

Inquiry-based learning in the first-year Information Management curriculum

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Abstract

This paper describes and evaluates *Inquiry in Information Management*, a first year undergraduate module designed on inquiry-based learning (IBL) principles at the University of Sheffield. In the module, students undertake a small scale, group research project, choosing a research question, conducting the research and reporting their results in poster form to invited staff and their peers, while also maintaining a group blog. The paper begins by explaining the context in which the module was developed and summarising the concept of IBL. It continues by describing the design of the module, highlighting some workshop activities designed to 'scaffold' students' inquiries. The quality of student work was high, and there was an enthusiastic response to the freedom offered by IBL. Involving students in designing assessment criteria for the posters helped them understand the assessment better. Overall, students' engagement with Information Management seemed to have deepened. Future developments are discussed and the authors reflect on the new demands IBL makes on both students and staff, and on how the application of IBL in this context is shaped by the fluidity of Information Management as a discipline and ambiguities regarding the place of research in this context.

KW: inquiry-based learning, research-led teaching, information management, peer assessment, blogs

1. Introduction

The purpose of this paper is to share our recent experience of developing an inquiry-based learning (IBL) approach for a new, first-year undergraduate module in Information Management. We had previously used IBL in other teaching within the BSc Information Management curriculum, including with first-year students.

However, the more strongly student-led, 'whole module' approach we set out to take here represented a further step in the development of our practice for all of us in the teaching team (the authors of this paper). We were impressed by our first-year students' ability to rise to the challenges we set them, and the impact of the approach on their interest in the subject area. We hope that this account will convey something of the excitement we gained from working with students and each other through IBL, and of what we learned through the process - both from what we considered worked well, and from what was less successful. In illustrating one interpretation of IBL, our paper describes an overarching design framework that could be adapted to other contexts, along with some detailed practical examples of learning tasks that may also be transferable.

1.1 The module

Inquiry in Information Management is a first-year, second-semester core module for the BSc in Information Management programme in the Department of Information Studies, University of Sheffield. Student numbers on this programme are relatively low (generally not more than thirty each year) and in the first year the module ran (2006-7) the year-group comprised eighteen students. We structured the new module around one two-hour workshop each week for twelve weeks, plus group tutorials and independent activity.

We had two main aims in creating the module, which builds on first-semester modules that introduce students to foundation principles and concepts in Information Management. First, we wanted to help them deepen their engagement with, and understanding of, Information Management as an academic discipline and professional practice. Second, we wanted to give them an opportunity to develop their research understanding and skills. We have found that our Level 1 (first year) students often experience some initial difficulty identifying with Information Management; because it is relatively little taught or understood in schools, they tend to arrive without a clear idea of what it is and of what it offers in terms of both intellectual interest and career opportunities. Against this background, we wanted to offer more core Information Management content in the Level 1 curriculum and at the same time give some space for students to explore aspects of the discipline in a relatively free, open-ended way. We thought that an inquiry-based approach would contribute to their developing as creative, critical and inspired learners, as well as to

developing their inquiry-related understanding and skills, including in the area of information literacy. Setting out explicitly to engage first-year undergraduates in a collaborative 'research community' activity was also a way to involve them at an earlier stage in the research-led culture of the Department and the University. We hoped that including our undergraduates at the earliest stage of their career in one of our most valued practices - that of research - would begin to induct them into the community of inquiry represented by the Department of Information Studies, and to introduce them to the connections between research and practice in Information Management. Beyond this, we wanted to contribute to fostering a critical, 'inquiry orientation' amongst our students that we see as central not only to academic endeavour but to life and work outside the academy in a profoundly complex and challenging world. On the basis that developing such an orientation is difficult, because it involves engaging with uncertainty and critiquing assumptions, and that it is important, because it is a morally-driven exercise aimed at improving the world, this seems an important endeavour.

1.2 Inquiry-based learning

Our own exploration, as teachers, of the meaning and practice of IBL was also an important aspect of the process of designing and facilitating the new module. Its development was supported by CILASS (the Centre for Inquiry-based Learning in the Arts and Social Sciences), a Centre for Excellence in Teaching and Learning awarded to the University of Sheffield by the Higher Education Funding Council for England in 2005. CILASS promotes approaches to teaching that mirror discipline-based processes of inquiry and research within the student experience, with the aim of more closely aligning disciplinary and interdisciplinary practices of teaching, learning and research. We hoped that our experience, and what we learned from it, would contribute to informing wider departmental and institutional initiatives in IBL, and to inspiring colleagues to further develop the inquiry elements of their own practice as teachers.

IBL is an approach to active learning in which open-ended, student exploration, investigation or research drives the learning experience, and all learning and teaching resources and activities are designed to support the inquiry process (Khan and O'Rourke, 2005; Lee, 2004, Healey, 2005). With theoretical roots in constructivist and socio-cultural models of learning, it is advocated as an approach

that engages students explicitly with the processes of knowledge-creation and co-creation and is regarded as a key pedagogy in strengthening the links between teaching and research in higher education (Brew, 2006). Students learn through engaging with the questions and problems of their discipline, and with the intellectual and creative works that constitute its focus or evidence base, in ways that mirror the scholarly and research processes of that discipline. The University of Sheffield's commitment to IBL is premised on both local and wider evidence that, where students have opportunities to learn through inquiry, the result can be increased engagement, deeper approaches to learning and, ultimately, graduates who are well-equipped to move into the next phase of their lives (see, for example, Justice et al. 2008). Inquiry capabilities are central to the characteristics of the 'Sheffield Graduate' as articulated in the University's current Learning, Teaching and Assessment Strategy (2005-2010).

As emphasised by Hutchings (2007), the point of departure for all IBL is *the question*, whether established by the teacher, the student, or by negotiation among them; questions may be embedded into a case or problem scenario, or provide the focus for a variety of different forms of research project and investigation. From this point of departure, students embark on an emergent process of exploration and discovery, often in groups, with guidance from teachers working in a facilitative role. This approach implies a strong commitment to the development of student autonomy and responsibility, for example in terms of students defining their own research questions, and the resources and support they need to pursue them - though taking into consideration the needs of more novice students for greater 'scaffolding' in these and other processes than those at higher levels of study.

While some forms of IBL focus on questions to which answers already exist, IBL is often conceived as a means of engaging students with the contested nature of knowledge and with 'messy', open-ended problems and lines of inquiry that are authentic and important to the discipline or practitioner context. Some IBL approaches are designed principally to facilitate students' exploration of the existing knowledge-base of their discipline, whereas others more explicitly invite their participation in building disciplinary knowledge. Hutchings (2007) comments that,

the truest, most radical and empowering forms of enquiry-based learning are those which endow students with the challenge, freedom and responsibility of determining all - or at least as much as is possible - of their learning within the

field [...] such enquiry-based learning is closest to replicating genuine research and is its ultimate power as a learning method (pp.19-20).

'Process support' activities and resources that aim to develop students' capabilities in areas of relevance to the inquiry process are often embedded into designs for IBL. These may focus on the development of discipline-specific inquiry methodologies and techniques, and of 'transferable' skills in areas such as collaborative work. Strategies to encourage student reflection on process also are commonly adopted, with the aim of facilitating the development of meta-cognitive and other skills associated with learning to learn.

There is no single design protocol for IBL. However, the following broad elements of the inquiry process typically are accounted for in the design and facilitation of inquiry activity:

- Students and/or tutors establishing an inquiry task;
- Students pursuing lines of inquiry (often in groups);
- Students drawing on their existing knowledge, and identifying new learning and information needs;
- Students seeking information and evidence from multiple sources;
- Students discussing, receiving guidance and feedback, and synthesising information;
- Students reflecting, analysing and communicating ideas and results;
- Students working with peers and teachers as partners, or participating in an inquiry community.

Principles derived from constructivist perspectives on learning, whether oriented towards more strongly cognitivist or social/situative theoretical variants, underpin design for IBL. At the University of Sheffield, academic staff are supported by CILASS to approach design for IBL in terms of a number of distinctive features, including: situating the inquiry task at the centre of the students' experience; identifying a task that requires student engagement with authentic inquiry practices of their discipline; providing for 'process support' in areas such as information literacy development as well as discipline-based methodologies and techniques; providing activity-sequencing that is appropriate to an emergent process of discovery.

In designing *Inquiry in Information Management*, we wanted to embed an authentic, if small-scale, research experience into the first-year BSc curriculum, thereby inviting students, with our support, to engage with the challenge of taking a significant level of responsibility for both the direction and process of their learning within the module. In what follows, we discuss the learning design that we developed, and some themes arising from the experience of facilitating the module. Our aim is to convey its overall design, while highlighting a selection of specific activities and issues.

2. Learning design and facilitation

As indicated above, the module was designed to incorporate two interwoven strands: one in which students would learn more about aspects of Information Management, and the other in which they would begin to learn about the nature and role of research in this field and what is involved in doing and disseminating research. We placed the small-scale, student-led research project at the centre of the learning design, as a way of knitting together these two strands and enabling students to identify and explore an aspect of Information Management that was of particular interest to them. We designed a range of workshop and tutorial activities, and provided supporting 'content input' in the form of readings and short presentations, with the aim of facilitating students' engagement with different conceptual and practical issues relating to both Information Management and the research process. While we did not design the module as a detailed 'introduction to research methods', we did want to introduce a relatively strong focus on exploring the nature of the research process and on fostering students' self-reflexive awareness of themselves as developing researchers. We did not attempt to consider different research paradigms, or explain data collection methods, in any depth. Instead, we aimed for students to gain a sense of the overall shape of a research project at an early stage in their undergraduate careers.

We were fortunate to have the opportunity to hold all the module workshops in a CILASS 'inquiry collaboratory' - a newly-refurbished learning/teaching space designed specifically to facilitate information- and technology-rich collaborative inquiry activity (see http://www.jisc.ac.uk/eli_learningspaces.html for a short presentation on this space). Its facilities enabled students to access a wide range of digital resources during workshop activities, and also to generate digital material that included presentation slides, blog entries and material captured from (off-line)

whiteboards. The room was arranged to enable students to cluster in small groups with access to laptops and plasma screens, which were used for group presentations. Whiteboards were available to write on, and 'copycam' technology and digital cameras were used to capture material generated on these for uploading to the module's virtual learning environment (VLE) site. All workshops were co-facilitated by two or more staff - this was to gain a collective overview of the module the first time it ran, rather than out of necessity, although we identified benefits of co-facilitation that we would like to build on further in future iterations.

As well as making a range of resources available via the VLE, we made extensive use of it to capture and share student work and workshop activity. It was also used to support individual student reflection, with each student having a 'personal journal' space using the bulletin board tool. A blog was created for each student research group and we encouraged groups to use their blog to discuss, record and reflect on their research activity. The teaching team kept a blog that was accessible to students via the VLE. We used this blog to discuss aspects of 'doing research' from our personal perspectives and to reflect on the use of blogging to support research activity.

The following sections offer more detail on a number of tasks designed for the module.

2.1 The central inquiry task

The central inquiry task invited students to work in groups of three to carry out a small-scale research project, from generating a valid, practical and worthwhile research question through to presenting findings at a research 'mini-conference'. Conducting such research implied some depth of engagement with the thinking and concerns of the discipline, and an introduction to assumptions underpinning typical approaches to research methods. Students started work on these projects in the fourth week of twelve, following a series of preparatory workshops. Each research group had a member of staff acting in an advisory capacity. Tutorials were held as part of some of the workshops and at other times. Groups also discussed how to locate relevant literature for their project with a subject librarian, and gained feedback on their developing projects from two visiting expert practitioners.

Two groups chose to develop project ideas that arose out of preparatory workshops, and four projects were stimulated either by other modules on which students were studying or topics introduced early within this module. The projects were:

- A usability study of the university portal, drawing on student input through questionnaires;
- A study of the relation between learning style and discipline of study among students in three different departments (including Information Studies),;
- A study of student awareness of the environmental impact of mobile phones, based on questionnaires and interviews;
- A study of the role of mobile phone in development, comparing Kenya and the UK, based on published data
- A study of the use of Facebook for personal information management, based on an online focus group;
- An investigation of intellectual property rights issues in the University, based on expert interviews.

In the final week of the module, groups presented research posters to each other and guests, including the Head of Department and other staff and student researchers from the Department.

2.2 ‘Scaffolding’ activities

As indicated above, we designed small-scale inquiry activities, carried out during workshop sessions, to support both the Information Management and ‘research process’ strands of the module. Examples that focused on the former were:

- *How do you conceptualise Information Management?* At the start of the module, students explored and presented their existing conceptions of Information Management through a mind-mapping exercise, working initially as individuals and then in small groups. They returned to this exercise at the end of the module, as a means of reflecting on the development of their conceptions.

- *What is 'personal Information Management'?* Students explored the concept of personal information management through analysis of different types of working space discovered through images on a public photosharing site (Flickr), plus group discussion of a research paper on this topic provided by lecturers.
- *Is Information Management a discipline?* In this exercise, the students were asked to inquire into whether Information Management can be considered a discipline, with reference to indicators put forward in a research paper (Webber, 2003). These include the emergence of an international community with its own language and 'gurus'; the existence of professional associations and journals; the existence of university departments and consensus on a curriculum; the existence of doctoral studies and people's identification with Information Management. Working in groups, students were encouraged to reflect on what they already knew, before exploring the web and a set of provided resources to gather evidence and make their case. Within the module teaching team there was some contention about whether Information Management is truly a discipline, and we wanted to include students in our genuine debate on the issue.

Reading exercises during the module were designed to recapitulate and build further on students' existing knowledge of core concepts in Information Management. Two expert practitioners, with international profiles, gave invited presentations on specific aspects of Information Management and their personal insights from their own careers. Optional group sessions with a University Careers adviser allowed students to explore potential careers paths, as a way of trying to locate themselves and their future in the landscape of Information Management.

An early scaffolding activity was designed to prepare students for developing their research projects:

- *What does research involve?* Students spent two weeks early in the module on a small-scale, group-based research exercise designed to model the whole research cycle, from establishing and refining a research question, through literature searching and reviewing, through data collection and analysis, to reporting and dissemination of findings via scholarly and practitioner-oriented

publication. A broad topic was chosen by tutors ('mobile phones'). The culmination of this exercise was group presentations and discussion on 'imaginary' research project plans. For example, one group produced a set of six Powerpoint slides explaining a research plan for investigating "Do different age groups use mobile phones for different purposes and why?", covering literature sources, primary data to be collected, broadly how these would be analysed, and how and where (in specific journals) the findings could be communicated to a wider audience. The two members of staff facilitating these workshops carried out the same exercise alongside students, co-developing their own 'imaginary' project plan and presenting it alongside those of students. The aim in doing this was to share their enthusiasm for the activity with students, and illustrate something of the way in which they might approach refining a research question.

In the course of the module, students were also offered introductory readings about 'doing research' and some published alternative schematics of the research process. We wanted to emphasise the variation in the shape research can take, and the sense in which research is an iterative process. We also told students about importance of ethics in the research process, and assisted them to gain Departmental research ethics approval for their own developing projects.

2.3 Assessment activities

The assessment for the module was twofold, as follows:

Group research:

1. The poster presenting the group project (25%).
2. The group blog, recording the development of the group research project and including a range of required items (records of meetings and research activity; research instruments; group mindmap; bibliography, downloadable poster etc.) (25%).

Individual work:

3. A reflective account discussing the development of the student's understanding of Information Management through the module (50%).

Here, we comment in particular on one aspect of the assessment of the research project: students' involvement in developing the criteria for peer-assessment of research posters. From the outset, we planned to use an element of peer-assessment in the module, with the aim of encouraging students' ownership of, and responsibility for, their learning process. We wanted them to participate both in developing the assessment criteria for their research posters, and in assessing other groups' research posters. Two workshop sessions were devoted to this task at a point when students' research projects were in progress and moving towards completion. We describe them in some detail here because of the impact they proved to have on students' learning experiences on the module as a whole.

In the first of the workshops, students worked in groups to review 'what makes good research' and 'what makes a good research poster', and to propose a set of assessment criteria for each. As part of this exercise, we spoke about the purposes that posters are used for at research conferences and gave students the opportunity to view and evaluate a wide selection of differently designed posters. The groups presented their proposed criteria to the whole class for further reflection, comment and negotiation.

The second workshop focused on refining and, where necessary, modifying, criteria to ensure that they could be clearly understood and used. The students were divided into groups that each were given one of the criteria formulated the previous week. They were to try to reach agreement about what they understood by it and identify weak and good examples (e.g., of 'appropriate research method', 'conclusions reached based on research carried out'). The groups then presented their suggestions to the whole class for further reflection and comment.

As staff, we needed to ensure that the criteria developed by the students would be acceptable to our own conceptions of good research (and good posters), as well as being likely to be acceptable to external examiners. At the same time, we wanted to respect students' views and empower them to take ownership of the criteria, building on what they had learned about doing and communicating research during the module. We aimed to take a facilitative rather than directive role in mediating the negotiation process, and found that our main tasks during these particular workshops were to clarify, commend, tactfully challenge, and summarise. We also alerted students to difficulties we could anticipate with some proposed criteria, for example

the extent to which they could realistically be applied by novice researchers (e.g. as regards originality of the research question).

The actual assessment of posters took place at the closing 'mini-conference', with module students, tutors and guest researchers all contributing, using the criteria generated by students through the workshop exercise.

3. Evaluation and reflection

Using the CILASS framework for evaluation of its educational development projects, we evaluated the first iteration of the module by identifying a number of impact indicators (including evidence of student engagement and achievement) and using student and staff focus groups facilitated by a CILASS evaluator, the standard Departmental student feedback form, and students' work, as evaluation data. In this section, we highlight in particular some of the outcomes that relate to student engagement and learning, and some of what we consider to be successful and less successful aspects of our learning design and facilitation.

3.1 Successes

Stimulating students' curiosity and engagement was central to our aims in adopting an IBL approach in the module. Overall evaluation pointed to positive impact in engaging students with both Information Management and the process of inquiry. The particular highlight, for us, was the quality of many students' engagement with the inquiry task and the student work that was presented at the mini-conference. Students had successfully defined a research question, gathered primary or secondary data, analysed them and produced effective presentations of the results in poster form. This represented a rounded accomplishment and a level of engagement in research that we rarely demand before the third undergraduate year. All the work was good, and several pieces were excellent. Students' depth of understanding, while not always fully reflected in the posters, was evident in their discussions around them at the closing 'mini-conference'. This was remarked on by guests, and it was clear that students (rightly) felt pride in what they had produced and that presenting work to external visitors was motivational and satisfying. Following on from the conference, we have displayed students' posters alongside other research posters in the Department.

Student attendance on the module was high overall, and some workshops in particular generated a high level of interaction amongst peers. Student feedback via a number of channels (focus group, feedback questionnaire, reflective portfolios) was positive, with the new module gaining high scores on questionnaires on every criterion. One student commented that,

“Inquiry based learning is a very good way of working for yourself without being told what to do, it has helped learning because the information is looked at first-hand rather than being given by others. I think I work well in this way” (Reflective Portfolio).

Specifically, students reported that they enjoyed having the freedom to research their own questions despite (some said) this being challenging. The sense of ownership this gave students is apparent in the following comment:

“What made us pick this particular topic was that we were all fascinated by something non-one within the department really knew the answer to [] it was the challenge of finding this that drew us to the idea” (Reflective Portfolio).

Students appreciated the facilitative role taken by staff, including having a kind of ‘personal tutor’ while working on projects, and they remarked on what was distinctive about the student/teacher relationship on the module:

So in other words the idea is to give students a chance to teach themselves in some sense and the module staff was making an impression of rather a team of advisors and coordinators, than ordinary lecturers” (Reflective Portfolio).

Students reported that they had developed and added some new concepts to their notion of Information Management as both discipline and practice (assertions that we were able to verify with reference to their work) and that they saw the discipline and possible career directions in a more favourable light. They found the opportunity to interact with high-profile guest practitioners particularly inspiring, both in terms of feeling more positive about career paths and expanding their understanding and ideas about Information Management in the real world. One student commented:

“The course has made me realise that there is a large possibility of me pursuing a career within the IM field eventually [...] Guest speakers like [...] have significantly enhanced my view of the subject and very possibly pressed me into creating a career out of it” (Reflective Portfolio).

We observed students' understanding of research developing and changing as the module progressed. In the initial research cycle exercise we found that they tended to equate research with information-seeking, and this enabled us to explore with them the relationship between these; it was a topic we returned to at other points in the module. Arriving at the student-led assessment process for research posters proved to be a powerful learning experience for both students and staff. We observed, and students confirmed, that genuinely involving students in the creation of criteria that would be used to assess their own work helped both to improve their understanding of the topic (the nature of good research) and the assessment process, and to increase levels of student satisfaction; students reported that this was a challenging but memorable and especially satisfying part of the module. The exercise also gave us a very valuable insight into students' conceptions (and misconceptions) at this stage of the module. When the assessment of posters took place, the mean scores allocated by staff and students coincided on every aspect of the poster design and quality of research. This indicated to us that the students had reached a good understanding of the assessment criteria and that the mark sheet they generated had been unambiguously written and understood by all.

4.2 Adjustments, developments and reflections

The outcomes of the first iteration of the module are, from our perspective, encouraging; we are building on them as we further refine the design and our approach to facilitation this academic year. Our experimentation with some aspects was not as successful as we had hoped, and we therefore plan to make some adjustments in the next presentation of the module. In particular, we are considering an alternative approach to research group blogs, which we had hoped would promote the 'research community' dimension of the module's learning design, and encourage students to engage in on-going group reflection on, and recording of, research activity and outcomes and comment on each others' projects. With some notable exceptions, student groups did not engage very effectively with blogging, making most of their entries towards the end of the module (when assessment was approaching) so that there was little opportunity to explore other groups' work as it progressed.

We believe from their feedback and our observations that a number of factors militated against many students' engagement with blogging for the purposes we

intended, including the challenges of managing peer group processes over an extended period and students' unfamiliarity (and perhaps discomfort) with reflective writing in general and the conventions of the medium in particular. There may have been a tension, in a formal learning context, between our inviting students to engage in informal writing in a blog, and the demand for formal academic writing elsewhere. As a genre, reflective writing is hard to master and we did not give students any models beyond what was implicitly modelled in our own blog. Developing an appropriate style in a blog is hard (Burgess, 2006:109). Due to time constraints we did not, as part of the support we provided for blogging, show students examples of ways in which other research groups use blogs; this might have proved helpful. The focus group suggested that students just did not see the need for the blog. This pointed to a failure on our part to fully explain the requirements of research publication, such as to produce a full literature review or explain the research instruments, or the importance of recording and reflecting on the research process. But it may also be that blogging is not the ideal medium for the purpose; indeed, our own experience indicates that levels of engagement may well be variable amongst members of any research group. Discussion in blogging is not very easy; the tool is designed more for a soliloquy (Gumbrecht, 2004).

While we do not think that the underlying issues are primarily to do with the tool itself, we are exploring the use of a wiki for the next iteration of the module, as more oriented than blogs towards co-construction of a final product. A wiki might also prove more useful than the University's VLE as a shared student-staff repository for material generated during and for the class. Consistent with the research community and 'student as producer' (Neary and Winn, 2008) model we are aiming to build, we would like to present the module's online environment from the beginning as a shared resource bank for students to contribute to - not just in their projects but in all the class work. However, this ethos is not easy to support within the current VLE because of system constraints on enabling students to upload material.

In a massified Higher Education system 'instructivist' expectations about the relationships between discipline, lecturer, students and physical space remain very strong. IBL challenges these often unconscious assumptions in ways which can create many small misunderstandings and frictions. As teachers, we need to develop activities that fully embody new roles, but which cannot be interpreted as lax discipline or a failure to teach anything, or even a kind of surveillance of students'

behaviour because of the strong focus on process that IBL entails. There was no concrete evidence that any of our students misconstrued the module in this way, but there are always ambiguous moments. IBL demands different behaviour: from students, that they interact with staff in a more equal way and renegotiate relations with fellow students, who are co-responsible for learning. For staff, arguably it demands exposing more real personal experience, acknowledging doubts and differences, and loosening control. We were delighted with the new learning and teaching space; disappointed that it was not more appropriated by the students. We were delighted with the independent-minded way they produced such accomplished research; a little disappointed about the depth of interaction between ourselves and students - they did not ask enough of us.

Students directly experiencing the creation of knowledge through doing research are likely to have a better understanding of academic knowledge creation in general. To be able to differentiate systematic research from advocacy or polemic, for example, and to evaluate research articles better. In terms of the 'seven pillars' of information literacy (SCONUL,1999), it moves them beyond location of sources to higher order processes of evaluation, application, synthesis and creation of knowledge. Our students began by equating research with search, but by the end of the module had had direct experience of how research uses and creates literature. However, two issues emerged for us that we need to explore further in future iterations of the module. Brew (2006: 62) comments that,

[G]iven the importance of inquiry to life after they graduate, it may not matter in the first instance whether questions the students begin to research are closely related to the subject matter of their study. What is important is that the teaching has to challenge and change students' conceptions of research.

Although we concur with Brew's suggestion that the topic of their research may not be very important, a second layer of learning could arise specifically from students using methods native to the discipline, because this connects them to other researchers in a community of practice. One group of our students conducted a user satisfaction study, which could be regarded as one of Information Management's classic research tools (although there is an ambiguity about whether this is research or a method of systems evaluation). Other groups used interviews and questionnaires: generic methods of data collection employed across many subjects

and spheres of activity, such as marketing, the media etc. They may, therefore, have lost this second methodological layer of disciplinary engagement. We might ask, further, if Information Management does have distinctive research methods? Indeed, this leads us to a second issue, around the role of research in Information Management and the disciplinary status of the subject area which, in common with a number of other applied disciplines, may be seen as ambiguous. There certainly is research in Information Management, but much of the knowledge base is practice-orientated. Knowledge based on experience and trial and error have high status relative to more systematic approaches. Further, members of the teaching team disagreed with each other about how far Information Management could really be regarded as a stable, established discipline, relative to Chemistry or Psychology, for example. Thus, when we offer an invitation to share our world as four individual researchers, how exactly is this articulated to the wider worlds and communities of the discipline of Information Management or even to the complex interdisciplinary world of our Department, with its researchers in information retrieval, chemo-informatics and librarianship (among others)? In a sense, each individual must work out where they fit in these wider worlds; there can be many different answers, even for one individual. As first year students, they are just commencing a career-long journey, and it is difficult to know how far we may have taken them. It is probably possible to recognise a student coming to talk and think 'like a chemist'. Given the fragmentation and changeability of the communities of Information Management, it may be much harder to identify whether they are talking and thinking like an Information Manager or in ways that will be effective in the workplace.

Conclusion

With this module, we aim to respond to, and engage, what Barnett (2007) has called students' "will to learn" through offering an early opportunity for our undergraduates to engage in student-led inquiry. The major new departure for us in this module is that we envisage their inquiries being propelled by questions that they themselves, at Level 1, identify and find fascinating and important - whether or not these are wholly 'new' questions. Recent research into first year students' experiences of inquiry across a number of different disciplines in the arts and social sciences suggests the value of authentic experiences of 'bounded freedom' for students' intellectual development (Levy and Petrusis, 2007). Approaches to IBL that move students towards the formulation and pursuit of their own lines of inquiry, from the start of their

undergraduate careers, can offer this experience. Barnett emphasises the value of such an approach in the context of the need for higher education to foster dispositions and capabilities that are essential for full and rewarding lives in a 'supercomplex' world. Developing a similar argument, Brew (2006) offers a powerful vision of inquiry as the defining characteristic of 'higher' education, in which the purpose of teaching becomes,

...to induct students into various forms of inquiry so that individuals are able to live in a complex, uncertain world where knowing how to inquire is key to survival. We are looking towards a higher education where inquiry can become centre-stage for both academics and students [...] where academics work collaboratively in partnership with students as members of inclusive, scholarly knowledge-building communities (pp.14-15).

We find this an inspiring vision for our own work with students on the BSc in Information Management, and a motivation to explore further ways to deepen mutual engagement between students, staff and the discipline.

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