to WordPerfect and then either printed on the network PostScript printer, and/or mailed.

3. Use of e-mail was compulsory in the Core Computing course. There was relatively little interest in using mail when it was not a necessity to do so.
4. The mailtool mail front-end proved not only easy to use but even quite popular.
5. For some students the prospect of e-mail to other universities nationally and internationally was very highly valued, but the problem of discovering remote e-mail addresses quickly (and other than by phone or mail) became a disincentive.

THE TRENT ENGINEERING CASE STUDY

At first sight the Trent case looks like a conventional business case study, with a written case description setting out the background to the company, its personalities, problems, and opportunities (Holtham, 1992). The case is indeed rooted in the "classic" case study tradition, and the underlying content is no different from a more conventional case. Trent Engineering is a company faced with a number of difficult strategic and operational problems, many of which in fact impinge on information technology potential and problems.

There are, however, major differences in presentation and processing of the case material, because the case is essentially rooted in an electronic infrastructure, with a particular emphasis on the use of electronic mail for communication between the instructors and students, (and vice versa) and between the students themselves. Of critical importance is the executive chairman of Trent Engineering's (Dr. Peter Green) method of working.

Dr. Peter Green

In the case, Green was educated as an engineer and became a lecturer in engineering after completing his Ph.D. He moved to the United States to teach, but then took on an increasing amount of business-related consultancy, eventually leaving the academic world to become a management consultant to poorly managed U.S. engineering companies. He then took an M.B.A. at the MIT Sloan School of Management.

Green spends a considerable amount of time traveling within the United Kingdom and internationally. Although Green is a full-time executive chairperson, as a result of his large amount of time away from the company offices, he has decided, for the moment at least, to allow the executive directors to create and allocate roles among themselves, in particular: the managing director, finance director, sales and marketing director, and the production director.

These four posts constitute the current management team of executive directors of Trent Engineering, and students in their groups allocate themselves to the roles.

Green has made it clear that if they are not able to change their approach they will be early targets of an efficiency savings program.

Communicating with Dr. Green.

Dr. Green can be very difficult to get in touch with. He usually attends the Friday morning meeting of executive management but this is the only time board members can see him. However, despite his physical absence, he is a very active communicator both inside and outside the company, generating large quantities of typing and numerous memoranda, notes, and phone calls, especially to the directors.

When he was working in American universities and consultancies, he became a user of electronic mail. When he arrived at Trent, he immediately instructed the IT department to install an electronic mail system. A system that was already in use for some staff was chosen, based on a UNIX minicomputer. This is accessed over the company network and can also be accessed by dialing using a modem.

Green has particularly requested the executive directors to use e-mail to receive communications from him and as the normal method to reply to him. This has not been popular with the executive directors, some of whom had limited experience using PCs, but no experience with a network.

Basic Operation of the Case

Students are allocated into groups before term starts; groups must reflect a mix of disciplines/backgrounds and require a core of at least four full-time students (part-timers and occasional students must be additional). If it were a course where all the students were part-time, it would be essential to try to ensure that there are at least four students per group with the resources and skills to participate actively in the case.

The case description and case instructions are issued in paper format in the first week of the course, and an oral briefing is given at this time to set the scene, explain the marking system, etc.

The case description looks complete but is not. The whole point is that further information about the company emerges gradually week by week, sent by the case administrators by e-mail. It would be possible to dispense with the written case and instructions entirely, but this will not necessarily create immediate confidence among the less IT-literate students.

The Nature of the Information Provided

The information provided electronically falls into several categories:

Actions. Actions are a specific instruction to be carried out in a defined time scale. This is the marked course work. These relate to subjects being taught in the parallel lecture course, (e.g., how to design more effective systems, whether executive information systems need to be developed, how the IT-related skills of the company could be improved).

Relevant Background Information. This material provides relevant data about

the organization, its environment, people, or problems. Relevant background information may well be a prelude to a later action.

Case Administration. There are a variety of ad hoc matters relating to the procedure of the case that are independent of the actual "running" of the company (e.g., location and timing of briefing sessions).

Noise. A proportion of the communications are in fact irrelevant to the specific areas to be covered; students are not, however, able to tell at the time whether an apparently irrelevant issue will turn into a subsequent action.

Team members need to share information (quickly) to be able to carry out the case study (or even to know what the questions are). Some information may be sent to every group up to every three days during the specific periods.

Students only have to respond to "actions" by using one of the following:

- e-mail to specific mailbox, confirmation of receipt or substantive content
- paper to specific staff member
- attendance at a meeting (e.g., all forty students, one from each group, at a particular time to get oral briefing)

Communications

Some items are communicated simultaneously to all students in the whole class. Others are only communicated to one member of each team. Different members of a team may receive information about separate parts of a problem. Teams that are poor at intercommunications will be at a disadvantage.

It is not essential or even necessary for the case administrators to know the formal role of each team member. Mailing lists can therefore be created arbitrarily so that communications on a given day are, for example, all sent to the first person listed in the group schedule. The ability to create a variety of different mailing lists is a powerful feature of a mail-enabled simulation.

Briefings and Videos

Briefings can be given via the case description (paper), the content of e-mail (electronic), or oral explanations (oral).

However, a potentially powerful medium for communicating a large quantity of information is a video. At the time of writing, three videos were available for the case representing Peter Green, executive chairperson (new broom); Derek Latham, group chairperson (group policy); and George Goldie, director (seasoned skeptic).

One of the advantages of the video is that softer, more subtle information can be given than is possible in a case. The videos were made to a specification, but the interviews were not scripted as such. The participants were expected to behave as the "characters" they represent and each of the participants in the video has actually held roles similar to that of their character.

The Haste LTD Business Game

By the third week of the course, groups were asked, in addition to their mail-enabled exercises, to work on a more conventional business game, using the Plan-It software from Understanding Systems Ltd. In the case, there was a subsidiary of the group called Haste Ltd., and the group chairperson had asked the directors of Trent to rework some of the previous management's decisions using the business game software.

In practice, the Haste exercise took on, in many student's minds, a dominant position, and many groups spent too much time on this exercise, perhaps because, being quantitatively orientated, it appeared to have specific correct answers.

Lessons: Prerequisite Infrastructure

The case, as written and used at City University Business School, has a number of essential technological prerequisites. All these features may not be easy to replicate in other environments, but the case may be adapted to fit within local constraints.

Adequate Communications Infrastructure

The case is predicated on access to an electronic mail system, with terminals or PCs in a quantity and location that make them convenient to use for both students and participating staff.

Individual Computer IDs for Each Student

It is very important in the case, as developed, that each student has an individual computer identity number (account/user name), so that mail can be pinpointed to individual students and also sent from individually identifiable student accounts. Since there is an individual element in marking, this tends to increase the significance of specific pieces of work being identifiable to that individual.

Software Ease of Use and Reliability

It is an absolute prerequisite that the electronic mail software be reasonably easy for the target student group to learn and to use and to offer a reasonably high degree of reliability. If the mailing system in use is archaic and/or oriented toward the needs of highly computer literate students, then the learning process will be one of considerable frustration for the business student, and valuable time will be wasted on technicalities which should be devoted to business thinking. The same applies to reliability. An unreliable system or one with very poor response times makes the whole exercise burdensome, a chore, time-wasting, and counterproductive. One of the aims of the case is to shift thinking about IT and encourage its creative use in business.

Adequate Training Capability

Most business studies students are, at the time of this writing, unskilled in the use of e-mail. Some have been users of electronic mail systems other than the system chosen: they face a "relearning" curve which may be just as steep as that of initial learning.

Much depends also on the general skill and hardware environment. If the students have a background that is 100 percent rooted in PCs, they may react negatively to the use of dumb terminals, for example, irrespective of the software in use.

An institution may have a general training capability in computing and electronic mail for students, but this has to be checked to ensure it is relevant to the expertise required for the Trent Case (reply to and compose simple e-mail messages) as opposed to more general, more expert, or more specialist needs. Since there is relatively little time available to teach business students the mechanics of computing, it is essential that this be done as quickly, relevantly, and effectively as possible.

Adequate Support and Advisory Services

The case as developed is fairly challenging to the computing services of the academic institution, because it may involve a large number of relatively inexperienced (in IT) students simultaneously using network and mail services with which they are not familiar.

Tutors will need support to develop and test both the case and supporting training and information materials. After initial tuition, it is also inevitable that some students will need continued advice and support. A major aim of the case is to ensure that students provide that support to each other; however, there is an inevitable minority who find the technology a barrier.

Adequate Computer Literacy of Instructors

Since the case is e-mail based, all instructors involved must, as a minimum, be able to use e-mail themselves, and ideally should be confident in file upload and download, and possibly access via a modem.

A subset of the instructors needs to be substantially computer-literate to provide academic leadership in the business use of IT, and to be able to deal with the inevitably broad range of student queries (and at least to know to whom some questions should be directed).

Because the case as developed involves a variety of software and remote databases, the functionality needs to be thoroughly tested before it is released to students, and this can be a lengthy and time-consuming process, especially when the case is initially developed.

Adequate Academic Resourcing

Due to the nature and incidence of interaction with students, this approach needs a more varied and greater volume of academic input. It requires several

staff (two at the very minimum) to be involved, and even if some lecture time is eliminated or reduced, being able to marshall and sustain these resources is not a trivial exercise.

Infrastructure and Resources

A fairly elaborate and fairly interactive case study of any type, computer-based or not, is more demanding of an institution than any more traditional approach.

Certainly at the time of writing, a computer-based exercise adds further dimensions of complexity and resources. Even though it permits high-speed activity and can actually totally eliminate paperwork in certain areas, it requires a focused effort over many weeks of both preparation and delivery.

It is not the intention here to deter potential instructors either from this case or from devising their own. But it needs to be recognized that computer-based teaching methods are rarely a source of savings in staff effort, certainly when under development. Traditional lectures, especially where not amended from year to year, remain the least-cost approach in most areas. The idea behind more experiential and group-based work is to increase the quality of learning, and this is the goal that an innovative delivery method can address.

EXPERIENCES AND FEEDBACK

Feedback partway through the course and observation of students in groups showed some preliminary experiences:

- Students tended to print out hard copy as soon as they received their mail. This meant that usage of the network printer was very heavy, indeed far in excess of normal capacity.
- The distinction in roles between academic and computer support staff often appeared unclear to students; academic staff were queried on detailed technical problems, and computer staff were often asked for extensions to course work submission dates.
- The computer laboratory used offered too little space for effective group work.

Overall, an intensive exercise of this sort places severe demands on the university's network infrastructure. No one, it would appear, had ever tested the electronic mail system with such student numbers before. A fault was discovered in the mail system's software. When mail was sent to more than fifty people in a single mailing list, delivery was unreliable or failed after the initial fifty. Not all students saved their own mail, despite warnings to do so. Intensive use meant a few workstations became faulty. There were recurring problems with a printer, exacerbated by heavy use.

None of these would probably have been serious in themselves, but with a large group of highly stressed MBA students, any infrastructure failures that impinge on their ability to complete coursework causes strain and tension. In this context, minor technical problems are rarely trivial.

The single most vocal complaint in the early part of the course concerned the groups. Groups were not self-selected, as was school practice in Term 2. A noticeable minority of groups had some problems at a basic interpersonal level, and the level of tutorial monitoring and support was insufficient to deal with every case that needed help.

In the light of the student feedback on workload, and the greater-than-planned time spent by students on it, it has been decided to separate the Haste Ltd business simulation out from the Trent case study; this will probably be used in Term 1 in another course.

Although there had been strong pressure from students for more experiential learning, in practice some students found the uncertainties associated with a nearly real-time case study very different from what they had encountered in other courses and in other pieces of group work. It was not possible to plan much in advance, and there was a premium on excellent and fast communications within a group. Where the latter did not occur, frustrations began to build up.

Despite all the "teething," technical, and group problems, the overall evaluations at the end of term were favorable, with a marked increase in rating over the previous year's lecture-only course.

The major decision made as a result of the feedback, and of the staff's own evaluations, was to shift a significant proportion of the dissemination of material from the electronic mail system to a City University Bulletin Board and Conferencing System. Certainly in our environment, mass publication of material for large numbers of students is more appropriate through such a system. Mail will continue to be used for targeted mailings to subgroups of students and for student responses to staff.

AUTOMATE OR INFORMATE?

It is increasingly well-established that in the business and public sector environments, a great deal of computerization has simply replaced existing manual systems with computer-based ones: this can be described as automation. Several commentators, most notably Zuboff (1988), have argued that to achieve the potential benefits which could accrue is not enough. What is needed is not just to automate business processes but to reconstruct them in the light of the new technological potential: this is a process she describes as "informating."

The university sector and indeed the educational sector generally in the United Kingdom has been very heavily orientated towards the use of IT for automating existing educational processes. For example, the then Computer Board funded a Computers in Teaching Initiative in 1989, and a center specifically devoted to

accountancy and business studies was set up. A journal, an annual conference, and regional events have developed from this. It is clear from these publications and events that there is an often enthusiastic minority of management education academics who are actively using or considering the use of information technology, but that much of this is automating-type activities. There are very few examples which go further.

There are some notable exceptions. A pioneering and particularly imaginative use of remote databases accessed via the United Kingdom academic network (JANET) to support the teaching of quantitative methods in economics has been created by Burley and Mabbett (1991). The Proteus simulation clearly developed a new approach to simulations. But these are essentially isolated examples.

THE DEVELOPMENT OF BROAD-BASED BUSINESS SIMULATIONS

In 1983 the Computer Board carried out a review of computer needs in universities over the following decade. The review painted scenarios of an "advanced" university in 1992 (Computer Board, 1983):

> New tutorial and simulation software is produced by small teams including lecturers, computer center programmer/analysts and educational technologists. . . Students studying vocational subjects (engineering, accountancy) use the communications network to use and carry out project work with contemporary applications software. . . In such an environment we envisage that all students would use their computers regularly to send and receive electronic mail, to house the library catalogue for source books in relation to their current studies, to write essays using word processing software, and to answer tests set on their courses.

The forecast was remarkably accurate in many respects, but overemphasized the degree to which students in subjects such as accountancy and business studies would be using networked services, even in the more "advanced" universities. A major part of the problem in the United Kingdom is that many business studies academics, even in leading business schools, are not physically connected to campus and hence national networks and thus are unable to develop suitable course material (Holligan, 1986).

ELECTRONIC CLASSROOM SUPPORT SYSTEM

After the Trent case had been completed, the tutors involved discovered from Internet discussion groups and their archives that Ralph Lewis, an academic at

California State University, Long Beach, had already been developing many of the concepts that had been worked on in the Trent Case Study.

Lewis's Electronic Classroom Support System (ECCS) is based around use of both electronic mail and bulletin board systems and represents a very significant use of electronic networks in teaching MBA courses:

> An electronic classroom support system has been developed based on Internet and CSUNET communications. It provides the student with online resources to select topic assignments, conduct bibliographic literature searches, access remote information servers, prepare written reports, review and comment on others' reports, conduct peer evaluations as well as receive input and feedback from the class instructor. A CoSy conferencing system is also utilized in a virtual work technology mode to provide the students with the experience of working in a decentralized, project-oriented, collaborative and distributed organizational environment. (Lewis, 1991)

FUTURE DEVELOPMENTS

It has been decided to apply the same approach to undergraduate teaching, but using a different case that is currently in preparation; it is not based around group work and follows the second-year Business Studies Information Technology syllabus. This case is called Sphere Consultancy. Support has also been obtained from several overseas business schools to organize collaborative case studies between their own students and those of City University Business School. Much depends in these circumstances on the communications infrastructure available. The simplest available is electronic mail. More advanced in the use of the Internet and direct log-on to remote machines (e.g., via telnet).

A longer-term objective of creating a more comprehensive "artificial environment" remains. Ideally this would be based on real company data, not at the relatively abstract level usually associated with business games, but literally in full detail—all transactions for a medium-sized company for a significant period (e.g., up to two years). This would be accompanied by as much softer data, including electronic and paper mail, as possible. The most feasible method of developing such a data resource would be as a national facility, accessible over the academic network. Such a resource would be valuable not only in learning about business information systems but also in many other business studies subjects.

Creating and developing the Trent Engineering case study was never easy, especially in the time scale available. In hindsight, the aims were perhaps overly ambitious and the staff input greater than expected. But the exercise was valuable for students (as shown in their assessments), and staff members have learned a considerable amount about how to use technology in the lifelike learning of technology in business.

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Paper 6:

Rich, Martin (1999) "A learning community on the Internet: some lessons from using the web" AMCIS conference, Milwaukee August 1999

A Learning Community on the Internet: Some Lessons from Using the Web

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Background

The starting point for this paper is the case study exercise, carried out by postgraduate students in different countries, described in Hacker et al (1996) and Rich (1997). This exercise used electronic mail as the principal method of communication, although there it was reflected in the evaluation of the exercise that e-mail was losing its attraction as a novel technology to use. Since the above papers were written, some work has been carried out to adapt the exercise to using the world-wide web, and this paper examines some lessons from the experience. It also places these lessons in the context of current ideas about the future of higher education, especially in Britain.

To recap the background, the exercise uses a case study about an instance of possible sexual harassment in a bank in California. This case was chosen as being topical, and also as being a case where different viewpoints would prevail in different countries. Students from Britain, France, on occasions two different parts of the US, and on one occasion Finland, entered an open discussion of their views of the case. Particularly they were asked to discuss whether there might be grounds for accusations of sexual harassment, and the reasons for their decision.

The staff organising the case study occasionally made contributions to the mailing list, for example:
- To raise particular questions which arose from the discussion
- To draw attention to topical issues, and sometimes to quote relevant articles from the press
- To avoid the discussion from deviating too dramatically from its intended course
- To put forward the view of one or other of the characters described in the case.

Different sets of participants approached the case in different ways. The approach chosen for the British students was influenced by a need to encourage teamwork and reflection as part of the learning process. So the students taking part in the case study worked in a number of teams. Each team was asked to look at a particular aspect of the case, or the discourse, while its members contributed to the open discussion. Examples of topics that the teams would look at were:
- International differences: how different would the case be in a different country?

- Information and knowledge in the case: how much was information being used as a source of power by the characters in the case?
- Using the electronic network for discussion: how different would the discussion have been had it taken place face-to-face?

At the end of the exercise the teams were asked to present their findings, on their particular topics, to the whole UK-based cohort of students.

This worked well because it involved the students in a form of action research, by analysing their own use of the Internet, and because it added some tangible value to a course that was primarily taught face-to-face.

Progress after 1997

In 1997 the use of a web conferencing system, as an alternative to electronic mail, appeared an attractive approach. A number of tools available in the public domain were investigated, including COW (Klavins, 1996) and WWWboard (Wright, 1995). These both adopted the approach of providing scripts which could be loaded onto a university's web server. An alternative, which placed less of a requirement on users to install their own web conferencing system, was to use a public access system such as Internet Classroom Assistant, or ICA (Nicenet 1997), and the first attempt to use web conferencing for the case study used this approach. ICA allows any user to visit a web site and to set up a discussion forum of their choice. A further advantage of this approach was that it overcame any resistance from the administrative departments in the various universities, responsible for providing the computing infrastructure.

Unfortunately this approach did not work well for the students based in London. There were serious problems in using ICA because of the interaction of the proxy and cache servers, used to connect the UK academic community to the rest of the Internet, and ICA. Technically these were not insuperable, but they would have required more resources than either the university or Nicenet, a non-profit organisation, was able to devote to the exercise. Although the London-based students were able to observe the discussion, their active participation was very limited.

In the succeeding year, a different technology was used, and again there was some difficulty in involving the students based in London. This time the difficulty was pedagogic, not technical. The students' syllabus had

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expanded and now included a further exercise which used the world wide web. The Internet-based case study became a less important part of the course than it had been before, and in particular the group presentations had to be dropped from the course. Students were still invited to join in the discussion, but none took the opportunity. McConnell (1991) described a management learning exercise where computer conferencing was an integral part of the students' assessment. It appears that the need to include an exercise in the assessment, if students are to participate, still applies.

Therefore in two successive years a web-based version of the case had not been widely used by students. While there were (different) external reasons for this in each year, the effect of this is that there is little evidence to support the use of the case with a web discussion. So it is an appropriate time to review the educational context and the fundamental reasons for using the case.

Why Use an Internet Case Study?

Two fundamental ideas underlie the original decision to use an Internet based case study. These ideas could be developed into hypotheses about where new technology can be used to assist face-to-face study:

- The technology needs to add value to the course in a tangible way, not possible without using new technology (in this example, by adding an international dimension)
- Electronic media such as the world-wide web should only be used where both pedagogic and technical prerequisites, which can be identified are in place. Without these, other more traditional media may be more appropriate.

Much of the work carried out in the use of technology in education addresses areas, such as distance education, where there are clear outcomes which can only be reached using new technology. Hiltz (1997) is optimistic about the scope for use of *asynchronous* learning networks – of which the e-mail list used here is one. Significantly, she warns against the idea that the use of asynchronous networks is a cheap approach to delivering education.

The Context Within Higher Education

In Britain, recent policy decisions in higher education have been influenced by a major national report into the future of the sector (Dearing, 1997). There is much in this report on the application of information and communication technology. Some of it is to do with cutting the costs of delivering learning to a large number of students. But new technology is also seen as a way in which new technology can expand the scope of higher education. This is more than an argument for distance education: it means that education could become more inclusive by allowing university-based students access to
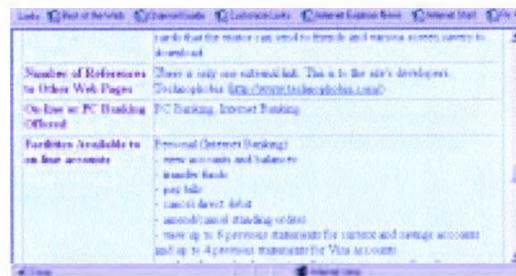
resources outside the hours they spend at the university, and it also means that UK universities need to compete in a global market. Kobrin (1998) describes how this global market affects people in employment, and business schools in particular need to prepare their students for such an environment.

There are also trends in educational thought, which Dearing alludes to, which emphasise the importance of collaborative work, and technology as a tool for collaborative work. Moll et al (1993) develop Salomon's concept of learning as a distributed process between different people, with some interaction which could be fostered by new networks. Use and discussion of a case study encourages reflection among the students. It is not only educationalists who favour reflection as part of learning; Plender (1997) puts forward a series of ideas about stakeholding that have attracted attention from political thinkers of various convictions. These ideas, which aim to avoid excessive short-term thinking, especially in business, depend partly on fostering a culture of collaborative learning.

Sandbothe (1998) puts the use of new networks for learning into a philosophical context, and suggests that time will become less important in the future as a characteristic of the learning experience. This works in favour of new technology, but perhaps not in favour of a case discussion which is very dependent on a sequence of topics being raised over a certain period of time.

Thoughts for the Future

The conditions, then, are still very favourable for running a case using an electronic network. The case still adds tangible value, and the international dimension is perhaps more topical than ever. Furthermore the MBA students, who were the first UK participants in the case, are still active users of the web for learning, notably by putting some of their own findings into a database which is accessible over the web, as shown in the screen example below. The unsuccessful web discussions were hampered by specific problems to do with the technological and pedagogic environments.

However, it has become difficult to separate the technical environment and the pedagogic environment. When the case was initially introduced, the technical environment, implied the need to provide sufficient training in using e-mail. Now the technology is more embedded in the students' experience. Few need any training in using the Internet or PCs specifically for this exercise. But the greater familiarity of the technology has also added to the expectations that students have.

Nevertheless, it is as difficult to transfer an exercise from one medium to another as it is to transfer from paper to electronic media. There is a paradox that the case study, in its web version, only looks a failure, so far, from the British side and so to categorise it as a failure is really an example of lacking understanding of other cultures' experiences. This is exactly what the case study set out to avoid, and now it is being repeated with a different set of (undergraduate) students.

One more reflection on the conclusions drawn in 1997. At that time it appeared that electronic mail failed to arouse interest among the students, whereas the web seemed novel and attractive. Now the web has become such a familiar part of the students' lives that pure web browsing – that is, simply looking through pages without providing any input – also lacks excitement. A sign of this is that the proportion of students with their own Internet access, independently of the university, increased from 35% in 1996 to 95% in 1998. Both of these figures were based on polls take when students first registered, and anecdotal evidence is that the proportion with Internet access increases during the year.

Conversely the idea of following a case study discussion, with students elsewhere in the world, over some time still has an attraction in its own right. But also, the simple browsing model (you *pull* information out of the web rather than having it *pushed* at you by e-mail) is very important in *building* a critical mass of use of a network. But the evidence of commercial web sites is that some more interactive communication is necessary to *sustain* use of the web. So e-mail, as an interactive medium, might actually be more appropriate for this discussion. In fact Netscape's 'Collabra' approach, which is now being used for the case study, is based on a Usenet newsgroups – a longer-established technology than the web, although the discussion can be reached through a web page by most users.

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Paper 7:

Rich, Martin (2000) "Teaching and learning about the virtual organisation" EDEN research workshop, Prague, March 2000.

TEACHING AND LEARNING ABOUT THE VIRTUAL ORGANISATION

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Introduction – Background to the Virtual Organisation Course

During the last year a number of students at City University have had the opportunity to take part in a new elective course on the Virtual Organisation. This fits within the final year of a degree in Management and Systems. The new elective course has been taught through innovative methods, including visits to places where ideas of virtual work have been put into practice, and a series of collaborative exercises. There is an emphasis on encouraging the students to be reflective throughout the course.

As well as giving the students an opportunity to learn about some topical issues, this course allows the university to review where some of the ideas of open learning may be used in a city-centre university. Initially the aim was to use the principles of *action research* as part of the students' learning process: students would study virtually as a way of learning about virtual work. The innovative nature of the course, together with some of the results, is described in this paper.

Learning objectives

The term *virtual organisation* is widely used in business (Lipnak and Stamps, 1997; Savage, 1996), and the principal learning aim of the course was to identify exactly what the term meant, and what opportunities it offered to businesses.

To achieve this aim, the following detailed objectives were identified:

- To investigate a number of alternative definitions of 'a virtual organisation'

- To take a series of case studies, and look at the strategies that they have followed by becoming virtual organisations

- To set virtual organisations in the context of a changing business environment

- To identify the key technologies that enable organisations to operate virtually

- To identify what characteristics are necessary for virtual work to be introduced successfully in various fields.

A series of case studies offered a promising approach to learning about virtual organisations, and the business school had already collaborated with Shotlist, a supplier of educational video tapes, on a tape about virtual work. For this tape a number of examples had been filmed, and these were used to create a set of central case studies for the virtual organisation course. In the spirit of action learning, the student were encouraged to use this as a way to develop further case material themselves.

Relevance to Other Courses

These efforts have focused on the delivery of one new course, but there are some urgent issues that need to be addressed. Business schools in Europe have always competed with those elsewhere in the world, but there is a new generation of international business schools, such as Pensare, and Unext, which use new information networks to provide a global presence. These organisations have some very prominent supporters: for example one of the sponsors of Unext is the London School of Economics which is an extremely strong brand world-wide.

City University has a particular advantage because of its location in central London, and it is tempting to dismiss institutions which are based on distance learning, as not being serious competitors

However there are plenty of examples from outside the academic field, where market leaders have been toppled by new competitors who were *not* regarded as serious competitors when they started in business. Christensen (1997) describes how this can happen, and his examples include the demise of the traditional minicomputer manufacturers.

Christensen describes how the manufacturers of personal computers improved their products, so that they were able to colonise much of the market previously supplied using larger computers. There is a clear analogy with the possibility that new entrants might build their reputation in distance learning, and then expand into traditional, face-to-face, learning.

The challenge for established business schools is to provide a model of teaching and learning which can compete with these new entrants; this model needs to build on the strengths of existing schools but it also must entail a move away from traditional lectures. This course is one example of how such a move could be made.

Structure of the Course

City University uses three-hour sessions as an important unit in timetabling, so this course was formally set up as 30 hours of contact time: one three-hour session per week for ten weeks. However a deliberate decision was taken not to include more than one hour's formal lecturing in each week. One aim of the course was to move away from an assumption that students needed a lot of contact time if they were to feel that they were getting value for money.

A typical session within the course was structured as an hour's introductory lecture, followed by either some group work, or a guest speaker. One week was devoted entirely to a visit away from the university (to the Waterside office used by British Airways), and another week included a visit to the innovative Open Learning Centre within City University. The orientation of the course was very practical, so that the students concentrated on real examples of virtual work. These examples were taken from a wide enough range of organisations and contexts to emphasise that there is no single definition of virtual work, and few clear rules as to when a virtual approach might be appropriate.

In one session students were encouraged to reflect on the structure of virtual discussions – building on the idea of the reflective practitioner (Schön, 1995). One technique for this was to use a *speech act* approach to discourse analysis (Vinograd and Flores, 1986): the students practised this approach on face-to-face discussions during the class, and then applied it to a virtual discussion using a web-based conferencing system. Students were also encouraged to look at examples from their own experience – this was particularly relevant as many of them had spent a year in industry as part of their studies.

Initially the objective was to limit the number of students taking this course to 30 participants. In the event a much larger number of students expressed an interest and 45 were registered for this option. This larger number of participants, compare to the original plan, meant that it was essential to limit severely the amount of formal lecturing.

Experience through presenting the course

As this was a new course, a considerable amount of preparation was needed for each week's session. Although the basic structure was determined in advance, the exact content, and the contributions of some of the guest speakers, was determined as the term progressed. Also the number of participants exceeded the number expected, so some elements of the course needed to be modified to accommodate this larger group of students.

Some of the case studies discussed in the initial planning were not eventually followed up. For example the Eurotechnopolis initiative inspired by Ettighoffer (1992) was included in the original plan. In the event, two visiting speakers agreed to talk to the students about telework – which is a large part of Ettighoffer's field – and it was felt that a further telework example would have made the course less balanced.

The participants on the course came from two separate degree programmes, because students taking a BSc degree in Business Studies were allowed to join in with options, such as this, which were part of the BSc Management and Systems degree. When the students gave presentations within the course, they often reported that the Business Studies students had quite a different working style than the Management and Systems students: those on the Business Studies degree had a very strong grounding in marketing and finance, but were not so experienced in group work and in reflection on their own work.

Assessment of the students was by both coursework and examination. The coursework comprised three short, related, essays about virtual work. One required students to focus on a particular technology and how it could encourage virtual work. One required the study of a particular rôle in business and the scope for filling this rôle virtually. One required the study of a business process in the light of the previous two exercises.

Because of the practical nature of the course, the examination was based around a case study, distributed to the students in advance.

Evaluation

Questionnaires are used to gather students' opinions of the courses at City University. The overall rating by the students from the Management and Systems degree programme was 4.5, on a scale from 1 (low) to 5 (high). The principal criticism was the lack of convenient notes, although a course summary and much supporting documentation was distributed and was also made available via the Internet using PDF format.

The basic structure of the course is proven and it is planned to run the course with the same structure in future years. Inevitable, because of the rate of change of the subject, the course will need considerable revision from year to year but the use of a mixture of teaching styles, and the opportunity for students to practise virtual work, have proved valuable and will be retained.

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Paper 8:

Holtham, Clive and Rich, Martin (2001) "Barriers to academic take up of computer mediated communications and video technologies – the comfort factor" technology in education and training (TET) Prague, May 2001

Barriers to academic take up of computer mediated communications and video technologies - the comfort factor?

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Context

This paper is written in the specific context of higher education in the United Kingdom, although it also draws on materials collected at a workshop conducted for business school academics internationally on behalf of the European Foundation for Management Development. The UK context involves universities being formally assessed by external academic auditors (Quality Assurance Agency, 2000). This involves being assessed under six categories: subject provision and aims; learning outcomes; curricula and assessment; quality of learning opportunities; student achievement; maintenance and enhancement of quality and standards. One of the key questions asked in relation to curriculum is:

> *Is there evidence that curricular content and design is informed by recent developments in techniques of teaching and learning, by current research and scholarship, and by any changes in relevant occupational or professional requirements?*

Overtly, this question is geared to ensuring that the practice of teaching and learning is not static, but informed by contemporary developments in teaching and learning research and practice. It also emphasises the changing needs of a key group of stakeholders, in occupations and professions. Yet in reality, the pace of implementation of technology-based learning in the UK has been much slower than the pace of technological development and innovation. There are many factors which have influenced this relatively slow pace of implementation. Liber (1998) takes a broad-ranging pessimistic view:

> "Despite central funding and considerable effort, learning technology has not yet achieved its promise in UK Higher Education (or elsewhere). The reasons for this are several: unlike journal papers and other texts, there is no incentive for computer based materials to be produced; there are no recognised standards for computer based materials, thereby preventing materials from different sources to be incorporated into each other in any sensible way; searching and finding appropriate materials is a hit and miss affair with current searching mechanisms; different learner profiling and management systems are incompatible with each other, preventing information sharing across institutions; and these are also incompatible with university record systems.

Focus and overview

One key factor which slows down implementation is only indirectly touched on by Liber, namely the attitude of the educator to change, specifically to changing their own

pedagogic approach and day-to-day working practices, improved incrementally often over many years. So first we review the literature relating to organisational change.

This paper then focusses down further on one specific barrier to change, namely the need to develop new skills in personal use of technologies. Two contrasting applications are drawn upon. The first is the move to support face to face courses with offline, asynchronous learning resources and communications. The second is the move to teleteaching via video-conferencing from the office desktop.

One key finding from this analysis is that academics need to feel "comfortable" with the technology involved, and preliminary indications of how to achieve this are put forward.

CMC and Videoconferencing

Computer mediated communications (CMC) has a very long history, indeed educational use preceded and informed the subsequent development of commercial conferencing systems. (Hiltz and Turoff, 1978). It was well established for distance learning during the 1980's (Mason and Kaye, 1989), and has subsequently evolved into a method that is also used by face to face students, not only for distance learning (Holtham and Tiwari, 1998). The single-focus CMC software packages are being augmented or even replaced by what are claimed to be comprehensive Virtual Learning Environments (VLE's).

In her landmark work on e-moderating, Salmon (2000) lays very considerable emphasis on the training of prospective moderators, and draws heavily on her own experiences in this at the British Open University. Their training programme required ten hours study by the tutors, using a similar five phase approach to that developed for actual student use – welcome, induction, teaching, knowledge construction and development. Three types of novice were identified – swimmers (confident), wavers (slow but enthusiastic) and drowners (unmotivated complainers). Her checklist for training e-moderators runs to no less than 21 items, with a heavy emphasis on practicing, on use of the technology itself as the main delivery medium, on flexibility to e-moderator skills and availability, on process discussion, and on continuing support after the initial training.

After pioneering research and development work (Dickson, 1974), videoconferencing began to become more widely available in the 1980's (Ehrenburg, 1985), with still wider but finite adoption in the 1990's (Schaphorst, 1996). A particularly interesting study is that of the University of Ulster (Dallat, 1992). This is partly because Ulster was an early adopter of video in the 1980's, but mostly because it is a detailed and fairly honest review of the impact of videoconferecing on academics in particular.

"Content transmitted by tutors to students seemed comparatively unchanged from conventional teaching input"…"
"The experience of teaching by videoconferencing initially became draining.."
"the advantages in using videoconferencing for teaching and learning are pragmatic rather than pedagogical"
"the use of videoconferencing affects styles of teaching more than patterns of student learning. Videoconferencing challengers the teacher more than the learner."

The Ulster study specifically refers to Ehreneburg's term "technostress", and includes a depressingly long list of both technical and environmental features that can detract from videoconferencing, with a very major emphasis on sound quality at both the near and remote ends. Its list of classroom requirements will be familiar to anyone who has been using videoconferencing outside a fixed studio context:

"Each video conferecing classrooom should have: small window in door, wall clock, clear labelling of control buttons, booklet of instructions, loudspeaker telephone and fax, including necessary extension numbers."

Rationale for Focus
We have selected CMC and videoconferencing because:
    - each has great, but largely unfulfilled potential in higher education learning
    - we expect each one to raise a different set of issues
    - in due course we foresee some convergence between the two, so that the videoconferencing is just another service which fits into the discussion group.

Some universities such as Georgia State University are already achieving convergence by building real video into their WebCT system, though they are deliberately keeping their use of both underlying technologies as simple as possible. London Guildhall University have been using videoconferencing for professional courses for the insurance business, partly because a key financial services customer is based in Norwich.

A major barrier to many in videoconferencing is that even today the equipment to do team videoconferencing is elaborate to set up. One university reported to us "that on several different occasions we can get video to work but we can't get sound to work - notably I'm afraid with our external collaborator who is *very* willing to help with providing another end, but where we haven't been very good at getting both ends to work."

In both these cases videoconferencing was introduced to satisfy a very tangible market. For Georgia State there was a tangible market for videoconferencing from being based in a big city at the centre of a vast, rural area with a big regional audience for distance education. We also felt it may have related to Atlanta's aspirations to being a 'world-class city'. For London Guildhall it was simply the existence of the market for videoconferencing in Norwich.

Georgia State use RealAudio which is a simple, easily accessible, standard. It is also a good illustration of the extensibility of the Internet because students can watch real-audio as soon as they have downloaded the package as a plug-in to their browser. London Guildhall have one classroom set up as an extremely simple video-conferencing suite.

Videoconferencing, so far, is hampered by the complexity of much of the equipment and, in the UK, the slow take-up of ISDN and things beyond. Simple, portable, videophones make it easier to set up but it is still seen as a daunting technical task.

Discussion groups as an adjunct to a conventional course are relatively easy to set up. The barriers here are to do with recognising where such tools fit into a complete course, how they can complement other ways of delivering material, and also choosing a suitable platform to use and sticking to it. One of the concerns with one course we reviewed was that in practice several different platforms were used because some of the students set up discussion fora themselves in advance of the university-provided fora being available.

In another instance there were a group of part time students funded by their companies. These were keen students but with the added incentive that they were allocated a few marks for their contribution to the discussion board. Here are a few tangible findings:

- The students didn't, on the whole, like the user interface for the discussion and there was a lot of adverse comment on specific points. It contrasted unfavourably with some used by their employers
- A lot of the students already had some experience of using discussion groups, and one or two posted examples of good practice which they had encountered
- There was a sense that a single discussion forum for 50+ people didn't work very well, but at least satisfied some sort of need
- There were several very clear, very practical, benefits from the forum. The most dramatic was when one student used it to keep in touch with his colleagues while he was 3000 miles away in New York. But there were also remarks along the lines that at least it created a forum where the whole cohort could share ideas - something which wasn't possible in an evening-based class setting
- The students were very reluctant to use computers at the university. But because they all now have Internet access at work, they were able to use the discussion list from their ordinary places of work
- There was some demand for the discussion to be kept going after the course finished. In practice very few students took advantage of this

One big barrier is still expectations. One MBA discussion group was acceptable to the part-time students because they also had a big face-to-face session at which it, along with ideas about virtual work, were introduced. As the academic involved said: "There is unfortunately still a sense that our students come expecting to be entertained for a solid three hours."

For both technologies, key barriers are concerned with support and level of use; both of which in our view are still ill-understood. A lot of technology is now 'plug-and-play' if everything works properly - for instance a lecturer can now connect a laptop both to a data projector and to a network connection in any teaching room, and have a good chance that they can demonstrate web pages live almost immediately. But if the technology doesn't work first time, it can take a long time to sort out any problems.

One university using an electronic classroom had experience which mirrors this. "On a good day the network can be set up very quickly indeed but any problem can take a long time to iron out. So we need to build support structures which can deal effectively with

these patterns, and in particular not assume that we can do without technical support on call because the technology works straight away 80% or even 90% of the time."

Technology skills need to be used if they are to be retained by academics. A lecturer said "at a personal level I've dabbled with the discussion groups over a very long period but never used it frequently enough really to retain a lot of knowledge about it." So somehow the introduction and implementation of the technology needs to take account of the need to build up and retain skills. There needs to be an explicit strategy for training and dissemination of skills in using this sort of new technology. There also needs to be a critical mass of use of the technology to ensure that skills aren't lost.

Change and the academic
Cross and Steadman (1996) argue that "ironically, teaching, the common mission that is shared by all colleges and universities, is a strangely private affair, often practiced behind closed doors without much opportunity for discussion with one's professional peers". In fact what often happens with early adopters of educational technology is that they will talk freely about their experiences with peer early-adopters around the world, but probably not with the colleague in the office next door in their own university.

We need to envisage the move to use of new technology by academics as not simply the learning of new technical skills, but also as a form of organisational change and innovation. It is important to apply training (Anderson, 1993) to the skills dimensions, but wider change management is also needed. In relation to skills training, Belbin and Belbin (1972) created a hierarchy of training levels:

C – Comprehending (ability to apply to new situations)
R – Reflex (fast reliable responses)
A – Attitude (modify attitudes)
M – Memorizing (recall from memory specific information)
P – simPle (acquaintance of a wide range of easy to follow procedures)

We suspect that the academic world has not applied sufficient thought to this simple CRAMP hierarchy of training. There is still a preference to run courses on educational technology as if they were for Reflex purposes -- i.e. in the "programming" skills needed to utilise educational software. But in practice what is often needed is much more like Attitude change combined with Comprehending (i.e. the ability to rethink the educational task, not simply apply technology to automating the traditional task). We have also observed that there is a tendency to develop complex technologies that require C+R+M levels. Yet in 1938 Ezra Pound warned: "man is an over-complicated organism. If he is doomed to extinction, he will die out from want of simplicity" Much more effort should be going into making educational technologies significantly easier to use, so that only P type training is then needed. We have seen this graphically in the video-conferencing suite at the Computer Science Department at KTH, Stockholm. In the earlier generation of video-conferencing equipment, a trained and skilled technical was needed throughout working in a high-tech control room. In the new suite, the academic can by themselves

control all facilities via a highly customised interface that is very close to needing only P-style training.

The generic key blockages to learning summarised as follows (Boydell and Pedler, 1981) can very much be said to apply to academics faced with new technologies:

Perceptual – limited vision of range of learning processes
Cultural – individual's background lends itself to planned inputs from specialists
Emotional/motivational – any "threats" to credibility/security avoided
Intellectual – learning not seen as ongoing
Expressive – communication limitations, hence avoids discussions etc
Environmental climate – risk taking not encouraged by the organisation

Beckhard and Pritchard (1992) touch explicitly on resistance to change: "…there is a universal condition that wherever there is a change effort, there will be resistance. It may be caused situationally by the need to learn new things or destroy old and familiar ones. Or it may result from the individual dynamics of a fear of failing, or of looking silly or incompetent. They draw on Beckhard's earlier formula:

$$C = (A+B+D) > X$$

Where C= change; A=level of dissatisfaction with the status quo; B=desirability of the proposed change or end state; D= practicality of the change (mimimal risk and disruption); X="costs of changing"

We have found this an invaluable formula for conceptualising the business change process. It cannot be used mathematically – it symbolises the key areas of resistance to change and equally of the levers in favour of change. In relation to academic use of new technologies, it is often the case that A is too low – general satisfaction with the status quo. Very great emphasis tends to be placed on X, the costs of change, and one very real problem is that in both CMC and in videoconferencing the costs can be quite high, both financial and in terms of academic time, energy and effort.

One valuable model for reviewing wider organisational change is the "processual approach" (Dawson, 1994). This involves a three phase process of a type common in th change literature – Conception (need to change), Transition (tasks, activities and decisions) and Operation (new organisational arrangements). The processual approach however augments this with three drivers – the substance of change, the context of change and the politics of change. Politics is generally under-discussed in the study of academic change, but is often a powerful undercurrent which needs to be made much more explicit.

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Paper 9:

Holtham, Clive; Murphy, Ciaran, and Rich, Martin (2002) "Business information systems: can relevance link teaching and learning to research?" Scholarship of teaching and learning (SOTL) conference, London, June 2002

Business information systems: can relevance link teaching and learning to research?

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Paper for SOTL (Scholarship of Teaching and Learning) 2002 Conference
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Abstract

This paper reviews, for the discipline of business information systems, the relationships between business practice, research and teaching/learning. It places particular emphasis on the implications of "relevance" for both research and teaching/learning. The paper draws on the new and growing academic discipline of the scholarship of teaching and learning (SOTL). Business information systems itself represents an interesting disciplinary perspective, since it spans two overlapping professional areas. It begins by reviewing the nature of SOTL, and the nature of the academic discipline of business information systems. It then addresses the relationships between the three domains of practice, teaching/learning and research, drawing out implications for each of these in conclusion.

1. Overview

Our starting concern was the potentially important impact of the scholarship of teaching and learning (SOTL) on both research in a discipline, and on the delivery of teaching and learning for that discipline. As we proceeded, we began to focus on the specific impact of SOTL on the relevance of research to practice, in our chosen domain of business information systems. This led on to particular concentration on the question of the relevance of mode 2 research (Gibbons et al, 1994). In our final phase, we returned to the diverse set of inter-relationships between practice, research and teaching and learning.

This subject matter is of relevance for:
• overall strategy of university departments concerned with professional development
• teaching and learning design both at curriculum and module delivery levels
• national and institutional policy makers concerned with the recruitment and personal development of academic staff
• researchers in SOTL and in knowledge management

2. Scholarship of teaching and learning

The explicit study of the scholarship of teaching and learning (SOTL) has evolved over the last two decades, although of course it is not difficult to trace its origins at least back to Plato and Aristotle. One modern strand has explicitly focussed on professional development, particularly based on the concept of the reflective practitioner (Schön, 1983; 1987). More broadly, much activity has centred on the Carnegie Foundation for the Advancement of Teaching. Ernest Boyer (1990), a former Carnegie Foundation President, argued strongly for a concept of four dimensions of scholarship that extended well beyond research: discovery, application, integration, and teaching. These are four inter-dependent forms of inquiry focused on learning.

In 1998, the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) built on Boyer's concept of teaching as scholarly work, extended by Glassick, Huber and Maeroff (1997). In the UK a parallel initiative has been reflected in the SOTL 2001 conference.

Outlining the boundaries of the subject, it may first be useful to see how it relates to existing subjects. It draws on the generic pedagogy of teaching and learning, including both how learners learn, and how teachers teach, and on the possible links between the two. It also draws on the purpose and management of higher education, including the study of scholarship. It specifically concerns the relationship between research and teaching and learning "in a given discipline" i.e. it is about the application of research methods of that discipline to the teaching and learning process. It also particularly actively promotes reflective behaviour by the scholar about the potentially beneficial interaction between teaching and research. For example, Illinois State University (2002) has defined SoTL as "systematic reflection on teaching and learning made public."

Shulman (2000) identifies three broad rationales for advocating a serious investment in the scholarship of teaching and learning - professionalism, pragmatism, and policy:

> "Professionalism refers to the inherent obligations and opportunities associated with becoming a professional scholar/educator, and especially with the responsibilities to one's discipline symbolized by the PhD. Pragmatism refers to the activities needed to ensure that one's work as an educator is constantly improving and meeting its

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objectives and its responsibilities to students. Policy refers to the capacity to respond to the legitimate questions of legislatures, boards and the increasingly robust demands of a developing market for higher education."

For Bender and Gray (1999):
> "the scholarship of teaching is not merely teaching our scholarship. Nor is it simply teaching well. It is thinking hard and consecutively about the frameworks we have constructed and how we move within them. As scholars of our teaching we must attend unremittingly to the responses of our students. We must use what we learn about their learning as data that justify or require us to change our practices, and we must make what we learn about our teaching one of the essential topics of conversations within our disciplines. The scholarship of teaching means that we invest in our teaching the intellectual powers we practice in our research."

3. Business Information Systems

Within the university, there is a wide spectrum of academic disciplines. Some are essentially oriented to the sustaining and improvement of professional practice – including the professional areas of medicine, nursing, architecture, law and business. Others are primarily theoretical, including philosophy and mathematics, while a third group combine both, including economics and engineering. In the areas of professional practice, it is essential to consider not only research and teaching/learning, but also professional practice (Macfarlane and Ottewill (Eds) 2001). For example, is possible for teaching/learning to be grounded in contemporary research, but still remain disconnected from the needs of professional practice.

We want to start by describing some of the key issues in the discipline of business information systems. These issues extend well beyond what can be studies using what Gibbons (1994, 1995, 1998) describes as "Mode one" research. In the early years of business information systems the primary emphasis was on designing systems that worked and met fundamental business needs. This was a discipline akin to engineering. As the design problems of the fifties, sixties and seventies were increasingly mastered, it is not surprising that the attention of business information systems research turned to questions of adoption, to questions of strategy, and to questions of the overall business value of information systems. There was a move away from the "engineering" historical legacy towards a locus in management science, and increasingly even in behavioural and social science.

The discipline of business information systems is served by conferences such as ECIS, ICIS and UKAIS. Its leading journals are MQIS and Information Systems Research, although there have been increasing coverage of the domain in most leading general management journals including Sloan Management Review and California Management Review.

4. Features of the domain of business information systems

Today, business information systems as a discipline is subject to some particular considerations which are exaggerations of those found more widely in business and commerce:

• Change without innovation
• Fashion-led change

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- By historical standards, extremely short-term product life cycles

There are some distinct aspects to the practice of business information systems. As is repeatedly pointed out in the IS research relevance debate, academia only contributes a very small percentage of what is perceived by business executives as research. There is also a strong element of fashion and even faddism in the way that practitioners of business information systems engage with new and emerging ideas.
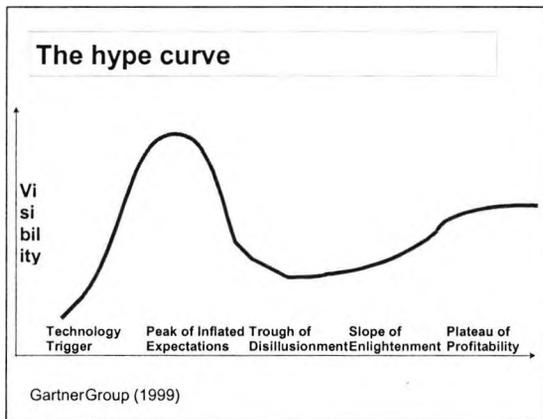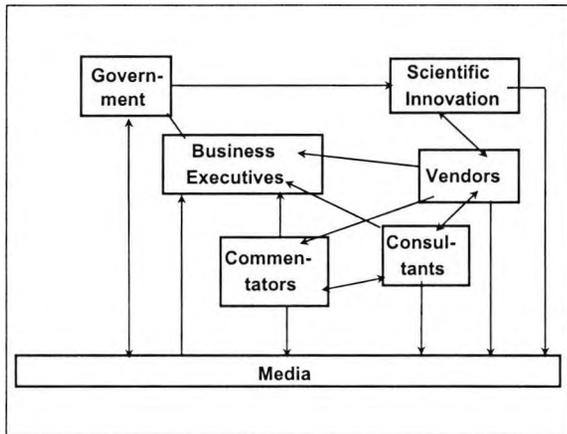

Figure 1 Hype Curve

There are several variants of the "hype curve" specially formulated for information systems ideas, as illustrated in Figure 1 (Gartner, 1999). Leaving aside the fashion dimension, the technologies underpinning business information systems can change at a significant rate, most notably in recent years in relation to both ecommerce and to fixed and wireless telecoms. Much research carried out before 1999 on ecommerce has now become obsolete, for example.

5. Business information systems as an academic discipline

There is considerable controversy over the nature of professional education and development, and this is in many ways professional development is at its most fragmented in the area of business and management. Historically, business studies arose from the practical needs of industry and commerce. The world's first business school, but frequently unheralded, was the Ecole Superiere de Commerce de Paris, founded in the 1820's – some 50 or so years ahead of the Wharton School in Pennsylvania. Its students were no doubt unkindly nicknamed "the grocers" by the students of other grande ecoles.

The study of business information systems in higher education is now largely, but not exclusively, incorporated in graduate schools of business. It may also be located in Informatics or Accounting Schools. University departments concerned with professional development are not only involved in formal degree courses. They typically also undertake continuing education, continuing professional development and the key area of executive education. It is also essential here to recognise that there are a broad range of non-university providers of both research and of teaching/learning, both direct and indirect. These include consultancies, management trainers, management conferences, business media (especially written), and related gurus. Much of this research, teaching and learning is actually part of the wider marketing and sales of information systems, as outlined in Figure 2, which indicates the extent of pressure on prospective purchasers, and the relatively minor role of academia amongst this sheer volume of activity.

Figure 2: Pressures on IS purchaser executives

The historical origins of the information systems discipline derive from computer science, information science and work study/O&M, with some influences from general systems theory and from business studies. At one extreme, it derives from a classic scientific/engineering/design discipline, at the other it is concerned with social and intangible factors. Looking to the future, there may be some doubt as to its continued existence. One of our previous conclusions on the future of business information systems commended an inter-disciplinary approach, with the discipline deliberately working at the boundaries of others, and adapting organically (Holtham, 2001):

> "information systems will survive as long as it fails to achieve the status of a classic discipline"

A good example is the overlap with geography, traditionally neither a business nor an information systems discipline, but with a great deal to offer in terms both of geographical information systems and in terms of the geographical data visualisation tools that can be applied to generic business information needs.

6. Area of Focus

There has been frequent questioning of the success of the linkage from business school scholars to the companies whose practice they seek to influence. There has been a parallel questioning for the discipline of information systems. So it is perhaps hardly surprising that the specialism at the intersection between the two disciplines – business information systems – could be said to be under question from both its constituent perspectives.

One of the problems which is then faced is how to construct a research question in order to focus on this "linkage from scholars to the companies whose practice they seek to influence". One the one hand it can be seen as a problem lying within the domain of educational studies, more specifically the management of higher education including the achievement of learning and research outcomes. On the other hand, it may be a problem falling within the host discipline, business information systems. More typically, the latter has been the preferred solution for many researchers in this area, since it does not deviate from their own conventional disciplinary perspective. The alternative perspective of educational studies may have been perceived as a foreign discipline. In the UK, this may slowly adapt, particularly in

the light of the RAE exercise now accepting papers on SOTL within a discipline as acceptable for that discipline.

When considering the relations between disciplines, a helpful framework was developed by Biglan (1973a, 1973b), who studied the "tribal" culture of different academic disciplines, from which can be derived a four-quadrant model (Figure 3). Kolb (1981) derived similar empirical results, and this model has been further drawn upon in Becher and Trowler (2001)
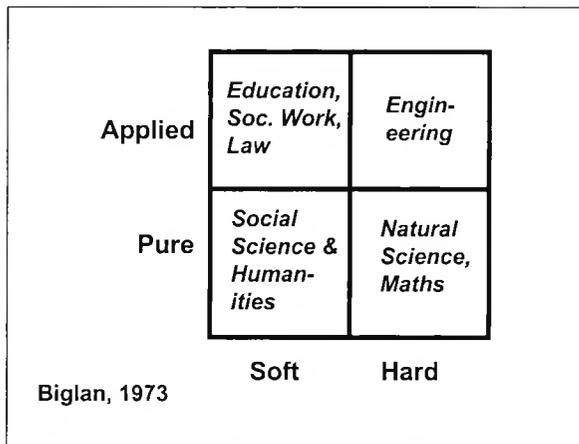

Figure 3: Map of Academic Tribes

What is interesting about the evolution of the computer and information systems discipline in relation to the four quadrants is its migration from the pure-hard segment, the initial computer science theory which underpinned computer development, through the applied-hard segment, the engineering discipline needed to designing and implement computer systems. This was succeeded by the soft-applied disciplines of management and behavioural science, as information systems became increasingly concerned with the business value and practical deployment problems implicit in the development process. In the final phase, soft-pure, is seen a concern with the theoretical and philosophical origins of the subject. It is interesting that Tranfield and Starkey (1998) argue that the key defining characteristic of management research is its applied nature, and that its central concern should be 'the general (engineering) problem of design'.

One of the most profound implications of the SOTL perspective is that it begins to allow the questioning of academic practices and the often unquestioned assumptions which underpin them:

• Teacher as heroic individual
• Academic freedom must not constrain the area or focus of individual research (Seybolt, 1996)

It is important for our argument that these types of conclusion are related to the specific practices of individual disciplines, hence our deliberate focus on the business information systems domain.

The very first business computer was the result of collaboration between an end user (Lyons), and a university (Caminer et al, 1998). This is one of the most clearcut examples of "collaborative research", with an intense interaction between the researchers with leading-edge knowledge, and users anxious to harvest that knowledge.

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There have been other examples of this "collaborative research", most typically with the researcher or university spinning off their invention via a marketing operation (Groupsystems, Autonomy, Microcosm). This marketing operation in effect becomes the user with which collaboration often continues.

In business information systems there has been over a 30 year period a noticeable shift in the research core academic discipline. This has shifted from an engineering and design focus, into one more centrally located in the social sciences. We are not critical of this shift in itself. After all, no-one has centrally imposed this focus. It reflects hundreds if not thousands of micro-decisions by individuals world-wide. Of key concern is not the research area or teaching style of any one individual. It is rather the overall composition of the discipline. We believe there needs to be more debate over whether the business information systems discipline can as a result sustain its relevance to the leading edge of professional practice. There are already concerns over de facto erosion of the business information systems discipline e.g. through its amalgamation back into computer science departments.

7. Mode 2 Research

There is increasing challenge to the classic methods of research, e.g. OECD (1997):

> "In the early part of the 21st century, however, university research and its relation to society are likely to be very different from what they are today."

Bain (1994), Chairman of the Commission on Management Research, argued that:
> "the value and quality of some management research is being questioned by academics, funders, and users alike".

One of the most active challenges to classic research comes from the advocates of Mode 2 research. Hammersley (1999) provides an excellent summary of Mode 2 research, which is worth quoting at length:

> "Mode 1 research is based primarily in universities, is focused on disciplines, and is concerned simply with contributing to a cumulating body of knowledge; so that any 'application' of the knowledge is a secondary matter, and one that is seen as beyond the responsibility of researchers.....Mode 2 research contrasts with Mode 1 in several respects:

> First, it is focused on solving problems that arise in particular practical contexts. The aim is to generate some solution or product, rather than simply to contribute to a body of knowledge.

> Secondly, it takes place via team work, involving researchers from diverse disciplinary backgrounds. And these teams are seen as 'non-hierarchical, heterogeneously organised forms which are essentially transient' (Gibbons et al 1994:vii).

> Thirdly, Mode 2 research is transdisciplinary in orientation. In other words, while disciplinary knowledge is drawn on, even more important are the knowledge,

understanding and techniques that those engaged in Mode 2 research accumulate in the course of doing it.....

Finally, accountability is practical in character, involving users as well as researchers. Indeed, there is no permanent body of researchers that could play the kind of role in accountability that the discipline plays in Mode 1 research......"

The British Academy of Management (BAM) has facilitated debate on the nature of management research, stimulating Tranfield and Starkey (1998) who argued for more widespread adoption of mode 2 by the management research community. BAM are organising a special research forum on Mode 2 – its call for papers (MacIntosh, MacLean, Huxham (2002) summarised Mode 2 via a star (Figure 4):
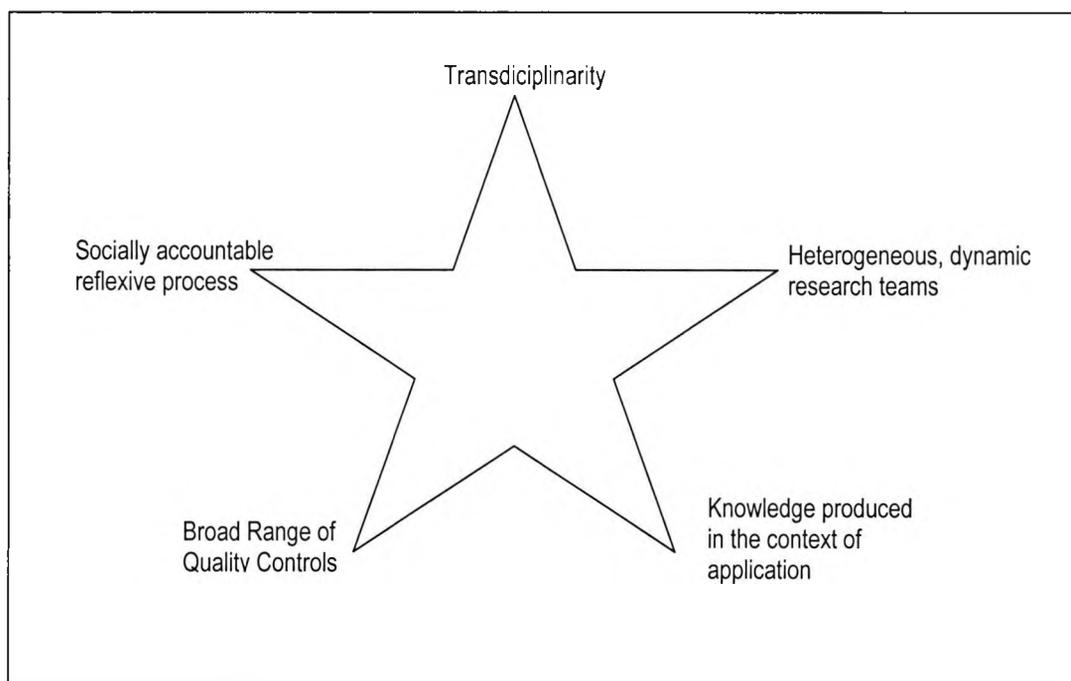

Figure 4: Mode 2 Features

The movement promoting Mode 2 research is steadily gathering momentum, and it has gained some foothold in the UK's Economic and Social Research Council (ESRC), no doubt aided by Michael Gibbon's membership of the Council (ESRC, 2001). But insufficient attention is being paid as to how significantly increasing amounts of Mode 2 research might actually be achieved, beyond ESRC pump priming activities, although the BAM initiative represents a welcome approach.

8. A framework for considering the interdependence of professional practice, research and teaching and learning.

In Figure 5 below we introduce what we believe are the three interdependent areas of concern in SOTL. We have, symbolically, deliberately shown professional practice as the apex of the pyramid. The two primary roles of the university – teaching/learning, and research, form the pyramid base. Our focus is on universities. So we are not specifically concerned with non-university research, teaching and learning. However these clearly do have key roles to play, particularly in the mediation between research and practice. It has to be recognised that there

are a wide variety of important non-university approaches, ranging from third party training, through to all the tacit-oriented tools of in-company applied knowledge management.

We have then simplified the Venn diagram into a triangle, which we then utilise further in Figure 6, in order to be able to identify the broad thrusts of particular interdependencies of research, teaching/learning and practice.
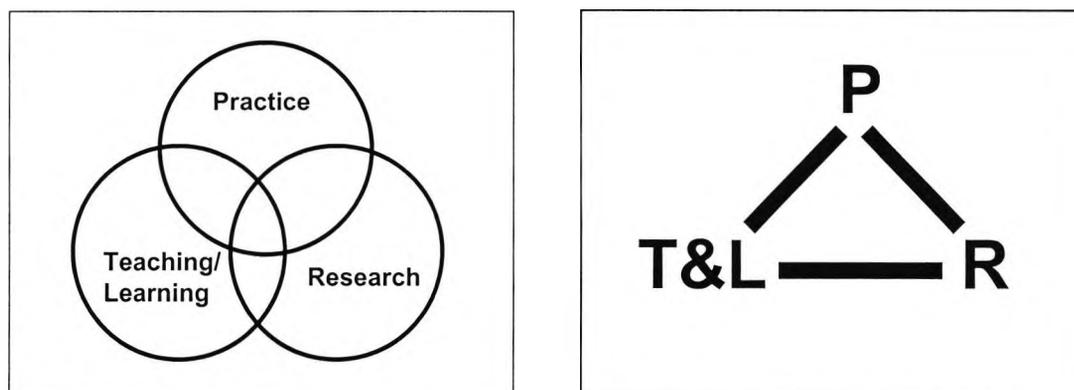
Figure 5

Figure 6 sets out to create a shorthand to describe different approaches to SOTL. It contains seven common scenarios, believed to be among the most frequently occurring in university schools concerned with professional development. The ordering of the nine reflects our own perspectives on the degree of interdependence. The direction of the arrows is intended to reflect a relationship from supplier to a consumer. What we call classic training tends to reflect the agenda of the training provider, being supplied to the professional as a consumer. So too, is classic research, where the expert researcher provides their results to the professional as consumer of that research. In some cases, the teacher may also be a practitioner, or the practitioner may also be a teacher, in which case there is potential for a double-headed arrow, of practice directly informing teaching and vice-versa. The fourth scenario is that of a teaching hospital, where the research base both directly informs the generality of practitioners via publication, but also has an intimate interaction with the development of trainee doctors, and the updating of experienced ones.

The fifth scenario is that based on collaborative research between universities and businesses. This is more commonly found in the UK in research funded by the EPSRC, for example, which has a variety of collaborative research programmes. As in the teaching hospital, these have opportunities for directly influencing teaching and learning. But of greatest significance is the way in which the research agenda and themes are jointly agreed and jointly funded by the higher education system and one of its key stakeholder groups. In practice, the stakeholders may indeed have the stronger influence on the shape of the research, hence our single arrow from practice to research. The sixth scenario is that already discussed on the need for more mode 2 research. Our seventh and final scenario may not yet have been explicitly achieved. This is where all three domains of practice, teaching/learning and research are highly interactive with each other – we describe this as the reflective teacher/reflective practitioner in an attempt to stress what are likely to be its core dimensions.
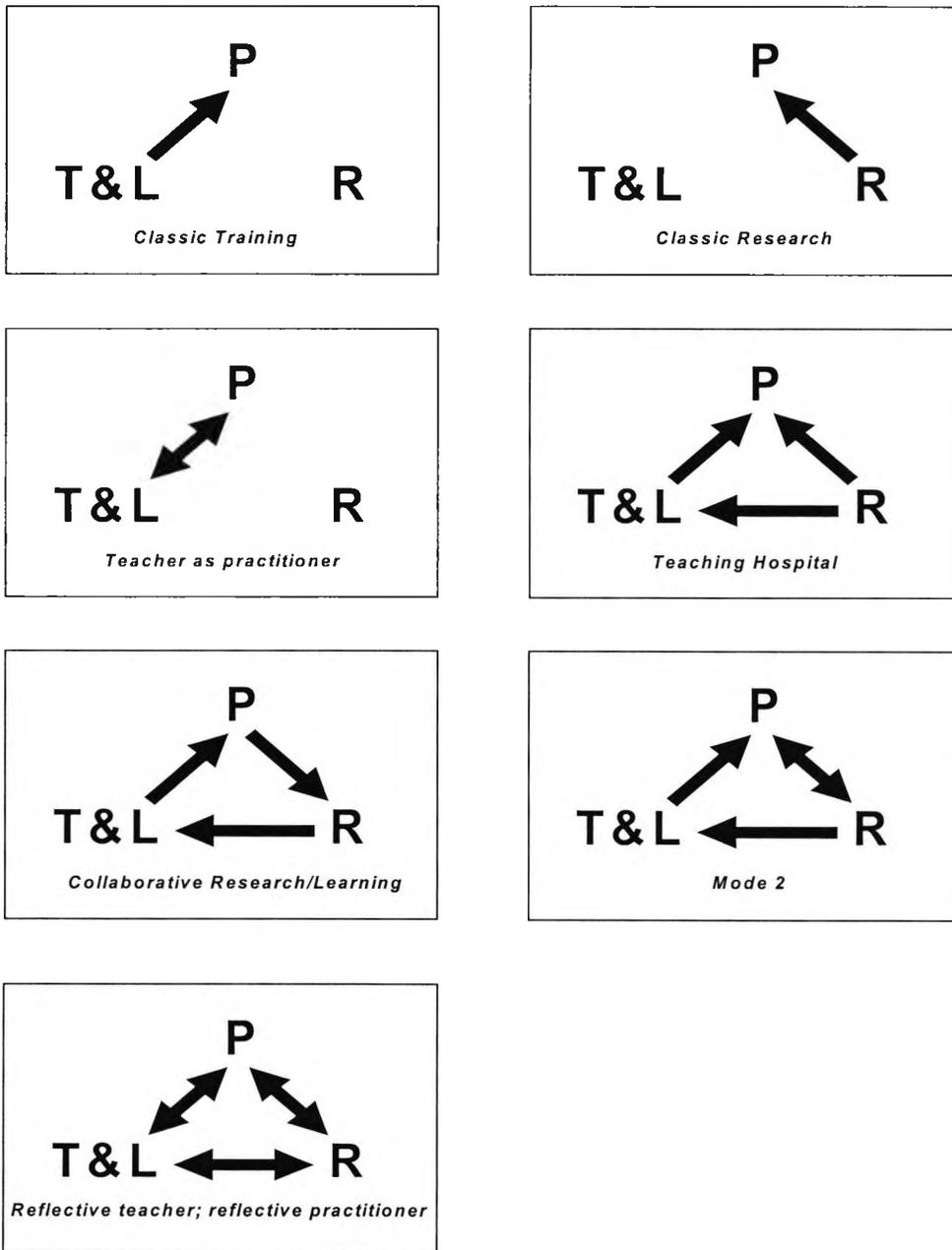
P

T & L   **R**

Classic Training

P

T & L   **R**

Classic Research

P

T & L   **R**

Teacher as practitioner

P

T & L   **R**

Teaching Hospital

P

T & L   **R**

Collaborative Research/Learning

P

T & L   **R**

Mode 2

P

T & L   **R**

Reflective teacher; reflective practitioner

Figure 6: Seven scenarios

9. Research Relevance

There has been a relatively active self-examination of research relevance from academics within the business information systems community (Lee, 1999; Lyytinen, K. et al 1999; Westfall, 1999 and 2001), and more generally in management education (Thomas and Tymon, 1982; Ackoff, 1994). Interestingly, one academic (Field, 2001) who straddles the information systems and management communities, seizes on this as an example of the insecurity of the IS community. Thomas Davenport (1997), who has unusually moved

regularly between academia and senior positions within consultancies, has made one of the most perceptive contributions to the debate:

> "If the state of student education and hiring is mediocre, the state of IT-oriented research is downright dismal. Universities harbor a relatively inexpensive source of brainpower that could be harnessed in solving the world's IT problems. But few IT academics are viewed as the world's authorities on IT in business"

Benbasat and Zmud (1999) advance five reasons for lack of relevance in business information systems research:

> "Two are associated with the nature of IS scholarship: an emphasis on rigor over practical relevance and a lack of a cumulative research tradition. A third reflects the dominant attribute of the domain in which our research takes place: the rapid and continuous rate of change associated with information technologies. The fourth reflects the limited extent to which IS academicians are exposed to the business and technological contexts in which IS phenomena transpire. The fifth is associated with institutional and environmental constraints that influence the freedom of action within academia."

Critics of business schools generally, such as Crainer and Dearlove (1999), argue that reward systems lead to faculty with little practical business experience producing high quality research unrelated to managerial realities. Porter and McKibbin (1988) amplify this:

> "…it is useful to review briefly the chief criticisms leveled at business school research in the past few years by various observers – in and out of academia. These criticisms can be grouped into three overall categories: (1) quantity of research has become more important to business schools than quality, (2) the intended audience of most business school research is the academic community rather than the combined professional community of scholars and practitioners, and (3) owing to the effects of the first two tendencies, there has been a proliferation of arcane, trivial, and irrelevant research."

Wilkerson (1999) concluded that:

> "Practitioners view management professors as somewhat ineffective, especially relative to executives and consultants, as instructors in management development seminars and workshops."

In the discussion of relevance we have been particularly struck by the proposals of Flyvbjerg and Sampson (2001). They recommend researchers drawing on draw on all three of Aristotle's types of knowledge:

- Episteme: analytical scientific knowledge
- Techne: craft know how
- Phronesis: prudence, practical wisdom

Flyvbjerg suggests that phronesis (practical wisdom) is largely ignored in scientific and even social science research, yet in fact embodies the very characteristic that is needed for applied research to be made relevant and directly related to practical action, or put into Aristotle's own more elgant words from the *Nicomachean Ethics*:

> "a true state, reasoned and capable of action with regard to things that are good or bad for man."

Of particular interest in the business information systems debate is the absence of almost any significant reference to Gibbons and Mode 2. This absence is generally avoided in the general management debate. This absence is all the more surprising since knowledge management is

one element in the business information systems domain. Also of interest is the limited linkage made between research relevance, and teaching and learning.

It seems to us, therefore, that our proposal to relate research relevance, with increased emphasis on Mode 2 research on the one hand, and with SOTL on the other hand, could be of particular significance to the business information systems community. We do not anticipate that our proposal will necessarily be readily accepted, for the generic reasons widely discussed in the higher education literature relating to self-image, rewards, journal publication criteria etc.

This then brings into question how change might be brought about. This has initially to be considered on a national basis, given that governments and their agencies do at some level have a concern for both university research and for university teaching and learning. The other possibilities are at institutional or more likely at departmental level.

The overall conclusion of many academics themselves within the business information systems community is that their research is not regarded as relevant by the business community. This raises a medium to long-term concern about direct support from business, both financial and non-financial. There is also the indirect effect of perceived lack of support affecting government and institutions' spending priorities. In this sense relevance acts as a subtly coded term for "well funded".

Among the numerous proposals for improving relevance, there it a considerable emphasis on specific detail about the conduct of individual research projects. There is by and large much less on the larger scale questions addressed in this paper, such as the nature of scholarship and the need for a shift towards mode 2 research.

We believe that the issues of research relevance are significantly interrelated with decisions related to the scholarship of teaching and learning. However, this affects not only the extent to which research should have more emphasis on Mode 2. Shulman (2000) argues that:
> "We will need to develop networks of campus-based teaching academies to serve as centers, support systems and sanctuaries for these kind of scholarly efforts."

In the UK indeed, HEFCE has funded a discipline-based Learning and Teaching Support Network (LTSN) to promote innovation in teaching in learning, particularly through new technology. In a specification for the discipline centres, however, there is no explicit mention of research (LTSN Generic Centre, 2002) although it is identified that:
> "The core activities of each subject centre include:
> ...* ensuring that all practitioners and disciplines are aware of current and future developments in learning and teaching....

This highlights a crucial question of how the interaction between research and teaching and learning is managed, if at all. It is feasible at national and institutional levels to manage the two areas as if they were entirely unrelated. At an individual level there needs as a very minimum to be a physical reconciliation of the time spent on each activity. Many, but by no means all, academics do consciously manage the two dimension. This leaves the school/departmental level as the most likely source of practical management of the interrelationship of the two.

Bender and Gray (1999) recognise resistance to the scholarship of teaching and learning:

"Concurrently, we also have encountered those who, without questioning the centrality of teaching to the faculty mission, have not developed a degree of comfort with conceiving of it as scholarship. This may suggest we have yet fully to come to terms with this new paradigm and with its challenge to the professoriate to rethink and rechart existing or imagined academic boundaries. More than simply a new term for traditional tasks, the scholarship of teaching describes a new concept of academic work. In the scholarly classroom, guided by reflective practitioners, students are encouraged to become speaking subjects, and teaching becomes the object of ceaseless and generative inquiry. In this changing realm, scholar and student, joined in widening circles of learning, engage in a mutually illuminating and dynamic process, fuelled by our collective desire to know."

10. Conclusion

At this stage, we can identify a need to examine further three hypotheses:

1. Relevance is best achieved by

EITHER optimising research and teaching/learning separately

OR Explicitly managing the relationship between research and teaching/learning, both at individual as well as departmental level

2. Relevance is significantly enhanced by moving to mode 2 research approaches.

3. Mode 2 approaches are significantly enhanced where the context of teaching and learning is explicitly influenced by SOTL factors.

We would argue that at the margin, and particularly three key margins relating to doctoral thesis topics, academic recruitment practices and faculty personal development, explicit action needs to be considered institutionally and, if necessary, nationally.

The medieval university was not particularly concerned with research in the modern sense, but more with providing an opportunity for reflection and the development of wisdom. With the development of the PhD in Germany in the nineteenth century, and the major growth in universities in that period, by a hundred years ago relatively little research was done in industry. Much research was by then carried out in universities. Today, much equivalent research, particularly expensive scientific research, is done either in industry or in specialised institutes. So the university may be entering a new cycle, or perhaps rather a renaissance, of producing reflective and wise people who are capable of being innovative thinkers. Based on the experiences for the business information systems discipline, our research skills goal may increasingly need to be to produce people who can develop our societies as a whole, not just to train apprentices for the academic profession.

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Paper 10:

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Making space for twenty first century management learning

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Making space for twenty first century management learning

Abstract

This paper has developed from four years of research in developing a large wholly new business school building. There has been an explicit and strong concern with the educational characteristics of the new physical space. Five key criteria emerged for the client brief: Flexibility; Interactivity; New types of augmented conversation; Exploiting information richness and Innovative pedagogy. One of the key features identified has been the neglect of physical space as a fundamental pedagogic resource in higher education, and particularly in its role as a force for and against innovation in educational practice. An essential part of the business plan for the new building was to evaluate the criticisms of the physical university, to assess whether there was in fact a viable case for a new city-centre physical building. An important metaphor found during the initial design phase related to medieval monasteries. They had both flexible and customized spaces capable of dealing effectively with a wide range of knowledge work, in the context of many visitors and itinerant monks. There is then a discussion of the lessons of experiments with four innovative pedagogic models: Primary School; Museum/Gallery; Architecture Studio/ Medieval Craft Workshop; and Club. There is a preliminary assessment of the impact of such models on the five key criteria. The paper concludes by pointing to the need for a great deal more research being needed at the intersection of learning, physical space and virtual space, including tentative hypotheses for further study:

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Making space for twenty first century management learning

Context

This paper has developed from four years of research and development,, which has been dominated by the practicalities of designing and constructing one of the largest wholly new business school buildings in Europe. This is the Cass Business School, City of London, the new name for the City University Business School. Its location on Bunhill Row was a former banknote factory, appropriate for a school serving the City as financial district. And it has local associations with creative icons such as Jonathan Swift, Daniel Defoe and William Blake. The previous business school is spread over four buildings and its main building, Frobisher Crescent, was originally designed as apartments, so the transition to a single integrated building is itself of great significance.

At the very start of the $60m project, there was a decision to set in train a study of how physical space can impact on educational outcomes. From this initial point onwards, there has been an explicit and strong concern with the educational characteristics of the new physical space. Several criteria emerged for the client brief, which underpinned respectively the making of the business case for funding, the design brief to achieve planning permission, and the detailed architect's plans. These were:

Flexibility
Interactivity
New types of augmented conversation
Exploiting information richness
Innovative pedagogy:

The Business School supported a programme of academic research over this period, which has resulted in a range of publications (Holtham and Tiwari, 1998; Ward and Holtham, 2000a; Ward and Holtham, 2000b; Holtham, Ward and Rosander, 2001; Holtham, Ward and Bohn, 2001). In addition there was a substantial level of visits and discussions by the design team, including to most of the leading modern business schools in Europe and the USA, and to relevant non-university buildings.

The significance of space in the physical university

One of the key features identified from our research has been the neglect of physical space as a fundamental pedagogic resource in higher education, and particularly in its role as a force for and against innovation in educational practice. In the UK for 1999/2000, (HESA, 2001) there are five broad areas of expenditure on universities:

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Academic & Research	55%
Central & other services	19%
Premises	11%
Library & Computer	7%
Residences/Catering	7%

It can be seen that expenditure on physical premises (excluding those for residences) greatly exceeds that spent on library and computer combined. Yet Paechter et al (2001) correctly highlight that:

"Because learning has been seen traditionally as something that takes place only in the mind, the fact that learning is something that happens to embodied learners occupying particular spaces has been generally ignored or played down."

Edwards (2000) argues that "50-60 per cent of a modern university is general teaching space", and that:

"universities have the almost unique challenge of relating the built fabric to academic discourse. Put another way, the university environment is part of the learning experience and buildings need to be silent teachers...the principle of academic mission being expressed or explored through the estate of buildings is an important one."

In considering why so little research has been carried out into the physical space of higher education, Paechter provided one explanation, but we are also driven to consider that for most front-line academics (and even for heads of schools and departments), they perceive themselves as having almost negligible control over the disposition of physical space. In Sweden, physical space is typically not even owned by the university itself. And even elsewhere, the design and control of physical space is carried out by estates and facilities management experts. These are typically neither academics, nor part of the pedagogic culture of the university. One conclusion we reach from this, is that in spite of such obstacles, it is perhaps all the more important for academics to become directly involved in the specification and design of physical space, so it does better meet the pedagogic needs of students, faculty and programmes.

There are a few exceptions e.g. the efforts of OECD (2001) to stimulate innovation in educational building design. Many of the published documents on university buildings are purely functional, concerned with students per square metre. In the worst cases, very few of the photos show any students in classes or on the campus.

One notable contribution to the link between pedagogy and physical space is the work of Thomas Markus (1993), which though historic in nature and not specific to management education, serves as an excellent reminder of just how dominant are the medieval attitudes to learning space. This is true both at a

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micro level (of the individual course or learning experience) and at the macro level (institutional decisions on space, both physical and virtual).

Requirement 1: flexibility

It was vital that an expensive physical building was not locked into particular models of either education or business, as over its lifetime both of these are very likely to be subject to change. As part of the funding package, it was also necessary to ensure that the building could be converted to generic office use if necessary.

This was sought in several different dimensions:
(a) Potential reconfiguration of the whole building away from academic use in the long term.
(b) The ability to amend the broad configuration of the building in the light of changes in demand or changes in educational delivery in the medium term
(c) The ability to amend the detailed internal layouts periodically (Brand, 1993)
(d) The ability for individual spaces to be used for multiple purposes in the short term.

Requirement 2: interactivity

The rationale for a physical building was primarily seen to be to achieve rich human-to-human interactions. Given the very substantial choice of learning modes for MBA students globally and in the UK, the expectation of current and future students attracted to this school is therefore primarily to be attending a physical school. But there is much to be done to make every aspect of the building as part of the learning space. The role of "third spaces" (Oldenburg, 1989) is of particular relevance to interactive management learning environments. The purpose of third spaces can be defined as follows:
First space: Home
Second space: Work
Third space: Hangouts at the heart of a community

One key dimension is that third spaces lead to business innovation. An area studied in knowledge management is the role of "innovation laboratories". The lecture and case study based model of education typically envisage face to face learning as having a strong collective emphasis, whether in large or small groups. But there is also potential for reviewing other models of spaces for learning which do not derive directly from those classically found in universities.

Requirement 3: augmented conversation

The combination of information richness and interactivity permits the human-to-human interaction to be effective both face-to-face and in virtual, extended or augmented ways that integrate analogue and digital media. The historical origins of computer-supported collaboration can in particular be traced to the

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pioneering work of Douglas Englebart (1962). His research was concerned with the "augmentation of human intellect" and hence our own use of the adjective "augmented". We are interested here in the ways in which technology in the broadest sense can enhance conversation, since conversation lies at the heart of the knowledge creation process, and hence of the learning process.

One term that has had more common usage than augmented would be "virtual", but we are increasingly dissatisfied with this term as it implies that the conversation is in some sense "not real". Our current preference is for the word "extended" conversation, as this actually implies some benefit from the use of technology to support the conversation. Our intention is to include face-to-face same-time same-place augmentation, such as with group decision support systems (Denis et al, 1988). Of course, we also wish to include both same-time different-place conversations, such as video-conferencing, as well as different-time approaches such as computer conferencing. It is also worth bearing in mind the relatively unusual same-place different-time approaches, for example the use of notice boards.

Requirement 4: exploiting information richness

A physical building also has a role to play in permitting and stimulating access to information in a variety of media, both analogue and digital One of the purposes of physical space is to provide a convenient location for the assembly of information resources which underpin and indeed fuel the process of knowledge creation in particular. Historically, this has meant the creation of a physical library of books and journals. But the physical library is already steadily being replaced by electronic media, especially in relation to academic journals - books much less so. A physical library will, however, still be needed for access to librarians, for access to specialist resources and for the availability of several forms of study space.

There is also the question of access to the internet. Despite the growth of remote wired access and now even several methods of wireless access, the laws of physics suggest that university wired access (increasingly via fibre optic) will always have a significant speed advantage over domestic services transmitted via copper wire or wireless. In addition to essentially text-based information resources, high-speed non-domestic network access will also allow use of e.g. advanced audio- and video-conferencing.

Requirement 5: innovative pedagogy

It was vital that the new building did not see its aim as achieving the best of twentieth-century learning methods, but itself contributed to the development of innovation in twenty-first century management learning. Of key importance are the type of pedagogic models envisaged. The first century and a half of formal management education has been dominated by face-to-face education. The

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models that have dominated have typically evolved from the more traditional professions of medicine (lectures) and law (case studies) (Hall, 1966; Kaplan and Kaplan, 1982).

Didactic teaching is very closely linked to the lecture theatre. It is important to see the origins of the tiered lecture room in the need for medical students to be able to see the body being operated on. The closest analogy at the time was with a place of entertainment: the tiered theatre, and hence the lecture "theatre". But the lecture theatre need not necessarily equate to didactic teaching. The formal lecture theatre of the Royal Institution in London was an interactive place for leading scientists such as Michael Faraday to present and discuss with their peers. The modern case study classroom is geared as much to student-to-student interaction.

These face to face models are under significant challenge from the advocates of open and distance learning, as well as from newer paradigms of learning, such as Problem Based Learning. It is essential to reiterate that consideration of pedagogy should precede design of tools, but tool innovation may enable pedagogic innovation, and on a wide scale.

In the study of knowledge management generally, there has been a growing interest in the capabilities of physical space to enhance the creation and sharing of knowledge. These studies have tended to emphasise the potential of informal, rather than formal, spaces (Steinbeck, 1999). We review below the theoretical potential for further innovative models of learning which challenge the status quo, but that still involve physical space in face-to-face education (Evans, 1995). Subsequently, we discuss the lessons of experiments with these innovative models as part of the process of developing a specification for the pedagogy underpinning the move to a new business school building. Four possible models are discussed: Primary School; Museum/Gallery (Falk and Belling, 1982; Hein, 1998); Architecture Studio/ Medieval Craft Workshop (Boyer and Mitgang, 1966); Club (Duffy, 1997).

Need for physical university

At the time of writing in summer 2002, the final phases of building construction are nearing completion, with the new building opening in the autumn of 2002. Yet this new physical building was conceived and constructed during the very time when there were the fierce criticisms of the physical university itself. It is essential, therefore, to review these criticisms which actually derive from a wide variety of sources, which we group into two: technology critics and non-technology critics. The non-technology critics tend to concentrate on the elitism of the traditional physical university (Illich, 1971). Or, as with the open university movement, they criticise its inflexibility and economics (Daniel, 1996). Or in some cases they criticize both (Drucker, 1997).

The technology critics argue that the physical university is an outdated concept that can now be partially or wholly replaced by technology, which is

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more convenient and flexible for the learner (Noam, 1995). This has been a long-standing promise from the early experiments in the 50's and 60's with "teaching machines". The "no significant difference" movement (Anderson) argues that for (increasingly technology-supported) distance learning:

> "..research over the past seventy years has generally concluded that there are no significant differences between learning delivered face-to-face and that delivered by alternative media"

In practice the e-universities have as yet done no more to supersede conventional universities than did the first computer-based learning systems of the 1970s. Most of the e-universities either failed after the dot.com boom ended in early 2000, or have modified their scope to become providers of content or tools. The most successful universities providing distance learning, such as the (UK) Open University and the University of Phoenix are much longer-established institutions which were set up to provide instruction to students who traditional universities did not cater for.

An essential part of the business plan for the new building was to evaluate these criticisms, to assess whether there was in fact a viable case for a new city-centre physical building on the scale being contemplated. The outcome of this evaluation was to map the relative contributions of electronic and face-to-face learning (Figure 1). Our own work has involved virtual learning environment use since 1993 and subsequent use of the most advanced digital library facilities. We have been active in research and development into the next generation of academic videoconferencing (Holtham and Knudsen, 2001). Yet the more we used virtual space, the more significant we actually saw the role of physical space in our particular version of the learning experience. Due to our geographical location and market positioning, this is primarily face-to-face. However, as in our new face-to-face MBA for the Bank of China, we make very active use of electronic media for when the UK based faculty are not present in China.
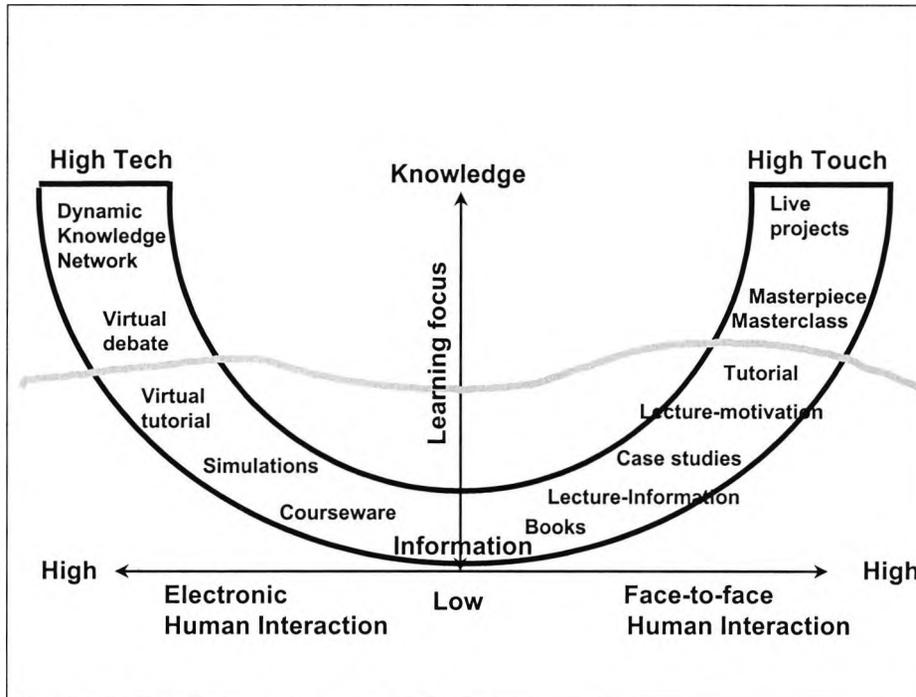
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Figure 1: Learning environment: Focuses

It is rarely the case that the electronic replaces the face-to-face. The conclusion reached from this evaluation was that the school would need to aim for a combination of "high touch" in relation to face-to-face, combined with the "high tech" tools that would in particular support the face-to-face learning which the school envisaged as its principal delivery method, not least in the light of being in such an exceptional physical location serving the City of London, itself part of central London, a leading centre of world trade and business.

Search for a metaphor for management learning space

A central message from the preliminary research was that to maximise thought and knowledge creation, it is necessary to create as diverse a range of knowledge spaces as possible. Where standard types of space are necessary, such as are essential for enclosed academic offices, they should still be capable of being reconfigurable at a micro level.

One of the next areas of research attention, was to seek a metaphor. Jilk and Copa (2001) emphasized the importance of the symbol or metaphor in focusing strategic direction in building design. The City University Business School search was for institutions that had a primary focus on the creation and extension of knowledge, combined with hosting a variety of transients and location independent workers. The most powerful metaphor we found during the initial design phase related to the medieval monasteries. When Stoddard (1966) elegantly describes life in French monasteries, he starts to raise ideas relevant to a new business school:

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'The monastic plan in its entirety is a series of interior spaces logically arranged around circulatory galleries and staircases, designed to fulfil the needs of a life of contemplation, prayer and corporate worship'.

Stoddard talks of multi-functional space, such as Fontenay's monk's hall, 'Where all were allowed to meet, read, copy manuscripts, and talk at specified times'. And at the Benedictine cloister of Saint-Trophime at Arles, Stoddart enthuses over its sculpted piers and capitals depicting scenes from both old and new Testaments.

"The Christian story enfolded in stone as monks strolled, read and went about their daily schedule along these lighted walks... It is in these Normanesque cloisters, perhaps more than any other part of the monastery, that the sense of reflective peace and calm is most acutely felt". (p 25)

Barren modern office headquarters and the Aircraft Hanger university learning resource centres have absolutely no "sense of reflective peace and calm". Spence (1984) also reminds us in his terminology how some of our building terms are influenced by monastic life:

"Office = Monastic Church Service
 Carrel= Seating recess in cloister wall, used by monks for study."

Three particular features of the monastery are worth considering. The first is the library. Monasteries were often places of learning and education. At San Marco the great Dominican monastery in Florence, Scudieri (1995) notes "extraordinary intellectualistic clearness of the basilical structure of the library, a temple of knowledge". Today the role of paper based books and writings is diminishing, but there is undoubtedly still a need for at least one physical space that provides intensive support to the creation of knowledge. To achieve a "temple" of knowledge might be too great ambition for CUBS. But the San Marco example shows that it is possible to rise well above the ordinary, so we aimed to follow some of its lessons and create our own parallel to San Marco's being "an ideal place to live, study and pray, a remarkable "City of God" set within the chaotic city of men".

Secondly there is the chapter house, named because (Wright, 1998) each morning "the monks assembled there for a sort of business meeting, which began with a reading that always included a chapter from St Benedict's Rules. The Chapter House is a superb example of a highly specialised meeting space, optimised for a particular function, and perhaps only used for a very small portion of the day.

A third relevant feature of the monastery is the concept of the cloister: "Cloisters served many purposes. Primarily they were galleries of communication between the various domestic buildings themselves, and between them and the church. The cloister alley next to the church wall was the recognised place for meditation, and the monks would spend their

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allotted periods of prayer, reading, study and meditation in that alley. Some cloisters had stone benches along the church wall for the monks to sit on. The outer wall of this alley was divided into carrels, each carrel occupying the space of half a window." Wright (1998)

Updating the metaphor

The Oxbridge physical cloister or quadrangle is inappropriate to most modern urban behaviour patterns, and it was not feasible in the City of London to allow for any external quadrangle, even on the roof. So the real question is not copying the medieval cloister. It is essentially about trying to recreate some of the spirit and functionality of the cloister within a totally modern urban environment.

The idea in our mind was a space that is dedicated to a multi-functional approach to study, reflection and discussion. The cloister allowed for accidental contact, for the conversion of private study into small group discussion, and back again. This should be a key objective of the modern equivalent of the cloister. The cloister was not the same as Fontenay's hall - which was more like a library reading room. It was much more geared to reflection and knowledge development and creation.

For a modern block, the modern cloister might physically look like a set of connected wide corridors. But if it does look like this, then it is essential that the corridor is not a through traffic route, that it is not a busy communication channel, but in fact a dedicated space. The study carrel is a space that is personalised as long as someone is using it, but is very definitely multi-user. Some carrels in monasteries were almost private, and maybe there should in the modern cloister be different grades of carrel, with increasing indications of privacy. For the less private carrels, studying there should be a sign of being capable of being interrupted.

Some space needs to be for informal small group discussion. This might involve coffee, but this area is quite different in intention from a cafe area. It is definitely aimed at academic discussion and dispute. We would not envisage whiteboards in a cafe - they would be essential in the modern cloister. It would deliberately be only semi-private in that it is important to encourage people to overhear the talking of others - this must have been a feature of the cloister since the words of the monks in discussion must have been audible to those working individually in their carrels.

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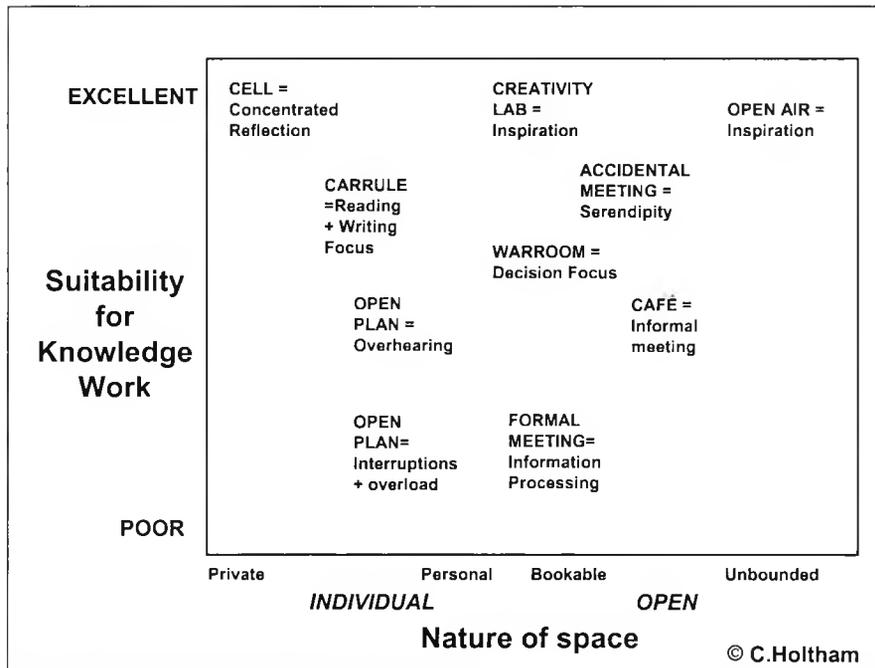
Spaces for Knowledge Work

Figure 2: Spaces for knowledge work

Figure 2 is based on a review of a wide variety of metaphors or styles of knowledge work. Two types of spaces are identified – individual and open, each subdivided into their own spectrum. In carrying out an assessment of suitability for knowledge work, it can be seen that in general open plan is unsuitable for private knowledge work. There are, however, a minority of conventional office staff who are able to undertake knowledge work in open plan. The basic cause of this seems to be a delight in being interrupted, and the ability to overhear (legitimately) the work of others, and to interact with them.

As already mentioned, the no-significant-difference movement are sceptical about the value of lectures at all. However, for many universities with a face-to-face policy, there is a question of building on any economical ways to remain physically in contactg with students. The lecture may not be very effective, but it is quite economical. The 'right sort' of lecture can be highly stimulating to students. It needs to be seen it more as a motivational or inspirational device, however, rather than just as a vehicle for transmitting information or knowledge.

Spectators pay good money to attend to attend theatres or stadiums where they are 'only' passive recipients. But we can find a play or match exciting and fun, and we can feel part of it even with minimal interaction. So a role can be envisaged for an equivalent type of lecture. The issue is not implementing 'entertainment-style' lectures. It is rather evolving towards a lecture that is a genuinely collective human experience. In relation to physical space, it is important to see that a dominance of any one form of learning method is probably a bad thing, above all because both we and our students have such a diverse range of learning styles.

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A variety of space needs to be provided for non-lecture based study, which can include:

small independent group work
electronic group work
facilitated group work
library supported independent study
web supported independent
coursebook packs with paper and/or electronic self-assessment
CD-ROM's of learning resources
Specially made or off-the-shelf videos (but **not**, in general, videos of lectures).
Business Games

School as model

It is a minor irony that as a result of progressive educational theory since the second world war, secondary and especially primary schools have been redesigned to involve much more group work, and much more learning by doing. The modern UK secondary school is much more learner-centric than the modern UK University, with a great emphasis on individualised worksheets, and on detailed and continuous measures of achievement. A modern secondary school has much less emphasis on lecturing than it did three decades ago, and in part this creates a generation of young UK undergraduates, who literally have to adapt to a more traditional system. Some European and Asian countries still do retain a more didactic style, and students from these countries have fewer problems in adapting.

For older MBA and executive learning students there may be more expertise in sitting passively in a lecture, but attention spans are shorter for a different reason - such learners want to learn fast and they want relevance, plus skills and insights that are immediately applicable in the workplace. Older learners may also have participated in executive education classes which are likely to be based around small group and experiential learning.

Probably the nearest metaphor is that of the nursery school - rooms that are much less formal even than primary school. The nursery school encourages learning by play and learning by doing. We need physical locations that can help unfreeze thinking. But we also need places to plan for or even achieve action. We need a toolset so that knowledge-rich products can be created or simulated there and then. We have always been attracted to the warroom as a place for collecting information, analysing it, and taking decisions.

Stafford Beer's 1972 Operations Room designed for President Allende of Chile and destroyed after his assassination in the military coup, probably remains the peak of radical modern thinking about executive meetings. 8 relaxed swivelling chairs, no paper, and a wide variety of wall displays

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controlled from on-chair keypads, all added up to a unique environment for executive work (Beer, 1981).

Somehow subsequent computer-based electronic boardrooms have never quite recaptured the holistic dimension of Beer's work, perhaps because they have over-concentrated on the digital media at the expense of analogue. They have also tended to be over-dependent on a facilitator-centric style of meeting. An action-orientated envionment needs to avoid being based on a single information processing style - it must embrace both analogue and digital approaches. It needs to avoid being based on a single leadership style. A rigorous mathematical basis for intensive teamworking has been proposed by Stafford Beer (1994). This envisages groups of 30 organised in ever rotating teams of 6. Team Syntegrity is based on the icosahedron for the size of the group, and the size of breakout teams literally derives from Beer's observation of relationships between geometrical designs and effective business meetings.

Medieval Craft Studio

Schon's (1983) "Reflective Practitioner" has stimulated a whole vein of thinking about management learning. Schon partly envisaged a return to the learning style of the medieval apprentice. He envisaged learning spaces for adults that were not based on didactic traditions, but rather were based on a medieval craft studio. As part of our planning for the new building we developed a brief for a "business" craft studio.

*"There may well be a whole range of possible management learning studios, but we can envisage some repeating themes. The first is that learners should feel **physically comfortable** in them.*

*The next feature should be the encouragement of **varied interaction.** This can be at a whole variety of levels. A group of 20 might want to form a single large circle. They might want 5 sub groups. They might want a lecturette.*

*They will certainly need flexible methods for **brainstorming and recording** their ideas and progress. Some learning environments do not make this easy. The best we have seen have made walls which are flip chart, blue tack and sticky tape friendly. Walls covered in whiteboard material offer the possibility of being able to write on the wall itself.*

*The modern management learning studio should be **information rich**. In the middle ages the library would have been in a separate physical location, not least for reasons of security. Today we would expect all learners to have immediate access in team rooms to a wide range of information resources, email, internet discussions etc, and perhaps also audio and videoconferencing.*

*The learning studio should facilitate **analytical work**. Almost all of this will today be carried out by a variety of computer software, and hence there needs to be a*

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range of high quality software readily available, so that most analytical tasks can be readily handled.

*The studio is also a place to **display and present** the masterpiece. This could be in one of the traditional analogue formats - flip chart, OHP, typewritten report, or even physical model or pastiche. Equally it could be displayed and presented in computer-based format."*

Wake Forest University in North Carolina created an executive learning centre that it calls an "Executive Sandpit" and this was influential in helping us design the West London TEC's "Executive Studio". There are two other contemporary examples that have influenced our thinking on the above. The first is the Hoechst-Celanese Innovation lab in Charlotte North Carolina. We were fortunate to have visited this centre at the invitation of Tom Woczyck shortly before it closed as a result of a merger. The high tech-high-touch ambience of this centre influenced us greatly. In the UK, the Post Office's Innovative Centre near Rugby has similar aims.

Museum/Art Gallery

There is great potential for examining the contribution of the museum, exhibition and display in management learning environments (Ward, Victoria and Holtham, Clive;2000c). One particular collaboration was between Sparknow consultancy and City University Business School who decided to use jointly the format of an art exhibition to communicate key concepts in knowledge management to a group of executives from many sectors, including several Chief Knowledge Officers. It reflected a conscious decision to experiment with a different type of learning space. The event was titled Spark 005, as it was the 5[th] event in a series which all related to knowledge management, but adopted an artistic or performance-oriented approach. One influence was Bacon's four part prescription for a repository of knowledge (Markus, 1993):

> "1. a library
> 2. a zoological and botanical garden
> 3. an experimental laboratory and
> 4 a goodly huge cabinet, wherein whatsoever the hand of man by exquisite art or engine has made rare in stuff, form or motion; whatsoever singularity, chance, and the shuffle of things hath produced; whatsoever Nature has wrought in things that want life, and may be kept; shall be sorted and included."

The zoological and botanical aspects support an organic metaphor for evolutionary project processes, and there is an even closer relationship between the library, laboratory and "goodly huge cabinet" and our methodology for knowledge management. Markus also usefully contrasts the active learning of a museum with the passive learning of the lecture hall:

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"Because a museum is a classifying device, by moving through its space the visitor recovers the entire system. In the auditorium the visitor is stationary and recovers a fragment of the system."

An early decision was made to create some unspecified type of artefact that could be first used at an evening event and then re-used at the Design and Learning exhibition. Several brainstormings and investigations had failed to yield a satisfactory concept. At a very late stage in the project planning theatre designer, writer and poet Angie Dove suggested that the artefact should be a garden shed. Her imagination had been stimulated by reading a book on Dr. James A. H. Murray. Murray was the first editor of the Oxford English Dictionary. He created the dictionary from thousands of small slips of paper sent in by volunteer readers. These grew too voluminous for his house, so he was banished to work in a metal shed in his garden, filled with pigeonholes, which he called his "scriptorium". (The OED defines this as *"a writing-room; specifically the room in a religious house set apart for the copying of manuscripts."*)

The central artefact developed was a standard 8' x 6' wooden garden shed purchased from a garden superstore. Inside, specially made wooden pigeon holes were added to mimic those of Murray, but more specifically to represent tangibly the logical classification system developed and evolved by Sparknow. Inside the shed were many additional items hung from the wall and roof in the manner of tools in a garden shed, except these were documents and photographs relating to knowledge management. Advanced publicity described this as the "Scriptorium".

The format of an art exhibition, with the garden shed as the central exhibit, led to a quite exceptional level of response and stimulation, with particular stimulation achieved by the Shed exhibit. Other exhibits, even those planned to be 'interactive', however, attracted rather less interest.

With the benefit of experience, it can be seen that the shed and its contents proved to be a powerful and tangible metaphor for key aspects of knowledge management. It created a self-evident climate of warmth and intimacy, quite different from exhibits in open space just a metre or two away. The sharing of experiences via the "seed packets" in particular were very candid. So the shed worked at three levels:

In literally making the intangible into a tangible form, e.g. with the physical analogue classification system

At a metaphorical level, containing a wealth of symbolism relating to key processes in knowledge management. It reinforced the idea of knowledge as 'organic' rather than 'mechanistic'.

Its sheer unexpectedness acted as a stimulus to ideas about knowledge management and essentially as a source of creativity. It appeared to act as

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an "unfreezing" device and there is little doubt that the shed played the role of a transitional object.

Club

The idea of the office as Club derives from the work of Frank Duffy (1997). The type of club he refers to is what might be called the London Club. These are members-only institutions used for a combination of social but more particularly business networking purposes, whether politics (the Carlton Club) or show-business (the Garrick Club). They perform multiple roles and have diverse spaces to reflect those roles. For example a club will have a library and/or very comfortable reading room, but it might also have a more utilitarian "writing room". The club is a classic third space. There is a heavy emphasis on meeting the needs of peripatetic visitors. And there is a special emphasis on stimulating serendipity.

The office as Club has most particularly been implemented in management consultancies, such as Accenture's London office. In this case there are a wide range of spaces geared to the nomadic consultant The club can also be found in a particular type of corporate headquarter, such as BA's HQ at Waterside near Heathrow airport. Here, the whole metaphor of the building is of the English country village with a high street through which walking is channeled, and geared to serendipitous contact. There is even a village stream. The dominant club theme is seen in the centrally located cafe. This is not simply a place for refreshment. It is more particularly a place for informal meetings. The Relationship Marketing Department of BA has fully deployed the club metaphor for its whole space.
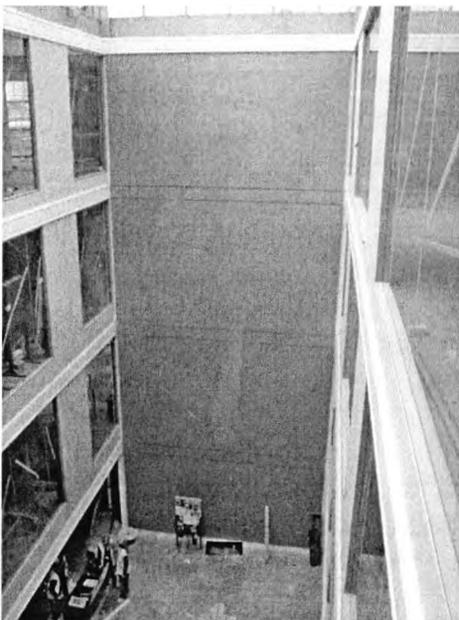

Figure 3: The West Atrium of the Cass Business School (under construction)

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In a large modern business school the club metaphor is potentially of great significance. The typical academic may be fairly peripatetic, and so will have a particular need for informal and serendipitous space. In the case of City, a key decision was taken in 2001 to brand the new school as welcoming to outsiders (a key monastic strength) with the new strapline to the logo: "the intellectual hub of the City".

The Cass architects have fully grasped the significance of the club metaphor and have sought out a wide range of opportunities for informal spaces in particular. Most of these are in areas used jointly by staff and students. There are also informal spaces created in the staff/research office area. One of the single most impressive academic club environments we have seen is the combined student centre and library at George Mason University, Virginia. Unusually this treats the whole building as "library" space, so books can be read in the refectory, and equally almost the whole building is a social space, so there are drink and food machines in amongst the book-stacks. Within the formal library area there are a huge range of different styles of study space.

Conclusion

One of the most striking conclusions from our study has been the relative lack of attention devoted to the implications of physical space in higher education generally, and in management education in particular. The physical space of a business school typically represents a far greater proportion of the operating expenses of a school than does the virtual space. So we need to recognize the importance of developing physical spaces which are better geared to twenty first century learning.

We then need our institutional and national funders of universities also to grasp that educational effectiveness depends on more varied, more flexible and more extensive learning spaces. Physical space is as important an educational tool as are the tools of information technology and library content.

Physical space is a Cinderella of higher education pedagogy, yet it is a costly Cinderella. We need to reconfigure at least parts of our physical space away from extremely traditional didactic spaces. Although financial resources are a key dimension of achieving this, probably an even more serious constraint is the serious mindset gap which often exists between university strategists and pedagogic experts. A similar gap also exists between many academic faculty and pedagogic innovators.

Over the four year period, we have been able to carry out experimental work on spaces for learning, and also carried out reviews of relevant theory and leading-edge practice internationally. This is a particularly difficult period to review the lessons learnt, as the ultimate test lies in the effective use of the actual building (Brand, 1997). However, in Figure 4 we have set out an initial indication of the lessons from our particular experience, relative to the five initial

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criteria set for physical space. This grid could be extended by adding other approaches, including the classic lecture and case study.

	Primary school	Museum	Work-shop	Club
Flexibility	HIGH	MED	HIGH	MED
Interactivity	HIGH	LOW	HIGH	MED
Exploiting infor-mation richness	LOW	MED	HIGH	MED
Augmented conversation	MED	HIGH	HIGH	HIGH
Innovative Pedagogy	MED	HIGH	MED	MED

Figure 4: Preliminary assessment of the impacts of the four methods

Our findings perhaps inevitably point to the need for a great deal more research being needed at the intersection of learning, physical space and virtual space. We offer the following as tentative hypotheses for further study:

1. The physical university will continue, but not necessarily only as we have known it

2. In business education in particular, there will be pressures to move to a high-tech plus high-touch physical and virtual environment

3. There will be increasing realization of the importance of physical university space to stimulate the move from information to knowledge

4. Part of the key to understanding both physical and virtual space will be a third dimension, which for shorthand can be called "emotional space"

5. Innovative pedagogy is essential, but the problem of exploiting physical space is not a new one, so we need not to be afraid to take well-established ideas from other areas

The massive investment in university buildings has often been carried out in a highly instrumental way - of ensuring there are enough student spaces available under conventional learning methods, particularly lecturing. Learning innovations often have to fitted into physical spaces designed conventionally, and as a result, less than ideal to implement the innovation. The nature of university decision-making is often that decisions on physical space are taken

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on a technical or financial base rather than a pedagogic base. Of course, the same is often true of information technology decisions.

One piece of good fortune caused by a wholly new building for a single school with a clear vision is that it was more feasible to synchronise technical, financial and pedagogic dimensions. Of crucial significance was acceptance by the dean and other senior staff of the link between pedagogy and the priorities for the physical design of the new building. Such acceptance is not inevitable in either academic or business life. But it is a precondition of making spaces which are fit for twenty first century management learning.

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Paper 11:

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Information Literacy for starting MBAs - issues and dynamics

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Abstract

This paper discusses the issues surrounding the information literacy requirements for a cohort of MBA students starting a one-year full-time course. It is based around experience of running an MBA programme in successive years, particularly in the context of a major redesign of the MBA programme for students commencing in the autumn of 2002. It takes a critical view of the approach used for the training of MBAs in information management skills at the start of their programme.

For some years the core programme taken by the MBA participants has included a module on information management. To support this, part of the orientation week at the start of the programme has historically been devoted to basic 'information literacy' skills. There is a tacit distinction between this early stage, where the objective is to ensure that students have sufficient ability to participate effectively in subsequent modules, and the acquisition of more detailed and varied knowledge later in the course.

In the past the effectiveness of the orientation week has been limited both by environmental factors (technical problems, difficulties in getting all the students in the right place and communicating the logistics, lack of communication between academics and support services, etc) and also by the diversity and the rapid changing nature of the cohort.:

As part of the redesign of the course for autumn 2002, the orientation week was amended to include much more time devoted to information management and navigation skills. In addition to hands-on sessions, a series of seminars was introduced so that students were encouraged to discuss the process by which they had discovered the relevant information. The week was structured so that students could work either a the university or on their own computers, so that they were less reliant on the university's infrastructure in the event of technical failures.

Preliminary feedback suggests that the structure of the revised orientation week was sound, but the new structure has introduced some interesting issues which are discussed further in the paper.

Background

This paper describes some issues which were raised during a major revision of the day MBA programme at Cass Business School. Participants in this programme have been expected to use Information and Communication technology (ICT) as part of their coursework since the early 1990s (Rich, 1994). In that time both the nature of ICT used in business and the participants' initial information literacy skills have changed considerably – notably through the advent and widespread use of the Internet. When e-mail was first used for communication between students and staff at Cass some of the MBA participants were very dismissive of it, and suggested that 'our time would better be used with an exercise based around WordPerfect of Lotus 1-2-3'!

To support this use of ICT, the programme has evolved to include both initial classes which support students who need to gain information literacy skills, and an information literacy module where students are expected to use these skills. It is ultimately the students' responsibility to ensure that they have the necessary skills before they embark on the information management module.

Until the 2001-2 academic year the information management module was delivered in January-March for a one-year full-time MBA starting in late September. This meant that the information literacy classes could be spread over the first three months of a one-year programme although student feedback consistently suggested that students would like this material as early as possible in the programme. The redesign for the 2002-3 academic year involved dividing most of the teaching into more concentrated units. One effect of this was that the information management module was delivered in October and early November for a one-year programme, and the information literacy skills needed to be taught mostly in the students' orientation week when they first arrived.

In recent years students' prior knowledge and expectations have changed considerably. There has always been a group with very little IT experience who need considerable help in the early stages of the programme. Often this help has as much to do with building confidence as with acquiring skills. There has also always been a group with a high level of information literacy, who approach the university with a number of very specific and complex questions. In recent years these have been characterised by students with particular demands for access to university computing resources from their own computers, either lap-tops plugged into the network at the university or their own computers at home, or even requirements such as reading and sending e-mail from their mobile phones.

MBA students are particularly demanding, vocal, and ready to remind university staff that they are attending an expensive course for which they have high expectations. The issues covered here should also be relevant to other courses but would be most intensely felt by the university for the MBA course.

Requirements and problems

Problems that have been identified to do with the information literacy classes could be divided into a two main categories: environmental categories and the nature of the student cohort

Environmental factors

These included:

- Technical problems with computers and network connections, which often occur at the start of the programme. When such problems do occur, at best they hamper students' progress: at worst they create a bad impression of the information management component of the programme and mean that students have a negative view of it throughout the MBA

- Organisational problems as the students needed to be divided into groups for hands-on classes at least, and it was often difficult to ensure that everybody knew where they should be at a particular time

- Technical and organisational problems came together in one year during the late 1990s, when a computer laboratory had been booked for teaching, but the students arrived to find that the computers were unusable because new software was being installed on them at the time

It was recognised that in autumn 2002 there would be a particular risk of disruption from environmental factors because:

- The student computers were being upgraded from the Windows NT operating system to use Windows XP during summer 2002 – this was a major project over which the academic staff teaching information literacy had little influence

- Cass Business School was moving to new premises during the 2002/2003 academic year, so the orientation week would be among the last teaching done in the old premises and there was a concern about maintaining learning resources in the period immediately before the move.

For this reason a pragmatic decision was taken to design the orientation week to minimise the dependence on hands-on work, and particularly to minimise any need to use computers at the Business School.

The nature of the student cohort

Issues surrounding the student cohort included:

- Considerable variations in the level of ability with which students embark on the programme. In recent years the orientation week has catered well for those with very little experience in using electronic resources, who have used

it as an opportunity to learn and develop basic skills. It has also catered well for the most experienced and knowledgeable students, who were saw the orientation week as a chance to improve their skills in specific specialist areas. It catered less well for the many students who fell between these categories.

Although the orientation week includes a simple diagnostic survey where students can assess their own level of information literacy, it has proved difficult in practice to make any useful evaluation and proved difficult to deter students from attending classes aimed at people less knowledgeable than they are. An example of this is a basic Microsoft Excel class, focusing on the how numbers, formulae, and so on might be put into cells and on basic concepts such as the difference between absolute and relative addresses, where some more expert spreadsheet users attend and ask questions about features such as pivot tables. During the early stages of planning the 2002-3 academic year, lecturers' views were sought about the skills that students should have. One response was that students needed to be more tolerant of their colleagues with very different information literacy skill levels.

•   Changes in students' expectations from year to year which made it difficult to respond effectively to concerns raised in any particular year, and also, together with changes in the software being used, severely restricted the opportunity to re-use materials.

•   Familiarity with use of the Internet and particularly with searching the web. Paradoxically, this is not always an advantage for MBAs, most of whom are returning to study after at least two years working in business

As part of their Information Management module, MBAs need to search for background information, mostly by searching bibliographic databases. In particular they need to be familiar with a number of databases which are reached through the 'Athens' authentication system now widely used by universities in the UK. and also they need to submit the coursework for this module electronically. Within the last five years, this requirement to use bibliographic databases has become essential to many components of the MBA programme, as increasingly the institution has devoted resources to acquiring more electronic reference sources.

But this has coincided with a change in the nature of the prior knowledge held by starting MBAs. In particular many of them are very expert users of Internet search engines such as Google, which require rather different searching strategies from the bibliographic database. There is a tendency for Google users to type a very large number of keywords into a search screen, whereas users of bibliographic databases such as Business Source Premier need to give more thought to how they can construct complex queries.

•   Students were also frustrated by the apparent lack of purpose in some of the classes: they were encouraged to practise using particular resources but they were not in general given either defined tasks or the opportunity to discuss them

Most of the students in practice arrived with a high level of practical knowledge of how to use IT. However it became apparent, particularly during the information management module, that there were deficiencies in their ability to apply and extend this knowledge. There is a parallel with the concepts of deep and surface learning (Ramsden, 1992). In the context of computing skills, surface learning implies learning mechanistically how to use something. Deep learning implies enough understanding of the underlying principles to give a set up extensible and sustainable skills and it was apparent that the students needed more opportunities for deep learning in this area.

A new approach for 2002-3

As part of this approach the team devising the module reviewed exactly what was meant by information literacy. Information literacy refers to students' ability to use and navigate information effectively during their studies. Bruce (1997) identifies a number of different ways in which students might experience information literacy. Her first category, the information technology conception, refers to students who view information literacy primarily in terms of using information technology, while subsequent categories imply a greater degree of involvement by students in the use and understanding of information.

Bawden (2001) surveys a number of alternative definitions of Information Literacy. He observes a number of common factors, notably that, as with literacy in its conventional sense, the standard of information literacy expected of different people varies a lot according to their background, and that information literacy represents a skill that people can continue to use and extend once they have acquired it.

The challenge then was to find an approach which fitted well with these definitions of information literacy, and also met the practical requirement to reduce dependence on the computer systems at the business school. To that end the hands-on classes, that had been the core of the information literacy skills component for many years, were largely abolished. Computer laboratories were reserved for particular groups at particular times, but this was only so that students could rely on some access to a computer at the university *if they needed it*. They were encouraged to use alternative resources – their own lap-tops, or even an Internet café – if that was more convenient.

In the past there had been a major introductory lecture, part of which was devoted to explaining the computing and library facilities, and part of which was devoted to taking questions about particular problems. This was replaced by a very short introductory lecture and a 'trade fair' in which students could move at their own pace between five different stalls, each providing information and support in a different area. Support for the very few students with no significant prior experience of using Windows-based PCs, which in the past had been provided by an optional timetabled class, was

provided by one of these stalls. Others covered access to the library databases, help with connecting student computers to the university network, and so on.

The rest of the information literacy module was reorganised around a series of seminars. These were held in a conventional teaching room (without any computers in it) and were structured so that students would work in small groups on a number of discussion points.

As an initial exercise students were given a number of questions to find the answers to using the Internet or other resources. Some of them required either a little local knowledge or some deduction to answer, for example:

- Who played Abigail in the original Hampstead Theatre production of *Abigail's Party*?
- There is a house to rent in Northampton Square [next to City University's main site]. What rent is being asked for it?

After this students were given discussion points – for example what precautions they should take against viruses, and how they should manage multiple copies of their work on different computers. The typical format of a seminar was that each of four groups would lead the discussion on a different topic. These structured discussion proved particularly valuable because they offered an opportunity for knowledgeable members of the group to add their own views and experiences – for example one participant was able to offer some knowledge of copyright law when this was discussed.

Issues from the revised orientation week

Preliminary feedback suggested a number of issues:
- The revised structure was successful at insulating students from technical problems in the very early stages, but students did become frustrated by technical problems typically 2-3 weeks into term. Nevertheless these problems did not poison the students' view of ICT from the start, nor did they occur on such a scale that it was impossible in practice for the support staff to deal with them
- There was still a sense that the seminars were good for people with some ICT knowledge already, who could use them to build on that knowledge, but they were not so good for beginners who in some cases felt excluded
- There is still scope for improving the logistics and the communication between staff and students and making it clear *where* students should be at a particular time and *what* staff should be there. On at least one occasion a group of students expected a formal class, when in fact they just had time reserved for preparation as a group. This was due to a simple misunderstanding of a printed timetable.

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Supporting information literacy for starting MBAs through action research

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1. Introduction

The recent past has seen continuous systematic change to the subject of Information Literacy. For business students at all levels mastery of Information Literacy has become an increasingly important skill. There is an expanding range of computing applications that support the office. The subject itself has moved on from the acquisition of basic computing skills in the use of office software packages. There is an increasing distinction between basic use of a package, and between advanced use, or mastery, which typically requires subtle interpretation and manipulation of information. Mastery involves far more than the ability simply to operate the package.

At Cass Business School, a major redesign of the MBA offered the opportunity to make some radical changes to the traditional approach to teaching these skills. Traditionally this was a skill taught early in the course in a fairly mechanistic way, through computing workshops. It had been perceived by staff and students as a simple skill of only moderate importance. The workshops were autonomous, relatively unconnected to other parts of the degree, though some of the material later in the degree was taught on the assumption that students would have a level of basic competence with certain computer packages. Under the redesign, it became possible to integrate these skills into the core programme to a greater degree. It also became possible to attempt to deepen the students knowledge and understanding of the subject.

As the change was designed and implemented, it gradually became clear that this process was unlikely to stop at this stage. The expectation was that further redesign would take place as the course evolved. To the staff in charge of the new skills component of the MBA this project seemed to fit well to the model of Action Research. Other writers have suggested that Action Research methods offer a valuable approach to researching and developing educational courses (Carr, W. and Kemmis, 1986, McPherson and Nunes, 2002).

The classic definition of Eden and Huxham (1996) that 'action research involves the researcher in working with members of an organisation over a matter which is of genuine concern to them and in which there is an intent by the organisation members to take action based on the intervention' applies in this case. The academic staff that would design and implement the course changes were in a position to discharge both roles of researcher and practitioner. Moreover the expectation of further interventions that would change the status quo promised the cyclic process of change and evaluation that promotes the opportunity for theory development.

This paper argues that action research is an effective way to approach course design, when major change is thought to be necessary. The case example of the redesign of the Cass MBA programme demonstrates its value. The application of action research methods offers a way to explain and understand the drivers for change and a structure by which further changes can be developed and assessed in a systematic way.

2. The challenges in designing an information literacy module for the Cass MBA

Changing perceptions as to student needs have driven changes to the MBA programme at Cass and hence to the information literacy module. This section describes the original module structure, discusses the theory underlining the changes made to the MBA programme and describes the impact of the redesign on the information literacy module.

2.1 Cass experience prior to redesign

For ten years from 1992 to 2001 the structure of the computer literacy programme for MBA students remained unchanged. During the orientation week there would be a formal introductory lecture at which students were briefed about their computer literacy requirements. This typically took most of a morning and included presentations by both

academic and technical staff. There was also one compulsory hands-on class where the principal objective was to establish that students were able to log into the university's systems and to use some basic functions.

By 1994 e-mail was already used within the university for communication between students, even though most MBAs arrived with little or no experience of using it. So for some time the introductory hands-on class was primarily an e-mail training session. Once e-mail became widely used and most students were familiar with it before starting their MBAs, this initial class became largely a diagnostic session simply to establish that students had access to the network.

Questionnaires were used on occasion to gauge students' level of experience and expertise, but these proved to be unreliable as a measure of the amount of expertise in the cohort as a whole. There was a strong tendency for students to play down any prior experience that they had. In addition, the questionnaires revealed that some students had very substantial IT experience which they could have usefully shared with others on the course, but in practice there was very little sharing of ideas and information through the course.

The first week also included an introductory class aimed at complete beginners, and any other students were strongly deterred from joining this class. After the initial week computing classes were available, and were included in the course timetable, but were voluntary. These classes followed a service teaching approach, that various of the later components of the MBA programme would be structured on the assumption that participants would have a certain level of computer literacy, and that it was the students' responsibility to attain this level but that classes would be available if the students wanted them.

Anecdotal evidence suggested that this arrangement worked well for students with absolutely minimal computing experience – in practice by 2000 less than 5 would be in this category about of perhaps 110 students each year on the MBA programme. It was also appreciated by students who had a high level of computer expertise because they were able to use the optional classes to improve specific areas of knowledge. The approach worked much less well for students between these two extremes, and it was significant that students in this category would often lack some of the

requisite skills for other components of the MBA even though they had chosen not to attend the relevant computer classes.

A further issue was vulnerability to technical failures, which was compounded by the likelihood of faults on the computer system appearing in the first weeks of term. Despite collaboration between technical and academic staff, the staff responsible for teaching computer skills were not in a position to do anything to alleviate technical problems. Nevertheless when problems did appear in the first weeks, they were often seen by students as a poor reflection on the learning experience as a whole. Typical problems that occurred included a modification being made to the computers' operating system at the last minute, so that a group of MBAs arrived in a computer laboratory one morning to find all the computers unusable because the software that they carried was being built, and a fault that made it impossible for students to log into the system for the first time on certain computers. These problems create a very bad impression of the entire computer facilities in the university and also meant that for many students their first encounter with the teaching staff responsible for computer skills was watching them wait for the technology to start working.

2.2 Theory development for information literacy

An MBA has three constituent parts – a group of core courses without which the degree could not qualify as an MBA, a set of elective courses and a major piece of individual project work. At Cass, prior to 2002, the MBA followed a traditional structure with the core courses tending to reflect the functional model of a firm. Dissatisfaction with this design had been expressed for some years. Individual modules – both core and elective underwent continuous redesign, but there seemed little opportunity or will to redesign the degree as a whole. The main concerns expressed early in 2002 were:

- Over-reliance on lecturing as a teaching approach
- Lack of integration between modules, especially the core
- Overlap between modules
- Potential imbalance between subjects
- Lack of consistent coverage of skills training for all students and the lack of integration of skills with application
- Potential inappropriateness of the aims of skills training
- Student dissatisfaction with the core courses, despite the acknowledged high quality of the lecturing

Two major theories underpin the design of an MBA degree – the theory of the firm and the managers job role within it and teaching and learning theories. Theories of the firm and the managerial job role have changed over recent decades following research into the changing patterns of business operations. Over the same period considerable research into teaching and learning has led to significant developments to the theories on this subject. It was the perception of the significance of these theoretical and practical developments and the apparent mismatch between these ideas and the traditional course structure that drove the course changes at Cass.

In the spring of 2002, all the teaching staff for the core modules of the MBA embarked on a collaborative project to redesign the core courses (more than half the degree programme) for implementation in the autumn of 2002. It soon became clear that there was substantial agreement as to the key problems. In particular the MBA working group came to the view that the traditional degree structure gave too much weight to knowledge acquisition and too little to application of theoretical ideas and the integration of business knowledge and skills. Over the subsequent period of six months this working group delivered a major redesign of the core component of the degree. By the start of the new academic year, the core course had been restructured into blocks of modules – four blocks of three core modules and three blocks of skills modules. Each block was designed and managed by a small working team of the teaching staff concerned. Information literacy was one of the skills blocks. Perhaps the most radical effect of these developments was the change to the process by which the programme was to be designed. Small teams of academic staff collaborated over the design and delivery of groups of subjects. This was a process that was planned to continue into the future, offering the potential for debate on and change to composition and relative weight of the individual components of the programme. The most significant aspect of the restructured degree for the information literacy module was the agreement as to the need to integrate skills with the other courses on the degree and the allocation of more time to skills training, within the block structure.
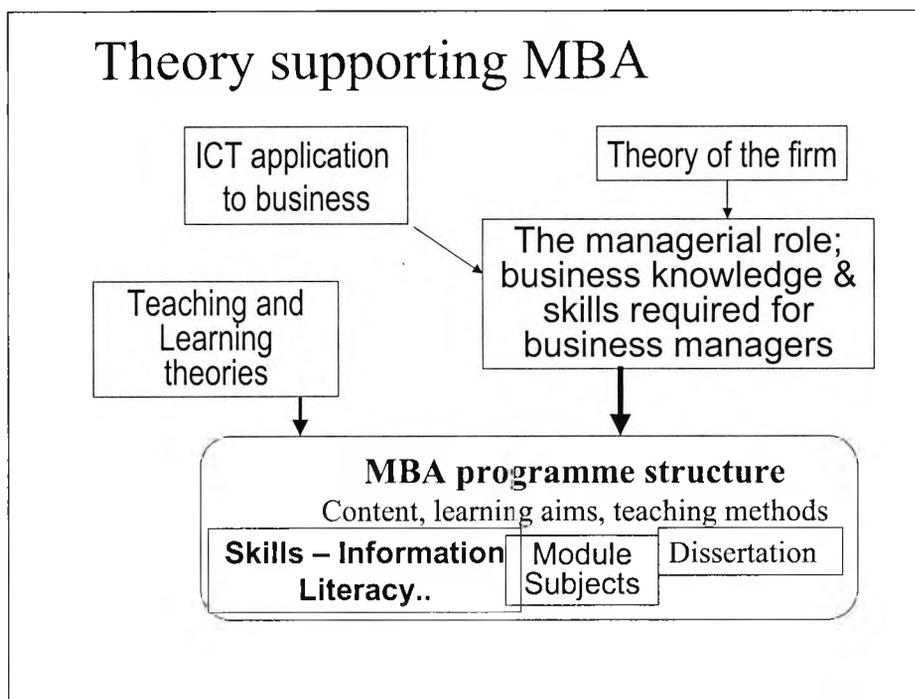

Figure 1: Proposed theoretical basis for an information literacy module design

It is clear that an information literacy module is but one small plank within the structure of the MBA degree course. However it is inevitably profoundly affected by changes to the MBA programme. The enormous scale of developments in information and communications technology over the last half of the 1990s has also played a large part in

changing the requirements of such courses. Many new applications are now considered key tools for the manager. In figure 1, we present a theoretical model that binds together these factors and identifies the basis for developments in our ideas on information literacy.

2.3 Information Literacy for the 21st century

Information literacy refers to students' ability to use and navigate information effectively during their studies. Bruce (1997) identifies a number of different ways in which students might experience information literacy. Her first category, the *information technology conception*, refers to students who view information literacy primarily in terms of using information technology, while subsequent categories imply a greater degree of involvement by students in the use and understanding of information.

Bawden (2001) surveys a number of alternative definitions of Information Literacy. He bases his survey on three general concepts of literacy: 'a simple ability to read and write; having some skill or competence; and an element of learning'. In addition he observes a number of common factors, notably that, as with literacy in its conventional sense, the standard of information literacy expected of different people varies a lot according to their background, and that information literacy represents a skill that people can continue to use and extend once they have acquired it. It can be regarded as a skill that integrates a number of other elements which an information-literate person might be able to build on.

Mastery in this paper refers to a level of understanding beyond basic computer skills. In particular it refers to the acquisition of a level of confidence and understanding that allows people to *extend* their skills and knowledge. For instance it refers to understanding the menu structures associated with a Windows package well enough to be able to adapt to use of a new Windows application with minimal instruction or reading. It refers to being familiar enough with the way that web sites are structured to be able to construct complex web searches and to navigate parts of the Internet that one might not have encountered before. In the context of a search engine such as Google, mastery would reach beyond knowing the search engine's technical features, to possessing the intuition necessary to deal with a large number of search results.

There is a parallel with the concepts of deep and surface learning (Ramsden, 1992). In the context of computing skills, surface learning implies learning mechanistically how to use something. Deep learning implies enough understanding of the underlying principles to give a set up extensible and sustainable skills.

The word 'mastery' has entered the popular business lexicon, partly as a result of its use by Senge (1992) as a desirable attribute for managers. However Senge sees it as a generalised attribute, as a form of self-knowledge, which is rather different from the application of the term to a particular set of skills.

2.4 The redesign of the Information Literacy module

The redesign of the MBA programme included a move away from modules that ran through a complete ten-week term, towards blocks of four weeks interspersed with individual weeks based around particular topics. This offered an opportunity to make computing and information literacy skills one of the components of the first four-week block of the MBA, and this, together with the orientation week that preceded the block, meant that students had a considerable opportunity to learn about computing skills during the first five weeks of their degree programme.

At the same time, the style of the material was changed fundamentally, from mostly hands-on classes to a combination of practical exercises and tutorial classes, where the tutorial classes were structured discussions and did not take place in a computer room. The practical exercises were devised so that they could be carried out by students either using their own computers and Internet connections, or using the facilities at the university. This meant that they mirrored accurately the way that students would work in practice during their MBA programme. It also reduced the dependence on the university's computing infrastructure at a time when it was prone to failure, and so reduced the risk of students receiving a very negative view of the information skills component because of unreliable computers. To reinforce deep learning, the tutorial classes were based around a series of questions which the students would discuss in small groups. Some of these questions related to simple practical skills, but most of them were about information management skills and issues. For these classes the students worked in the same groups of 6 or 7 that they would use for other

parts of the programme. In each tutorial class one group would lead discussion about a particular question, and other participants would join in with possible answers and suggestions.

In addition to providing an opportunity to reinforce the learning, the tutorial approach addressed the issue of a very wide range of abilities within the cohort. It meant, in principle at least, that students who had a lot of expertise in information management, could share their ideas with other students who attended the same tutorials. In practice this level of sharing could only be achieved with very careful facilitation of the tutorials.

The first few tutorials were well-attended and the discussion there was very lively. The later tutorials were concurrent with other, assessed, exercises within the programme and the level of both attendance and enthusiasm among students diminished. Also some technical problems did become apparent during the first few weeks and it could be difficult to prevent some tutorials from becoming purely opportunities to talk about these.

Nevertheless the new structure averted many of the problems that had affected the computing skills component of the programme in earlier years, and it at least provided a suitable environment for deep learning.

3. Action research and its relevance to course development for the MBA

Action Research has become increasingly prominent not only among organizational scientists but also more recently with information systems researchers (Eden and Huxham, 1996; Carr & Kemmis, 1986; Avison et al, 1999). Despite the practical difficulties of applying the method, its use is being strongly advocated (see for example the forthcoming Special Issue of *MIS Quarterly* on "Action Research in Information Systems"). Dissatisfaction with conventional positivist and qualitative methods has to some extent driven this development. Action research is thought to overcome some of the shortcomings of other research methods (Baburoglu and Ravn, 1992; Greenwood and Levin, 2000; Baskerville and Wood-Harper, 1996). This section outlines the main elements of the method and discusses why it is appropriate for the course redesign project at Cass, described in the preceding sections. The discussion is organised into two sections – the first on goals and the second on process.

3.1 Goals

Action researchers seek solutions of immediate practical relevance to existing problems while simultaneously expanding scientific knowledge (Avison, et al., 1999; Eden and Huxham, 1996). This is achieved through the collaboration of researchers and practitioners. For Eden and Huxham (1996) the most significant characteristic of action research is that these two groups collaborate on a subject of great practical importance to the practitioners and that the expectation of both groups is that organizational change will be enacted based on the results of the work carried out. This emphasis on action is one of the great attractions of action research. The relevance of research carried out by more conventional research methods has come under increasingly harsh criticism especially for those subject domains that are concerned with the social world (Greenwood and Levin, 2000). Action research, by emphasising the practical outcome seems to address this particular problem. For the case discussed in this paper, the course leaders are discharging both roles of researcher and practitioner. Hence collaboration and intent to implement change are beyond dispute. This is similar to the situation that developed at the Tavistock Institution in dealing with the psychological disorders caused by the 2nd World War, in which scientist and therapist were one (Baskerville and Wood-Harper, 1996). The theoretical model on which the course change is based (presented in section 2.2) underpins both the changes to the MBA programme and the information literacy module.

Unlike most research methods action research embraces change. Other research methods seek to study and understand existing organisational and social structures. The action researcher seeks to create organisational change and study the results (Baburoglu and Ravn, 1992). This is an interventionist approach that encourages social experimentation. Indeed Baburoglu and Ravn would go further in proposing that this method could be used normatively to create the future that we want to live in. It is a method of particular relevance to fluid situations that are subject to continuous development and change. This describes much of the business and educational world. In particular it seems well suited for research into the MBA courses at Cass, if our courses are to evolve to meet the needs of a demanding group of customers.

A3.174

3.2 Process

Many different forms of action research have been applied to IS research problems (Baskerville and Wood-Harper, 1998). However the one chosen for this project is based on an early approach described by Susman (1983). This is a five phase cyclical process (see figure 2), which requires initial agreement on the client-system infrastructure.
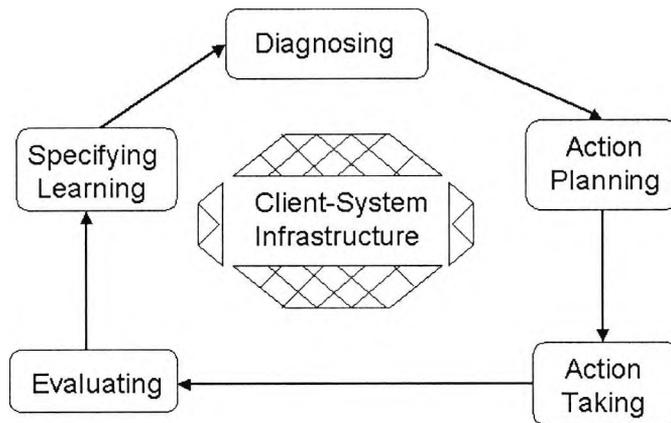

Figure 2 The action research cycle (Baskerville and Wood-Harper, 1998 Taken from Susmann 1983)

The client-system infrastructure is the specification of the environment within which the research is to be carried out. This would cover a multitude of issues like; the level of authority of researchers and practitioners to investigate and act, the boundaries of the problem to be researched, the separate responsibilities of client and researcher. These are all factors that help to define the scale of the intervention and the scope of the research. Where researchers and practitioners come from different organisations and have differing goals, this stage involves much work. It would be important to clarify all contributors needs, responsibilities, contributions before any substantial work is started. This is the stage at which the contract between all parties should be settled. For the Cass project, this stage should be less controversial in that there is less ground for conflicting goals between researcher and practitioner. However the traditional approach to programme design and delivery in which individual lecturers assume responsibility for the constituent modules precludes course changes that depended on collaboration across modules. The creation of the working group for the MBA changed the organisational (the client-system infrastructure) context in a radical way.
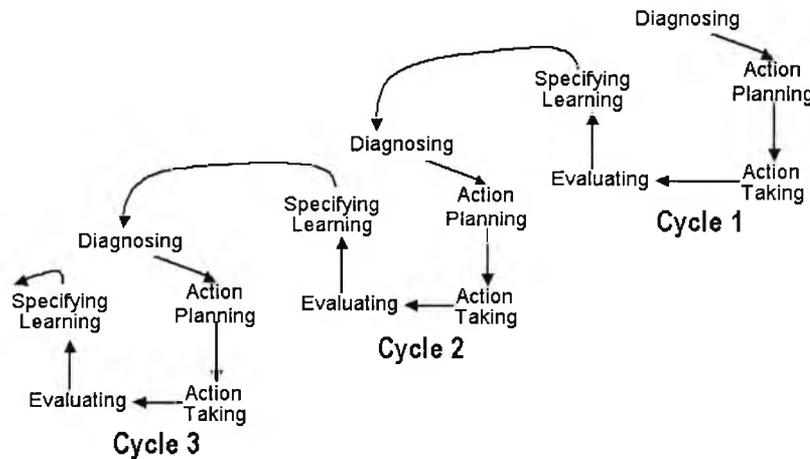
The five phases of one cycle are shown in figure 2. Diagnosing is the stage at which the primary problem facing the organisation is identified. Researchers and practitioners collaborate on developing and action plan to relieve these problems and then implement the agreed intervention (the action taking stage). The evaluation stage is perhaps the most critical and difficult to complete successfully. It involves assessing the effects of the intervention on both a practical level ('Did the action relieve the problem') and a theoretical level ('did we obtain new theoretical insights? Did the results support pre-existing theory?'). If further cycles are indicated, some framework for the next iteration will be required. Finally the learning achieved can be categorised into three types, knowledge about and for the client organisation, the basis for designing further iterations and new theoretical insights. The cyclic process of repeated applications of these five phases is one of the distinctive and powerful features of this type of action research (figure 3). Succeeding cycles allow the opportunity for the learning from the previous intervention to be incorporated in the next action. This process of action, feedback, reflection informs the design of further interventions and theory development. It is a continuous process building knowledge and practical understanding from cycle to cycle. For those subjects that are heavily dependent on the social and organisational context and subject to continuous change, this is a more

promising approach than other research methods. For the information literacy course, it was the restructuring of the MBA degree

course as a whole that offered the opportunity to make a major intervention and start cycle two.

Figure 3: Spiral of action learning

3.3 Summary
For Baskerville and Wood-Harper (1996) the ideal domain of the action research method is specified by the following characteristics:

1. The researcher is actively involved, with expected benefit for both researcher and organization
2. The knowledge obtained can be immediately applied
3. The research is a cyclical process linking theory and practice'

The course redesign project meets all these criteria. The researchers and practitioners are one and expect to obtain both theoretical and practical benefits. The knowledge gained will be put to immediate use for the next cohort of students. The first cycle has been completed and cycle two is underway with several more cycles expected.

4. Application of Action Research methods to the redesign of the information Literacy module at Cass
The project team was made up of the three authors, all of whom have contributed to the information literacy course over the two cycles. Although we, the team members were generally in substantial agreement as to both research and practical goals, it only became clear how limited our range of options had

been as the possibilities offered by the major restructuring of the MBA began to unfold. The client-system infrastructure within which we worked had exerted powerful pressures and imposed severe constraints. This section describes the results of the initial cycles.

4.1 Cycle 1
Cycle 1 lasted many years. The original diagnosis phase identified the need for a set of computing skills training classes to be added to the existing MBA degree programme. Two factors contributed to this perception. Software developers were providing an expanding range of increasingly sophisticated computer packages that contributed to the efficient operation of the office. The managerial job role was undergoing significant change and the direction it was moving in included the expectation that managers could make appropriate use of computer packages. In practice the need for additional classes was driven by the development of a university wide network that all students needed to use and the patchy nature of package training delivered by the individual modules of the degree.

As described in section 2.1 above, the intervention taken was the design of a set of computing classes delivered in the first weeks of the programme. This was taught for many years, with minor changes to course content in terms of additional packages and university network functions, but with no change to the

course process in terms of structure or pedagogic approach.

Evaluations were made every year that surfaced a number of problems and criticisms – all on the quality and effectiveness of the course to meet the formal teaching aims. The evaluations were fairly informal. They comprised the perceptions of the teaching staff, computer support staff and student feedback on an individual and group level, notably the staff/student liaison meetings. An important point is that in a one-year course there are serious difficulties in identifying tangible improvements year on year, because each cohort of students does not really see any benefits from improvements in the course from one year to the next. Many of the issues covered by student feedback on information literacy have been to do with 'hygiene factors' (Herzberg, 1959) that only really generate comment when they are absent. These evaluations resulted in little additional learning with respect to the theory underpinning the course, but a lot of information on the practical problems of delivery. In particular neither the basic learning aims nor the teaching methods of the module were ever seriously questioned.

4.2 Cycle 2

Cycle 2 started in early 2002, with the formation of the working group to redesign the MBA programme. Theory development, diagnosis and action planning proceeded in parallel. The diagnosis stage resulted in a major change in our definition of information literacy and teaching aims for the module, as described in section 2.3. This led to the module redesign described in section 2.4.

Evaluation is proceeding on several levels – for the module individually through the staff and student perceptions, and for the MBA core as whole through student feedback forms and staff/student liaison committees. It is notable that staff feedback now comes from those teaching the core courses not just from the information literacy teaching group and computer unit staff. However it is becoming clear that we need to design a more formal system for evaluating all the elements of the module. Learning aims concern all the MBA participants – staff and students. Much of the assessment of module success relies on the tacit knowledge of staff involved in preceding cycles. For example one of the authors could see a change to the pattern of IT problems from previous years, in that they did not occur quite as early in the term as had happened in earlier years. In his view, that would have

translated into a much better initial impression for students. But that depends on his largely tacit knowledge. It would be good to find ways of turning such judgements into explicit knowledge. Assessment of student skills acquisition is also important and needs to be targeted on the new goals. For example assessment through application and use on the core courses that the module has been designed to support.

4.3 The Future

The theoretical basis proposed for the MBA programme and information literacy module offers an explanation of the swelling dissatisfaction expressed about the traditional programme. Further work to amplify the description of the constituent elements would help to clarify the value of the various aspects of the course redesign and enhance continuing change initiatives. Evaluation of this model is key to successful course changes. If it is a poor representation of current business conditions and/or teaching methods, the course design for which it is a base will rapidly become flawed. Continuing change to business conditions could have a similar effect. Effective evaluation methods are far from clear but are the key to further learning. The results of cycle 2 have also established the need to develop more formal systematic evaluation procedures for the practical realisation of teaching aims.

With the review of the MBA core courses for the autumn term 2002, cycle 3 may have started. For the information literacy teaching group, diagnosis, theory development and action planning stages are again proceeding in parallel. The review and planning actions undertaken for the MBA core as a whole are having a significant impact on this process. The scale of the intervention for the following year will determine whether this is a new cycle or a refinement of cycle 2.

5. Conclusions

Action research can be an extremely valuable research method for course leaders. It is particularly appropriate for business degree courses, facing the need for continuous change driven by technology and developments in business theory and practice. The application of this approach to the case of the information literacy course at Cass Business School has suggested several promising lines of enquiry for future cycles of course development.

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