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FOUR

Embedding a Library Program in the First Year Curriculum: Experiences and Strategies of an Australian Case Study

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Setting the Context*

The Queensland University of Technology (QUT) located in Brisbane, Australia, is a medium-sized university with approximately 40,000 students across the seven faculties of Built Environment and Engineering, Business, Creative Industries, Education, Health, Law, and Science and Technology. It is one of three universities that have a major presence in Brisbane.

QUT's Graduate Capabilities state that every QUT course aims to develop graduates who are able to demonstrate a capacity for life-long learning, including the ability to search for and critically evaluate information from a variety of sources using effective strategies and appropriate technologies.¹ At QUT such information literacy (IL) skills

are traditionally the domain of the Library.

In this chapter we case study the embedding of IL skills into a first year unit, *BEB100 Introducing Professional Learning*, of the Faculty of Built Environment and Engineering (BEE), which has average yearly enrollments of 1300 students.² The BEE faculty consists of three Schools:

1. Urban Development
2. Design
3. Engineering Systems

Combined, these Schools teach across 19 disciplines, represented in table 4-1.

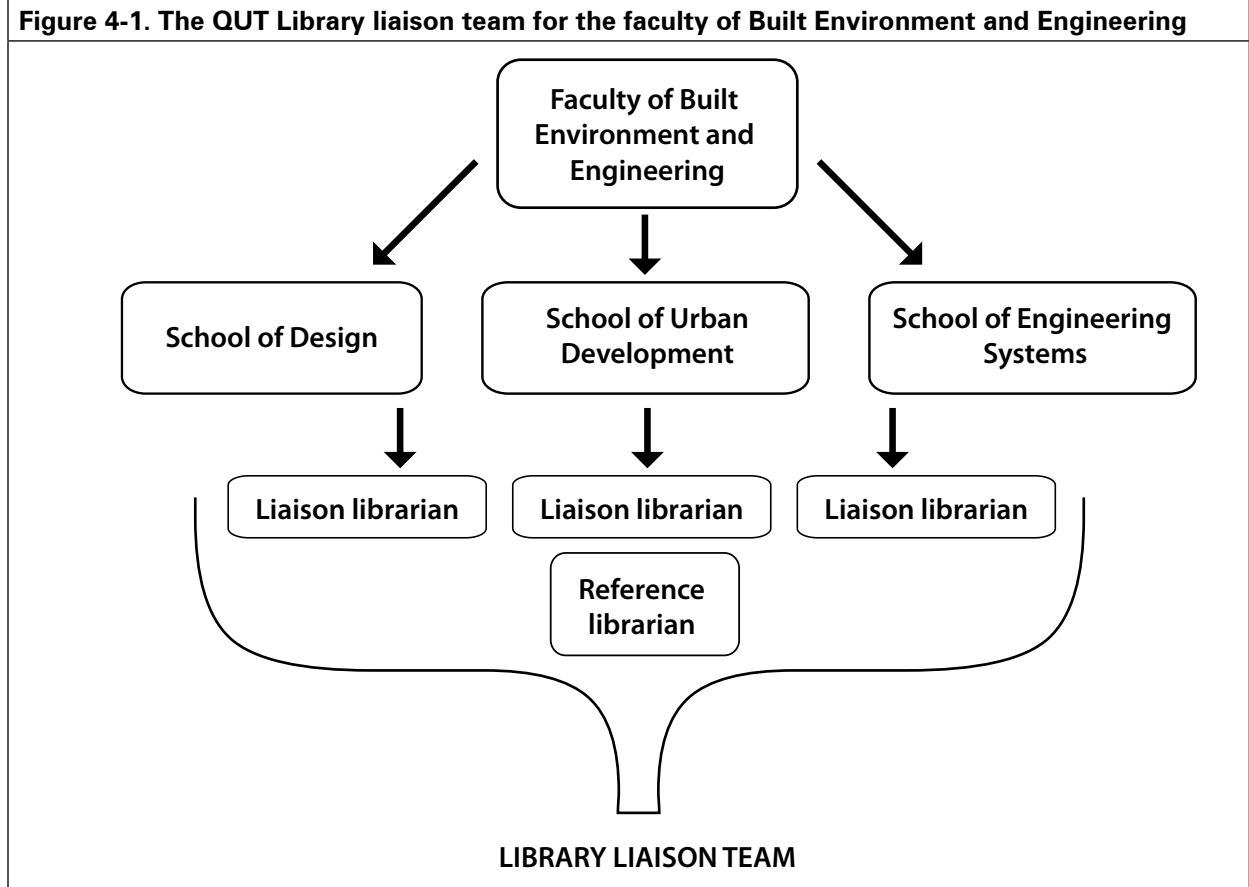
At QUT Library, a Liaison Librarian is assigned to each of the BEE Schools and, with the assistance of a Reference Librarian, form the Faculty's library liaison team.

*Glossary of terms	
Faculty	At QUT, Faculties typically comprise a number of Schools. Some countries such as the U.S.A. refer to faculty being the individual academic staff members. In Australia, we typically refer to these as academics.
School	At QUT, a School is the fundamental organizational teaching unit comprising a group of academics and led by a Head of School. Other institutions may call this a Department.
Unit	At QUT, a Unit is the fundamental delivery package of content. Some institutions refer to these as Subjects or Courses.
Course	At QUT, a Course is the collection of units, which forms what is also known as a Degree program. Some institutions use the term Course to refer to a Subject or Unit.
Liaison Librarians	At QUT, Liaison Librarians are the Library's direct link with academics within the faculties. Other institutions may refer to Faculty Librarians or Subject Librarians.

Table 4-1. BEE Disciplines	
School	Disciplines within each School
Urban Development	Construction Management, Quantity Surveying, Property Economics, Spatial Sciences, Urban Regional Planning, Civil, Civil and Construction, Civil and Environmental
Design	Architecture, Landscape Architecture, Interior Design, Industrial Design
Engineering Systems	Aerospace Avionics, Electrical Engineering, Infomechatronics, Mechanical Engineering, Medical Engineering, Software Engineering

QUT Library, part of the Division of Technology, Information and Learning Support, is well respected within the university and considered to be a helpful place offering outstanding service. Liaison Librarians have a good reputation, and with their transferable skills are often called upon to take on more responsibilities.

QUT Library is a hub of Information Literacy (IL) activity and with strong leadership, has pursued and developed many initiatives in this area. IL is delivered through traditional means such as the Library Help Desk and generic and discipline-specific IL classes, however, the delivery of academic skills has recently entered the IL portfolio and we now talk about integrated literacies as encompassing information literacy and academic skills. Academic skills include (but are not limited to) time and task planning, note-taking, reading and comprehension, critical thinking and creating an argument, writing, group work and exam preparation,



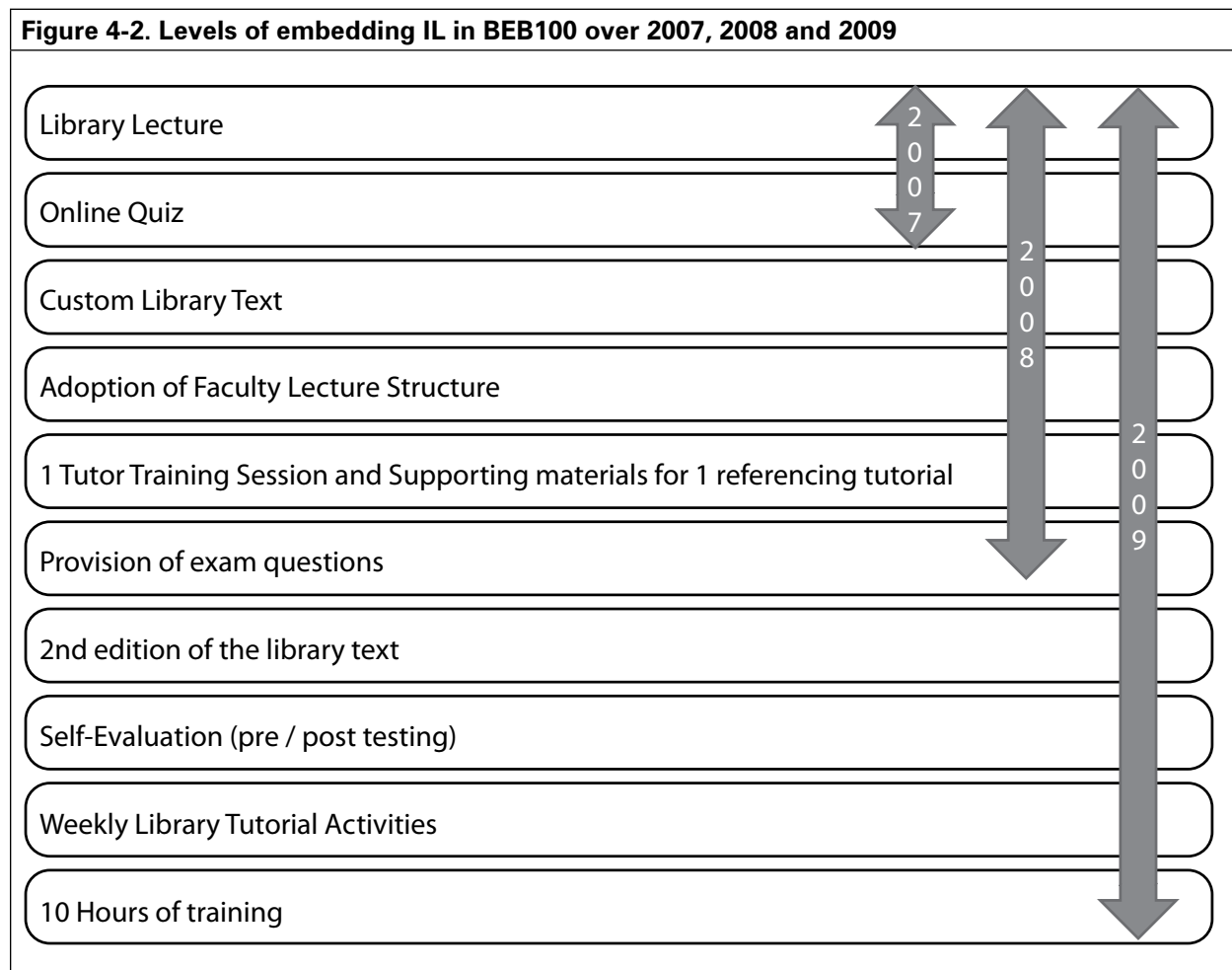
and are now offered via the Library’s service points as well as an online portal called *Studywell*.³

For a variety of reasons, some academics are more responsive to including IL instruction in the curriculum than others. One argument that often arises is that it is difficult to fit IL into an already crowded curriculum although if you are truly embedding this shouldn’t be a problem. Fortunately, the first-year BEE unit coordinators are strong advocates of the library and sought involvement from the library liaison team for BEB100, a large first-year unit of approximately 1,300 students.

BEB100 as a faculty-wide unit was developed in 2006 as a way to introduce BEE students to foundational professional knowledge, values and skills such as project management, communication strategies, ethics and teamwork.⁴ IL skills also fea-

tured in the curriculum and, in 2006, our library predecessors delivered IL skills via a single lecture.

In 2007, 2008 and 2009, library involvement in the unit escalated massively in size and scope via a number of different strategies. When we came on board we saw BEB100 as a golden opportunity to embed IL into the built environment and engineering disciplines. By ensuring that common foundation skills were taught in the first year across the 19 faculty disciplines, we could assume basic knowledge in later years, which would enable easier scaffolding of IL skills when we engaged with the students in individual discipline-specific units. An additional benefit of having foundation skills taught to all first year students across the disciplines meant there would be a consistent approach from which all students would all gain a



core skill set, and allowing them to later change disciplines if they found there were better suited to other areas.

Our involvement over three years has resulted in a significant amount of embedding where the unit coordinators and tutors can deliver the IL content themselves in the years to come, as we will demonstrate.

Stages of Embedding—2007

Our involvement in embedding IL into BEB100 started in 2007. Based on feedback on the first iteration of BEB100 in 2006, the BEE Faculty was planning some significant changes to the content and structure of the unit. In 2007 we undertook two main activities:

- A library lecture
- An online quiz

Although library lectures could be described as bread and butter work, if it is done in collaboration with academics and you can demonstrate that you add value you will find that more doors open enabling further embedding. This was certainly true in our case as the work we undertook in developing the library lecture and the quiz in 2007 enabled us to develop a strong working relationship with the academic teaching team, which led to opportunities for substantial embedding in later years.

The Library Lecture

In 2007 there was a very short lead in time from being asked to deliver a lecture to getting the material ready and this limited the extent of embedding possible. Due to the size of the cohort and a desire to keep the unit in context with the 19 disciplines as much as possible, we had to deliver three lectures tailored to the three schools of Design, Engineering Systems and Urban Development. It was important to tailor each lecture for the Schools as the assignment requirements were all slightly different, but at the same time it was important to keep the core basic skills and format to each lecture.

One of the issues with using a lecture as the primary method for delivering IL instruction is that time is limited and yet the expectations of what should be delivered in 50 minutes can be high. In 2007 the lecture had to include:

- A general introduction to the library
- The importance of information literacy for BEE professions
- Skills to effectively search the catalogue, databases and the internet for reliable information for the unit assignment
- An understanding of the importance of referencing, and
- Where to find additional library resources

Not much for a student in week 2 of their first semester at university to take in, let alone deliver! We tried to keep the lecture simple and communicate the key points, but it can be very difficult to cut down to the essentials.

The search skills and knowledge imparted during a lecture are more likely to be retained if they are put to use. In 2006, to address this issue there was an attempt at delivering hands on instruction by providing library-run tutorials. Our predecessors advised against attempting this again in 2007 due to the large number of students, small training lab sizes (capable of accommodating 50 students at most) and only three liaison librarians and a reference librarian available to deliver the training. For the library team to take on this level of commitment in conjunction with the generic library programs and additional teaching to second, third and fourth year students was logistically burdensome and impractical. Our alternative solution was to develop an online quiz, which doubled as a self-paced tutorial within QUT's Learning Management System (LMS).

The Online Quiz

While QUT Library had tools such as the online information literacy tutorial PILOT,⁵ academics felt that library training should be more faculty focused and blend in more effectively with the unit.

Students had to see the relevance of IL skills to their disciplines and terminology suited to their skill areas.

We developed an online quiz with questions focused towards the BEE disciplines. The questions linked to supplementary material, which students could access before answering the questions. These links enabled students to seek further instruction or undertake a short learning task to gain the knowledge that they required to answer each question. All of the supplementary information and learning tasks already existed as modules within PILOT or on the QUT Library website so we made effective reuse of existing resources and saved time by not reinventing the wheel.

The content of the online quiz from 2007 can be found on *QUT ePrints*.⁶ Results from the quiz were positive and showed that students had undertaken the activities, gained new skills, and applied knowledge from the lecture and supplementary materials. Embedding the quiz in the LMS, within the normal domain of the unit, meant that the library and IL skills were seen as an integral and necessary part of the unit.

Through our work in 2007 we had created a core foundation skills lecture which could be tweaked for individual cohorts saving time and resources, and the online quiz enabled us to engage students in self-paced learning activities where needed, without the need for the library to deliver tutorials to over 1000 students. The work with the lecture and our willingness to develop custom resources, specifically the online quiz, established us as part of the teaching team and really built the foundations for embedding in this unit in future years. To borrow the title of a Kev Carmody and Paul Kelly song it is true to say that “From little things big things grow” as we will illustrate in the rest of this chapter.

Stages of Embedding—2008

Access to feedback is a valuable and critical aspect to moving forward with embedding and teaching

IL skills within a curriculum. It is essential to understand what resources are working, what aren't and how they can be improved. QUT runs the Learning Experience Survey (LEX) at the end of every semester to capture feedback on individual units and teachers. In the case of BEB100 in 2007 the students in the middle of semester also undertook an evaluation survey. A question about the library lecture revealed that 86% of students (764 out of 891 respondents) **agreed** or **strongly agreed** that the library lecture was helpful in searching for, evaluating and referencing material for the assignment. A summary of all the LEX data for BEB100 for 2007 to 2009 can be found in Table 7 of Smit and Murray.⁷ We were also able to make use of the FAQs that were developed throughout the unit in 2007 in response to students' questions to inform areas for development in 2008.

We were able to text mine the feedback for qualitative comments by searching for the mention of words such as “library”. Some of the comments included: “the library lecture was difficult to follow in a non-interactive environment” and; “...one (lecture) that I believe was helpful was the library one which showed us how to look for information on the library website, however it was still boring and dragged out.” We would argue that the “boring” comment was probably partly due to the nature of the material and the way it was delivered (not embedded) which encouraged us to liven things up. One comment reflected on the self paced PILOT resource: “I found that the best source of learning about information literacy was to spend some time going through the PILOT project.” While we considered all the feedback, we found it important, especially with qualitative information, to consider comments in the bigger picture and to remember that one negative comment is not necessarily the view of all 1200 students.

The second important factor in successful embedding is early planning and preparation as the time required to create effective resources for embedding can initially be high although there is long

term gain for students, academics and librarians. The planning for the third iteration of BEB100 started shortly after the exam period in 2007 giving a lead in time of 6 months for BEB100 2008. As a result of having a good lead in time and reviewing all the feedback, the activities undertaken in 2008 (in addition to those undertaken in 2007) were:

- Writing a custom library text
- Adoption of the faculty lecture format (enabling better blending of the lecture)
- Preparation of some tutorial material for delivery by academics
- Provision of final exam questions (30% of final exam) giving significant weight to the library content

A Custom Library Text

Students gave the text book aspect of LEX, for BEB100, a very low rating in 2007, a reflection that there was no one text covering all the material taught and indicating that students desired a text to accompany the professional skills delivered in the unit. The academics selected the text *Writing for the Technical Professions*⁸ as the text that would address the majority of the professional skills taught in this unit, but commented that there was still a gap in library and research skills particularly from a QUT context. The Faculty teaching team suggested, over a coffee in a faculty tea room (where the most productive liaison work often occurs) that perhaps we could write a chapter to be added to the chosen textbook. This was a major opportunity that was seized upon and a lot of work was undertaken over a short period of time to meet the required publication deadlines. During the writing process we sought feedback from academics to ensure that our content would meet their expectations and we received some valuable input. The result was *Researching for the Built Environment and Engineering Professions*.⁹

QUT is very proactive in the Open Access field and librarians promote it on a regular basis, so we

were careful to ensure that we retained the copyright for our material and issued a non-exclusive license to the publisher for the context of BEB100. By doing this we ensured that we could freely re-use and re-purpose our resource and could make it available via *QUT ePrints*. This was not only beneficial to students from an equity viewpoint (they could get a free copy) but also enabled re-use of the text in other units without the need for students to purchase a copy. The text is now a backbone resource for many other faculty units. Since we made the text available on *QUT ePrints* there have been 1285 combined downloads of the text in addition to the printed copies which were bundled with the text book which students purchased from the University book shop.

The text was primarily structured around the content we were delivering in the lecture. The main content covered included:

- planning for research
- search strategies
- search tools (catalogue, databases and the web)
- evaluating information, and
- referencing

The text is a great resource to deal with information overload, as it allows us to reduce the content of the lecture and to focus on the core, critical points. Students can expand their knowledge by reading the detail (unlikely to be retained from a lecture) in their own time and at point of need. It also means that students have a text covering basic IL that they can refer to during their 4 years at university. We are pleased to still see copies of the first edition, with their distinctive bright orange covers, used during assignment times. The library copies are also well used. In 2008 the text included referencing examples of resource types that the students were likely to use for their assignment. In 2009 QUT Library launched a new writing and referencing guide called *Cite|Write*,¹⁰ which had the engineering referencing examples included. Following the rule that it is better to use existing

resources that are well developed and widely supported, we removed the referencing table and included links to *Cite|Write* in the second edition of the text in 2009.

Developing the Lecture and Other Resources

After the text had been finalized we took the initiative and set up a meeting with the teaching team in late 2007 to plan how we could engage in the unit in 2008 and how we could best leverage the library text book. Academics have much more teaching experience than librarians and through true collaboration they provided us with a wealth of support in the development of our lecture and strategies for engaging with students in large lecture theatres. The academics were keen for us to reference the library text as much as possible in our lecture so that students would use the text and value it as a useful resource. To do this we mentioned page numbers continually throughout the lecture and on the PowerPoint slides. Other enhancements to the lecture included the addition of a short movie we created to capture the importance of IL skills to future BEE professions (rather than just having a librarian talk about it). This was very effective and engaging—it runs for just over two minutes (without sound) and yet we still had silence in a lecture theatre of 500 students. We also hoped the use of media would alleviate some of the “boring” stigma from 2007. The movie clip, lecture slides and other supplementary material that we used can be accessed on *QUT ePrints*.¹¹

Other refinements to the lecture saw a second librarian driving the presentation and demonstrating the searches while the primary librarian maintained eye contact and engaged with the students. We also had a third librarian and reference librarian in the audience with microphones so that they could participate in any discussion.

At our meeting we also raised how we could best add value based on the feedback in 2008 and we were requested to provide assistance with de-

velopment of the Criterion Referenced Assessment (CRA) for 2008 in relation to referencing and search skills. We were also keen to try and engage students more in the tutorials and we collaborated with the academics on creating some tutorial resources on referencing for use by Faculty tutors. The text was also the basis of supporting information for the library tutorial for which we carried out a “train the tutor” session in 2008. This led to further tutorial involvement, which is described in more detail in 2009 section.

Online quizzes were again used in 2008 but in a new Learning Management System (LMS) and using questions randomly selected from a bank of questions we provided. In addition, we were asked to develop a bank of questions for the mid-semester quiz and for the final exam. Also following the faculty lecture series format we established some week 2 tasks for students which included reading the library text, completing the online quiz and going to the library and borrowing a relevant book to take to the tutorial.

Without the advance planning for 2008 it is fair to say that there would never have been time to create resources and effectively blend IL into the unit. There was a high level of collaboration with academics when we created the resources but we ensured that we were not taking over the teaching of the unit and tutorials. Probably one of the trickiest balances in embedding is the fine line between truly embedding and providing resources for the academics to use, or just doing the work for them.

Stages of Embedding—2009

Over the years of our involvement with BEB100, we have had many discussions with the unit coordinators about the ways we could improve IL content and delivery. In 2009, two major additions were added which dramatically increased our involvement in the unit:

- Pre- and post- testing of student IL skills
- Weekly library tutorial activities and delivery of tutor training

Pre- and Post-testing of Students' IL Skills

For some time, academics and librarians have observed students entering university with inflated estimations of their own skills and abilities in information seeking. While we are resigned to students' initial belief that everything can be found on Google—which is unsurprising given its easy, intuitive interface and relative certainty of finding *something* on a topic—we wanted to evaluate their perceptions of their information skills and test the reality of their skills. Thus we developed a pre- and post-testing strategy in an attempt to achieve this. The premise of the strategy entailed:

- Pre- testing student IL perceptions and skills early in the semester
- Analyzing the results for strengths and weaknesses
- Providing feedback on the strengths and creating interventions based on the weaknesses, and
- Post-testing student IL perceptions and skills at the end of the semester, to see whether there had been a measurable improvement.

There was some debate over what to call the strategy. The university and unit coordinators are concerned that students should not be subject to too much “testing” or “surveying”, so we settled on calling our strategy a “self evaluation of skills” which we blended into the operation of the unit—it wasn't tagged on or optional. For the purposes of this chapter, we will refer to the self-evaluation as a pre- and post- test.

The Pre-test

The pre-test was undertaken during the tutorial in week two of semester, prior to any formal IL instruction in the unit. It was completed during the tutorials as student attendance at tutorials is compulsory, resulting in a larger response rate than an online quiz. Questions were presented to students on a PowerPoint and their answers were recorded on a paper multiple choice question (MCQ) an-

swer sheet. These answer sheets were identical to the ones the students would have to use for the final exam, and therefore they were getting practice in filling them out, as they aren't overly intuitive. The final number of respondents was 1,153; a large sample size from which to draw some conclusions and observations.

The pre-test consisted of 20 questions in five categories set out in the Australian and New Zealand Information Literacy Framework, also known as the “ANZIIL standards”.¹² It tested the areas of planning, searching, evaluation, referencing and ethical use of information. Each of the five categories was introduced by a question testing student perception of their IL skill levels—see table 4-2.

Each perception question was then followed by three competency questions testing the actual skill. For example, for the category of referencing, students were asked to choose the correct answer from five possible answers for the following questions:

1. Look at the following reference for a book and identify what information is missing
2. What type of reference is this?
3. In this reference, what is the title of the journal?

Results of the perception questions revealed that the majority of students thought they were **OK** or **Good** at all of the categories. Full analysis of results including the competency questions revealed that in reality, students were good at planning, evaluating and ethical use, but less successful at searching for information and referencing. Consequently, we targeted most of our intervention in those two areas throughout the semester.

The Intervention

In 2009 the pre- and post-testing strategy was introduced to obtain evidence of the value of an embedded IL program, which built upon 2007 and 2008 library involvement to include:

- Two lectures—in past years the lectures were given as early as week 2, when stu-

Table 4-2. Student Perceptions of their IL skill level in week 2 (sample 1153 students)

Skill Area	In Your Opinion	Poor	Could be Better	OK	Good	Expert
Planning	How would you rate your ability to plan searches for information you need?	1%	9%	42%	44%	3%
Searching	How familiar are you with search tools needed to find information?	1%	10%	38%	46%	5%
Evaluating	How would you rate your ability to evaluate whether information is correct, reliable and of high quality?	0%	7%	35%	53%	5%
Referencing	How would you rate your ability to reference (or cite) items such as books, articles, websites and so forth?	5%	24%	36%	29%	6%
Ethics	How would you rate your ability to find and use information responsibly and legally?	1%	8%	29%	52%	10%

dents were “green” and generally unable to conceive the importance of library skills to their academic careers and assessment tasks. The two lectures in 2009 each addressed weaknesses revealed in the pre-test results and were scheduled for later in the semester to come in line with assessment deliverables:

- lecture 1 (in week 7)—finding information
- lecture 2 (in week 9)—referencing
- A second edition of the textbook, with minor updates to reflect changes to the library website and resources and based on feedback and FAQ’s in 2008
- Interactive online resources for the BEB100 Blackboard site, including resources to assist with learning call numbers and referencing
- IL skills built into the CRA for the group assignment, including demonstrating use of a wide variety of sources and correct referencing style
- Weekly sample exam questions to give students a sense of the types of questions they would be asked in the final exam
- A bank of assessable multiple choice questions for the mid-semester quiz and final exam.

These materials were supplied for self-help, to support the content being actively delivered in the lectures. However, the significant addition in 2009 was the introduction of weekly library tutorial activities and the delivery of tutor training.

Weekly Library Tutorial Activities and Delivery of Tutor Training

In collaboration with the BEB100 unit coordinators, we increased library involvement by appropriating half an hour of each two-hour tutorial, with the remaining time dedicated to a half hour writing activity and revision of the weekly unit content. The exception to this schedule was in weeks seven and nine—the weeks we delivered our library lectures—where the full two hours were dedicated to library content.

We developed the library’s tutorial content around the unit content taught each week. Table 4-3 lists these tutorial activities.

Most of the library tutorial activities were supplemented with readings from the library text and interactive flash objects embedded into the BEB100 Blackboard site. Students were also encouraged to bring along laptops to the tutorial that, due to the size of the cohort, could not be held in fully equipped computer labs.

We developed seven hours of new weekly tutorial activities in total, but the real breakthrough

Table 4-3. Schedule of library tutorial activities in 2009		
Week of semester	Weekly topic/content	Library tutorial activity
1	Knowing the built environment and engineering professions	Internet searching—using Google Advanced Search to locate professional associations and accrediting bodies
2	Ethics	Pre-test of student IL skills
3	Cultural issues & writing	Searching of library catalogue – keyword and subject searching for books on any topic covered in the unit to date
4	Graphics	Referencing images and diagrams, both the in-text citation and the reference list
5	Camp week	Nil
6	Team work	Provide feedback from week two pre-test and identify any issues that need addressing further
7	Library lecture – finding information	DEDICATED 2-hour library tutorial. <ul style="list-style-type: none"> • Locating and searching relevant databases • Locating a full text article from a journal citation
8	Writing reports	Search the web for officially published, professional examples of technical report writing.
9	Library lecture – referencing	DEDICATED 2-hour library tutorial. <ul style="list-style-type: none"> • Recognizing different reference types • Identify missing elements from references • Creating in-text citations and end references
10 – 12	Preparing and delivering oral presentations	Nil
13	Preparing for exams	Post-test of student IL skills
Exam period	Multiple choice exam	Assessable IL questions form approx. 30% of exam

came with the weekly hour-long tutor training sessions. We attended these sessions at the request of the unit coordinators to instruct the tutors in carrying out the library tutorial activities. The tutors found this beneficial as they could ask us questions while we were on hand to help and we also distributed detailed instruction sheets for tutors to consult during the tutorials. This delivery of IL skills by the tutors has been the most important step towards fully embedding such skills into the first year curriculum.

The Post-test Strategy

As mentioned, the premise of the pre- and post-testing strategy was not only to gauge student perception versus the reality of their IL skills, but also to tailor library involvement based on the results of

the pre-test in an attempt to improve these skills. Therefore, to gain evidence of the effectiveness of our involvement with the unit, the post-test was conducted at the end of semester. The perceptions were tested in week 13 tutorial, and the reality was tested via the library questions asked in the final exam.

Once again we delivered the perception questions in the tutorials. Even though tutorials are compulsory, the response rate was significantly lower at 475 as attendance rates tend to drop off throughout the semester. However, when matched to the same sample from week 2, we still found this a decent-sized sample from which to draw conclusions.

The same perception questions were asked in the post-test. Across the five categories tested, there was a combined increase of 14–24% in the

Good and **Expert** categories, indicating that students believed they had improved their IL skills throughout the semester.

However, the reality of students' IL skills at the end of the semester would be the true indicator of improvement. As in 2008, we developed a bank of assessable multiple-choice questions for the final exam, and it was from the results of the final exam that we could analyze the reality of their IL skills. However, the exam questions were not evenly split across the five categories as some areas had been targeted with more intensive instruction than others. Therefore, one competency question from each category in the pre-test was mapped to a question in the final exam that tested the same skill but was asked in a different way. This was beneficial as it prevented rote memory of answers to questions asked in the pre-test, and the final exam also tested the skills at a deeper level than in week 2 which if answered correctly, indicated true gaining of skills.

Across the categories of planning, searching, evaluation and referencing, there was an improvement of between 22–32%. The category of ethical use of information could not be directly mapped, however, the average percentage of correct answers to questions testing this skill was 91% indicating a high level of comprehension.

Through the pre- and post-testing strategy, we have been able to prove that a structured and thoughtful approach to embedding IL skills within a curriculum can have a positive impact on student learning outcomes. While great efforts were involved in preparing library materials and content for BEB100 in 2009, these initial efforts have resulted in materials that can easily be reused, and with some updating and training of the tutors each year, embedding can continue and may even be adopted by other disciplines.¹³

Issues, Strategies and Experiences

Over the three years we have embedded into the first year engineering curriculum we have gained some useful insights on the issues that arise and

as a result, developed some strategies that we now employ in other teaching-related areas of our work. In hindsight, many of these would have been good to have known at the outset of our endeavours and so we have listed these for the consideration of any librarian attempting a program of embedding.

Conduct an Environmental Scan—Locally, Nationally and Internationally

Keeping an eye on the literature (such as reading a book like this) and attending IL conferences is a great way to start. The idea for the movie in our lecture originated from attending the ANZIIL conference in Hobart, Tasmania in 2007 as did the idea of trying to gauge the value of our work. A local scan is also worthwhile—by asking other liaison librarians about their experiences with IL testing and quizzes we were able to gather a good selection of questions for our quizzes, which we adapted, to the BEE context, saving time and effort.

Contextualize the IL Content to the Discipline

It is hard to think that liaison librarians are not already effectively contextualizing IL content to their disciplines. However, we found that a small amount of extra research connected our IL content not only to the curriculum and the university's graduate capabilities, but also to the professional competencies of professional associations and accreditation bodies such as Engineers Australia and the Accreditation Board for Engineering and Technology.¹⁴ Thus we were able to point out these connections to students in the lecture, giving them some relevant context around the importance of IL skills.

Collect Feedback

Collecting feedback on what is going on around you is essential to make improvements to your embedding program. Be proactive in sourcing the feedback early and making changes. The feedback we were able to collect from students through sur-

veys, Learning Experience Survey (LEX), and the pre- and post-testing strategy was key in targeting areas of weakness and ultimately improving our content.

Re-use Materials and Resources

When embedding it is important to re-use as many existing resources as possible so that you can direct energy and efforts into other areas. Our rather simple quiz enabled us to develop a tailored learning experience based on substantial existing resources. Having lots of resources available to supplement and aid the academics is key to embedding.

As mentioned, a big challenge for us was fitting all the required information into a 50-minute lecture. The temptation is to teach everything but the reality is that this can't be done. Less is more, and re-usable resources can be created and embedded within other areas of the curriculum to support the lecture.

Publish the Findings of your Work

It is important to publish the findings of your work, otherwise no one will know what you are doing. Through publishing at conferences and in journals, others can find out what works well, what doesn't, and can leverage existing resources you have created. It is also important to avoid "preaching to the converted" and for this reason, we presented our work at the Australasian Association for Engineering Education (AAEE) conferences in 2008 and 2009, attended mainly by engineering academics. Share your successes with your colleagues but more importantly, with academic staff. Attending and presenting at the AAEE conference in 2008 allowed us to demonstrate to academic staff, the value of embedding, and using their terminology, proving the value that it can have in their domains.

Summary and Future Directions

Embedding IL is a long process and the time we dedicated to the task increased as our involvement has increased. Over the three-year period, the

teaching team contributed the following approximate amounts of combined preparation and teaching time:

- 2007—30 hours
- 2008—54 hours
- 2009—154 hours

The 2009 total seems extravagant, but in 2010, the total combined time of preparation and teaching has been reduced to approximately 53 hours, similar to 2008 levels but retaining the same amount of involvement as 2009. This is good evidence that our embedding strategy is just that—embedded, with our initial investment in time paying off as we had hoped.

As librarians it is increasingly necessary to build evidence to prove the value of what we do, as academic teaching staff cannot be expected to take a "leap of faith" in including IL if they don't have the space in the curriculum or are dubious about the benefits. So when planning for embedding, carefully consider how you will collect data, either directly or indirectly, as proof of the value of your work and the benefits of an embedded IL program is required if you are to maintain an ongoing program. Teaching and library staff change over time and if the value of your contribution is not clearly visible then you will have a harder time remaining embedded. Keep any data that you can, present your work at conferences and publish what you have done for others to learn and to gain credibility about your motives.

Additionally, embedding is not possible without the advocacy and support of academics. We were fortunate to collaborate with academics who valued information skills enough to feature them in the curriculum and had confidence in our abilities to develop effective materials. We had countless conversations behind the scenes, in person and via email about the unit and how it could be improved. We believe that collaboration between librarians and academics is essential for embedding to occur. Additionally, support from the academic teaching team can assist in gaining buy-in from

students and changing preconceived notions about the value of information skills. In our case, there was a positive and measurable change not only in their perceptions of IL skills but more importantly an improvement in their actual skills.

An unexpected indication of the value of our work occurred when the teaching team discussed our efforts with the team in charge of QUT's First Year Experience program. As part of this program, a successful "transitions in" strategy to prevent attrition rates by aiding students identified as "at risk" was implemented, and there were discussions that the results of our week two pre-test might be used confidentially to assist in identifying these students, thus revealing another benefit of our work.

We also found that a key part of embedding was training the tutors to deliver library activities. By creating resources for tutors to use, providing backup support where necessary and continually updating the resources in line with the curriculum, there was a shift from spending our time in lectures to spending our time on resource creation and tutor training as a complement to the lectures.

With all this in mind, the real test of our hard work came when the BEE faculty underwent an external review of its large units, including BEB100. The review arose from the faculty's continual strive to improve its LEX results. We provided a written submission to the review panel demonstrating the value the library provided to BEB100 and we also attended focus groups to discuss our thoughts in person. Ultimately the review panel recommended removing the faculty umbrella and returning the unit to the control of the three Schools. While the unit would still be core for all BEE students, there would be three discipline-specific approaches to the content.

Future Directions

In 2010, BEB100 ceased being a faculty-wide unit and is now offered separately by each of the three Schools. It is still a core unit called *Introducing*

Professional Learning, but the three new unit coordinators each have a degree of free reign over the amount of discipline-specific and library content included in:

- UDB100 Introducing Professional Learning—School of Urban Development
- DEB100 Introducing Professional Learning—School of Design
- ENB100 Introducing Professional Learning—School of Engineering Systems

At the end of 2009 before this split, the BEB100 unit coordinators requested feedback from the tutors for unit content that should be introduced, retained or removed.

Fortunately the tutors flagged the library content as too important to remove and there was general agreement that the weekly schedule used in BEB100 in 2009 should be retained for the new units in 2010. The exception to this is the lecture on referencing which is placed earlier in the semester as students find it helpful for their other units.

While there was some reduction of the library content in ENB100, both UDB100 and DEB100 have each continued with the 2009 schedule. In fact, in DEB100 the embedding has been so successful that library assistance has only been requested for minor updates to the content. The week 2 pre-test was administered and the results analyzed without library assistance, and the tutorial materials have been so self-explanatory that tutor training hasn't been required. There has even been another small addition to each of the 2010 units with the lecture on report writing being given by one of the library's Academic Skills Advisors. This has helped to reinforce the library's expertise in supporting academic skills and strengthening the library's IL portfolio.

It is hoped that some further analysis of final exam data from 2007, 2008 and 2009 will be undertaken in 2010–2011 involving detailed examination of the 35 questions used to test student IL skills in the end of the semester exam. In addition, we will attempt to cross-analyze these final exam

results to determine if the large increase in library involvement over the three years has resulted in positive outcomes for students, however, as we didn't have a plan for a longitudinal study of results in place in 2007 this may prove difficult.

With the decision to change BEB100 to a School-based offering in 2010 our goal posts were moved, but we are confident that our efforts to develop comprehensive and effective methods for embedding IL into the first year engineering curriculum at QUT have paid off. With increased involvement over the 2007, 2008 and 2009 iterations of BEB100 and via the pre- and post-testing strategy delivered in 2009, we were able to prove the

value that a tailored and constant IL presence had on improving student information skills.

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