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Learning Research Methods: How Personalised Should we be?

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Abstract: Much recent discussion in higher education has focused on the scope that exists to provide personalisation to students. This influences a range of factors, spanning the expectations that students have of the learning environment, the styles and methods used by lecturers, the need to deliver very specialist material to students, and the type of technological infrastructure that is adopted to support learning. For example, some viewpoints suggest that electronic resources to support learning should be delivered through a 'personal learning environment', as distinct from the currently familiar 'virtual learning environment', the implication being that personalisation is built into the learning environment as a core component. For teaching research methods, a personalised approach is attractive because students can be expected to vary in what approaches to research they are likely to use in other areas of their studies. Typically students want to make clear choices about exactly what research methods they learn. Furthermore there are particular variations in the extent to which students already have some experience of conducting their own research, and in the ease with which student are likely to adapt to a research mindset where they can deal with the demands of independent inquiry. For many students research is an individual pursuit, and indeed for students on undergraduate or taught postgraduate courses which include a major project, a piece of independent research is the most significant item of individual work within their course. Therefore this paper raises the question of whether research training needs to be as personalised as research itself. If it appropriate to prepare students for a major piece of research, where they will be choosing their own research methods, through a didactic course which covers a standard range of methods? Is it - in fact - essential that students are exposed to a wide range of research methods including those that they have no intention of ever using? The need to provide a range of skills and knowledge, and the possibilities to adapt this to students' requirements, constitute only one facet of personalisation. Another is the ability to adjust material to differing prior levels of expertise, and to help students in finding the most effective path to achieve the necessary learning. While students are unlikely to enter higher education with any significant exposure to academic research methods, some of them will have carried out activities that have resonances with the research process. So there is considerable scope for inviting students to identify the most appropriate level at which to start learning research techniques. The intention is to identify some general principles for the personalisation of research methods learning and to discuss in what circumstances these might be relevant.

Keywords: personalisation, research methods teaching, student choice

1. Introduction

This paper discusses the overlap of two subjects which are directly relevant to the teaching of research methods:

- The need for university students, on taught degree courses where research is not a major area of focus, to learn a certain amount about how to conduct research – usually as a preparation for a significant individual and independent project that they must pursue as part of their studies
- The emergence of personalisation as a current trend in learning and the possibility to apply this in different directions.

It reviews different approaches to personalisation and relates these to the teaching of research methods. Part of the background is that the research carried out by students within a taught degree is an individual activity and an intrinsic property of such research is that students should have differing individual requirements. In other words students' research work is highly personalised, and an important question is whether their training in research techniques should be personalised to the same extent.

The discussion in the paper is based on the author's personal reflection and experience, predominantly in the context of undergraduate business and management degrees, within which students are required to carry out a single substantial piece of individual research in their final year. This reflection includes some thoughts prompted by the difficulties in applying some approaches to personalisation, which had achieved a measure of success when implemented to support other areas of learning, to the teaching and learning if research methods.

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2. Concepts around personalised learning

This section introduces some of the concepts underpinning the potential for personalisation of learning in higher education. It discusses the context, and sets the scene for a further discussion of why personalisation is particularly relevant in the teaching of research skills within a university course. After a discussion of why personalisation is relevant, there follow some observations on the implications for learning design, and then the potential use of technology to achieve more personalised instruction.

Personalisation of products and services has become a familiar concept in many areas of life. The notion of the 'long tail' (Anderson, 2008) is built around the ability, given the technology that is now available, for businesses to offer a very wide range of products. Any products based around information technology will typically include a very large range of options and customisable features. Mass customisation (Coletti and Aichner, 2011) emerges from the development of manufacturing processes that allow the economies of scale historically associated with large-scale production, but also permit a wide variety of individualised products to be offered. Apple, with the iPhone, have adopted the contrasting approach of providing a highly standardised product which is manufactured and sold in large numbers, but in creating an ecosystem where suppliers of applications and accessories are allow their customers to build something which is highly personalised (Nuttall, 2011).

Personalisation is one of the promises of the recent generation of MOOCs (massive open online courses). One reading of the design philosophy behind MOOCs would be the application of mass customisation principles to adult learning. Typically the benefits of large-scale learning in a MOOC are sold to students in terms of access to prestigious institutions and highly regarded faculty. Nevertheless Anderson and McGreal (2012) position new models, notably the availability of open educational resources, as an example of the emergence of a low cost 'no-frills' approach to provision of higher education. George Siemens, one of the originators of the term MOOC, ascribes the need for new approaches to learning, to the complexity of the issues with which students need to grapple (Kolowich, 2014).

MOOCs are open to criticism, notably for the fact that computer-mediated individual support is no substitute for the quality of mentoring that direct contact with an expert can provide (Palaimo, 2013). There is a danger that personalisation of the MOOC experience can become superficial, and that a student-centred approach, or an invitation to students to co-create content, can appear as an excuse for students to work on their own with minimal help. But there are indications that the approaches embodied by MOOCs could have potential in preparing students for an individual research project. The promise of access to experts is appealing, because students value the opportunity to discuss their aspirations for research with academics with relevant knowledge. Also a MOOC offers an avenue for students into the chance to learn at their own pace, and a research project constitutes a significant element of self-paced learning which typically contrasts with the structured material taught elsewhere in a degree course. Dealing with complexity, referred to above as a driver for the use of MOOCs, is also a characteristic of students' research projects, where there is a need to address and make sense of messy and unstructured problems.

Personalisation has a role in academic environments where a more didactic, face-to-face approach remains the primary channel for instruction, and arguably a measure of personalisation should be a feature of all higher education courses (Istance, 2011). Personalisation can be viewed in terms of alternative paths followed by learners – notably where there is a distinction between taking alternative paths to a common goal (for example where there is a wide discrepancy within the student cohort in the level of prior knowledge of a subject, but everybody in the cohort needs to achieve a baseline level by a certain stage, or where different members of a cohort exhibit different preferred learning styles and might benefit from material presented in a manner that suits their style). But it can also be viewed in terms of catering for alternative goals, where students might wish to learn about specialised topics which are only relevant to a few members of the cohort. In the context of research methods, and particularly training to carry out individual research, this aspect of personalised learning through offering multiple goals is significant.

Wells and Ball (2008) characterise students' learning processes as an act of knowledge building and of navigation: an implication is that for both students and educators it is essential to recognise the effort which

must be put into navigation. This is particularly relevant when resources are provided online, and when students need to pick resources which are right for their specific needs – for instance a student carrying out individual research into a particular topic should be able to navigate rapidly to supporting materials for their chosen research methods.

Simple quizzes can be used for self-assessment by students, so that they can adopt the most appropriate path through a personalised learning landscape. The use of games to facilitate learning through a sequence of interactive processes (De Freitas and Maharg, 2011) can be viewed as a further stage in this process where students choose and navigate their own path.

One variant on the notion of personalisation is the emergence of interest in a personalised learning environment, characterised by being learner centred and able to adapt to a learner's use of a range of resources (Van Harmelen, 2006). It should be stressed that this concept has been raised in discussions of the sort of technology that could be used to support learning. At one level this could be viewed as a potential alternative to the virtual learning environments used in most institutions to make online resources available to students. Kallkvist et al (2009) discuss the creation of personalised learning spaces, and indeed their use to assist students in carrying out individual inquiry at an undergraduate level, using tools principally intended for students to produce e-portfolios of their own work.

Rae and Samuels (2011) discuss the use of a *personalised system of instruction,* an approach with a strong emphasis on formative assessment where students receive regular feedback and are encouraged to learn from this. They observe that this approach is particularly effective for students who could be perceived as being at risk of losing interest in a subject. Tellingly, they report on the technique being invoked to reduce the failure rate on a class which they describe as 'painful', and they refer to personalised learning being offered as far back as the 1970s, long before the current wave of interest in learning using the Internet. Marin Juarros et al (2014) compare two different approaches to construction of a personal learning environment using widely available interactive tools. In their evaluation they advocate that students be introduced to personalised learning environments at an early stage in their courses, so that they can adopt the mindset of *prosumers* (Toffler, 1981) where they create parts of the same products and services that they consume. Related to this, they suggest that autonomy in learning should be one of the defining characteristics of the current generation of students. It could be added that autonomy is an essential attribute for students about to embark on (possibly their only) exercise in research.

A further recent trend has been an increased interest in learning analytics and measurement of the interaction between learners and resources that are help online. This stems in part from an interest in analytics as a business tool (Davenport and Harris, 2007), but also reflects educators' dependence on computing platforms which can generate considerable volumes of data about their users. Greller and Drachsler (2012) discuss the challenges associated with dealing with the data collected this way (including significant ethical concerns) and propose a generic approach to the use of learning analytics. Social learning analytics (Buckingham Shum and Ferguson, 2012) refers to the increased complexity entailed in applying the principles of analytics when the learning environment is, in practice, a complex and interconnected set of social networks.

Adaptive learning (Newman, 2013; Thompson, 2013) connects the use of analytics with the personalisation process, by automating students' decisions about which options to choose. In adaptive learning, data is used to construct a complex picture of a learner's requirement and to deliver learning materials accordingly, possibly in such a way that one learner would encounter subjects in a completely different order from another taking nominally the same course. A further characteristic of adaptive learning is that materials can be assembled at the same time that data about learners is gathered, and an ever-increasing body of material is incorporated into a learning resource.

What, then, are the practicalities of providing personalised instruction to support students' individual research? What benefits might accrue and how can they be evaluated? On the strength of current ideas about personalised learning environments, and the availability of tools to help students to navigate through available information, the most promising approach looks to be the provision of supplementary online resources. Students should be encouraged to browse through these and to identify the ones which are most appropriate to their own subjects of interest. These resources can be provided in tandem with a small amount of formal instruction in research methods. While students would be encouraged to explore their own route

through these resources, there is potential for the use of analytics to steer students in directions that might be appropriate for their interests.

Such resources would provide value for students, by giving them access to useful supporting material for individual research, and by encouraging them to think through choices which affect their research projects. There is also potential to put students in touch with experts from within the university, by inviting academics to participate in the online resources and to offer guidance to students whose research interests coincide with those of the academics. Limitations of providing these online resources centre around some students' reluctance to engage with supporting materials which are provided online. Also some effort is needed to prepare such resources, and to be effective, they should be provided in good time so that students – even those who are predisposed to hand in their final project at the last minute – should have access to them at an early stage.

Evaluation of students' experience in carrying out individual research can be problematic. Within universities, evaluation questionnaires are very often worded in a way which is effective for a didactic, taught, component of the course but difficult to apply in the context of independent learning. The National Student Survey sets out to evaluate the experience of students in their final year, but there are limitations in using the resultant data – for example the analysis by Bennett and Kane which highlights the extent to which different students have different interpretations of the questions used in the survey.

3. Architecture

In the light of the current rhetoric on personalisation, some principles which could be applied to a learning architecture, suitable for constructing teaching resources for undergraduates pursuing, typically, a single major piece of individual research, are discussed here. While the architecture is about pedagogy and not about any technological platform, it is worth noting that the author's institution uses the Moodle virtual learning environment, and that work on personalisation of learning was concurrent with the transition from an early release of Moodle to a much newer one that facilitated the provision of content tailored to one student.

In this context, the term 'architecture' refers to a set of broader assumptions and general design principles that inform the approach to learning used in this setting. Garavan et al (2012) discuss architecture in the context of talent development among employees of an organisation, suggesting in a business context that it could be represented in terms of a set of systems and strategies that could contribute to effective learning which is appropriate for an individual. Given that in business and management degrees, an individual project often includes some work alongside an organisation, and offers scope for students to develop particular areas of interest, it is appropriate to use similar terminology when discussing training and supervision for student projects. Personalisation should be introduced early within a unit of learning. For the purpose of research training for undergraduate students at least, the unit of learning would be the final year project and any directly associated research training. This relates to the observation above, that students should be aware of their role as prosumers from an early stage, and also encourages them to consider their choices about methods and their research plan from an early stage.

It is worth reviewing the characteristics of a final year research project and discussing, how they could inform a learning architecture. The final year project differs from other aspects of the undergraduate course in the importance of an element of one-to-one supervision with a member of academic staff. Supervisors vary considerably in their preferred approaches: some like to annotate drafts sent by email whereas others rely very heavily on face-to-face discussions. Personalised online content for the final year project needs to reflect this, and possibly there is a need for supervisors to make explicit choices in how students should receive online material. But there is also a need to students to make choices, and to be guided in these – notably in what sort of demands to make of their supervisors. Sometimes students will work alongside their peers to form a community of practice, sharing their own knowledge and ideas.

The academic aspect of a project implies that students need to demonstrate some familiarity with the literature around their area of interest. In particular they will be expected to apply a high level of information literacy to their studies, and to evaluate the relevance and level of authority associated with different sources

(Abilock, 2010). The paradox between students working individually, and working as part of a cohort with shared aims, comes into play around this sort of issue, as students with projects covering different areas will encounter the same issues around information literacy and evaluation.

A potential benefit of introducing personalisation early in the unit of learning is the opportunity to foster a research mindset among this group of students. It is tempting to regard online learning resources purely as a means of offering practical information. However for students encountering research for the first time the biggest challenge is often to become accustomed to thinking as a researcher – to recognise how to carry out research and even to become familiar with some of the language of research. There are parallels with other subjects, where indeed there is scope to provide tailored extra support to students who struggle with the vocabulary and concepts which underlie the subject.

There is a considerable variation among students in which research methods they will wish to use. But students will also seek guidance so that they can make choices: somebody considering interviews, surveys, and observation as possible tools for data collection would have a working knowledge of all three before choosing just one. Moreover students who have conducted an individual project can be expected to have some familiarity with a range of research methods, and not only the ones that they have used themselves. So personalised resources should offer students the opportunity to explore a very wide range of research methods.

Because research training is a considerable step, for most undergraduate students, away from anything that they have done before, there is limited scope in building a component of adaptive learning into research training resources.

4. Experience and reflection

While early indications led the author to be optimistic about the use of a personalised approach to research training within their own institution, in practice the use of online personalised or adaptive resources to support learning of research skills remained limited. Some of this could be attributed to a lack of resources and commitment to creating learning materials, together with the lack of any perceived gap in requirements. Research training for undergraduate students, in preparation for their final year project, comprises a small number of briefing sessions together with one-to-one meetings between students and their academic supervisors. This is usually fit for purpose, at least to the extent that the majority of students were able to carry out projects with a significant research element. Students taking their final year project were provided with a simple Moodle page which included some pointers to background information on the research process. This attracted some traffic in the period immediately before the deadline for submission of the project, suggesting that online support for the project process was of most value as a way of dealing with last-minute emergencies.

It should be noted that the connection between formal research methods tuition, and the supervision for the final year project, was fairly loose. In principle the intention was that students attended a short series of briefing seminars where they were introduced to research methods, but they were then handed over to the supervisors, and any further instruction in research methods took place through individual supervisor meetings. A large number of academics acted as supervisors and there was a considerable variation in the extent to which these academics engaged with content elsewhere in the undergraduate course – including the research briefings. A consequence of this process was that, once students' supervisors were allocated, students tended not to engage in any research instruction unless it was provided by their supervisor.

However discussions with faculty colleagues, and particularly with academic managers concerned with providing resources for supervision, have uncovered a new set of imperatives to revise the project supervision process. One is apparent from feedback, some of it from students, particularly through the National Student Survey taken by all final year undergraduates in the UK, where a clear theme in students' free-text comments was that they appreciated the opportunity to carry out individual work, but that many of them would have liked more scaffolding, which would help them to carry out their projects with a clearer idea of what could be expected. But the supervisors also offered feedback, that in some cases they were unclear as to what was expected from student projects, and how best to offer guidance.

Furthermore, the number of students on the undergraduate business and management courses has increased in recent years, and this has placed increasing demands for supervision on a group of academic staff who are already under considerable pressure of work. So questions have been raised on how the current model for supervision can be adapted to place less pressure on individual members of academic staff.

Reflection on the reluctance, among both staff and students, to use personalised online learning revealed a number of issues:

- Because a lot of research tuition in practice had taken place through individual tutor meetings, research was perceived as a solitary activity by students (in contrast to the taught components of their degrees, which typically involved large lectures and a lot of teamwork). Personalisation was provided, but by tutors choosing specific topics which were relevant to individual students and by dispensing guidance to individuals. While this was valued by many students, unfortunately a number did not get sufficient guidance from their supervisors – and an argument for introducing more online resources could be framed either in terms of replicating elements of the personal tutoring meeting or in terms of dealing with the deficiencies experienced by this minority of students. While there were guidelines as to how much contact time students and staff should have in project supervision, there were also considerable discrepancies between tutors and students in how rigidly these were interpreted. So individual areas where students could have benefited from more research support were usually seen as difficulties affecting an individual student, and perhaps their relationship with their supervisor
- Stemming from the individual nature of research work and research supervision, each student had a very different set of requirements and interests. While superficially this might appear to contribute to a case for personalisation, in practice this was merely an argument to put students in an environment where a wide range of learning resources was available, and there was not a strong case for taking one approach to learning and personalising it
- Within the university there was some experience of implementing simple personalised resources using a virtual learning environment to direct students to suitable material online. This had been well received in one particular instance, when students were revising for an impending exam and were nervous about their level of preparedness. This approach was effective in the period immediately before a formal exam because students were looking for guidance on how to deal with a task that required a set of unequivocal answers. However students were more reluctant to engage with such resources in connection with research skills, which were more open-ended and where understanding of the skills would help them to ask further questions.

The last point, referring to the use of online resources by students to support last-minute revision, is particularly striking. A conscious aim in learning design throughout the undergraduate degree course was to provide a range of learning approaches to accommodate students with a variety of different preferences. This variety extended to different approaches to last-minute study, but a consistent pattern was that many students became 'instrumental' in the approach to an exam, in that they became focused on practical learning which could assist them with the exam. This pattern appeared less marked when the students were faced with an imminent deadline for a project, even though this was also a major piece of work where students might have been expected to turn to online resources for rapid guidance.

Campbell et al (2007) discuss personalised learning in connection with school, not university, education and some of the ambiguities that they document are specific to school-level education, notably the use of a predefined curriculum. Significantly, they discuss different perspectives on personalisation in terms of different models of deep and shallow personalisation. In forming their argument they draw on alternative views of personalisation which have their origins in analysis of the provision of a range of services, such as healthcare, but significantly they comment that deep personalisation can arise where professionals become advisors and brokers. This perspective has resonances in the roles of the supervisor of a student research project. Normak et al (2012) conceptualise personalised learning in terms of the interaction between learners and a logical space through which they should navigate following their own route. This is another approach that might be expected to fit the exploratory approach that would typically be pursued by students learning to carry out individual work.

In practice technology was used to support the project process, but at a simple level and with little connection to the supervision process. Moodle pages were made available with links to a limited range of pedagogic

resources, but also as a repository for practical information: timescales, procedures for referencing, facilities for electronic submission of student work, and so on. While supervisors had access to these Moodle pages, they were not encouraged to review them and no effort was made to publish guidance or information for supervisors through Moodle. So practical recommendations to enhance the use of Moodle to support the project process would include the provision of more resources (and possibly a dedicated Moodle page) specifically for academic staff acting as supervisors, and also ensuring that the Moodle spaces for the project attained a critical mass of use by students.

There are a number of alternative interpretations of the role of a project supervisor with subtle differences between them. Part of the context is that students on a predominantly taught university course perceive a project, where they need to carry out individual inquiry, as an excursion into the world of research. But it is a temporary excursion, and often one that they may value but that nevertheless takes them beyond the sort of learning experience within which they feel comfortable. Given this context, the role of a project supervisor is that of a guide or mentor, and the supervisor's individual tuition is perhaps the most important element in helping the student to understand research methods.

A supervisor as a broker – implicit in the discussion of deep personalisation – would have a slightly different perspective. From the student's viewpoint this implies an awareness that there are other sources of research guidance than their own supervisor. The supervisor's role could involve mediating, both with academic experts in related fields and also with a range of sources of instruction in research methods. So the supervisor would no longer be somebody who knows everything in the students' eyes, but become somebody able to facilitate personalisation.

In terms of providing online support and resources, then, a possible way forward would be to place the personalisation in the hands of the supervisor. Instead of inviting students to fill in questionnaires and choose options to navigate the most suitable route through learning materials, it might be more fruitful to provide questions and options for supervisors, which would help them to locate the right learning materials online for their students and which would facilitate their role as brokers. Moreover that this recognises that not only do students have their own preferences in how they learn, but supervisors have different styles which they bring to bear on the process. It also fits well with an environment where there are a large number of supervisors, and particularly in one where there is a need to provide students within a large cohort with a sense that they are receiving some individual attention.

So, returning to the stated intention in this paper, of identifying general principles for personalisation of teaching and learning of research methods, one important point is that personalisation should be about tailoring approaches to the research supervisor's individual requirements as much as it should be about tailoring them to students' needs. One further factor affecting the process is the institution's formal structures and procedures. In the author's institution these state that to achieve an honours undergraduate degree the student must carry out a successful final year project, although the definitions of what constitutes a suitable project are worded to allow some flexibility. Academic staff are expected to supervise a certain number of projects, which could be either postgraduate or undergraduate, as part of their teaching responsibilities. Some, but not all, academic staff regard project support as part of the responsibility associated with formal lecturing: if they deliver lectures on a subject to a group of students, they are prepared While there is some scope to amend day-to-day process of project supervision, any fundamental alteration to the nature of student projects would be regarded as a major change requiring a complex and lengthy approval process.

At a broader level, the structure of the institution's degree courses is based around a number of taught modules, each based around a certain amount of material delivered typically over 10 weeks. Within this structure the project is regarded as a double module, nominally lasting 20 weeks of the teaching term, but with minimal formal tuition. Moreover it is assessed through a single item of work (the final project) in contrast to other modules which are based around multiple assessments – typically an exam and often more than one piece of coursework. In practice students rarely spread their project work evenly over the 20 weeks allotted to it, so there is already a tension between the way that the project is represented within the structure of the degree, and the way that it is carried out by students.

Although the modular approach provides flexibility and choice for students in that they can choose different subjects to study, it can work against personalisation by making it difficult to provide units of learning which do not easily fit into a complete module. Such small units of learning could include tuition in particular research

skills which would be relevant to particular students' projects, and provision of such small units is a further practical example of personalisation which would be worth pursuing.

5. Conclusions

Synthesising the issues discussed above, a number of concluding points emerge:

- Personalised learning does in principle offer some attractive possibilities for research training. However these are not necessarily easy to implement using the electronic resources that are available
- The role of the supervisor in encouraging and implementing personalised online learning is critical, especially given that a good supervisor will already provide a personalised approach to face-to-face learning
- An effective supervisor would act as a broker, actively creating a link with other academics and other resources, and online materials should be designed to support this role
- Benefits can accrue from exposing students to online personalised resources early in their research activities and thus to encourage them to adopt the mindset of a researcher.

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