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Fostering independent learning and critical thinking in management higher education using an information literacy framework

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Abstract

Independent learning and critical thinking are perhaps equally blessed and cursed in the academe. As management academics we strive to foster these capabilities in our students, particularly our undergraduates, and we are often frustrated by our lack of success or impact. The thesis of this paper is that information literacy frameworks provide a 'way in' to constructing engaging, independent learning journeys as summative and formative assessment tasks. A model for doing this is proposed using the Australian and New Zealand Information Literacy Framework. A case study is then provided of how this approach was applied in an Operations Management subject at The Queensland University of Technology, Australia, in a partnership involving academics and library staff. Far from being merely about library skills, the conclusion of the paper is that information literacy offers a rich platform for fostering independent learning and critical thinking that has for too long been ignored or undervalued.

1. Introduction

Independent learning and critical thinking are a blessing and a curse for the management academic. They are at the core of what makes a university-level management education distinctive and they are key graduate capabilities pursued by many higher education institutions worldwide (Johnston and Webber 2003). Yet, they are also a curse as sources of frustration and disappointment for management academics who too often confront the cold, confused stares of their undergraduate students who are looking for 'the right answer', 'the right way' and clear guidance on 'what we're supposed to do, what we're supposed to know and what we need to do to pass the subject'. Information literacy frameworks offer a way forward to structure an independent learning journey for management students that can be interesting, rewarding and foster lifelong learning.

Arising in Australia from the shift towards generic core skills in education that emerged from the work of the Mayer Committee in 1992, information literacy has been described by UNESCO as focusing on knowing the need for information, and being able to identify, locate, evaluate, organize, and effectively use the information to address an array of problems (UNESCO 2003; Johnston and Webber 2003). This description was adopted by the Australian and New Zealand Institute for Information Literacy (ANZIIL) in its information literacy framework (Bundy 2004).

There is a growing literature on approaches used by information professionals, on occasion with academics (Doyle and Hammond 2006), to embed information literacy in higher education to strengthen lifelong learning outcomes and to support subject and programme learning objectives relating to critical thinking, reasoning, judgement and ethically responsible decision making (Bundy

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2005; Wallace 2007). My argument is that the time is long overdue when we need to examine information literacy frameworks more carefully and to employ them creatively and sensitively to assist our students to enhance their independent learning and critical thinking skills. This approach extends work by Leigh and Gibbon (2005) who argued that the integration of information literacy standards into the management classroom may assist in enhancing students' information seeking skills.

The next section of the paper presents a discussion of the Australian and New Zealand Information Literacy Framework and its relevance in helping to develop students' capacity for independent learning and critical thinking. This approach is applied using a case study of an Operations Management subject at the Queensland University of Technology. Finally, there is a discussion of results and conclusions.

2. The Australian and New Zealand Information Literacy Framework (ANZ IL Framework)

The Information Literacy Framework was developed by academics, further education teachers and library staff from around Australia and New Zealand. It has been adopted by university libraries on both sides of the Tasman but, in my own experience at least, is still perceived by academics as relying on an IT-based approach to library skills. In fact, the ANZIL Framework is much more, going to the very heart of independent learning and critical thinking (Andretta 2007; Bundy 2004).

The ANZ IL Framework consists of six core standards, each of which is accompanied by detailed learning outcomes and examples of how these learning outcomes may be met (Bundy 2004). These standards may be seen as a process model that enables us to construct an architecture of an independent learning journey for our students, within an assessment task. The six standards state that the information literate person:

- recognises the need for information and determines the nature and extent of the information needed
- finds required information effectively and efficiently
- critically evaluates information and the information seeking process
- manages information collected or generated
- applies prior and new information to construct new concepts or create new understandings
- uses information with understanding and acknowledges cultural, ethical, economic, legal, and social issues surrounding the use of information (Bundy 2004, p. 11).

This framework of standards may be depicted as the architecture of an independent, critical learning journey because it balances structure and capacity for exercising curiosity, creativity and judgement. It is not overly prescriptive regarding 'the right answer' or 'the right way', and yet it provides guidance for students to challenge their own assumptions and thinking. This is not unlike the 'new pedagogy of the question' suggested by Andretta (2006, p. 12), where information literacy is positioned as helping students to frame their learning in terms of critical questions and enquiry processes, rather than the pedagogy of the answer, within a more didactic frame of pedagogical reference. This process model was applied in structuring the major assessment task in an undergraduate Operations Management subject at The Queensland University of Technology, Australia.

3. An independent, critical learning journey in Operations Management

A one semester (13 weeks) subject in Operations Management was selected as the trial site because this is a discipline area where students have experienced difficulties in understanding the link between theory and application. It is also an area where the range of teaching and learning tools available for instructors has been limited.

It is not uncommon for able students to experience difficulties in studying this discipline, complaining of its (perceived) lack of real world relevance and struggling with the application of techniques to real world problems. Meredith (2001, p. 399) lamented that: "Operations will, I believe, always be a field that most people try to avoid unless they are forced to confront it because it is hard work, entails a well-defined body of knowledge, and is detail oriented."

If this seems a little pessimistic, others have discussed ways of making the concepts and techniques of operations management seem real to students who do not have the background or familiarity with production settings (Lewis and Maylor 2007; Ammar and Wright 1999) and concepts such as assembly lines, stock/inventory and layout. Not only are these and other concepts foreign to many students, they are also perceived (not necessarily with close and informed consideration) as dry, uninteresting and of little relevance in today's business environment. The effect on student performance and reported course experience is not only frustrating for teachers but also undermines an important management sub-discipline in the overall scheme of the undergraduate business degree.

The response in the literature to the teacher's dilemma of helping students to engage with (or even visualize) the concepts of operations management and their applications, has tended to focus on particular techniques and methods. For example, studies have looked at the impact of graded homework problems on student performance (Peters et al. 2002); collaborative learning techniques (Yazici 2004); in-class problems (Ammar and Wright 1999); games (Lewis and Maylor 2007; Anderson Jr. and Morrice 2000; Sun 1998; Smith 1990); simulations and virtual learning environments using computer mediated communications, online publishing, computer assisted assessment and course management facilities (the emphasis here sometimes seems more on the technology enablers than on the integration of technology and pedagogy) (Greasley et al. 2004); experiential learning methods, such as mock factories (Polito et al. 2004) and rolling reinforcement methods linked to the scheduling of classes (Mukherjee 2002). Luque and Machuca (2003), studying the Spanish scene in operations management education, with findings perhaps not dissimilar in other countries, found that teaching methods focused on lectures, case studies, software exercises, visits to companies, invited speakers, multimedia presentations and business games. These methods, no doubt, are useful and used widely. However, they may be enhanced by a systemic pedagogical framework that can be applied as a broader approach to independent learning and critical thinking within which the specific techniques may be located. The risk is that the methods or techniques for learning noted above are seen as ends in themselves, whereas it may be more helpful to see them as located within a deeper learning framework that can help business students to experience, reinforce and apply key concepts for themselves amidst the messy dynamics of the real world.

The trial took place in a class of 160 undergraduate business students, most of whom were studying towards a management or human resource management major, in either their full time second or third year. The teaching mode was a two hour lecture and a one hour tutorial held weekly. The tutorials were part of a 12 week programme of activities (there was no tutorial in week 1) designed to explore key concepts and techniques in Operations Management, reinforcing and applying material covered in lectures and in the set textbook for the subject. A comprehensive tutorial manual was prepared by

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the lecturer and tutors that explained: the assessment task and how it linked with subject objectives; the use of an information literacy framework as the template for design and completion of tutorial activities; the weekly task requirements; the use of worksheets for each task, and supporting resources. The manual was intended to provide students with detailed guidance on the rationale for the tutorial programme design, the objectives of the programme in the context of subject goals; what was required of students; and how they would be able to meet these requirements. Tutorials comprised between 24 and 30 students, working in self-selected groups of between three and five people. The tutorial programme consisted of a single, staged assessment task that centred on a consultancy style project in which small groups of students were asked to analyse and make recommendations for improving the operations of a service firm in the hospitality industry.

This assessment task was broken down into a series of weekly activities over the semester and included a series of information capability tasks completed using worksheets that would provide much of the data for a final written report. The final report itself and a class oral presentation comprised the other elements of the overall assessment.

In undertaking this project, students were encouraged to think creatively about information sources and information collection methods, including using personal observation, reflecting on their service experiences, making drawings and taking measurements (for example, of service times, waiting times and floor areas), as well as reviewing documentation and conducting interviews with informants from the businesses selected. It was key that students could successfully complete this project by taking a consumer perspective, with limited need to look into the back room operation in detail. The teaching team made a deliberate choice to use the term information rather than data or knowledge to encourage students to think about their own information seeking and using behaviours. We also decided to distinguish between primary and secondary information sources, in much the same way as is customary in methodology.

A range of supports was put in place, including detailed briefings in lectures on the project and on the links between lecture topics and their application in the project; guidance on specific tasks to be undertaken on a weekly basis; guidance on group formation; instruction on the rudiments of research methods, information collection methods, report writing and preparing and presenting oral presentations; and opportunities for student reflection, individually and in groups. The centrepiece was the tutorial programme of weekly activities facilitated by tutors and library staff that was structured using the information literacy framework. This is outlined in the table below.

As is evident in this table, the description of activities was framed around the theme of a legal trial: that is, a trail of information sources and their relevance to address specific questions.

Table 1 Learning activities linked to information literacy framework

Title of activity	Description of activity	Link to enabling IL Framework	Support provided
The service (week 2)*	Select a service firm and set of operations activities for analysis. Determine how primary sources of information will be collected.	Understanding the context of information needs and the extent of information needed. Accessing information efficiently.	Discussion in tutorials on parameters for selecting a firm and set of operations to study, including access, information sources and timeframe for the project.
The search (for secondary information sources) (weeks 3 and 4)	Search for secondary information sources relating to the selected firm and chosen operations activities.	Accessing information efficiently	Instruction on information searching, search strategies – in lectures and reiterated in tutorials
The trial (weeks 5 and 6)	Determining the quality of information sources and outputs, and implications for search strategies adopted.	Critically reflecting upon, and evaluating, information sources and information obtained.	Instructional input (with readings) and discussion in tutorials on criteria for testing the quality of information sources, especially secondary sources. Lecturer, tutors, library staff.
The lock-up (week 7)	Identify ways of classifying and organising information obtained.	Wide definition adopted here, including note taking and storage using bibliographical	Instruction on using bibliographical software – tutors and library staff.

Title of activity	Description of activity.	Link to enabling IL Framework	Support provided.
The judgement (weeks 8 and 9)	Comparing/contrasting information found in the secondary literature with primary information sources from students' fieldwork.	Synthesising information and incorporating relevant insights into knowledge base.	Individual and group facilitation and selective expert input but tutors and library staff.
The appeal (week 10)	Reflecting on issues around accessing and using information collected in the project.	Reflecting on the cultural, ethical, economic, legal and social issues surrounding gathering and using information.	<ul style="list-style-type: none"> ▪ Critical reflection in groups, with tutor and librarian facilitation. ▪ Briefings in lectures to unpack the ethics of information collection and use, in the context of business operations. This included working through a sample of trigger questions on the role of the researcher and responsibilities to the business and to the wider community.

*tutorials commenced in week 2; group presentations were delivered in weeks 11 and 12.

To illustrate the process in more detail, one detailed example of a tutorial activity is provided. In 'The search' (undertaken in week 2 of the tutorial programme), students were asked to identify primary and secondary sources pertaining to their chosen service organisation and operations activities. Students were first reminded of the conceptual framework of primary and secondary sources, with examples and quizzes used to reinforce understanding. Examples were drawn from business contexts, such as legislation, government reports, business periodical articles and online interviews. A brainstorming activity was then used to help students develop their own ideas as to possible primary and secondary sources for their consultancy projects.

Next, the tutor and business librarian explained the purpose of search strategy in the context of identifying primary and secondary sources. This was accompanied by worked examples using the ProQuest and Ebsco databases, as well as an online database containing industry and company financial and market analyses. Each group was asked to develop two possible search strategies for their selected operations activities, with staff moving around the class to provide guidance to each group and clarify concepts. Live demonstrations were conducted using an example from one group so that students could see how search strategies were operationalised. This raised several questions relating to both technical searching issues and deeper issues relating to the limits of using online databases.

This was followed by discussion of non-standard sources, such as using interviews with company representatives, blogs, direct observation and wikis. The tutor provided input here on academic requirements and ethical issues, and the librarian explained some of the challenges of referencing sources. By the end of this tutorial class, most groups had developed two search strategies and identified a range of possible sources that they would seek out.

In this process model, tutorials operate as learning spaces constructed jointly by students and teaching staff; tutors typically do not stand at the front and deliver instruction. There is some of this approach in the early weeks, but this tapers off considerably after about the third week of classes. From then onwards, students work in groups and tutors and library staff move around the room working on specific issues, questions and so forth. Tutorials were also spaces for work planning and reflection on work completed outside the classroom. Much like a consultancy operation, students would agree on pieces of work to be done (guided by the structure of tutorial activities weekly) either individually, in pairs or as a whole group, and they would then come together the following week to discuss progress and/or results. Some groups decided to meet in between tutorial classes, but the programme was designed to accommodate those who didn't choose to do this. At the end of the process each group submitted a detailed consultancy report and a short oral presentation.

One of the challenges facing instructors attempting to integrate and embed information literacy within assessment activities is to balance learning and critical reflection relating to subject content and information literacy skills development. This is an ends/means issue, where a danger perhaps is that the focus is so much on information literacy instruction that subject content is subsumed. Our experience was that a reasonable balance was maintained, although it no doubt ebbed and flowed over the 12 weeks. In this context, balance was aided by: clear explanation of means and ends – that is, that the information literacy framework was explicitly directed at facilitating critical thinking about subject content; design of each activity to ensure that there was a clear subject related outcome that was visible and measurable, and which was linked clearly to the final deliverable; and the teaching team approach, where tutorials were facilitated by both the librarian and tutor, so that each understood and complemented the others' skills and roles. We were certainly aware of the risks and, while it would be remiss to claim that an optimal balance between the application of IL skills and critical thinking on subject content was struck, we were satisfied that reasonable supports had been put in place to prevent bias. It is also important to say that the learning that emerges from the integrated approach adopted here carries benefits that, potentially,

go well beyond the individual subject; hence, it may be problematic to try and isolate overly the benefits of this approach to one subject.

4. Results

The core argument in this paper has been that an information literacy framework may be used in business education to foster independent learning and critical thinking. Three measures were used to assess the success of the project: the quality of students' written reports, particularly evidence of judgement and critical thinking; written feedback from students which we sought in the final week of the semester; and reflections of the teaching/library staff involved.

There are almost always tails on the quality curve of student assessment items and this project was no exception; there were examples of very strong and quite poor work. However, we noticed a relatively high number (based on a normal distribution) of written reports with marks in the credit to high distinction range. Examining these reports more carefully, as part of a routine moderation process that is employed in the Faculty, the following features were evident:

... students were questioning their own assumptions about the quality of information used in the analyses

... students raised important questions regarding the ethicality of dealing with certain observed processes and practices

... the structured approach to handling primary and secondary information seemed to assist students to understand the elements of critical thinking, which led them to identify areas where current knowledge was confirmed, questioned or augmented

... the extent of redundant information was low compared with previous experience of marking this kind of assessment in the past

... some students identified important issues relating to the classification, organisation and storage of information, framed as personal reflection on their own academic practice, for example, in reducing observation to categories, that was evidence of deep learning.

As part of this trial of using information literacy to structure an independent learning journey, students were asked to comment in writing on their experience of the programme and on specific parts or aspects that they enjoyed and/or found challenging. In many ways the comments speak for themselves and so I have chosen to report extracts from the written comments below, without further commentary on each one.

...it was great to do a real world project that gave us the freedom to choose what we wanted to learn about in the unit and the methods we wanted to use.

...I felt there was too little structure and guidance about what you expected from us in the hand in work...how to make sense of what you were covering in lectures in a practical situation.

too little time in class to really discuss the work that we had done. Maybe next time have shorter lectures and more workshop time.

the librarian and tutor worked well together in helping us to understand what we were supposed to do. They didn't push us to do what they wanted... I really liked the style of the tutorial and how it worked in with your lectures. It was like it worked in really well together.

...through this project, I eventually ended up buying into the business that my group studied. The quality of the program and the process that you provided in the Manual were excellent to help us to think through the issues and to analyse without pain.

...I didn't like the way the tutorials were so unstructured... like without any questions and answers to work on relating to your lectures... I felt that I had paid money to learn and was basically told to go and do it myself...

this has been the most interesting subject that I've done in my degree so far because of the way it was taught and the excellent Manual that we got. I enjoyed coming to class and working with my tutorial group... The tutor was quiet but great...[he] was there when we needed him.

There is a mixture of positive and negative perceptions in these comments. But all of the comments provide insights into students' experiences of the journey that they were asked to embark upon. As is evident, for some the journey lacked order, while for others it was powerful and liberating. The comments also point to quite specific (if occasionally overlapping) insights into the quality of the programme design and the way that we operationalised the information literacy framework. That said, it is also important to recognise that the quality of the learning experience, in this approach to design, is self-evidently co-constructed. That is, the enhanced structure that some students were looking for was already there – but they had to take a step or two more to make it visible, for example, by asking further questions about the quality of their primary information or by testing an assumption found in the literature.

The teaching staff reported that they enjoyed this approach to instruction, even though the tutors had come in to the process with negative preconceptions about information literacy as merely 'library skills'. The reflections of the teaching staff - the lecturer, two tutors and the liaison librarian who participated in the tutorial classes throughout the semester - confirmed that there was a fine line separating the comfort and discomfort of students regarding independent learning and critical thinking. Tutors reported critical incidents of telling observations by groups into some aspect of a firm's operations; and other incidents of frustration, sometimes anger, directed at the teaching staff because of a lack of direction about 'the right answer' or 'the right way' to think selected issues. Tutors were uncomfortable at times with the translation of what seemed like a rather tidy process on paper to the messiness of the classroom. In part, this related to a revision of the tutor's role in this subject from the expert and director of proceedings at the front of the class, sometimes akin to delivering a mini lecture, to being a facilitator where, as one tutor commented, the critical skill was to know what not to say and when not to buy in to a group's dilemmas. The significance of the trial for the role of teaching staff, especially tutors, was an unexpected area of learning.

We were satisfied on the basis of the qualitative, interpretive evidence collected that the project had been a success in fostering independent learning and critical thinking in our students, to an extent that we had not experienced in the past.

The results of the trial were sufficiently persuasive for us to continue the integrated teaching approach in the following semesters, with adaptations made to the manual and to the design and explanation of activities to reflect student, tutor and library staff feedback. The time available to complete activities in class was one area that needed attention and a decision was made to trim down some activities and span others over two weeks.

5. Conclusion

There has been a tendency for information literacy to be viewed essentially as being confined to so-called library skills, perhaps with an IT focus (Johnston and Webber 2003, p. 336), or as being focused on information searching behaviours. However, in the context of the information society, information literacy captures a more complex, farther-reaching notion traversing the wise and ethical use of information, obtaining appropriate information efficiently and lifelong learning (Candy et al. 1994).

However, while information studies academics, librarians and a scattering of academics from various disciplines have been running this argument now for several years, the literature indicates <http://jil.lboro.ac.uk/ojs/index.php/JIL/article/view/ART-V2-I2-2008-1>

that many academics still take a narrow view of information literacy. This is notwithstanding that Australia has been a leader in the specification and development of thinking on information literacy worldwide (Johnston and Webber 2003), with contributions from researchers such as Candy and Bruce (Bruce 1997a, 1997b). There is a recurring theme in the literature of frustration and tension between information professionals and academics relating to the importance of, need for and ultimately the construction of information literacy in the higher education setting. Authors speak of an apparent rift between academics and librarians and a hostile relationship (Julien and Given 2005), a difficult relationship (Julien and Boon 2002) and apathy on faculty's part, in contrast with 'library-friendly' faculty members (D'Angelo and Maid 2004). This tension centres on the role of information literacy in higher education. At the coalface, it manifests in differing apprehensions regarding how best to embed information literacy at subject and programme levels. In other words, there is no real disagreement between academics and librarians about the importance of information literacy (McGuinness 2006); rather, there are significant differences in understanding the scope and power of information literacy in facilitating learning.

I have put forward the argument that, in higher education, information literacy provides a sound framework that academics may use to foster independent learning and critical thinking. I have also demonstrated how this can be applied in teaching a mid-sized class in Operations Management, which is perhaps one of the more challenging areas in which to trial an information literacy approach to learning.

There is room for extension and refinement of the approach adopted. For example, the use of structure could be wound back further to give students greater choice and scope for judgement in selecting the foci of study in order to engage them further in the design of the learning journey itself. The information literacy framework gives integrity to the learning journey without stifling initiative and judgement. These are important characteristics in taking a lifelong learning approach to education.

Finally, it is important to note a warning raised by Andretta (2006: 18) of institutional resistance, not just by individual academics who may see their identities as being under threat if the construction of learning journeys is seen as shared territory with librarians, but by faculty-level and beyond. Andretta reports on the withdrawal of a dedicated information literacy curriculum because students were seen as not mature enough to operate as effective independent learners. In the trial reported in this paper it was evident that some students were uncomfortable with an approach that called for independent thought. In casual conversation, the teaching staff involved in the trial joked that this would affect their teaching evaluations. The reality however is that the high moral ground of independent learning, lifelong learning, critical thinking and judgement is relatively easy to espouse but much more difficult and messy to operationalise.

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