Integrating information literacy into higher education curricula

An IL curricular integration model

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ABSTRACT

This study investigates a way to systematically integrate information literacy (IL) into an undergraduate academic programme and develops a model for integrating information literacy across higher education curricula. Curricular integration of information literacy in this study means weaving information literacy into an academic curriculum. In the associated literature, it is also referred to as the information literacy embedding approach or the intra-curricular approach.

The key findings identified from this study are presented in 4 categories: the characteristics of IL integration; the key stakeholders in IL integration; IL curricular design strategies; and the process of IL curricular integration. Three key characteristics of the curricular integration of IL are identified: collaboration and negotiation, contextualisation and ongoing interaction with information. The key stakeholders in the curricular integration of IL are recognised as the librarians, the course coordinators and lecturers, the heads of faculties or departments, and the students. Some strategies for IL curricular design include: the use of IL policies and standards in IL curricular design; the combination of face to face and online teaching as an emerging trend; the use of IL assessment tools which play an important role in IL integration. IL can be integrated into the intended curriculum (what an institution expects its students to learn), the offered curriculum (what the teachers teach) and the received curriculum (what students actually learn). IL integration is a process of negotiation, collaboration and the implementation of the intended curriculum. IL can be integrated at different levels of curricula such as: institutional, faculty, departmental, course and class curriculum levels.

Based on these key findings, an IL curricular integration model is developed. The model integrates curriculum, pedagogy and learning theories, IL theories, IL guidelines and the collaboration of multiple partners. The model provides a practical approach to integrating IL into multiple courses across an academic degree. The development of the model was based on the IL integration experiences of various disciplines in three universities and the implementation experience of an engineering programme at another university; thus it may be of interest to other disciplines. The
model has the potential to enhance IL teaching and learning, curricular development and to implement graduate attributes in higher education.

Sociocultural theories are applied to the research process and IL curricular design of this study. Sociocultural theories describe learning as being embedded within social events and occurring as learners interact with other people, objects, and events in a collaborative environment. Sociocultural theories are applied to explore how academic staff and librarians experience the curricular integration of IL; they also support collaboration in the curricular integration of IL and the development of an IL integration model. This study consists of two phases. Phase I (2007) was the interview phase where both academic staff and librarians at three IL active universities were interviewed. During this phase, attention was paid specifically to the practical process of curricular integration of IL and IL activity design. Phase II, the development phase (2007-2008), was conducted at a fourth university. This phase explores the systematic integration of IL into an engineering degree from Year 1 to Year 4. Learning theories such as sociocultural theories, Bloom’s Taxonomy and IL theories are used in IL curricular development. Based on the findings from both phases, an IL integration model was developed.

The findings and the model contribute to IL education, research and curricular development in higher education. The sociocultural approach adopted in this study also extends the application of sociocultural theories to the IL integration process and curricular design in higher education.

**Keywords**
Information literacy curriculum, Information literacy education, Information literacy integration model, Higher education, Curriculum integration of IL, Sociocultural theories, Vygotsky, Bloom Taxonomy
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A STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other institute of higher education. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature

8th Dec 2010
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EXPLANATION OF TERMS

Explanations are listed below to clarify the way in which certain terms have been used in the context of this study.

Academic courses
Academic courses mean education imparted in a series of lessons. A semester course is a course that normally runs for 12-13 consecutive weeks within one of two divisions of the year, and a yearly course normally runs over two semesters.

Academic curriculum
Academic curriculum means an educational plan to engage students in the obtaining of knowledge and skills leading to a degree or certificate. It not only refers to the official list of courses and content offered by a university and leading to a degree or certificate, but it also refers to the purposes, organisation, course delivery and its associated activities, and to the evaluation programme developed by an institution.

Academic programme
Academic programme means a prescribed set of one or more courses or other work which, on satisfactory completion, leads to the award of a tertiary certificate, diploma or degree.

Assessment
Assessment is used to determine how well the students achieve the IL learning outcomes or objectives. Through an assessment, students can demonstrate that they have achieved particular learning outcomes. Two types of assessment are normally used in higher education: formative assessment and summative assessment.

Assignment
Assignment means a duty that students are assigned to perform or to complete in order to achieve the learning outcomes or learning objectives of an academic course or programme.

Extra-curriculum
This is an approach to IL education. IL activities are not normally linked to any specific academic course (Peacock, 2006; Wang & Russell, 2004). It is also known
as generic IL teaching.

**Formative assessment**

Formative assessment refers to informal assessment which supports student learning by providing feedback to students about their progression towards the IL learning outcomes.

**Framework**

A framework means a conceptual structure that puts discrete components or processes into a logical order to be used as a guideline (Simpson, 1989; Clifton, 2003).

**Information literacy (IL)**

Information literacy is understood as “using information to learn” within a disciplinary context in a collaborative learning environment (Bruce, 2008). The Australian and New Zealand Institute for Information Literacy (ANZIIL) IL standards (Bundy, 2004) provide a practical guideline by defining IL as: “a set of abilities enabling individuals to recognise when information is needed and have the capacity to locate, evaluate, and use effectively the needed information” (p. 3). IL is seen as being able to be applied to lifelong learning in order to learn, solve problems, and to make decisions.

**IL curriculum**

IL curriculum means IL related curriculum including IL related teaching policies, activities, assignments, assessment, delivery, organisation and evaluation.

**Information literacy embedding**

This is an approach to IL education, see *Information literacy integration*.

**Information literacy integration**

The terms IL integration, IL embedding and intra-curriculum are used interchangeably in the literature (Peacock 2006). As used in this thesis, the term means weaving IL into the curricular content, structure and sequence (Bundy, 2004).

**Intended curriculum**

The intended curriculum is what an institution expects its students to be taught and to
learn through its educational system (Codd, 1981; Preedy, 2001).

**Inter-curriculum**

This is an approach to IL education. IL activities are related to the curricular teaching content or assessment (Peacock 2006). It is also known as subject related or course related IL education.

**Intra-curriculum**

This is an approach to IL education (Peacock 2006), see *Information literacy integration*.

**Learning activities**

Learning activities mean students’ engagement in a variety of learning actions based on the learning objectives or learning outcomes.

**Learning objectives**

Learning objectives mean the specific statements set up by educator(s) that describe what they intend to teach. They can be fairly broad guiding principles for teaching.

**Learning outcomes**

Learning outcomes mean the specific statements of what students are expected to know, understand and/or be able to do from a course or a class or activity.

**Model**

A model is a representation of a concept or process and its internal interrelated components but not expressed in mathematical form. A model may, or may not be, underpinned by an established theory (Hughes, 2006; Simpson, 1989).

**Offered curriculum**

The offered curriculum means what teachers teach or plan to teach (Preedy, 2001).

**Pedagogy**

Pedagogy refers to teaching strategies including teaching planning and designing, and a style of teaching.
**Positivist paradigm**
Paradigm is a set of beliefs that guide actions in research. The positivist paradigm is the basic belief that reality is 'out there' and can be captured through the use of scientific methods and studied independently by the researcher (Cohen, Manion & Morrison, 2000).

**Received curriculum**
The received curriculum is what students experience or the knowledge and skills that are actually learned by students via the course (Preedy, 2001; Kelly, 2009).

**Social constructivist paradigm**
Paradigm is a set of beliefs that guide actions in research. The social constructivist paradigm seeks to understand the constructivist dialectic involving objective, inter-subjective and subjective knowledge, such as how we know the minds of others, how individuals or members of society apprehend, understand, and make sense of social events and settings (Gephart, 1999). This paradigm “recognizes the mutual creation of knowledge by the viewer and the viewed and aims toward an interpretive understanding of subjects’ meanings” (Charmaz, 2003, p. 250).

**Sociocultural approach**
This is a research approach based on sociocultural theories which emphasise the interdependence of social and individual processes in the co-construction of knowledge.

**Sociocultural theories**
Sociocultural theories claim that human cognition is developed through engagement in social activities and interaction through shared experience. Culturally constructed tools such as language and symbols play an important role in these external social interactions. The external social interaction will then be internalised to a transformed version of interaction and become part of independent human developmental achievement.

**Stand-alone information literacy education**
This is an approach to IL education. IL education is provided as an independent academic course and solely devoted to IL. It is taught either as a selective course for-credit or non-credit (Johnston & Webber, 2003; Sharkey, 2006; Visser, 2005), or as a
compulsory course as part of the general education program offered in a faculty or university (Breivik & McDermand, 2004; Callan et al., 2001).

**Student-centred learning**

It refers to an approach to education which focuses on the needs of the students, rather than teachers and administrators. With this approach, when curricular designers design the curriculum, course content or class activities, rather than asking ‘what am I going to teach?’ They ask: ‘what are students going to learn?’

**Subject librarian**

Subject librarian refers to a librarian who liaises with, and provides services for a specific faculty or department or subject in higher education. A subject librarian may also be referred to as ‘liaison librarian’ or ‘faculty librarian’ or ‘faculty service librarian’.

**Summative assessment**

Summative assessment refers to formal assessment which measures the sum of the IL learning in order to produce marks or grades.
Before you start reading my thesis, I would like to tell you my story. This is the story of my journey from being an engineering student to becoming a librarian, then an academic, back to a librarian again and now a researcher. I hope this journey will give you some background information about me and my research.

I was born in China and was one of the lucky ones who had an opportunity to take and pass the national university entrance examination in 1977 and, in consequence, studied at a university in China. The year of 1977 was the first year after the 10-year period of Cultural Revolution when all the universities were reopened in China. There was intense competition as there were far more people who wanted to enrol in universities than could be accommodated. After four years of university study, I graduated as a newly qualified engineer and started to work in an engineering institute in Shanghai (by then, all university tuition fees and accommodation were paid for by the Government in China and on graduation we were guaranteed employment). There were about thirty newly graduated engineers assigned to the same institute. I was the only one assigned to work in the library of the institute as I had the highest mark in an English test! Reluctantly, I started my career as a librarian!

I was information illiterate when I started working in the library so I attended many training courses for librarians. I participated in research projects and started to provide information services to engineers and researchers. I also provided them with reference consultation and training. Gradually, I started to enjoy working in the library where I acted as an information consultant and trainer for the provision of information literacy (IL) training to researchers and engineers. I enjoyed teaching/training so much that, five years later, I became an academic staff member in the Department of Information and Library Science at Liaoning Normal University (Nowadays one has to have a PhD to become an academic at any university in China). One of the courses that I taught was *Information Retrieval Systems*, in which I
worked collaboratively with a reference librarian. We co-designed class activities for students to use information to answer actual reference enquiries in the library. I found it was good experience for me, as an academic staff member, to work with the reference librarian in the integration of IL into the course curriculum.

In late 1995, I left my beloved teaching career and migrated to New Zealand where I changed my career as an academic to that of librarian. In the late 1990s, on completion of my Masters degree in Library and Information Studies in New Zealand, I became the first engineering subject librarian at The University of Auckland. Next I was appointed as the Information Skills Librarian and am currently the Learning Services Manager.

As a subject librarian and Information Skills Librarian, I had many reference enquiries from students at the library information desk, and via emails or telephone phone calls. I still remember how frustrated students were when they tried to find the appropriate information for their assignments or research topics. I repeatedly taught students individually how to select the appropriate information sources, to search, limit or broaden their search results, or how to evaluate the information found. At that point I considered that it would be more effective to teach students via academic courses. In consequence, I contacted course lecturers and talked to them about the problems that their students had and the support that I could offer. I then offered IL tutorials via selected academic courses. These were normally a ‘one off’ or ‘add on’ session which was taught once in each semester or, once a year. These class tutorials certainly proved to be an improvement on individual instruction as they provided an opportunity for a greater number of students to effectively use information in order to learn. However, I found that after we had offered ‘one off’ sessions, the students involved did not have the opportunity to continue to learn and apply IL in the later classes of the same course or via other courses. Also, students were inclined to view the IL tutorial as a ‘library session’ and thus did not pay much attention to it.

As a librarian and an educator, I struggled to work out the best way of systematically integrating IL into academic curricula. I started to investigate IL integration research and found many articles on the subject of the practical experience of librarians working with academic staff in the teaching of IL via an academic course. I found
this investigation frustrating. There were many repeated practical working examples but not much research on how to integrate IL across an academic programme; I could not find an IL integration model that I could use or adapt for this purpose.

I started to study for my Doctor of Education (EdD) in 2005 in the Education Faculty of a university where I gained useful knowledge of curricular design and learning theories which I have applied throughout this study. Then I transferred to a PhD at QUT, supervised by Professor Christine Bruce and Dr. Hilary Hughes, where I have shaped my work to target librarians and academic staff who are interested in the curricular integration of IL. This was my journey from engineering graduate to librarian, to academic, to librarian and thence, to researcher. In this journey, I have also published a series of journal articles and conference papers associated with this study. These are listed in Appendix I. You may find this research useful when you work with academic staff or librarians in the integration of IL into higher education curricula and also enjoy reading the rest of the chapters which embody the many years of my research and study.
Chapter 1

TOWARDS A MODEL OF CURRICULAR INTEGRATION OF INFORMATION LITERACY

This research investigates how information literacy (IL) can be systematically integrated across the curricula in higher education. It presents the collaborative experiences of academic staff members, librarians and learning and IT support staff in the integration of IL into the curricula of four universities. It provides a model of curricular integration of IL.

Research Background

Over the last decade or so, curricular development in many Australasian institutions, has included the identification of graduate attributes or profiles and graduate employability (Barrie, 2007); shifting the focus from content to critical thinking and lifelong learning (Ministry of Education, 2006); moving from teacher-centred teaching to student-centred learning (Maher, 2004); and encouraging collaborative learning by engaging students in a community of learner environment (Chiang & Fung, 2004; Christen, 2009). In these developments, the importance of IL has increasingly been receiving recognition within the wider academic and non-academic communities (Lupton, 2004).

IL is a required attribute in the statements of many institutions in regard to Graduate Attributes or Graduate Profiles (Bridgstock, 2009); it can also provide a pathway to the development of the required attributes (Hamilton, 2008), as well as being required by many professional organisations (IPENZ, 2009; ABET, 2009). IL has been playing an important role in assisting student learning (Peacock, 2008) in collaborative learning environments, for example: problem-based learning (Eldredge, 2004; Mondschein, 2007), resource-based learning (Dennis, 2001; Hannafin & Hill, 2008) and enquiry-based learning (Barnes et al., 2006; Kong & So, 2008).

As stated in the American Library Association (ALA) Presidential Committee on information literacy: Final Report (ALA, 1989) information literate people are those
who have learned how to learn. They know how to learn because they know how knowledge is organised, how to find information and how to use information in such a way that others can learn from them. They are people who are well prepared for lifelong learning, because they can find the information needed for a particular task or decision. IL is identified as a key competency for lifelong learning in an Australian Government report (Candy, Crebert & O’Leary, 1994). It is important to provide IL education for students in higher education.

The term ‘information literacy’ is described by ALA as a set of skills which enables individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989, p. 1). In a more extended view, information literacy has been described as a way of learning (Kuhlthau, 1993). In the 2000s, this view has been reinforced by many researchers such as Bruce and Candy (2000), Genoni and Partridge (2000), Limberg (2000), MacAuley (2001), and Lupton (2004; 2008). Bruce (2008) reconceptualises IL as being about engaging learners in information practices in order to learn. She describes how people go about learning by interacting with information in different ways and in different contexts.

IL education has evolved from library instruction programmes that were variously described as library instruction, bibliographic instruction, reader instruction, library user or reader education and information skills programmes (Dewey, 2001; Fjallbrant & Malley, 1984; Hammond, 1975; Lupton, 2004; Stevenson, 1977; Streatfield & Wilson, 1981). However the focus of IL education is quite different from these traditional library instruction programmes which focus on how to use a library and library resources, and how to access and find information. IL encompasses more than just accessing and finding information. It involves understanding information needs, critically examining how to use information, communicating information in order to learn, and keeping updated in today’s world of information explosion. The focus has shifted from specific information resources to a set of critical thinking skills involving the evaluation and use of information; from specific skills to general, transferable lifelong learning skills. IL education is not a library issue; it is a lifelong learning issue, a campus issue and an education issue (Rockman & Associates, 2004).
However, librarians in higher education have had a long history of providing library instruction programmes and are in a good position to work collaboratively with academic staff to provide IL education. Therefore, IL education in the sphere of higher education has mainly been developed by librarians (Bruce, 1997; Corrall, 2007). Most of the IL instruction and programmes have been initiated by librarians (Bruce, 2000, 2001; Breivik, 1992, 1998; Doyle, 1992; Cartin & Feid, 2001; Virkus, 2003).

Currently there are four main approaches to IL education in higher education (Eisenberg, Lowe & Spitzer, 2004; Peacock, 2006): extra-curriculum - a course outside of academic curriculum; inter-curriculum - a session(s) add-in to an academic course; intra-curriculum - integrated into a course; and stand-alone - an independent course(s) within academic curricula. The intra-curricular approach, also known as the curricular integration or embedded approach is defined by the ALA Information Literacy Competency Standards for Higher Education (ACRL, 2000) as being “woven into the curriculum’s content, structure and sequence” (p. 5).

The curricular integration approach is advocated by both the ALA Information Literacy Competency Standards for Higher Education (ACRL, 2000) and ANZIIL (Australian and New Zealand Institute of Information Literacy) Information Literacy Framework (Bundy, 2004). These IL frameworks propose that the integration of IL throughout curricula is the most effective way of providing IL education. Bruce (1997) argued that “IL cannot be learned without engaging the discipline specific subject matter. Therefore, students need to learn about discipline content as they seek and use information” (p. 60). In the literature, there are many practical examples of academic staff and librarians who have used this approach and worked collaboratively to integrate IL into an individual academic course. For example, at University of Manitoba, Canada, both academic staff and librarians have been involved in planning, delivering, and evaluating the integration of IL into a new interdisciplinary Textile Sciences course - Textiles, Products, and Consumers for first year students (Dakshinamurti & Horne, 2006). The University of Pittsburgh provides another example of IL integration where both academic staff and engineering librarians have worked collaboratively to integrate four IL assignments into first year engineering courses as required course content (Callison, Budny & Thomes, 2005).
While much scholarly work has been done in order to integrate IL into academic programmes, little research has been conducted into the process of systematic IL integration across an academic degree.

**Research aims and questions**

The aims of this research are:

- To investigate how IL can be systematically integrated across academic curricula in higher education;
- To propose a model of curricular integration of IL.

In order to achieve these aims, the key research questions are:

1. What are the key characteristics for the curricular integration of IL in higher education?
2. Who are the key stakeholders in the curricular integration of IL in higher education?
3. What is the process of IL integration in curricular redesign in higher education?

The main outcome of this research is the development of an IL integration model that can be used in higher education. This thesis presents the research that I have undertaken in exploring the characteristics of the curricular integration of IL and the process of IL integration in curricular design. The key characteristics of IL integration are identified: multiple partner collaboration and negotiation; contextualizing IL in the academic course content, and providing students with ongoing-interactions with information through both single and multiple academic courses. The research reveals that librarians, the course coordinators and lecturers, the heads of faculties and the students are the key stakeholders in the curricular integration of IL in higher education. The research also demonstrates that the curriculum can be viewed as the intended curriculum, the offered curriculum, and the received curriculum, as well as a negotiated document. IL integration into the curriculum is a process of collaboration and negotiation which can be done at different levels such as those of the: institution, faculty, department, course, or class.
The research concludes with a model of processes for the integration of IL across academic curricula in higher education.

**Research approach and methodology**

Sociocultural theories were applied as a basis for this study. Sociocultural theories are based on the social constructivist paradigm which considers that the reality of knowledge is socially constructed through interaction and shared by individuals (Bryman, 2001) and that research objects interact to influence one another (Hale-Haniff & Pasztor, 1999). The purpose of this research is to investigate a process for integrating IL across academic curricula and to develop a model for the integration of IL in higher education. This knowledge does not exist and cannot be discovered, instead it needs to be developed and constructed through interaction in a collaborative environment.

Sociocultural theories describe learning as being embedded within social events and occurring as a learner interacts with other people, objects, and events in the collaborative environment (Vygotsky, 1978). The sociocultural approach is a research approach based on sociocultural theories. This approach was adopted in both phases of the research: the interview and development phase. In the interview phase, I conducted semi-structured interviews with a sample of 23 academic staff and librarians who have had IL curricular integration experience, from three universities. In the development phase, I established 4 curricular working groups from Year 1 to Year 4 in a fourth university. Librarians, academic staff, learning designers and learning and IT support staff in these curriculum groups worked collaboratively to integrate IL across an engineering programme from Year 1 to Year 4. Based on the key findings and the practical IL integration experience, an IL integration model was developed.

**An IL integration model**

In this research, an IL integration model has been developed to represent one way of integrating IL across academic curricula. The model includes three key elements: *What*, *Who* and *How*. The outcome of the model is to enable students to be information literate.
The *What* element includes the IL guidelines indicated in the intended curriculum which may include the attributes of university graduates, accrediting organisation requirements, IL frameworks and standards, or national IL related strategies. This part of the model acts as a guideline to provide an IL curricular working group with a solid understanding of why IL education is important and a direction in planning and designing the IL curriculum.

The *Who* element deals with people who are the key stakeholders of IL integration. In order to work collaboratively with multiple partners in a community of IL practice, academics, librarians and other working partners need to communicate and establish relationships. They also need to understand the faculty curriculum and to be able to identify potential or core courses in each year in order to integrate IL across curricula. The notion of *collaboration* has been extended beyond academic staff and librarians to campus-wide multiple partners including course lecturers, librarians, student learning advisors, learning designers and IT support staff. The key elements of the multiple partner collaboration are identified as: *Shared understanding of the purpose*
of IL integration; Shared knowledge; Joint dialogue with respect and tolerance; and Joint efforts with trust and support (S^2J^2).

The How element deals with IL integration curricular planning and redesign. For example, the IL curriculum needs to be designed by contextualising IL with course or programme learning outcomes, assignments, class activities, assessments, etc; Students need to have the ongoing opportunity to interact with information in single courses as well as across multiple courses; learning theories are applied in the curricular design process. IL education can be delivered face to face, or online, or a combination of both. Bloom’s taxonomy (Bloom et al. 1956), IL frameworks and standard and institutional IL related intended curricula can be effectively applied to the development of IL learning outcomes based on which IL learning activities can be developed to scaffold students in their acquisition of IL learning.

The model was constructed and developed through the two phases of this study. In the interview phase, I dialogued and interacted with the chosen ‘experienced librarians and academic staff’ to share their knowledge and experience of the curricular integration of IL. They used the curriculum plan, assessment tools, IL activity examples etc., as interactive tools with which to share their experiences of the way in which IL was integrated into course contexts such as assignments or course activities. The key characteristics of IL integration were identified. In the development phase, we formed a community of IL integration practice. In this community, we applied some of the findings of the interview phase; we collaborated and interacted to co-construct the best way of integrating IL into the curricula; we communicated and negotiated to support each other in the development of IL learning outcomes, IL assignments, IL activities and IL assessment. Gradually an IL integration model was formed, shaped and developed to its final version which will be discussed in detail in chapter 7.

The significance of the study

This study contributes to the body of knowledge in three primary areas. Firstly, the study offers an IL integration model and strategies for higher educators to work collaboratively in the designing of a curriculum with IL integration. This is a
research based model which combines learning and IL theories with IL practice. The model makes a theoretical contribution to curricular development for IL education. It presents an IL integration framework to practitioners in higher education and provides a solution for the intended curriculum’s implementation. The model underpins the strong professional interests and scholarship around the curricular integration of IL. The model can be used or adapted by anyone who is working in the area of curricular integration of IL.

Secondly, it contributes to the deeper understanding of curriculum and IL integration into the curricula of higher education. This research synthesises multiple perspectives on IL integration including collaboration, negotiation, contextualisation and ongoing interactions. The research extends the notion of collaboration in IL integration, from librarians and academics (Cunningham & Lanning, 2002; Callison et al., 2005; Bennett & Gilbert, 2009) to multiple partners in a community of IL practice. The S2J2 elements of the multiple partner collaboration are identified. The research will help higher educators to understand the characteristics of curricular integration of IL and the process of IL integration in curricular design/redesign. The study also explores the different perspectives of the curriculum and its various levels in higher education.

Lastly, the study contributes to the IL body of research by applying sociocultural theories to the process of IL integration model development, curriculum theories and IL theories. This research is based on the sociocultural approach. Literature searches show that sociocultural theories present a new research approach in IL research and have been adopted in a limited amount of IL research. The application of sociocultural theories in this research will be useful to researchers for the sharing of my experience in the entire process of this research including in generating and analysing data and developing an IL integration model. This research has creatively applied Bloom’s Taxonomy to develop IL learning outcomes on which IL activities can be based. IL theories such as Six frames for IL education have also been applied in IL activity design.

My research is unique in several aspects:
It explores the process of IL curricular development;

It develops a model of curricular integration of IL which can be used or adapted;

It extends the application of sociocultural theories to IL integration and IL curricular design;

It creatively applies Bloom’s Taxonomy and IL theories to develop IL learning outcomes on which the design of IL activities can be based in order to scaffold students in IL learning.

**Organisation of the thesis**

Chapters 2 and 3 provide a review of the literature incorporating the areas of IL, IL curricular integration, and the influences of IL on the higher education curriculum. Chapter 2 focuses on the IL development in higher education including IL research and IL implementation. Chapter 3 emphasises the influence of IL on the higher education curriculum including the importance of IL and different approaches to IL education in practice. The literature review reveals research gaps relating to curricular integration of IL in higher education.

Chapter 4 describes the methodology and theoretical framework for the study. In this chapter sociocultural theories within the qualitative research which underpin this research are explored. The value of sociocultural theories for understanding learning is explored and an explanation is provided as to how sociocultural theories can support IL curricular design in higher education. The researcher also explains how the sociocultural approach is adopted in the data generation and analysis processes of this study.

Chapters 5 and 6 describe the findings from this research. Chapter 5 describes the key findings of the characteristics of the integration of IL. Chapter 6 describes the key findings of the process of the IL curricular development in higher education.

Chapter 7 explains the IL integration model in detail, as well as its application.
Chapter 8 is the discussion chapter which summarises the study findings and compares them with literature; it describes the contributions that this study makes to IL education and research; it discusses the issues and concerns raised from the study, as well as its limitations. Finally, the recommendations for further study are presented.

**Conclusion**

This chapter has introduced the study and revisited the research aim which is to investigate how IL can be systematically integrated into academic curricula in higher education and to develop an IL integration model. The researcher states that the process of the curricular integration of IL is a process of collaboration, negotiation and contextualisation. It is also an ongoing process via different academic curricula at various levels. The research demonstrates how sociocultural theories can be applied to the research process, to both IL curricular integration and IL curricular design.
Chapter 2

IL DEVELOPMENT IN HIGHER EDUCATION

This research aims to investigate how IL can be systematically integrated into higher education curricula. In this chapter the scene is set for the study by outlining the developments in IL research and practice. The following chapter will outline the influence of IL on the higher education curriculum. The thesis concludes with the identification of a gap in the research relating to cross-curricular integration of IL and the lack of a pedagogic model to support this integration.

Four phases of IL research development

This section reviews the four phases of IL research developed during 1980 to 2000 as summarised by Bruce (2000). According to Bruce, IL research has gone through four phases over the last three decades. The first phase was described as the ‘precursors’ (1980s) when, during that period, IL research focused on information skills and bibliographic instruction. Bruce viewed Kuhlthau’s research (1988; 1993) as the most influential work in this phase. Kuhlthau explored students' experiences of information use and described IL as a ‘way of learning.’ An influential definition of IL was established by the end of this phase when the ALA Presidential Committee on IL published its final report (ALA, 1989). The second phrase was experimental (1990-1995) when the term ‘information literacy’ began to be used in research. Doyle’s Delphi study (Doyle, 1992) in the US and Canada led to the term ‘information literacy’ being widely understood and used; in Sweden Björner (1991) developed a competency based model for IL teaching. In this period, IL was seen as important and was identified in an Australian government report as one of five key components for lifelong learning - Developing lifelong learners through undergraduate education (Candy, 1994).

The third phase was exploratory (1995-1999) when a variety of paradigms beyond the positivist approach to IL research were explored. For example, Bruce developed the relational approach to studying higher educators’ view of IL (Bruce, 1997) and provided us with a new understanding or interpretation of IL; Cheuk (1998) used a constructivist approach to developing a model of information seeking and using
process in 1998; Mutch (1999) analysed information management based on critical realism.

The fourth phase (2000- ), Bruce described as ‘evolving’ in which she predicted “the development of a community of researchers and research teams; growth in research beyond the educational sector, particularly the workplace and community; attention to a wider variation of cultural settings; and a firmer, more consolidated, research agenda” (p. 95). As Bruce predicted, research with a wider variation of more consolidated research agenda appeared in this phrase. We are still in the evolving phase. In the next section, the IL research in higher education is reviewed since the year 2000.

**IL research in HE since 2000**

Since the start of the 21st century, major advances have taken place in IL research and practice. These advances have led to the development of these areas: the perspectives of IL; the greater understanding of the ways in which students experience IL and use information for study purposes; and the theoretical perspectives that have been adopted in IL research.

**IL perspectives**

This section reviews different perspectives of IL since the 1970s when the term appeared in literature. IL has been described as a core literacy of the information society in the 21st century to achieve educational, occupational, economic and personal goals in the knowledge society (Lloyd & Williamson, 2008). The term ‘information literacy’ first appeared in 1974 (Zurkowski, 1974) and it appeared in IL research in early 1990 (Bruce, 2000) when IL emerged as an area of curricular practice in formal education (Lupton, 2008). Since then, especially during the exploratory and evolving phases of IL research, the term has been described or interpreted from different perspectives. ALA described IL as a set of skills which enables individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989, p. 1). Based on the ALA’s definition, a number of frameworks for IL have been developed by library associations in the USA, the UK, Australia and New Zealand.
In the last decade IL researchers have given various descriptions for IL. In Bruce’s phenomenographic study of the seven faces of IL (Bruce, 1997), she interviewed 16 higher educators including academic staff, librarians, staff developers, and learning developers. Her research showed that higher educators viewed IL from a variety of perspectives depending on how they experienced information. They viewed IL as using information technology; finding information located in information sources; executing a process for finding and using information; organising information; using information to build up a personal knowledge base; using information to generate new knowledge; and using information wisely. This research highlighted the different aspects of higher educators’ experiences with information. It focused on the relations between information and the users’ engagement based on relational learning theories. This study is regarded as a seminal work in IL research (Lloyd & Williamson, 2008; Lupton, 2004). Ten years later, Maybee (2007) adopted a similar methodology to find out how undergraduate students viewed IL. The research found that undergraduates viewed IL as information technology, information sources, information processes and as a knowledge base. This indicated that students had similar views on IL to those of the higher educators, but with fewer aspects.

McAdoo (2008) conducted a survey study to examine faculty understanding of IL. The study found that IL and IL instruction are still perceived by the faculty as being more technology and skills-based rather than process and cognition-based; and the lack of IL knowledge is perceived as the most significant challenge to its incorporation into the curriculum. Recently, Gross and Latham (2009) conducted an interview study at a university in the USA and found that “a common approach students used to try to unpack the term [of IL] was to start with the concept of ‘literacy’ and to try to apply familiar types of literacy (reading and computer literacy) to the word ‘information’” (p. 341). They concluded that the student view of IL focused more on product rather than process; students prefer people to information sources; they use people as informants to find needed information, as agents to help them to find the information needed and as tutors to teach them to find the appropriate information for themselves.
In the late 1980s IL was viewed as a way of learning (Kuhlthau, 1988). In the 2000s, research done by Limberg (2000), Todd (2000) and Lupton (2004) reinforced this view. Todd (2000) theorised an IL framework from the human cognitive process with four key aspects: information consumer; cognitive process of information; information construction; and purposeful use of information. This view argued that the human cognitive process is also a process of consuming, constructing and using information; therefore IL is viewed as an approach to learning. Lupton’s research (Lupton, 2008) investigated how undergraduates experience information in particular disciplinary contexts in order to understand how students learn. While Lupton focused on undergraduates’ experience with IL, both Genoni and Partridge (2000) and MacAuley (2001) focused on postgraduates’ experience with IL. They studied how doctoral students collect, retrieve, store and manage their research data in order to improve the existing IL programme to meet their needs.

Elmborg (2006) argued that IL is “more than a set of acquired skills. It involves the comprehension of an entire system of thought and the ways that information flows in that system” (p. 196). Therefore, IL needs to transcend its early instrumental conceptualisation. He drew Freire's aspect of critical consciousness to IL and student learning: “rather than focus on knowledge acquisition, students identify and engage significant problems in the world. By developing critical consciousness, students learn to take control of their lives and their own learning to become active agents, asking and answering questions that matter to them and to the world around them” (p. 193). This view has strengthened the critical role of IL to lifelong learning which enables students to learn how to learn.

Lloyd (2006) widened the IL perspectives through a sociocultural lens, “IL is a variable construct and is shaped and understood according to context” (p. 578). For example, in a workplace of firefighters, the process by which they become information literate is “underpinned by the interaction between expert members of the community of practice with the novice in the context of learning about practice and performance” (p. 572). Therefore IL is viewed as “a way of knowing” the universe (Lloyd, 2006, p. 575). This has extended the view of IL as a way of learning from an academic environment to a workplace situation.
O'Connor (2009) argued that the conceptualisation of IL developed in the library associations’ standards is overly technical, emphasising the acquisition of skills over intellectual maturation. She recommended reconceptualising IL by revising the existing IL documents or creating new professional statements to provide a more holistic definition of IL. Markless and Streadfield (2007) defined IL in three aspects from the IL instruction perspective: connecting with information (orientation, exploring, focusing and locating); interacting with information (thinking critically and evaluating); and making use of information (transforming, communicating and applying). Bruce (2008) reconceptualised IL as being about engaging learners in information practices in order to use information to learn, she called this informed learning. She argued that people go about learning by interacting with information in different aspects and in different contexts. This view helps our students to become informed learners by introducing explicit attention to information practices in a curriculum.

Recently Spiranec and Zorica (2010) have described IL 2.0 as subset of IL to emphasise the social, economic and cultural dimensions of IL which reflect the notion of using information to learn in a social and cultural collaborative environment. Pinto, Cordón and Díaz (2010) summarise different IL perspectives over the last thirty years and argue that IL is no longer limited to bibliographic instruction which focuses on the teaching and learning of a particular type of information tool. Instead, IL must be understood as “the acquisition of all the knowledge necessary to handle sources of information, documents and systems that enable us to understand, manage, critically interpret and reuse the information that helps us understand, improve and benefit from living in our society.” In this sense, IL involves “understanding a thought system and the way that information flows within it” (p. 3).

In summary, while IL is viewed by many library associations in their frameworks as a set of skills, many researchers have challenged it and tried to reconceptualise it. There are various perspectives: IL is viewed as a way of, or an approach to, learning; as a way of knowing; as a cognitive process of consuming information, of interacting with information, of constructing information and of using information in different ways and contexts, as well as using information to learn.
For the purpose of this research, I take the sociocultural view of IL as using information to learn within a disciplinary context. In the community of IL practice, students have an opportunity to interact with, construct and use information from different sources, interact with peer classmates and lecturers to complete a task or to solve a problem therefore to learn. The ANZIIL’s IL framework (Bundy, 2004) is also used as a guideline in curricular design and development to enable students to access, evaluate, organise, apply and use information to learn, to solve problems and to make decisions.

**IL and graduate attributes**

This section reviews the importance of IL and examines the research on tertiary students regarding their level of IL. Research has shown that university students lack IL capability and that it is necessary to provide IL education for them in higher education.

IL is a required graduate attribute of many institutions for their graduates (Barrie, 2007; Bridgstock, 2009). Graduate attributes/profiles in higher education generally include two main types of student achievement expected by a university for its graduates: 1) a discipline-specific body of knowledge and 2) more general or generic attribute or competencies which might be common to all, or to most graduates (Tucker & Palmer, 2004). These generic attributes normally include information literacy, lifelong learning, critical thinking, problem solving, and communication, all of which enable graduates to be effective contributors in the workplace and to society (Christensen & Cuffe, 2002; Barrie, 2007).

The requirements for information literate graduates have an impact on IL and curricular development in higher education. The focus of IL research is closely associated with the development of graduate attributes (Christensen & Cuffe, 2002; Hughes et al., 2005), generic skills (Briguglio, 2000; Robley, Whittle & Murdoch-Eaton, 2005) and lifelong learning skills (Abid, 2004; Lau, 2006). For example, Griffith University developed IL as a generic attribute and integrated it into the curriculum (Abbott & Peach, 2000). Similar work at Curtin University and
Swinburne University of Technology has been documented by Briguglio (2000) and Donkin (2008). Lupton’s research (2008) increased understanding of the nature of IL as a generic skill and graduate attribute.

Although IL is a required attribute in many universities, are university students information literate? Since 2000, this has been another ‘hot’ IL research topic. Hepworth (1999) studied students for their information seeking skills at Loughborough University (UK) by observing, talking through with students and task analysing. He found that students had difficulty with defining the problem, identifying information sources and developing search strategies. Students experienced a great deal of frustration when they searched for information.

“Generally students were unaware of the range of sources of information that could be used to identify relevant information; they had a poor understanding of the ‘information landscape’” (p. 6).

These findings also agreed with Leckie and Fullerton’s (1999) survey and Jacobson and Mark’s study (2000). Jacobson and Mark found that many traditional first-year students arrive on college and university campuses with a great deal of experience in searching the Internet. However, most students lack database-searching and critical-thinking skills.

Mittermeyer and Quirion (2003) conducted a study of over 5000 first year undergraduate students in Quebec universities (Canada). The results indicated that “a significant number of students have limited knowledge, or no knowledge, of basic elements characterising the information research process” (p. 7). They did not know how to do informational searching, whether they were computer savvy young people or older students who did not like computers. Walton and Archen (2004) had similar findings from their first year engineering student interviews at the University of Cape Town, South Africa. Students were using the web extensively for social and personal reasons, but they had limited academic experience of the Web. Head and Eisenberg (2009) conducted an online survey and collected 2,318 responses from students from six US universities. The study confirmed, and expanded upon the results of other research, that almost all respondents use the same small set of common information resources in the initial stages of research, no matter what question they have. Their
primary sources for course work are course readings and Google and they rely on course lecturers to identify additional sources.

Maughan (2001) reported the results of a five-year study conducted at the University of California, Berkeley. The students thought they knew more about accessing information and conducting library research than they could actually demonstrate when put to the test. Studies done by Seamans (2001) and Neely et al. (2003) further reinforced the phenomenon that students perceive their IL capabilities to be higher than they actually are. Bury’s (2009) recent research also concluded that student perceptions of their own abilities of IL are higher than their actual abilities. Hargittai et al. (2010) report from their recent research that students choose a web-site not because of its quality or relevance but because the search engine had returned that site as the first result. This is shown from the dialogue: Researcher: *What is this Web site?* Respondent: *Oh, I don’t know. The first thing that came up* (Hargittai et al, 2010, p.12).

An interview study with members of the teaching faculty conducted at two Californian universities (The California State University and the University of California, 2002) found that first year students were poorly prepared in terms of IL. Only one third of the university students could employ IL sufficiently well such as in “analyzing information or arguments and synthesizing information from several sources” (p. 4). A faculty survey at the Louisiana State University (Hrycaj & Russo, 2007) shows that there is much room for improvement in the information finding and information retrieval skills of undergraduate students. An online faculty survey (Information Literacy Advisory Committee, 2009) shows that “Less than 50% ‘agreed’ or ‘strongly agreed’ that their students could effectively search subject databases in their disciplines, and, similar to the catalogue searching results” (p. 19). Bury’s (2009) faculty online survey at York University also found that students heavily rely on the free web and lack the motivation to go beyond this.

Interestingly, Costantino’s study (2003) revealed that many academic staff and administrators assumed that students have learned IL skills from librarians or academic courses but many students responded that they had not had opportunities to learn these skills or that they were self-taught. Similar findings were also reported from a study at two large Canadian universities and the Kansas State University
(Collins et al., 2005) that “very few students were offered opportunities to determine the need for information (problem based learning)” and “over half of students are not asked to evaluate information in their assignments” (Collins et al., 2005, p. 10). This survey also showed that in engineering and other sciences, students did not develop IL capabilities until their senior year or graduate school.

The above evidence suggests that university students are lacking IL capabilities. First-year students arrive on campuses with a great deal of experience in Internet searching. However, most students lack critical-thinking skills and database-searching proficiency. Students perceive their IL abilities to be higher than they actually are. The literature suggests that it is critical to provide IL education for university students.

**Theoretical perspectives and methodologies used in IL research**

Various methodologies underpinning different theoretical approaches in IL research are summarised in this section. These approaches include both qualitative and quantitative based on positivism, relational phenomenography, cognitive constructivist and social constructivism and sociocultural theories. Based on different theories, different research methods are used in IL research. These research methods range from survey (Korobili, Malliari & Christodoulou, 2008; Mittermeyer & Quirion, 2003; Selematsela & Du Toit, 2007), Delphi study (Doyle, 1992; Saunders, 2009), case study (McAdoo, 2008; Serotkin, 2006), testing (Dunn, 2002; Gross & Latham, 2009; Mittermeyer & Quirion, 2003), to interviews (Critchfield, 2005; Gross & Latham, 2009; McGuinness, 2006), focus group studies (Dunn, 2002; Valentine, 1993), document analysis (Wright, 2007) and phenomenography (Bruce, 1997; 1999; Edwards, 2006; Lupton, 2008; Maybee, 2007), and approach (Elmborg, 2006; Mutch, 2000), and critical incident technique (Hughes, 2007; 2009).

Each of these research methods meets specific IL research needs. There are a number of researches, such as the survey (Neely, 2000), Delphi study (Saunders, 2009) and testing (Dunn, 2002) have adopted quantitative techniques. Quantitative approach tests theories by devising and carrying out repeatable experiments. It is useful for the collection of objective, measurable or patterned data from a large
sample such as survey. However, different methods are required to understand the constructive dialogue nature of human reality in social science e.g. how we know the mind of others and how individuals apprehend, understand and make sense of social events and settings (Gephart, 1999).

Other information literacy research, therefore, adopts qualitative, interpretative and critical stances. The critical approach assumes “a view of what behaviour in a social democracy should entail” (Cohen, et al., 2007, p. 26). Critical approaches to literature disclose how or why a particular work or concept is constructed and what its social and cultural implications are. Critical perspectives help us to view text as a multi-layered construct of meaning and inspire us to reread, rethink, and respond to it. For example, one critical theorist, Elmborg (2006) asks us to rethink information literacy teaching that is conducted through a banking concept of education (Freire, 1970). He asks, “What is the role of the library in the Freireian vision of critical literacy? Is the library a passive information bank where students and faculty make knowledge deposits and withdrawals, or is it a place where students actively engage existing knowledge and shape it to their own current and future uses?” (p. 193).

Relational, cognitive constructivist and social constructivism or sociocultural approaches usually draw on the interpretativist paradigm. Phenomenography, the method associated with the relational approach, focuses on how people experience or perceive phenomena. It is “a research method for mapping the qualitatively different ways in which people experience, conceptualise, perceive, and understand various aspects of, and phenomena in, the world around them” (Marton, 1986, p. 31). It describes to others “the variation of experiences present in a group of people in a given learning environment” (Edwards, 2006, p. 52). The outcome of a phenomenographic study is to identify the different ways that people experience a phenomenon and the structural relationships between these different ways of experiencing (Marton & Booth, 1997). For example, Bruce uses phenomenography to ask higher educators about their experience of information literacy instead of asking “What is information literacy?” She then identifies categories describing the way in which information literacy is experienced, which are represented in the Seven Faces of information literacy model (Bruce, 1997).
The cognitive constructivist approach (Piaget, 1954) emphasises accurate mental constructions of reality. It focuses on people as individuals who construct their own knowledge as they engage in the processes of interpreting and making sense of their experience or activities; new knowledge is always constructed and built on previous knowledge (Nuthall, 1997). For example, Todd (2000) based on the cognitive construction theories, theorises that information literacy plays a role in enabling people to connect to information, to interact with information, to cognitively process information, to construct information and to use information. Kuhlthau (2004) applying constructivist theories to explain information and learning, theorises that learning is a cognitive process of assimilating new information, a process of individuals “constructing meaning from the information they encounter” (p. 25). However, cognitive constructivism has been criticised for being closely focused on the individual learners whilst ignoring the social and cultural context of learning (Nuthall, 1997) and for its assumptions of individualistic and mentalistic knowledge construction (Bakhtin, 1981).

Social constructivism also adopts constructivist perspectives and shares some perspectives on learning and research with cognitive constructivism. For example, they both emphasise knowledge construction and encourage thoughtful reflection on experience (Jonassen, Peck & Wilson, 1999). However, unlike cognitive constructivism, social constructivist theories take much greater account of the important roles that social relations, community and culture play in learning and development (Rogoff, 1990). Social constructivism extends our view beyond individual learners and places more emphasis on the social and cultural context of research and learning. Vygotsky is the major theorist among the social constructivists (Glasson & Lalik, 2006; Limberg & Alexandersson, 2010; Palincsar, 1998; Zuccaro, 2008) who argue that development could not be understood by a study of the individual. The external social world in which that individual life has developed is not seen as separated, but must also be examined (Vygotsky, Rieber, & Carton, 1987).

Vygotsky’s sociocultural theory has appeared more recently in IL research (Lloyd & Williamson, 2008; Newell, 2006; Tuominen, Savolainen & Talja, 2005; Wang, 2007), but is yet to be developed. Lloyd and Williamson (2008) argue that “understanding
the historical, political, social and economic concerns that contribute to the
collection and shaping of context is a significant task for IL researchers” and
“exploring context becomes the first task in order to understand how a phenomenon
like IL is revealed as sociocultural, context-specific processes” (p. 9). However in
the IL literature little has been written about the principles of sociocultural theories
and how to apply them in the IL research. This research is intended to fill this gap by
providing a brief overview of sociocultural theories (in chapter 4) and introducing the
way in which they can be used in the research process and IL curricular design.

IL implementation in higher education

This section reviews how the IL frameworks and theories are enacted in practice in
higher education curricula. It outlines the role of IL frameworks in supporting IL
planning, implementation and evaluation; the current pedagogic approach in IL
education; the collaborative efforts in IL education; IL instructional model and
frameworks; how the IL implementation programme is assessed and evaluated; and
the librarians’ roles in IL education.

IL frameworks and standards

This section provides a summary of IL frameworks, including IL standards, and
information on how to use these frameworks as guidelines in IL education. Since
1999, a number of frameworks for IL have been developed by library associations in
the higher education sector. These include the ‘Seven Pillars’ of IL in the United
Kingdom by the Society of College, National and University Libraries (SCONUL,
1999); “Information Literacy Competency Standards for Higher Education” in the
United States by the Association of College and Research Libraries (ACRL, 2000)
and the Australian and New Zealand Information Literacy Framework by the
Australian and New Zealand Institute for Information Literacy – ANZIIL (Bundy,
2004). Both ACRL’s and ANZIIL’s definition of IL were based on the ALA’s
definition (ALA, 1989). In Australia and New Zealand, the most commonly used
descriptions of IL are drawn from the ANZIIL Framework and describe an
information literate person who: “recognises the need for information and determines
the nature and extent of the information needed; finds needed 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).

These IL frameworks provide guidelines for integrating IL into the curriculum. Therefore, these library associations’ IL frameworks are widely adopted by many of the institutions in their own countries. For example, the ACRL IL competency standards for higher education are widely used in USA universities (Critchfield, 2005; Elrod & Somerville, 2007); the ANZIIL IL Framework is adopted by all New Zealand universities and nearly 50 Australian institutions (ANZIIL, 2008); Corrall (2008) has analysed IL documents from 10 institutions in the UK and she found that 7 out of 10 institutions in UK adopted the SCONUL framework (SCONUL, 1999) and “one used the ACRL (ACRL, 2000) standards” (p. 30).

Much research has been conducted in recent years in order to apply IL frameworks and standards in IL programme design and development, assessment and evaluation. This research includes: designing an IL programme (Mondshein, 2007; Wright, 2007); mapping the ACRL IL competencies to different levels of cognitive development for the use of IL classes (Jackson, 2008); assessing an IL programme (Davidson, McMillen & Maughan, 2002; Emmett & Emde, 2007); measuring students’ IL levels (Critchfield, 2005; Knight, 2006). For example, California State University, Hayward, mapped commonalities between the National Science Education Standards and the ACRL Information Competency Standards for Higher Education (Laherty, 2000). Next they approached the science faculty and demonstrated the importance of IL to them by showing the commonalities of both the science education standards and IL standards. Critchfield (2005) developed a comprehensive IL evaluative tool to measure students’ IL levels based on the ACRL Competency Standards (ACRL, 2000). Davidson, McMillen & Maughan (2002) identified the top eight priorities among ACRL competencies, across all levels of students. Knight (2006) developed a scoring rubric based on both the ACRL IL Competency Standards for Higher Education and the course learning objectives. The rubric was used to score the bibliographies and to determine the students' levels of mastery of the objectives, their use of library subscribed databases vs. freely
available web sources. Jackson (2008) matched the ACRL IL standard indicators to different levels of cognitive development to their IL education. IL is growingly accepted as an enabling competence for effective participation in education, employment and society (Corrall, 2004).

Boon, Johnston and Webber (2007) argued that these IL standards are mainly developed by the library associations “rather than academics and/or researchers” (p. 206) and that “IL still receives surprisingly little critical attention outside the LIS [Library and Information Science] field” (p. 205). The authors carried out a phenomenographic study in order to find out whether higher education academic staff perceived IL in the same way as stated in the Library Associations’ frameworks; they investigated UK academics' conceptions of, and pedagogy for, IL and they compared the view of IL in the major three IL frameworks (ACRL, SCONUL and ANZIIL) from the perspective of these higher educators. They found that “the conceptions held by academic staff express similar skills and desired outcomes to all three frameworks” (p. 220), although a few differences exist, for example, the lack of a “recognising an information need” concept in their findings.

In summary, IL frameworks and standards are widely adopted by library practitioners in the curricular integration of IL in higher education. Research on IL frameworks and standards application has also appeared in IL research since the year 2000. In this research, the ANZIIL framework is adapted to IL curricular design, class activities and assignment design.

**Pedagogic approaches to IL instruction**

This section reviews various pedagogic approaches to IL instruction and IL curricular design. These include cognitive learning theories, constructivist learning theories, and the sociocultural constructivist approach to learning including sociocultural theories.

Learning theories and a pedagogic approach to IL education have appeared in the IL literature in last two decades. Markless (2004) argued that learning theories are not an optional extra but an essential in IL teaching. Literature searches have shown that

Liles (2007) compared three different types of learning theory: behaviorism, cognitive learning and constructivism and demonstrated how the different learning theories shape the role of IL trainers, students and the teaching methods employed. Mokhtar, Majid and Foo (2008) explored the integration of IL with a pedagogical approach based on Gardner’s theory of multiple intelligences. Oakleaf (2009) presented an IL instruction assessment cycle based on the assessment for learning theory. She suggested that good teaching is inseparable from good assessment; assessments are used as tools for learning. Oakleaf’s theory opens a new way of designing the IL curriculum.

Bruce, Edwards and Lupton (2006) proposed six frames for IL education based on relational learning theories. These six frames provide a guideline for higher educators with instructions on how to design an IL curriculum with a pedagogic approach. The Content Frame focuses on what learners should know about IL, e.g. teaching a key set of information tools and the techniques for using these tools. The Competency Frame focuses on what learners are able to do and at what level of competence, e.g. to develop different levels of IL competences for students to obtain.
The *Learning to Learn Frame* focuses on how to use information to learn, e.g. in problem-based learning, students learn through the process of solving problems by accessing, evaluating and applying information. The *Personal Relevance Frame* focuses on learners’ interests in order to engage them in the learning process. An example is for students to explore what their future career could be. The *Social Impact Frame* focuses on social impacts or social changes, e.g. seeing the social implications in the cases or tasks at hand and considering how relevant policies could be developed to guard against negative impact. The *Relational Frame* focuses on different perspectives. An example of this is to ask students to articulate their own views about the cases or problems in hand and to observe the differing viewpoints of their peers. Some of these frames have been applied in IL teaching. For example, Edwards (2006) applied the *Relational Frame* to an online tutorial design.

In this research, the sociocultural approach is adopted in IL curriculum and class activity design in order to foster student learning in a collaborative and interactive environment. Some of the six frames such as the competency frame and the personal relevance frame are also adopted in this research. The next section reviews the IL instructional models and frameworks found in the literature.

**IL instructional models and frameworks**

Model here means a representation of a concept or process and its internal interrelated components but not expressed in mathematical form. A model may, or may not be, underpinned by an established theory (Hughes, 2006; Simpson, 1989). Framework here means a conceptual structure that puts discrete components or processes into a logical order and can be used as a guideline (Simpson & Weiner, 1989; Clifton, 2003). There are a few IL frameworks that have been developed in higher education, such as the *QUT Information Literacy Framework and Syllabus* (QUT, 2010) and the *Research skills development framework* (Willison & O'Regan, 2006). These frameworks are used as guidelines in IL instruction practice in higher education.

The IL models include an IL curricular design model (Bjorner, 1991); a seven pillars model (SCONUL, 1999); an IL instruction model (Curl, 2001); a mapping model of
graduate attributes including IL (Christensen & Cuffè, 2002); an IL model with Indian perspectives (Varalakshmi, 2007); a three-tier IL model developed at California State University, Los Angeles (California State University, 2006); Colvin-Keene’s IL instruction model (Keene et al., 2010), and a collaboration model (Bennett & Gilbert, 2009; Dhanesar, 2006; Li, 2007; Walter, 2000).

Bjorner (1991) developed an IL curricular design model based on a vocational education model by determining what should be taught in IL classes. Bjorner developed eight categories of competencies aimed at defining broadly the entire process of information management. Bjorner’s model attempted to describe steps that would reflect all the types, levels and possible environments of information need. However, in the rapid changing knowledge world, it is impossible to predetermine all possible information needs. IL education has to be integrated into the academic curriculum by contextualising IL in various sets of academic course content which may not be able to be precisely predetermined. Bjorner’s model operated at the instructional design level and adopted the idea of an information meta-course in designing an IL curriculum which is a useful way of providing IL education in higher education. The meta-course consisted of a set of teaching modules, as individual lessons, arranged at intervals throughout a course.

SCONUL (1999) demonstrated a seven pillars model which showed diagrammatically the relationships between the ‘competent information user’ at the base level and the much more advanced level of information literacy. This model can be used as a guideline for developing IL competence in IL instruction design. A graduate capability and core skills mapping model was developed at the QUT Law faculty (Christensen & Cuffè, 2002). The researchers identified a table of core skills based on graduate attributes, including IL. Then they developed three different levels of these core skills and mapped them across the Law curriculum incrementally. The Colvin-Keene IL instruction model includes all the aspects of problem-solving and employs cognitive skills in each of its four stages (Keene et al., 2010).

Curl (2001) revisited Subramanyam’s information process circular model developed in the 1970s and adapted it to develop an IL instruction model based on the scientific and technical literature publication process or information life cycle. IL instruction
was designed based on the information publication process for engineering and technology students. This model can be used in the stand-alone IL courses but is not suitable for the IL integration approach. Varalakshmi (2007) suggested the design for an IL instructional model by focusing on the three key questions: what should be taught, when and where to instruct and who should be the instructor. Regarding what should be taught in relation to IL, Varalakshmi suggested higher order skills. These include knowledge and skills in the use of computers, network, multimedia, information retrieval and methods of information evaluation. Regarding when and where to teach IL courses, Varalakshmi recommended offering a 30-40 hour IL course to all first year students. In regard to the choice of who should be the instructors, Varalakshmi urged that IL must be conducted as a partnership between teachers and librarians. Varalakshmi’s model focused on the extra-curricular approach.

A multiple curricular integration strategy was developed at the California State University, LA (CSULA) with a top down approach (Information Literacy Advisory Committee, 2009). This is an institutional three-tier strategy for integrating IL into university curricula based on a faculty survey study. The three-tiered strategy model provides basic, intermediate, and advanced IL based on the CSULA Core Information Competencies. The authors recommend a strategy of integrating basic skills in required courses for freshmen and transfer students, and then progressively integrating the skills into courses at the upper division and graduate levels. However, it is stated in the updated report in 2009 that “outreach efforts are thus far limited to liaison efforts to embed [integrate] IL across a given department/program” (Information Literacy Advisory Committee, 2009, p. 15). In the appendix integration examples are listed for a few individual academic courses; however details of the particular model are omitted.

The most popular IL instruction model in the literature is a collaboration model. In the collaboration model, both librarians and academic staff work collaboratively to integrate IL into the curriculum by designing IL curricular objectives (Dakshinamurti & Horne, 2006), learning activities (Walter, 2000) and assessment (Fiegen, Cherry & Watson, 2002). Literature searches show that collaboration plays an important role in the development of IL programmes (Bennett & Gilbert, 2009; Callison et al., 2005;
Floyd, Colvin & Bodur, 2008; Ivey, 2003; Tucker & Palmer, 2004). In this collaboration, academic support is the key to success (Chiste, Glover & Westwood, 2000; McGuinness, 2007; Young & Harmony, 1999) and collaboration is built on personal relationships (Cleave, 2007; Corrall, 2008). This relationship forms “through repeated contact via social and professional interactions (bottom up) rather than administrative mandates (top down)” (Cleave, 2007, p. 181). Many librarians concentrate on developing relationships with key faculty members or new faculty members who may be more amenable to collaboration in the IL programme. Hrycaj and Russo (2007) found, from their survey of 188 academics, that academic staff remembers are supportive of collaboration but only very few are actually interested in collaborative IL assignment design/grading. The authors believe that librarians should still pursue collaboration.

Research shows that librarian and faculty collaboration in designing and teaching IL programmes has a positive impact on the students’ perceptions of their IL capability (Black, Crest & Volland, 2001; Dhanesar, 2006). Montiel-Overalla’s study (2008) reinforced the fact that teacher-librarian collaboration helps students and also improves their own teaching. Serotkin’s research (2006) showed that librarian and faculty relationships were improved as a result of the collaborative teaching of IL instruction.

Bruce (2001) extended the faculty-librarian partnerships from IL curricular design to five dimensions: policy partnerships, research partnerships, curricular partnerships, higher degree supervision partnerships, and academic development partnerships. Because these five dimensions all relate to IL, this research opens up the perspective of collaboration and partnerships between academic staff and librarians. The four characteristics of effective collaboration that were identified from the research (Ivey, 2003) are: a shared, understood goal; mutual respect, tolerance and trust; competence for the task at hand; and ongoing communication. Keasta, Browna and Mandelld (2007) identified the primary indicators of collaboration are “development of shared goals, joint dialogue and a higher level of trust” (p. 19).

In summary, the literature demonstrates that there are a variety of IL instructional models and frameworks, and many examples of collaboration in the curricular
integration of IL. However, only limited literature was found that provides a research based view of the processes for IL integration. The next section will review some IL assessment and evaluation methods found in the literature and it is followed by a statement of the challenges faced by librarians in IL integration.

**IL programme assessment and evaluation**

Along with IL integration into the academic curriculum, IL assessment and evaluation appear in IL literature as another key theme. This section reviews the most commonly used IL assessment and evaluation methods reported in the IL literature. Assessment here means determining how well the students achieve IL learning outcomes / objectives. In order to develop a strategy for assessing students in an IL course, Butcher, Davies and Highton (2006) recommended that assessment designers should consider why, what, when and how.

There are mainly three types of assessment commonly used for assessing IL achievement: prescriptive or diagnostic; formative, and summative assessment. Prescriptive or diagnostic refers to the informal assessment of the knowledge and skill of participants before the IL activity is designed or before a class is taught (Lau, 2006). Prescriptive assessment can be used for understanding students’ existing knowledge and skills in order to build new knowledge and skills. Prescriptive assessment can take the form of tests or self-checking questions or a student’s prior work review (Lau, 2006). Formative assessment refers to the informal assessment of what can be improved in order to provide corrective action to enhance student learning. Formative assessment normally occurs during IL activities (McMillan, 2004). It can be used for supporting student learning by providing feedback to students. It may carry marks, but the principal purpose of formative assessment is development rather than judgment (Butcher et al., 2006). Summative assessment refers to formal assessment of what has been learned in order to produce marks or grades (Glickman, Gordon & Ross-Gordon, 2009). This normally occurs at the end of the IL activities. Summative assessment can be used for making judgments and its primary purpose is to measure the sum of learning.

Listed below are commonly used IL assessment methods found in the literature:
Online quiz or multiple choice questions (Roberts & Bhatt, 2007; Welker & Quintiliano, 2008; Welker, Quintiliano & Green, 2005);

Pre-/post-test (Emmett & Emde, 2007; Gross & Latham, 2009; Holman, 2000; Moniz, 2007; Noe & Bishop, 2005; Palmer, 2004; Salisbury & Ellis, 2003);

IL assignment contextualised with the course context (Bhatt, Genis & Roberts, 2006; Callison et al., 2005; Dakshinamurti & Horne, 2006);

Annotated bibliography (Radcliff et al., 2007; Welker et al., 2005) or bibliography (Collins et al., 2005);

Rubric (descriptive scoring scheme) assessment (Knight, 2006; Oakleaf, 2006; Welker et al., 2005; Helvoort, 2010);

Course or project portfolio (Fast & Armstrong, 2003; Scharf, 2007; Snavely & Wright, 2003);

Reflection journal (Messer, Kelly & Poirier, 2005; Radcliff et al., 2007);

Web based peer review (Carlson & Berry, 2007); oral presentation (Nerz & Bullard, 2006) and class discussion (Bhatt et al., 2006).

Gross’s research (2009) showed that both the reflective essay and the experiential final exam are effective assessment methods and he suggested using these methods in assessing IL instruction.

Evaluation in education is a broader concept than assessment as it deals with all aspects of a programme including resources, staffing, organisation, operations, and efficiency (Goldschmid, 1978; Knapper & Cranton, 2001). Evaluation here means to determine the significance or the effectiveness of IL integration into a curriculum. It helps us to answer questions like: “How effective is the integration of IL?” or “What benefits have students gained through the integration of IL?”

Commonly used IL evaluation methods found in the literature are:

- Pre-/post-test (Emmett & Emde, 2007; Gross & Latham, 2009; Holman, 2000; Moniz, 2007; Noe & Bishop, 2005; Palmer, 2004; Salisbury & Ellis, 2003);
- IL survey (Cannon, 2007; McDermott, 2005; Puente, Gray & Agnew, 2009);
- Focus group study and interviews (Dunn, 2002; Serotkin, 2006);
• Comparing students’ performance in a controlled group (Dhanesar, 2006; Flaspohler, 2003; Larkin & Pines, 2005);
• Analysing students’ work (Dunn, 2002; Serotkin, 2006).

Pre-/post-test analysis is the most commonly used method in both assessing student IL skill improvement and evaluating IL programmes or activities. This enables the course lecturers or librarians to compare student improvement by analysing how well they have answered the IL questions after they have completed the IL activities or training. Pre-/post-test can provide a useful result for further improvement of the IL activities. However, Gross (2009) has recently analysed three specific IL assessment methods and concluded that “the pre-/post-test questionnaire was not a reliable method for assessing student success” (p. 5).

A survey would provide quantitative feedback from students but some qualitative feedback may be obtained if there are some explanatory questions included in the survey (Cannon, 2007; McDermott, 2005; Puente et al., 2009). Student focus group studies and interviews provide qualitative feedback (Dunn, 2002; Serotkin, 2006) and could be used in combination with a survey to further clarify any unclear questions (Radcliff et al., 2007).

Studies showed that student understanding and levels of thinking could be identified and evaluated by analysing students’ bibliographies (Lloyd & Williamson, 2008); analysing their literature reviews, annotated bibliographies, portfolios, research journals and IL online test or research reports (Radcliff et al., 2007). Flaspohler et al. (2007), Lloyd and Williamson (2008) analysed students’ work to evaluate the effectiveness of IL teaching. Control groups can be used in IL evaluation: for example, Flaspohler (2003), Dhanesar (2006), and Larkin and Pines (2005) compared student performance in two different groups in order to see the effectiveness of IL integration.

This section reviews the methods commonly used in IL assessment and evaluation. However it is also indicated in the literature that it is challenging to evaluate the effectiveness of IL programmes; comprehensive evaluation of the programme is complex and time consuming (Dunn, 2002; Palmer, 2004). An evaluation may not
demonstrate “how well a student has actually learned to navigate through a search strategy process to find, evaluate, use, and apply information to meet a specific need” (Rockman, 2002, p. 193). Librarians also face a challenge in providing IL education in higher education. This topic is discussed in the next section.

**Librarians as IL educators**

The concern about librarians’ lack of pedagogic knowledge and skills in the design and delivery of IL education has been discussed in literature.

The above sections discussed the change in pedagogic approach in IL instruction and librarians’ involvement in IL assessment and evaluation. The pedagogic role of librarians has emerged in this change (Fell et al., 2003; Grassian & Kaplowitz, 2001). Pedagogy here refers to teaching strategies including teaching planning and designing, and style of teaching. Research suggests that the role of librarians, as they become active contributors in curricular design in higher education, is evolving from that of being service providers to being active educators or learning facilitators (Doskatsch, 2003; Elmborg, 2006; Peacock, 2001) or, to becoming curricular developers (Thompson, 2002). This pedagogic role shift requires librarians to be equipped with pedagogic knowledge and skills, and be able to answer IL integration questions such as: “how do I do it?” (Peacock, 2001).

The concern about lack of preparation for this role has been expressed continually. The Think Tank III forum was held in 1999 and focused discussions on the future direction of library instruction in higher education. One of the key themes identified was that “librarians are still struggling for validation in our roles as educators, both within and outside of our profession” (ALA & ACRL, 1999, p. 2). Fowler and Walter (2003) concluded that as a result of integration of IL, “instruction programs are becoming increasingly complex” and that education for librarians is needed to prepare them more directly to fill these evolving instructional roles (p. 466). Elmborg (2006) argued that for librarians to work in IL education, they will need a different kind of philosophy because teaching IL “requires extensive knowledge of pedagogies” (p. 198) and “librarians must focus less on information transfer and more on developing critical consciousness in students” (p. 192).
Šauperl, Novljanski and Grčar (2007) concluded a research project in the University of Ljubljana, Slovenia. They stated that if librarians have knowledge of pedagogy, the organisation and the activities of their schools and faculties, then they are more likely to integrate IL into the teaching processes of different courses and disciplines. A survey study (Korobili et al., 2008) of 342 Greek academic librarians showed their understanding of IL education is to provide an 'orientation programme', 'a few-hours seminar' or 'teaching information retrieval in specific sources' (p. 188). Therefore they considered the 'ability to deliver lectures with appropriate pace and gestures' as being the most important skills and rated the 'ability to design the curriculum for the goal' as less important in their teaching. Hardy & Corrall (2007) concluded that the IL “training and development implications for librarians are significant” (p. 81). Saunders (2009) carried out a Delphi study in which she surveyed a panel of 13 IL experts to explore the possible evolution of IL over the next decade. The results showed that librarians will continue to play an important role in collaboration with faculty to teach IL. Most experts state that librarians should move away from the focus on information retrieval skills in favour of the more complex areas of IL and become more involved with planning and implementing IL into courses and programmes. They are concerned that neither the current practitioners, nor the upcoming LIS graduates are adequately prepared to adopt this role. They have suggested that if librarians hope to advise faculty on instructional design and assignments, or even take on a more full partnership role in instruction, they must be sure that they have learned the pedagogic theory to support the role.

Wright (2007) surveyed a group of academic librarians and found that they had gained IL knowledge from observing other practising librarians or that it had been drawn from experiences based on prior careers. Varalakshmi (2007) analysed IL programmes for trainers and found that the “programmes are inadequate and there is need to organise them more systematically, formally and in depth” (p. 49).

In summary, the literature shows that in order to prepare librarians to play their pedagogic role in IL education, librarians need to empower themselves with IL knowledge, pedagogic knowledge, and skills in design and delivery of IL education in collaboration with academic staff.
In this chapter, I have reviewed IL literature starting with four phases of IL research from the 1980s to the year 2000, based on Bruce’s exploration (2000). Then I have summarised the main IL research focus areas in higher education since 2000: the IL perspectives; and the theoretical perspectives adopted in the IL research. Various learning theories, beyond the behaviour learning approach, that have been adopted in IL research such as constructivist learning, relational theories; sociocultural theories and Gardner’s theory of multiple intelligences have been presented. Next the various learning theories adopted in IL teaching programmes have been outlined; a variety of methods have been found in the literature for the assessment and evaluation of IL programmes. Librarians as IL educators and the need for pedagogic training for librarians have also been discussed.

In the next chapter, the importance of IL in the curriculum and the current status of IL education in higher education are reviewed.
Chapter 3

THE INFLUENCE OF INFORMATION LITERACY ON THE HIGHER EDUCATION CURRICULUM

When we discuss curricular integration of IL, we need to understand what we mean by ‘curriculum’ before we can go further to discuss how to integrate IL into it. In this section, the understanding of curriculum and the importance of IL in the higher education curriculum is reviewed. The four approaches to providing IL education in higher education are summarized. The researcher concludes that integrating IL into a curriculum is the most effective way of providing IL education. The chapter ends with the identification of the gaps in IL research and the contribution of this study to IL research and curricular development in higher education.

Curriculum and the importance of IL in the HE curriculum

In this section, the term ‘curriculum’ as it relates to higher education is reviewed in conjunction with the current curricular focus, taking the subject of engineering as an example. IL plays an important role in the collaborative learning environment of the higher education curriculum, for example, in problem-based learning and resource-based learning.

Understanding curriculum

The curriculum of a university (as one form of higher education) is more than a list of topics to be studied and learnt. To fully understand the depths and facets of the word ‘curriculum’, a review of different meanings is warranted. In Understanding curriculum, Pinar and his associates (Pinar et al., 1995) stated that “institutionally, curriculum defines the knowledge to be taught” (p. 745). The term curriculum can be referred to as the educational plan of an institution, or a department, or to a program or course. For example, Ratcliff (1997) defined the higher education curriculum as an educational plan that is focused on curricular content. He indicated that in the USA, at the programme level, undergraduate curricula typically consist of three to four components: general or liberal studies, major specialisation, minor specialisations, and elective studies. The content of general or liberal studies is often
set institution-wide by the faculty, while major and minor specialisations are
prescribed by the department or program offering the particular specialisation. In the
professional faculties such as engineering or law, the major and minor fields may be
governed by the curricular prescription of the professional field represented, or by
guidelines extended by the disciplinary association, or by state licensure requirements
or professional board examinations. The enrolment in elective courses is nominally
left to student discretion, but a prescribed range of electives may be set by the
departmental major or minor. Ratcliff’s definition of curriculum refers to an
educational plan but is focused on the curricular content and what can be offered to
students. It ignores curricular delivery and curricular activities, as well as what can
be learnt by students. This definition focuses more on teachers than students.

In contrast, Eisner (2002) defines the curriculum as a programme with an emphasis
on curricular activities. The curriculum of an institution, a school, course, or
classroom can be conceived of as a series of planned events that are intended to have
educational consequence for one or more students. In other words, a curriculum is a
programme that is intentionally designed to engage students in activities or events
that will have educational benefits for them. This definition of curriculum refers not
only to an educational programme as in the above definition, but also to the learning
activities in which students are engaged. Eisner’s definition focuses on the curricular
activities and what students would gain or benefit from in the educational programme.
This is a student focused approach with an emphasis of student engagement.

However, in recent years, the academic curriculum has been seen as a series of
courses related by themes and skill development. For example, Porter (2004) defined
the curriculum as a list of courses and the level of skills developed leading to a
degree. The individual courses within the curriculum help learners to progress from
basic, introductory levels of knowledge and skills to higher-level objectives for
critical thinking, mastery of skills, and demonstration of knowledge common to a
discipline. The degree programme may involve courses in several different
departments or disciplines. Porter’s definition of curriculum refers to a collection of
courses to be completed in order to obtain a degree but it focuses on the subject and
the generic skills that students should be building up from a lower level to a higher
level. This is also a student focused approach, but with an emphasis on student competency.

In summarising, from the above curricular definitions and explanations, we can see that the curriculum in higher education is an educational plan to engage learners in the acquisition of knowledge and skills leading to a degree or certificate. It not only refers to the official list of courses and their content offered by a university, but also to its purposes, organisation, delivery and activities, and evaluation programme developed in that institution.

Current curricular focus – Subject knowledge only

This section summarises the current curriculum focus in higher education taking engineering as an example.

In both the Australian and the New Zealand vision for higher education (Bradley, 2008; NZ Ministry of Education, 2009), skills and capability, or value, are clearly stated as being the key components of an educated performance, in addition to subject knowledge. However, research has shown that the curriculum in higher education is still primarily focused on teaching subject knowledge to students. Taking the engineering curriculum as an example, this is still very textbook-centred (Collins et al., 2005; Nerz & Bullard, 2006). This focus on text-book learning was a shared concern at the 2003 Annual Conference of the Association of Southeast Asian Institute of Higher Learning which had delegates from Southeast Asian countries and Australia (Cheah, Chen & Ting, 2005). They reported that most of the Civil Engineering undergraduate programmes offered today in the Southeast Asian region have a very high technical content and that there is a lack of education in important generic skills such as IL and lifelong learning. As Cheah et al. (2005) concluded in their research, the situation in America is similar to that in Southeast Asia and Australia. Cheah et al. compiled basic percentages of broad components found within the Civil Engineering curriculum of four universities, three from the United States and one from Singapore. The comparison results showed that teaching content is heavily focused on subject knowledge. About 87% of civil engineering courses from these four universities focused on technical knowledge, basic science and
mathematics only. My experience and knowledge of engineering education in New Zealand lead me to suggest that most courses still focus on technical and subject knowledge.

This focus on subject alone led Freire (1970) to argue that the higher education system is a ‘banking’ concept of education, in which “the students are the depositories and the teacher is the depositor” (p. 45). In this view of education, the students are required only to receive, fill, and store the deposits. This system ignores education and learning as processes of inquiry. Students become collectors or cataloguers of the things they store. Consequently, students “are filed away through the lack of creativity, transformation, and knowledge” (Freire, 1970, p. 46). Also, with the fast expansion of the knowledge base, it is impossible for teachers to transfer enormous amount of new knowledge in a subject to their students through academic courses. An education system that is subject knowledge focused and that has a “banking” concept, no longer meets the students’ needs in today’s information explosion society, in which students are required to effectively find needed information and critically evaluate and use that information.

The subject knowledge only focused curriculum has resulted in producing students who tend not to be able to solve “real world messy problems.” The research of Bernold (2005), Kasowitz-Scheer & Pasqualoni (2002), and Russell & Stouffer (2000) found that recent graduates are incapable of applying what they have learnt at university to formulate creative solutions to problems they have never seen before.

As discussed previously that curriculum in higher education is understood as an educational plan in which to engage students in the acquisition of knowledge and skills to meet the needs of society. ‘To engage’ means to participate in or be involved in an activity. This means that, as part of the curriculum, students need to be involved in and to participate in the learning process, learning both subject knowledge and skills, especially transferable skills. This understanding of curriculum presents another movement in curricular reform in higher education: shifting from a focus on content only to a focus on critical thinking and lifelong learning (Ehrlich, 2002; Ministry of Education, 2006; Phillips & Bond, 2004); shifting from teacher-centred teaching to student-centred learning (Bender, 2003;
McGee, 1995; Stes, Gijbels & Petegem, 2008); and encouraging collaborative learning by engaging students in a community of learners (Quitadamo, 2002; Chiang & Fung, 2004; Christen, 2009). Research (Edler, 2003; Mondschein, 2007; Serotkin, 2006) demonstrated that IL integration into curriculum has played an important role in the collaborative learning environment. This collaborative learning environment includes problem-based learning (PBL) and resource based learning (RBL). This will be discussed in the following two sections.

**IL in problem-based learning**

Problem-based learning (PBL) is a pedagogic strategy for students to learn through engagement in real world problems through the provision of guidance, instruction and opportunities (Hoffman & Ritchie, 1997; Ribeiro & Mizukami, 2005). An example of PBL was developed at the School of Medicine, the University of New Mexico (Eldredge, 2004). The PBL tutorial process began with a group of six students, as they encountered a problem in the context of a simulated patient case, for example: “*María Rodríguez is a 42-year-old housewife who comes to your office with a one-year history of difficult breathing on exertion. The problem has become significantly worse over the last one or two months. Also, Mrs Rodríguez notes excessive fatigue and a sensation of chest pressure with physical activity. This morning she developed palpitations (sensation of irregular and fast heart rate) associated with a feeling of being short of breath while at rest (dyspnea)*” (Eldredge, 2004, p. 55).

Students had no prior reading or lectures to prepare them for this encounter. The problem became the catalyst for motivating students to learn from one another initially, and later to learn through their search for appropriate information resources under the guidance of lectures and tutor/librarian. Through the problem solving process, the students, lecturers and tutor/librarian formed a community of learners in which the tutor served as a facilitator who encouraged students to see the need for knowledge and to extend the limits of their knowledge. In order to solve the problem, the students searched for information and evaluated and applied it. Each information resource was critically appraised according to its relevance to the patient described in the case and the quality of its information such as its accuracy, timeliness, or
evidence-base. During the problem-based learning process, the focus is not on the students solving the problem, but on them using the problem as a catalyst to explore the answers to the question and to use information to learn. During the exploration, the students’ reasoning skills improved as they went through three stages: exploring a phenomenon/phenomena and identifying a pattern by searching information; reinforcing or modifying the initial pattern by using information or concept, and applying the concept in a new situation (Singer & Moscovici, 2008). This example demonstrates that IL plays a critical role in problem-based learning.

**IL in resource-based learning**

RBL is a methodology that allows students to interact with information resources such as books, journals, or web resources and to explore a topic by finding and applying information. Teachers are able to use information resources as learning tools to facilitate student learning, to assist students to explore a topic, complete tasks, or to answer questions. For example, in the City University of New York, a course lecturer and a librarian worked together to successfully integrate IL into a course curriculum in a resource-based learning environment (Dennis, 2001). In one session students discussed ‘who and what defines American women?’ The purpose of the session was to experience extraordinary collections of web-based primary sources. In the class, instead of telling students “there are web sites on women’s history or politics,” the tutor asked, “What is national women’s history month, and why should we care?” “What have American women contributed to our country’s history?” Students were asked to scrutinise a selection of primary source websites while debating broad critical questions. Then students searched resources by class, gender, region, and race. The class divided into three groups, selecting one of three activities: **Woman as worker bee or honey bee, High brow versus low brow, and Quilting bee.**

In the **Woman as worker bee or honey bee** group, students explored two websites: *Powers of Persuasion* (National Archives), the collection of US government propaganda posters from World War II and *What Did You Do In the War, Grandma?* (Wood et al., 1997), a Brown University project featuring oral histories of women who contributed to the war effort, at home and abroad. While browsing the web resources, students had to think about these questions: *what did women do in World
War II? In which ways were images of women on these two sites similar? How did they differ? What issues and concerns faced women during this period? If you were drawing the powers of persuasion posters, how would you portray women? (Dennis, 2001)

In the RBL environment, students are supported in their engagement in the learning process and are encouraged to search effectively for information that meets their needs and to critically analyse that information in the completion of their tasks. IL is a prerequisite of resource-based learning and it provides an excellent platform for fostering resource-based learning.

The above examples demonstrate that IL is important in a student-centred learning environment such as PBL and RBL. The integration of IL into curriculum provides an opportunity in curricular development for the development of student IL and lifelong learning skills.

Four main approaches to IL education in practice

As part of the graduate attributes movement, the importance of IL has been recognised within the wider academic and non-academic communities (Barrie, 2007; Hughes et al., 2005; Lupton, 2004). Significant practice-based IL enquiries are being conducted in higher education (Johnson, Jent & Reynolds, 2007; Johnson, Jent & Reynolds, 2008). IL can be implemented in various ways. This section outlines four main approaches to providing IL education in higher education. These four main approaches are: extra-curricular, stand-alone, inter-curricular and intra-curricular (Eisenberg et al., 2004; Peacock, 2006). As I shall indicate, of these four approaches, the integrated approach is the most effective way.

The extra-curricular approach to IL education is also known as generic IL teaching. IL is normally taught by the librarians outside of an academic curriculum (Peacock, 2006; Wang & Russell, 2004). The extra-curricular approach may be depicted as in Figure 3.1. IL teaching is supplemental to the academic curriculum and not normally linked to any specific academic course, attendance is voluntary. IL is not normally
assessed but formative self-assessment may be provided for immediate feedback to students for the benefit of their own learning.

Figure 3.1: Extra-curricular approach

In the stand-alone approach to IL education, IL is taught as an independent curricular course solely devoted to IL as part of the students’ curriculum. The stand-alone IL course can be taught by academic staff or librarians or shared by both. It is taught either as a selective course for-credit / non-credit (Behling, 2004; Donnelly, 2000; Sharkey, 2006; Visser, 2005), or as a compulsory course as part of the general education programme offered in a faculty or university (Breivik & McDermand, 2004; Callan et al., 2001). These stand-alone IL courses are mainly provided in American universities (Loo & Chung, 2006; Scales, Matthews & Johnson, 2005; Sharkey, 2006). The stand-alone approach may be depicted as in Figure 3.2 below.

Figure 3.2: Stand-alone approach

The inter-curricular approach to IL education is also known as subject related or academic course related. IL is taught as add-in session(s) for an academic curriculum by librarians in consultation with, or at the request of, individual academic staff (Simons, Young & Gibson, 2000; Wang & Russell, 2004, Peacock, 2006). It is related to academic curricular teaching content or assignments.
Attendance may be as a requirement of the course or programme. IL teaching is generally related to an academic course or programme. Students normally view IL teaching as an add-in session(s). IL may or may not be assessed. The inter-curricular approach may be depicted as in Figure 3.3.

The *intra-curricular* approach to IL education is also known as the curriculum integrated or embedded approach. IL education is *integrated* into an academic curriculum commonly via collaboration between academic staff and librarians during curricular design, delivery or assessment (Breivik & McDermand, 2004; Rader, 1995; Walker & Engel, 2003). IL classes may be taught by library staff or academic staff, or co-taught by both of them. IL teaching is part of the academic curriculum. IL assessment can be either formative, summative, or a combination of the mandatory requirements of the course or programme. This curricular integration approach is defined by the ALA IL Competency Standards for Higher Education (ACRL, 2000) as “woven into the curriculum’s content, structure and sequence” (p. 5). The intra-curricular approach may be depicted as in Figure 3.4 below.

Among these approaches to IL education, the intra-curricular approach is advocated as the most effective way of delivering IL education as argued in next section.
**Integration of IL into a curriculum is the most effective way**

Bruce (1997) argued that IL does not have a ‘life of its own’, rather it is a way of thinking and reasoning about aspects of subject matter.

“IL cannot be learned without engaging the discipline specific subject matter. Therefore, students need to learn about discipline content as they seek and use information” (p. 60).

Among the above IL integration approaches, both the ALA IL Competency Standards for Higher Education (ACRL, 2000) and the ANZIIL Information Literacy Framework (Bundy, 2004) advocated the curricular integration or intra-curricular approach. They believed that promoting the integration of IL throughout curricula is the most effective way of providing IL education. This is supported by several studies (Callison et al., 2005; Dakshinamurti & Horne, 2006; Feldmann & Feldmann, 2000; Hartmann, 2001; Milne, 2004; Welker et al., 2005; Williams, Blowers & Goldberg, 2004). Nerz (Nerz & Bullard, 2006; Nerz & Weiner, 2001) has many years of experience with working with academic staff in teaching IL to undergraduates. She argued that: “by linking information competencies to existing (or new) assignments related to class material, instructors and librarians have moved beyond decoupled instruction which is quickly forgotten, to ‘just in time’ needs based content” (Nerz & Bullard, 2006, p. 15-16). Jacobson and Mark also concluded that, from their years of experience of teaching undergraduates, the integration approach is the most effective (Jacobson & Mark, 2000).

Student survey results and documentary evidence also support the integrated approach to IL education. For example Hepworth’s (1999) qualitative study found that the integration of IL into a curriculum is a necessity for its successful delivery. A student survey (Korobili & Tilikidou, 2005) and an academic staff survey (Leckie & Fullerton, 1999) also suggested that the IL courses ought be closely related to the discipline and taught as part of the curriculum where students could see the value of IL and be able to apply IL skills to their subject study. The curricular integrated approach also enables IL education to be provided across an academic degree as IL can be integrated into different levels of curricula to build up the skills. As Nerz and Bullard (2006) pointed out, for example, the second year IL related assignment could be built on the ‘…what was learned from the first year’ IL related assignment.
Cochrane (2006) reported his experience of integrating IL into his two management courses in year 2 and year 3. He conducted a study by analysing students’ work in conjunction with a class survey. He concluded that “The case for developing the IL of students is strong… Consequently it appears that the transferable skills element of the undergraduate curriculum is growing” (p. 119). In 2008, McAdoo conducted a faculty survey at a US university and showed that “the best approach is seen as being one that is integrated into the entire curriculum” (McAdoo, 2008, p. 163). Corrall (2008) analysed 12 IL documents from 10 different institutions in UK and has found that all these documents advocate the integration of IL into subject studies by interweaving IL into academic curriculum and assessments.

The effectiveness of the integrated approach can also be explained by current learning theories. For example, according to constructivist theories, mental processes are motivated by the need to make sense of experience, as described by Novak, Mintzes, and Wandersee (2005):

> “Meaningful learning occurs when the learner seeks to relate new concepts and propositions to relevant existing concepts and propositions in his/her cognitive structure. …[It] depends on the quantity of relevant knowledge the learner possesses, the quality of organization of relevant knowledge, and the degree of effort made by the learner to integrate new with existing concepts and propositions” (p. 3).

When IL is integrated into an academic curriculum, it becomes more meaningful or makes sense to students in relation to the course activities in which they are engaged. Making sense of experience involves integrating that experience (IL) with established knowledge (subject knowledge) within the constraints of existing cognitive structures, to construct and develop new knowledge. Therefore, when students experience IL with their course assignments, course activities within their subject context, new subject knowledge and IL knowledge will be constructed and developed. This tends to make the learning more meaningful. An experienced IL librarian, Williams (2006), explained a simple example that IL needs to be relevant, meaningful. “First-year undergraduate computing students are not going to pay much attention to a talk about Boolean searching. However, show them how to find an electronic journal article about Bluetooth and their ears prick up” (para. 7).
The integration approach can be further confirmed by sociocultural theories which underpin this study. According to sociocultural theories, learning is shaped by the context, culture, and tools in the learning situation. The founder of sociocultural theories, Vygotsky, believed that all human activities take place in a social and cultural context with many levels of interactions. These interactions and activities are mediated through the use of tools, either technical (databases, online search tools, books, journals) or psychological tools (language, writing, and strategies for searching) (Vygotsky, 1978). Based on sociocultural theories, Hansman (2002) argued that the nature of the interactions among learners, the tools used within these interactions, the activity itself, and the social context in which the activity takes place, shape learning. According to Hansman, students’ learning is shaped when IL is integrated in an academic curriculum; information searching tools can be used as interactive tools in academic course activities such as course assignments or class exercises. Information resources such as databases or online books can serve as tools to assist students with their learning.

The above discussion suggests that the curricular integration approach is the most effective way of providing IL education. The next section will discuss the gaps in IL research and the contribution of this study.

The gaps in IL research and my contribution

There are many examples of IL integration in practice and the existing models found in the literature are IL instructional design models. Little research has been carried out about how IL could be integrated across an entire academic degree, and at all levels of undergraduate study. There is also the absence of a research based IL integration model to support the recommended integration of IL. This current research will fill this gap by exploring an IL integration model to integrate IL across an undergraduate degree. Also, from the discussion in the previous chapter we can see that little has been written about the principles of sociocultural theories and their application to the IL research in higher education. Therefore, the research will also fill in this gap by exploring sociocultural theories and their application to the IL curricular design and IL research.
In conclusion, this chapter summarises different understandings of curriculum. It raises the concern that current curriculum is still content or subject only focused and reviews the importance of IL in higher education curricular design, such as PBL and RBL. It summarises four different approaches to providing IL education in higher education: intra-curricular, inter-curricular, stand-alone, and extra-curricular. It argues that the intra-curricular or integrated approach to IL education is the most effective way to provide IL education in higher education. Finally, the gaps in IL research were identified. The research methodology will be presented in the next chapter.
Chapter 4

APPLYING SOCIOCULTURAL THEORIES TO INVESTIGATE CURRICULAR INTEGRATION OF IL

This chapter outlines the sociocultural theories that underpin this study and their practical application. Sociocultural theories take a qualitative and constructive research approach that explicates the relationships between human action and the cultural, institutional and historical contexts in which this action occurs (Wertsch, 1998). The sociocultural approach is a research approach based on sociocultural theories that emphasises the interdependence of social and individual processes in the co-construction of knowledge. A sociocultural approach is adopted in the entire research process of this study, including two phases of data generation and data analysis. The first phase is the interview phase conducted at Universities A, B and C and the second phase is the development phase conducted at University D.

**Conceptual basis of sociocultural theories**

This section starts with an overview of the two main research paradigms and their associated ontology and epistemology: the positivist and social constructivist paradigms. The ontology and epistemology for this research are based on the social constructivist paradigm, expressed through the adoption of sociocultural theories. Next the sociocultural theories are explained from four different aspects, followed by an explanation of the way in which sociocultural theories are adopted in education and IL research.

**Research paradigms, ontology and epistemology**

Research is more than simply a technical exercise and is concerned with understanding the world and this is informed by the way in which we view our world (Cohen et al., 2000). The term paradigm is used to describe the predominant worldview in the realm of human thought, which relates to a community, a group of researchers who share a worldview and ontological and epistemological beliefs and practices. The idea of the paradigm was introduced by Thomas Kuhn in his book *The Structure of Scientific Revolutions* (1962) and refers to the set of practices that define
a scientific discipline during a particular period of time. Guba and Lincoln (1998) have further defined the paradigm “as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways” (p. 195). Therefore, the paradigm can be defined as a set of beliefs that guide actions in research.

**Research paradigms**

Two main paradigms, the positivist and social constructivist paradigms have been commonly adopted in education research (Cohen et al., 2007; Palincsar, 1998). The positivist paradigm, referred to as the scientific method, is the basic belief that reality is 'out there' and that it can be captured through the use of scientific methods and studied independently by the researcher. It is rooted in the belief that reality exists apart from the knower and can be captured through careful, systematic processes of data collection/generation, analysis, and interpretation. “All genuine knowledge is based on sense experience and can be advanced only by means of observation and experiment” (Cohen et al., 2007, p. 9). Positivism often “searches for facts conceived in terms of specified correlations and associations among variables” (Gephart, 1999, Para. 6). The aim of positivist research is explanation which requires the relating of an event, observation or other phenomenon to a general law based on the observation and experiment (Robson, 2002) thus it is commonly used in natural science.

In comparison with positivism, the social constructivist paradigm is more phenomenological, interpretive, interactive and humanistic. The social constructivist paradigm seeks to understand the constructivist dialectic involving objective and subjective knowledge, such as how we know others’ minds, how individuals or members of society apprehend, understand and make sense of social events and settings (Gephart, 1999). This paradigm “recognizes the mutual creation of knowledge by the viewer and the viewed and aims toward interpretive understanding of subjects’ meanings” (Charmaz, 2003, p. 250). The focus of this paradigm is more on communication, human experience, and “the meaning that people make of their experiences in their historical, social, cultural, and political contexts” (Nelson & Prilleltensky, 2005, p. 243). The aim of social constructivist research is to
understand and reconstruct the meanings that are held by both the researcher and those being researched. Therefore this paradigm is often used in social science research in which the subjects are people instead of objects (Cohen et al., 2007).

Research ontology

Each paradigm has a common set of assumptions that are associated with ontology, epistemology and methodology. Ontology refers to nature of reality, “the theory of existence, to the nature of being” (Daale, 2003, p. 252) and concerns “issues of existence” (Guba & Lincoln, 1989, p. 83). Grix (2004) stated that “all research starts from ontology, after which one’s epistemological and methodological positions logically follow” (p. 59). The fundamental ontological question is, *What is the nature of reality?* In other words, *What is there that can be known?* The answer to this question will determine what can be accepted as ‘facts’ and what can be known (Sui, 1999). The positivist ontology asserts that reality is tangible, that it exists outside of ones’ self, “social phenomena and their meanings have an existence that is independent of social actors” (Bryman, 2001, p. 16). It believes "truth" exists or that “there is an external reality that is driven by universal laws and that can be known” (Nelson & Prilleltensky, 2005, p. 241). The social constructivist ontology asserts that reality is constructed, subjective and relative. Constructions are not more or less "true", only more or less informed, “social phenomena and their meanings are continually being accomplished by social actor” (Bryman, 2001, p. 18). In other words, the reality or knowledge is socially constructed through the interaction and shared by individuals. Thus, the reality is dependent on the individuals and groups who hold such constructions and is relative to the people who participate in the study (Guba & Lincoln, 1994; Nelson & Prilleltensky, 2005).

Research epistemology

Epistemology refers to the nature of knowledge and concerns “the theory of knowledge, especially in regard to its methods, validation and the possible ways of gaining knowledge of social reality, whatever it is understood to be” (Grix, 2004, p. 63). The fundamental epistemological question is, “*How do we know what we know?*” (Daale, 2003, p. 252) or, in other words, *What is the relationship of the researcher to the researched?* The answer to this question will determine “the way
we see ourselves in relation to knowledge. If knowledge can be separated into parts and examined individually, it follows that the knower or the researcher can stand apart from who or what one is examining. On the other hand, if knowledge is constructed, then the knower cannot be totally separated from what is known” (Maykut & Morehouse, 1994, p. 11). The positivist epistemology considers that the research object or the known and the researcher or the knower are independent of each other, and the influence of the researcher on the researched can be controlled (Hale-Haniff & Pasztor, 1999); and it advocates applying natural science methods to the study of social reality and beyond (Bryman, 2001). In contrast, the social constructivist epistemology considers that the research object and the researcher “interact to influence one another; knower and known are inseparable” (Hale-Haniff & Pasztor, 1999, para. 12) and findings are ‘created’ as research proceeds.

The purpose of this research is to investigate effective ways of integrating IL into multiple curricula and to develop a model of curricular integration of IL. The ontology and epistemology of the social constructivist paradigm provide a theoretical framework for this research. In this research, the social constructivist paradigm is expressed through the adoption of sociocultural theories which suggest that such understandings need to be developed and co-constructed through interactions in a collaborative environment. Vygotsky is considered to be the major theorist among the social constructivists due to the socially constructive nature of his theory (Glasson & Lalik, 2006; Limberg & Alexandersson, 2010; Palincsar, 1998; Trent, Artiles & Englert, 1998; Zuccaro, 2008). The application of sociocultural theories is still new in IL research and there is limited documentation of this approach in IL research (refer to chapter 2, the Theoretical perspectives section). In the next section, the sociocultural theories relating to the thesis are explained in detail.

**Vygotsky’s sociocultural theory**

Sociocultural theories were first systematised and applied by Vygotsky and his associates in Russia in the 1920s and 1930s (John-Steiner & Mahn, 1996). Lev Vygotsky was a Russian psychologist and educator who died of tuberculosis in 1934 in his late thirties “without the world understanding or accepting the sociocultural theory that he nearly single-handedly constructed” (Whiteside, 2007, p. 48). His
translated seminal works, *Mind in society* (1978) and *Thought and language* (1986) addressed the critical importance of cultural and social context to human cognitive development. Sociocultural theories have been further developed by other later theoreticians such as Lave (Lave, 1988; Lave & Wenger, 1991), Lemke (1990), Rogoff (1990, 2003), and Wertsch (1998). Sociocultural theories describe human cognition as developed through engagement in social activities, as an individual interacts with other people, objects, and events. Therefore, human cognitive development cannot be separated from its social, cultural, and historical contexts in which they emerged and are used (Johnson, 2009). This social and cultural engagement is mediated by culturally constructed tools such as language, materials, signs and symbols that create uniquely human forms of higher-level thinking. In his well-known genetic law of development, Vygotsky emphasised the primacy of social interaction in human cognitive development in which human mental abilities emerge twice: “first, on the social level, and later, on the individual level; first, between people (*interpsychological*) and then inside people (*intrapsychological*)” (Vygotsky, 1978, p. 57). From this perspective, learning and development occur on two planes: first on the social plane (interactions with others) and then on the psychological plane (within the learner or researcher). This describes a process of human cognitive development which is situated in, but not limited to, social interaction (John-Steiner & Mahn, 1996).

Vygotsky's sociocultural theory has been discussed in relation to four aspects of human cognitive development, namely mind, tools, the Zone of Proximal Development (ZPD) and community of practice (Mantero, 2002; Nuthall, 1997; Palincsar, 1998; Sheardson, 1999; Wertsch, 1991). First, *Mind* extends beyond a person and people. Mind, according to Vygotsky is socially distributed. Thus one’s mental habits and functioning are dependent upon one’s interaction and communication with others, which are also affected by our environment, context, and history (Mantero, 2002). Lave and Wenger (1991) claimed that “learning, thinking and knowing are relations among people engaged in activity in, with, and arising from, the socially and culturally structured world” (p. 67). The sociocultural perspective assumes that human cognition is formed through engagement in social activities (Mantero, 2002). Secondly, *Tools*, or semiotic means, assist the developing communicative and cognitive functions in moving from the social plane to the
psychological plane. Semiotic means include language; various systems of counting; algebraic symbol systems; works of art; writing; diagrams, maps and mechanical drawings and so on (Vygotsky, 1981). Thirdly, with regard to the ZPD (the Zone of Proximal Development), Vygotsky argued that to understand the relationship between development and learning we must distinguish between two developmental levels: the actual and the potential levels of development. The actual level refers to those accomplishments a learner can demonstrate alone or perform independently. This is in contrast with a potential level of development as suggested by the ZPD: “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 85). Fourth, with a community of practice, learning a subject domain is viewed as a process of becoming a member of, in other words, the participant is ‘taking part’ and ‘being a part of’ a community of practice (Mason, 2007, p. 2). A ‘community of practice’ is a group of people who are recognised as having a special expertise in some area of significant cultural practice (Nuthall, 1997).

Sociocultural theories have a profound impact on the direction of research in education (Whiteside, 2007) and information science (Limberg & Alexandersson, 2010). The sociocultural approach to research is to explicate the relationships between human action and the cultural, institutional and historical contexts in which this action occurs (Wertsch, 1998). Such an approach reveals the interconnected relationships between social and individual mind processes. Thus, Boardman (2004) employed sociocultural theories to investigate the interactions between teachers in general education and students with learning disabilities. Whiteside (2007) conducted her PhD research on university students in hybrid learning environments based on Vygotsky’s sociocultural theory. Vygotsky’s social collaboration and ZPD were adopted as a model in her study to understand how students’ thoughts become words through collaboration in face-to-face courses and in online discussions; and how learning increases through collaborative experiences with peers and with instructors. Wood (2004) adopted sociocultural theories in order to understand how sociocultural influences affect women's choices to participate in engineering/science. Wood claimed that the narrative data in her research were co-produced and co-constructed through an ongoing dialogue between researcher and participants.
Feddersen (2007) utilised Vygotsky’s sociocultural theory as a framework for defining a caring teacher. She co-constructed perspectives of caring teachers by interviewing both teachers and students, analysing student’s essays based on the essay questions that she had developed and conducting a focus group. In this process, students interacted with the researcher and they mutually constructed the description of a caring teacher. These studies demonstrated that sociocultural theories have been widely applied in the education research.

Limberg and Alexandersson (2010) also discuss the value of the sociocultural approach for information literacy. Their analysis demonstrates that various constructivist theories including sociocultural theories strongly influence learning and information practice. Sociocultural theories have been introduced in the domain of information science in recent years (Hjørland, 1998; Limberg & Alexandersson, 2010; Talja, Tuominen & Savolainen, 2005; Wang 2007). The sociocultural approach has also been adopted in information literacy learning activity design through emphasis on collaborative learning (Lazarow, 2004; Wang, 2006, 2007). Based on sociocultural theories, Tuominen et al. (2005) argued that IL is embedded in the activities of particular groups and communities. Therefore, “we need to understand the practices of these communities before we can effectively teach IL.” (p. 341). Practice here according to Tuominen et al. refers to practice of IL integration. This study’s literature review shows that to date only a limited amount of IL research has been published in higher education that has adopted sociocultural theories.

**Practical application of sociocultural theories**

This section outlines the application of sociocultural theories in this research including data generation and data analysis.

**Sociocultural approach of this research**

Underpinned by sociocultural theories, this study is based on a number of assumptions: 1) that knowledge is socially constructed and that the social nature of cognitive development serves as a powerful dialogic model for understanding how IL could be integrated into the curriculum in a community of practice; 2) that tools have
played an important role in these social interactions; 3) that internalisation serves as a powerful model when data are generated and analysed through this research. Each assumption will be further discussed in turn in the following sections.

The first assumption underpinning this study is the social interactive nature of individual development and a community of practice. Sociocultural theories inform us that mental constructions of reality are based on people's experiences and views; that the researcher and the participants are inseparable and interact to influence one another. Sociocultural theories recognise that knowledge is a construction between individuals or between members of a group of people. The process of this study was actually a process of a high level of interaction between participants and the researcher. The interview was a social interaction. In the interview phase, individual interviews provided the participants with the opportunity to share their experience and perspectives of IL integration with the researcher. Both academic staff and librarians were viewed as collaborators and valued experts. Through the dialogues between them and myself, as researcher, I communicated and interacted with them to explore the most effective way of integrating IL into the academic curriculum. After each interview, the participants were also asked to review transcripts and to provide comments on them. This was another example of an interaction. In this research, a socially interactive environment was established in which a community of IL integration practice was formed. In this community of IL integration practice, learning and knowing are redefined as the activities of ‘old timers’ – the experienced academics and librarians who are exercising their knowledge and experiences and assisting ‘the novices’ – the researcher, to participate alongside them (Nuthall, 1997). The researcher has gained much knowledge of IL integration in this community.

Sociocultural theories were also applied in the entire process of the development phase of this research. The researcher worked with academic staff, librarians, learning support and IT support staff to form a community of IL integration practice at University D. In this community, both the researcher and participants shared knowledge; we collaborated and co-constructed the best way to integrate IL into the course curriculum in each year; and we worked collaboratively by building on each other’s knowledge and developing scaffolding teaching material with which to assist students in their learning. For example, in the first year curricular working group, the
The collaborative learning aspect of sociocultural theories was also applied to the IL curricular design, such as IL related assignments, class activities and assessments. Students were provided with a collaborative learning environment to enable them not only to interact with the learning tools but also with peers and lecturers, thus becoming engaged in the learning process. For example, in an IL lecture, instead of showing and telling students the variety of information resources, the librarian asked students to talk to their peers in the class about their research topic and the resources required to conduct their research and how to find these resources. Each group discussed and tried different resources, then reported back to the class with the reasons why they thought these resources would be useful. The librarian intervened from time to time to extend students’ knowledge to a wider range of resources. Through these brainstorming discussions, interactions and the instructor’s intervention, students were able to internalise the variety of information resources for their research topic.

The second assumption underpinning this study is that human learning and development are mediated by tools or signs - semiotics. Vygotsky elaborated creatively on Engels’ concept of human labour and tool use as the means by which man changes nature and, in so doing, transforms himself. Like tool systems, sign systems (language, writing, number systems) are critical in the supporting and transforming of mental functioning as they facilitate the co-construction of
knowledge and become internalised and available for independent activity (Wertsch, 1991). In this research, tools have been used in different situations in a learning and development environment. In the interview phase, IL learning tools such as an IL assignment, an IL class activity, an annotated bibliography, web resource evaluation criteria, and an assignment marking schedule, were all used during the dialogue and interaction between the researcher, academic staff and librarians. Through the use of these tools, a new understanding of the curricular integration of IL was raised and new knowledge of the IL curriculum was developed. Learning tools were also used in the re-designing of IL curricula. In the curricular working group, electronic means for accessing information were used. These included databases, journal articles, patents, online books and an online peer review system. These were used as learning tools for the design of class activities. In the IL integrated activities, students were provided with a social collaborative learning environment to enable them to interact with the learning tools and to complete a course task, class activity, or an assignment. Vygotsky claimed that the internalisation of the use of these tools in social interaction leads to a higher order of thinking development (Vygotsky, 1986).

The third assumption underpinning this study is that the learning and development process is a process of internalisation. Vygotsky (1978) argued that learning and development occurs on two levels: first on the social plane (interactions with others) and then on the psychological plane (within the learner or researcher). The external interaction will then become internalised into a transformed version of interaction and become part of human independent developmental achievement. This internationalisation has been applied to the process of data analysis in this research. The data analysis process is a process of transforming interpersonal activities into intrapersonal activities; a process of meaning making; a process of developing the integration model. As result of this internalisation, an IL integration model was shaped and gradually developed.

In summary, these aspects of Vygotsky's sociocultural theory have been adopted in this study: that knowledge is socially constructed; that tools play an important role in social interactions; and that internalisation serves as a powerful model when data are generated and analysed through research. Social interaction plays a key role in
sociocultural theories; during the course of this research participants played an important role in both social interaction phases as discussed in the following section.

**Two phases of this research**

This section outlines two phases of this study: the interview phase and the development phase. Phase I focused on research questions 1 and 2: *What are the key characteristics for the curricular integration of IL in higher education?* *Who are the key stakeholders in the curricular integration of IL in higher education?* The main purpose of this phase was to co-construct the richest possible data on curricular integration of IL. Phase II focused on research question 3: *What is the process of IL integration in curricular redesign in higher education?* The purpose of this phase was to explore the process of IL integration in curricular design and also to apply IL integration knowledge developed from phase I. In the development phase, we explored how to systematically integrate IL across engineering curricula from Year 1 to Year 4 and thus to develop an IL integration model.

Phase I comprised interviews conducted at Universities A, B and C which were identified as IL active universities. The participants were 16 librarians and 5 academic staff who had experience in curricular integration of IL. Through these interviews, I explored and co-constructed with the participants the key characteristics of IL integration into individual academic course curricula. Key characteristics of IL integration into the academic curriculum and key stakeholders were identified through this phase.

Phase II comprised both interviews and the curricular working groups; these were conducted at University D. Participants were academic staff, librarians, learning support and IT support staff. In this phase, I interviewed 14 engineering course coordinators/lecturers, 4 engineering librarians and 7 engineering students at University D. Through these interviews, the researcher identified the potential courses and course coordinators who were interested in participating in this research. Next, four curricular working groups were established in each year from year 1 to year 4. In phase II, the findings from phase I were also applied and tested and an IL integration model was gradually developed.
An overview of the participants and methods used in each phase is outlined in Table 4.1 below.

<table>
<thead>
<tr>
<th>Phase (time period)</th>
<th>Participants</th>
<th>Methods</th>
<th>What new knowledge did this generate?</th>
<th>How did this contribute to my research?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I (Jun-Jul 07)</td>
<td>Academic staff and librarians from Universities A, B and C</td>
<td>Semi-structured interviews</td>
<td>Key characteristics of IL integration into a course curriculum; key stakeholders in IL integration</td>
<td>Findings were applied in phase II and also in the development of an IL integration model</td>
</tr>
<tr>
<td>Phase II (Aug 07 - Oct 08)</td>
<td>Academic staff, librarians and students from University D</td>
<td>Semi-structured interviews (Aug 07 - Jan 08)</td>
<td>Identified potential courses and course coordinators to integrate IL into their curriculum; curricular design process; key stakeholders in IL integration</td>
<td>The curricular working groups were formed</td>
</tr>
<tr>
<td></td>
<td>Academic staff, librarians, learning support and IT support staff from University D</td>
<td>Curricular working groups (Feb 08 - Oct 08)</td>
<td>Multiple partners collaboration and negotiation; working experience of integrating IL across curricula</td>
<td>By gaining a practical experience of integrating IL into curriculum; An IL integration model was developed</td>
</tr>
</tbody>
</table>

Table 4.1: An overview of the participants and methods used in each phase

**Research participants**

This section provides details of the research participants in both phases. It also identifies the characteristics of the participants and how the participants were recruited. In qualitative research, the process of selection of participants is extremely important, as argued by Arcury and Quandt (1999) it “must reflect the purpose or goals of the study, allowing the investigator to find representative individuals who have the characteristic being considered by the investigation” (p. 128). The basis for the recruitment of participants in this research was the specific purpose of the research: to investigate how IL can be systematically integrated into academic curricula. In order to achieve this purpose, I interviewed 22 librarians and academics from 3 IL active universities who had experience of integrating IL into the curriculum of a variety of subjects. In sharing their experiences of how IL had been integrated into the curriculum, the interviewees enabled the researcher to gain a considerable amount of practical knowledge of curricular integration of IL. Next I worked with the course coordinators, engineering subject librarians, and other learning support staff to form 4 curricular working groups. We worked
collaboratively to integrate IL across the curriculum from Year 1 to Year 4 of an engineering programme. The participants provided knowledge of the curriculum development process and opportunities for the researcher to gain practical experience of IL integration across the curriculum in practice and to apply the knowledge gained in phase I. Subsequently two groups of participants were recruited. One group included experienced academic staff and librarians from universities previously identified as being IL active. Another group included academic staff, librarians, learning support staff and students from University D.

**Recruiting participants from Universities A, B and C**

In order to find representative participants who had IL integration experience in higher education, at the 4th International Lifelong Learning Conference (Wang, 2006) the researcher was able to converse with many of the liaison librarians and academic staff who were present at the conference. This was the early stage of setting up opportunities to co-construct meaning around the curricular integration of IL. These conversations led to the acquisition of some real examples of the curricular integration of IL and also to the identification of Universities A, B and C as IL active universities. The librarians at those universities work collaboratively with academic staff to integrate IL into multiple curricula. The decision was made for the researcher to interview both experienced academic staff and librarians from these universities. In order to gain cross-disciplinary perspectives of the curricular integration of IL, interviews were held with representatives from as many subject areas as possible. However, the Engineering Faculty was the main area of interest since this is where the researcher would be working in the development phase.

Our University Library Director kindly sent emails to all three University Library Directors to explain my research purpose and attached my research proposal. When a contact person from each university library had been identified, they were each sent emails explaining the requirements for potential interviewees. For example, interviewees should all have several years of IL integration experience and come from different faculties but the inclusion of interviewees from the faculty or department of engineering would be essential for the research. The university libraries were advised of the intended dates of the researcher’s visit in order that
arrangements could be made for the interviews. When the interviewees in each of the universities had been identified, they were sent the Introduction Letter and the Information Sheet (refer to Appendix II). A week before the interviews, the Consent Form (refer to Appendix II) was sent to them along with the interview questions. A total of six academic staff members and 16 librarians from the three universities participated in individual interviews, as shown in Table 4.2. They all had IL integration experience and many of them had more than 5 years experience. This ensured that appropriate participants were interviewed, from whom I have gained a considerable amount of useful knowledge of the curricular integration of IL. This knowledge was shared and applied in IL curricular design by the curricular working groups in the development phase at University D.

**Recruiting participants at University D**

From a personal perspective, in order to have practical experience of integrating IL into academic curricula and to develop an IL integration model, I planned to work on the integration of IL across curricula with the academic staff of a faculty in an undergraduate programme. I have a BE degree and used to work in an engineering library and thus I decided to work with the Engineering Faculty. I discussed my research details with the Engineering Library Manager at University D. The Manager was very supportive and we considered potential academic courses in various departments and lecturers who might be willing to participate in the project in addition to the librarians. We decided to choose the Civil Engineering department.

I worked very closely with the Civil Engineering subject librarian. We met with the Dean of the Engineering Faculty and the Head of Department (HOD). I introduced my research, the process, the purpose of the research, and also clarified the proposed involvement of the engineering academic staff members in this research. Both the Dean and the HOD supported the research. They believe that the integration of IL is not only an issue for this research, but is also an educational issue. In conjunction with the Civil Engineering subject librarian, I then contacted the Civil Engineering Departmental Manager to obtain the Civil Engineering course list from Year 2 to Year 4 and the names of the course coordinators. Since all first year engineering students take the same courses offered by the Faculty, the Associate Dean
(Undergraduates) provided information about first year engineering courses and the names of the course coordinators.

We explored the composition of the Civil Engineering curriculum and analysed the core course outlines and content for each year. Next all the courses were organised into a chart by year, and then by semester. Each course had a short description and was also associated with the names of the course coordinator(s) and course lecturer(s). The curricular chart clearly displayed the overall Civil Engineering course list from Year 1 to Year 4 based on which we identified seventeen possible course coordinators across 4 years. These potential course coordinators were identified by meeting the following criteria: they were all current course coordinators; they taught a core course in a different academic year, and they had the potential for joining the curricular integration group based on the Civil Engineering subject librarian’s personal experience. Interview invitations were emailed individually to the potential interviewees attached with the Introduction Letter and the Information Sheet. Fourteen potential candidates replied and agreed to participate in the interviews. Prior to the interview, the Consent Form and the interview questions were sent to each interviewee. In a similar way, all the engineering librarians were contacted and interviewed.

In order to gain knowledge of students’ experiences of IL education in the curriculum, engineering students were also recruited to participate in interviews. The Associate Dean (Undergraduate) at University D sent an email to thirty selected engineering students based on their nationality, year of study, subject and gender. Of these selected, nine students replied and were interested in participating in the interview. Since two students had withdrawn just prior to the interview, seven students were interviewed; they were all current year 1 to year 4 students. Thus, there were a total of twenty five participants in phase II of the research: academic staff, librarians and students from University D. Next, four academic staff each from Year 1 to Year 4 joined the curricular working groups to work with librarians, other support staff, and the researcher to redesign the curriculum and to integrate IL across curricula. The table below states the characteristics of the participants in both phases.
Key characteristics of the participants

Table 4.2 below listed the key characteristics of the participants in this research.

<table>
<thead>
<tr>
<th>Phases</th>
<th>Data generation site</th>
<th>Participants</th>
<th>Years involved in IL integration</th>
<th>Teaching qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>University A</td>
<td>4 academic staff members from 4 faculties: Business; Engineering; Nursing and Science.</td>
<td>2-7 years</td>
<td>1 yes; 3 no</td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
<td>7 librarians from Business; Law (2); Education; Health Science; and Medical science (2)</td>
<td>2-15 years</td>
<td>2 yes; 5 no</td>
</tr>
<tr>
<td></td>
<td>University B</td>
<td>2 academic staff members from Business and Engineering Faculties.</td>
<td>3 years and 7 years</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 librarians from Engineering; Law; Creative Industry (2); Business (2); Engineering; Education.</td>
<td>1-15 years</td>
<td>3 yes; 5 no</td>
</tr>
<tr>
<td></td>
<td>University C</td>
<td>1 librarian from medical science faculty</td>
<td>6 years</td>
<td>No</td>
</tr>
<tr>
<td>Phase II</td>
<td>University D</td>
<td>14 academic staff members from Civil Engineering department and Electronic Engineering department</td>
<td>0-3 years</td>
<td>None</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td>4 engineering librarians</td>
<td>5-10 years</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 engineering students (1 Year I + 3 Year II + 3 Year III + 1 Year IV)</td>
<td>1-3 years</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 4.2: Participant information

Data generation

This section gives an overview of data collection as well as data generation in both phases. Qualitative methods of interview and curricular working groups were used in this research through two phases of study. The qualitative interview is one of the most important data generating tools in qualitative research used in information science (Myers & Newman, 2007). Qualitative methods are commonly used to elicit and understand people's views and construct understandings, therefore they are usually associated with the social constructivist paradigm (Creswell, 2009). Qualitative methods provide an environment for the researcher and participants to develop a close working relationship, in which to interact and co-construct a new
understanding of curricular integration of IL. Such an environment fits well with the sociocultural approach. This section presents a description and justification of the ways in which the research data were generated with the adoption of sociocultural theories in two phases.

**Data generation in phase I - Interviewing at Universities A, B and C**

Due to the interactive nature of interviews, the method used in the research for this thesis has been used previously by other researchers who also adopted sociocultural theories (Boardman, 2004; Feddersen, 2007; Whiteside, 2007; Wood, 2004). In phase I, I conducted 21 qualitative individual face to face interviews at Universities A, B and C. All interviews lasted an average of 1 hour to 1.5 hours. A laptop was used as a recorder at all the interviews. All the interviews started with a briefing concerning the purpose of the research. I then checked with the interviewees to ascertain that they had read the Information Letter and the Consent Form and asked whether they had any questions or concerns about the interview. On being assured that they had a clear understanding of their involvement in the research, the candidates were then asked to sign the consent form.

The semi-structured interview technique was used. This neither follows the guidelines so closely that may miss important information nor it is so loosely structured that it results in the generation of irrelevant or unnecessary information (Mathie & Camozzi, 2005). The quality of the original interviews determines the quality of the subsequent analysis and findings. Therefore, in each interview, the quality criteria for an interview suggested by Kvale (2007) were used as the guide for the research. I talked to the participants in a friendly way making conversation informal and easygoing. For example, at the beginning, I told each participant that this was to be an informal conversation and that the interview was an opportunity for me to share their experience of integrating IL into the curriculum. This also gave us an opportunity to discuss any IL related issues e.g. how librarians also manage a heavy teaching workload. I told them that it was their actual experiences of how to work with academic staff or librarians in IL integration that were of interest and importance.
In order to ensure that the participants and the researcher were discussing the same ideas, their understanding of the interview questions was first ascertained. For example, I realised that at different universities there is a different understanding of some terms e.g. ‘courses’ and ‘programmes’ so the meanings of the terms used in the questionnaire were explained to participants with the use of examples. The individual degree of familiarity with the jargon that had been used in the interview questions, such as *intra-curriculum* or *inter-curriculum* was also ascertained. If participants were unsure of any meanings, I then explained the terms, with examples, to ensure that all had the same level of understanding of the questions. In order to focus on the purpose of the interview and concentrate on the interview questions, interviewees were sometimes interrupted and asked to think back to the original question. Careful attention was paid to the participants’ responses during the interview to ensure that their responses and viewpoints were fully understood by the researcher. They could then be further encouraged to be more specific in their response. The following phrases were used during the interviews: “Do you mean ….?” “Would you explain that?” “Could you please give me an example?” “Tell me more about ….?” When it was necessary, the participants’ previous responses were referred back to in order to make a connection with an earlier part of the conversation. These probes were appreciated by many participants and we explored further to get more of their experiences and thoughts. This established a relaxed and trusting environment in which the interviewees could talk freely, honestly and self-disclose. Occasionally, the recording was stopped for reasons of confidentiality.

Sociocultural theories were applied as a guide for all the interviews in this research. Based on sociocultural theories, in the qualitative interview, the interviewers are not like “sponges, simply soaking up data that is already there” (Myers & Newman, 2007, p.3). Instead, the interview is a social interaction, where both researcher and participants are actively co-constructing knowledge (Fontana & Frey, 2008). The interviews in this research were highly interactive. The participants and I interacted and co-constructed the understanding of the integration of IL and also discussed the most effective ways of integrating IL into the curriculum. During interviews, both participants and researcher dialogued and shared their experiences of IL integration. IL class activities, IL assessment tools and samples of IL teaching resources were all...
used as interactive tools to gain a full understanding of how IL had been integrated into the academic curriculum. New knowledge of IL integration was generated through these communications and interactions, and through the demonstration of learning tools. Progressively, a common interpretative understanding of curricular integration of IL in higher education was reached and, in addition, solutions to some common issues were also found. For example, when there was a discussion on the heavy teaching workload that librarians had when IL was integrated into intensive course curricula, it was agreed that the provision of online IL education or for training tutors to offer IL courses would be appropriate ways of easing the librarians’ workload.

Data generation in phase II- Interviewing and the curricular working groups

The data generation in this phase included both interviews and the curricular working groups. The purpose of the interviews was to understand the process of curricular design in higher education and to identify the course coordinators in each year who would be willing to join this research and to integrate IL into their courses. The purpose of the curricular working groups was to practice the IL integration experiences and to apply the findings from phase I and therefore to develop an IL integration model.

In order for the academic staff to understand IL and the reason for needing to integrate IL into the curriculum, the concept of ‘tool’ based on sociocultural theories was extended by developing an IL policy comparison chart. IL related attributes were extracted from the Graduate Profiles, the Graduate Requirements were extracted from the accrediting professional body and related ANZIIL standards were extracted from the ANZIIL IL framework. They were all developed into an IL attribute chart. This chart was used as a mediation tool when both the librarian and the researcher initially approached academic staff to introduce the concept of IL and its importance in higher education. Most of the academic staff did not know the meaning of information literacy, which had been mentioned in the interview questions, so when they looked at the IL comparison chart, they understood immediately what was being talked about. Therefore, these extracted IL attributes were used as an interactive tool in order that the academic staff could see the importance of IL education to their students. At the
same time, these attributes and standards acted as a good introduction to IL for academic staff.

The same interview techniques used in phase I were used in this phase. For example, I always ensured the participants understood the questions. This was achieved by questioning or by explanation using examples. All interviews lasted an average of 1 hour to 1.5 hours. Through these interviews, I came to understand the process of curricular design or redesign, the responsibilities of the course coordinator and the course lecturer in curricular redesign, and the various curriculum levels at University D. These were then further reinforced through the curricular design working practice. Four core courses from Year 1 to Year 4 were also identified, whose course coordinators were willing to participate in the research. Other partners, such as learning designers, student learning advisors and IT support staff, were then invited to join the curricular working groups where necessary. Thereafter, four curricular working groups were formed.

In these curricular working groups, a community of IL integration practice was formed based on the sociocultural approach. In this community, the IL integration activities found from phase I were applied; the problems currently common to most students were discussed; the design for new assignments to integrate IL into the course curriculum was brainstormed; IL learning outcomes for each year of engineering students were developed; IL was contextualised in the class activities, assignments and assessments; the group collaborated and negotiated the methods of assessment and percentage of marks for IL activities; the group explored how to provide students with ongoing opportunities to use information to learn. As a result of these interactions and collaborations, new knowledge for the integration of IL across an engineering curriculum was developed and an IL integration model was co-constructed and gradually developed.

From the data generating process we can see that the role of the researcher underpinning the sociocultural approach is different from traditional research. The researcher is participating and collaborating with the participants. The researcher acts as a member of an IL community, as a co-constructer and co-generator of new knowledge of IL integration in the community of IL practice. This is similar to other
participatory research such as action research; the researcher does the research with people instead of researching on people (Galtung, 1975). They both aim to create a participatory dialogue between the researcher and the participants (Strege, 1996). However, the goal of action research is to improve the understanding of practice by its practitioners, and to involve participants in changing the situation in which the practice takes place (Carr & Kemmis, 1978). The goal of sociocultural based research is to co-construct and co-generate new knowledge with the participants. Therefore, in action research, researchers work with the participants as actors (Swantz, 2008, p.34) in order to change the situation. In contrast, in this research, the researcher works with the participants as collaborators, co-constructors and new knowledge generators in order to generate new understanding and new development.

**Interview questions**

The interview questions related directly to the research aims outlined in chapter 1, namely to investigate how to integrate IL into academic curricula in higher education in order to develop an IL integration model. Thus, I developed four groups of interview questions to generate qualitative data from the various participant groups. For example, the questions developed for the interviewees at Universities A, B and C were required to elicit the participants’ experiences of the curricular integration of IL. The questions developed for the academic staff at University D needed to elicit the curricular structure and organisation of the overall programmes and courses offered by the Civil Engineering department, to understand the process of course curricular revision at University D and to identify academic staff who had the potential to join this project.

The interview questions for the participants from Universities A, B and C were developed based on the research questions 1 and 2, namely the key characteristics and stakeholders of IL integration. I explored these research questions by focusing on the participants’ experience when working with academic staff or librarians to integrate IL into the curriculum. There were five sets of questions. The first set of questions was designed to elicit details of the participant’s background information. The second set was to obtain details of the participant’s experience of the curricular integration of IL, and from this information, summarise key characteristics for the
curricular integration of IL were summarised. The third set was to discover the best approach to teaching IL. The fourth set of questions was to identify the key stakeholders in the curricular integration of IL. The fifth set was designed to pinpoint the challenges that were faced in the integration of IL. The key interview questions are listed below:

1. Can you tell me about the course and programme that you are involved in with IL integration? (Below are follow up questions if needed)
   a. How did the IL integration into this course / programme happen initially?
   b. Could you please tell me details of how you worked with academic / library staff to integrate IL into this programme / course?
   c. Can you provide examples of IL related assignments, learning outcomes, assessments or class activities? Any material available?
   d. How do you assess student IL skills?
   e. Do you have any follow up courses that enable students to continue to build on their IL skills?

2. There are different approaches to providing IL education in higher education: intra-curriculum, inter-curriculum and extra-curriculum. Which approach do you think is the best approach for teaching IL from your experience and why?

3. Who do you think are the key people in the IL integration and what are their roles?

4. Do you think collaboration with academic staff/librarians and other support staff is helpful? Please provide examples. How did you initially start the collaboration?

5. What do you think the biggest challenges are in curricular integration of IL?

6. Do you have any future plans for IL education?

The interview questions for the academics from University D were developed based on the research question 3, namely the process of IL integration in the curricular redesigning in higher education, and also to identify the academics who would be interested in joining this research. The research question was probed by focusing on the curricular design, or redesign, process and the roles of the course coordinator and lecturer in the course curricular design process. There were five sets of interview questions. The first set of questions was designed to gain an understanding of the
background of each participant. The second set of questions was posed to enable the researcher to explore the curricular structure of Civil Engineering. The answers to the third set of questions revealed the process of course design or development and to what extent the course coordinator/lecturer could revise the course content, assignments and assessment processes. The fourth set elicited the academics’ understanding of IL and graduate attributes. The answers to the fifth set of questions identified the lecturers who were interested in joining the project to integrate IL into their course curriculum. The key interview questions are listed below:

1. Which courses are you currently involved in teaching? Could you tell me more about each course: how many students enrolled, course coverage, course delivery methods, and assessment?
2. What makes up the Civil Engineering curriculum? How are the Civil Engineering courses related?
3. When you teach a course or mark student’s assignments, what are the major problems that you think your students have?
4. When you or a group of people design a new course or redesign or revise any existing courses at the University:
   a. Who is involved in the course redesign or revision group?
   b. How do you decide on the course structure, content, class activities, assignments and assessment, and learning outcomes?
   c. What influences this decision?
5. When the same course is taught by different lecturers, will the course structure, content, delivery methods and assessment be changed based on the lecturers’ preferences or expertise?
6. Have you incorporated the engineering accreditation organisation requirements and/or the university Graduate Profiles, e.g. academic skills in your courses? If you do, please give me an example. (The comparison chart of Graduate Profiles, engineering accreditation organisation requirements and IL standards is available)
7. Have you heard about IL? The aim of this research is to develop a model of IL integration into higher education curriculum. Are you interested in joining this project?
The interview questions for the librarians from Universities D were developed based on the research question 1 and 2, and also sought to identify librarians who were willing to join a curricular working group. I discussed the interview questions by focusing on the participants’ work experience in IL integration and what they had offered to students in the IL integration at University D. There were five sets of interview questions. The first set was to obtain the participant’s background information. The second set was designed to elicit each participant’s experience of delivering IL teaching and integrating IL into the curriculum. The third set identified the key stakeholders in IL integration. The fourth set had been designed to reveal the best approach to teaching IL, from the perspective of an experienced participant. The fifth and final set of questions uncovered the challenges faced by the librarians. The key interview questions are listed below:

1. Please tell me more about the academic courses in which you have been involved in teaching IL, including:
   a. Course titles, year, compulsory or elective
   b. How have you been involved in each course? Initiatives, course design, teaching, assessment or support, etc.
   c. How do you engage students in your class?
   d. Have you applied the ANZIL IL standards to these courses and how?
2. There are different approaches to teaching IL in higher education: extra-curriculum; inter-curriculum and intra-curriculum. Which approaches have you used to teach IL? Which approaches do you think are the best and why?
3. Who do you think are the key people in the IL integration and what their roles?
4. What do you think the biggest challenges are in integrating IL into the course curriculum, in terms of working with academic staff, course design, delivery, assessment or support, or working with students?
5. The aim of this research is to develop a model of IL integration into the higher education curriculum. Are you interested in joining this research?

The interview questions for engineering students from Universities D were developed based on the research question 2 and 3. The interview questions were discussed with students by focusing on their experiences in using information to learn through their course study and their feedback about IL activities via the courses. There are four
sets of questions. The first set was designed to obtain the participant’s background information. The second set was to find out if they had sufficient information about the subject / specification that they were studying in Year I. The third set was designed to reveal whether or not the students were sufficiently informed in the required skills when they graduated from the university. The fourth set explored each of the student’s experiences in using information to learn through any of their academic courses and also revealed their IL capabilities. The key interview questions are listed below:

1A. If you are a first year student, have you decided which specialisation you are going to study from the second year?
   a. If yes, how did you make the decision? How much did you know about the specialisation before you chose it? Did you do some research about the different specialisations before you made your decision?
   b. If not, how are you going to make your decision? How would you like the School to help you to make that decision?

1B. If you are a second year or senior student,
   a. Do you think you have made the right decision in your choice of specialisation?
   b. How much did you know about the specialisation before you chose it?
   c. Did you do some research to get to know more about the field that you chose?

2. Do you have any suggestions of how the School could help you more with this?

3. Have you heard about the professional engineering Graduate Requirements and the University Graduate Profile?

4. Which courses have you studied that required you to solve a problem by searching for and applying information from various sources? Give me examples.

5. Have these skills (information searching and application) been reinforced later on in other courses? Or have you applied these skills to other courses?

6. Can you tell me about a previous assignment where you needed to find information?
   a. How did you go about it?
   b. If you use library databases, which did you use?
   c. If you use the Internet, which search engines did you use?
   d. Where did you learn how to research that information?
Data analysis

Data analysis in this research involved a process of internalisation based on sociocultural theories (Vygotsky, 1978). This internalisation is an inductive process of seeking meaning and making sense of the co-constructed interview data and co-developed an IL integration model. Through this internalising process, the key characteristics for the curricular integration of IL and the process of IL curricular integration were identified. These key characteristics and the IL curricular integration process were then applied in the practice of curricular development at University D. New knowledge was developed through the dialogues and interactions with the participants, as well as through the curricular development practice and the process of curricular redesign. Based on the findings from the interviews, an IL integration model was gradually co-constructed, formed and developed through the development phase to its final 9th version which is detailed in chapter 7. The data analysis included interview transcribing, interview data analysis and curricular working group co-constructive data analysis. This will be discussed later in this section.

Interview transcribing

In this research, I transcribed verbatim the recordings done at Universities A, B and C in order to obtain as much detail as possible of the IL integration knowledge and experience of the research participants. For the interviews conducted at University D, I summarised the key points rather than presenting them as verbatim transcriptions. The reason for this is that the main purposes of the research were to understand the curricular redesign process and to identify possible course coordinators who would
be interested in joining the IL integration curricular working group for the research. These key summaries provided sufficient information to meet the purposes.

During the transcribing, I listened to each recording repeatedly to minimise possible mis-hearings or the effects of poor recording quality. Each interview transcription was typed out in a Word document. The details of the interviewee and interview date were recorded at the top of the document, followed by three columns: recording position (e.g. 2’30’’), interviewee’s responses and researcher’s notes (refer Appendix III for an example of coded interview transcript). The recording position column enabled the researcher to access the exact location of words or to be able to quote quickly at a later time. In the interviewee’s response column, any new ideas or important suggestions were marked in bold font making it easy to go back to them afterwards. The researcher’s notes, including reflections and observations, were added when the recording was transcribed and also when the transcript was read again later. These notes were helpful in the analysis of the interview data.

The completed transcriptions of this interview data were sent back to all the individual interviewees for their comments with a data consent form for them to sign allowing the data to be used as part of the research. This is shown below:

| Please note: all the comments will remain strictly confidential. Neither your name nor possible recognition will be indicated in any of the publication of this research. Instead, a code will be used throughout the research thesis. If you agree to Li Wang using your confidential comments as part of her research please sign this disclaimer. |
| I agree to allow Li Wang to use my comments for her research. I agree on the condition that these comments remain strictly confidential. |
| Name____________________ Signature ______________ Date: _________________ |

A few of the participants returned the transcript with feedback or suggestions for change. In order to respect these participants and their rights, the transcripts were updated and sent back to participants for further confirmation, as suggested by Mahn (1999) who believed that ethical consideration should accompany each stage and facet of qualitative research. Also, in order to preserve the confidentiality of the participants, codes have been inserted instead of names when they are quoted in this thesis and the names of the universities retain confidentiality by the use of codes such
as: Universities A, B, C and D.

**Interview data analysis**

According to sociocultural theories (Vygotsky, 1978), the data analysis process is a process of internalisation which consists of a series of transformations from interpersonal activities to intrapersonal development. Through the external interactions with the participants in phase I, knowledge was reconstructed and began to occur internally. Through this internalising process, the interview data and transcripts were analysed by going through an inductive process of making meaning out of the co-constructed interview data. To do this, all the IL integration examples were summarised and the results were added to the end of each transcript. The transcripts were read through by means of focusing on each of the research questions, for example, in order to find the answers to the key research questions “what are the key characteristics of IL integration?” Potential codes were identified by pulling together real examples from the transcripts as suggested by Lincoln & Guba (1985) and Bogdan & Biklen (2007). When reading through the transcripts I identified the repeated occurrence in the conversations of such keywords as ‘contextualisation’, ‘work with academic staff and other support staff’, “work with librarian and other support”, ‘multiple IL sessions or activities’; thus these key expressions were identified as codes. Coding means to attach “one or more keywords to a text segment in order to permit later identification of a statement” (Kvale, 2007, p. 105). Further examples under each coding were extracted. Then the concepts were increasingly developed as indicated by Denzin & Lincoln (2003) and the key characteristics of IL integration emerged, such as: ‘contextualization’, ‘collaboration’, ‘ongoing interaction’. Categorisation means “a more systematic conceptualization of a statement” (Kvale, 2007, p. 105). As the result of the analysis, the key characteristics for the curricular integration of IL were identified. These key characteristics were then applied and tested in the development phase at University D. During the development phase, the curricular working groups worked collaboratively to contextualise IL in a curricular context and to provide students with ongoing interaction with information in single courses and across a four year period of study. Therefore, ‘contextualisation’, ‘collaboration’, and ‘ongoing interaction’ were identified as being the key characteristics from IL integration practice. The
negotiated nature of collaboration was also clearly recognised from the development phase. The table below demonstrates an example of the data analysis process in this research - how the key characteristics of IL integration were identified (note: L3, A4 and T5 stand for conversations with no. 3 Librarian, no. 4 Academic staff and no. 5 student).

<table>
<thead>
<tr>
<th>1. Codes identified from phase I (conversations from which the codes originated)</th>
<th>2. Key characteristics emerged from phase I</th>
<th>3. The emerged key characteristics further confirmed in phase II</th>
<th>4. Key characteristics of IL integration were finally identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Work with academics and design group’ ‘work with librarian and IT support’ ‘work with academics and learning support’ (L1, L2, L3, L4, L5, L8, L9, L10, L13, L15, L16, L17, A1, A2, A3, A5, A6)</td>
<td>Collaboration with multiple departments</td>
<td>‘Collaboration and negotiation with multiple partners’ (curricular working groups 1-4)</td>
<td>Collaboration and negotiation with multiple partners</td>
</tr>
<tr>
<td>‘contextualise IL in course content’ ‘contextualise IL in course assignment, assessment’ (L6, L13, L14, L15, L16, L17, A1, A2, A4, A8)</td>
<td>Contextualisation</td>
<td>‘Contextualising IL in course context such as assignment, class activity, assessment’ (curricular working groups 1-4)</td>
<td>Contextualisation</td>
</tr>
<tr>
<td>‘multi-IL sessions and activities’ ‘IL activity in week 1,4,5 &amp; 9’ ‘IL activity in assignment 1, 2 &amp; 3’ (L1, L2, L9, L13, L14, L15, A1, A5, T3, D5, D6)</td>
<td>Ongoing interaction with information</td>
<td>‘Ongoing interaction at intervals in a single course or throughout multiple courses’ (curricular working groups 1-4)</td>
<td>Ongoing interaction with information</td>
</tr>
</tbody>
</table>

Table 4.3: An example of the data analysis process

As the result of this internalisation of data analysis, the key characteristics of IL integration were gradually identified as: collaboration and negotiation, contextualisation, and ongoing interaction. In the similar way, the key stakeholders of IL in integration were also identified.

**Curricular working group co-constructive data analysis**

Maxwell (2005) suggested analysing simultaneously with data generation, data interpretation and the writing of the report. This process enables the researcher to grasp insights and themes in the data in a timely manner, to focus the attention of the research and to shape the study as it proceeds (Chiang, 2008). This technique was not able to be applied in phase I as interviews had to be conducted in a very limited
time period during site visits. The technique was applied in phase II when the researcher worked with curricular groups at University D. The curricular group consisted of course lecturers, librarians, student learning support staff, IT support and learning designers, and the researcher. Each curricular group held an average of six meetings or discussions. We brainstormed and communicated on how IL could be effectively integrated into the course curriculum. We interacted and collaborated to design IL integration activities. New knowledge was generated through the group interaction and co-constructions. For example, through the curricular working experiences, it was demonstrated that university teaching policies are useful guidelines in IL integration and curricular design; that negotiation is a part of collaboration in IL integration and curriculum is actually a negotiation document. Bloom’s Taxonomy was recognised in practice as a power tool for developing the IL learning outcomes to scaffold students from a lower level to a higher level in their learning.

After each of the group discussions, the researcher immediately wrote up the discussion briefs and sent them to all the members. In these discussion briefs, matters discussed and agreed, action plans and timelines were summarised (refer to Appendix V for an example of the meeting briefs). New knowledge had been generated in the meetings and discussions such as how theories were applied in the curricular design process and the successful collaboration strategies in the IL integration process. According to sociocultural theories, the process of summarising meetings and discussion is a process of internalisation of generating knowledge from inter-personal to intra-personal. When I summarised and internalised the group discussions, I was looking for the answers to the following research questions: ‘What is the process of IL integration in curricular redesign in higher education?’ ‘Who are the key stakeholders in this integration?’ and ‘What are the key characteristics of IL integration?’ The findings from phase I were confirmed from practice experiences of phase II. Also, increasingly, new concepts gradually emerged from these group discussions, such as: the intended curriculum; the offered curriculum; the received curriculum; the institutional curriculum; the academic programme curriculum and the course curriculum; collaboration and negotiation; curriculum implementation and the application of learning theories. As illustrated in Table 4.4 below, the key concepts were collated; they were used as codes and formatted into categories.
Next the researcher studied the interrelationships between these codes and categories. As a result of this analysis, the process of IL curricular integration was identified, the IL integration model developed and revised constantly to its final version (see Figure 7.1, Chapter 7).

**Quality of the research**

The reliability and validity of the data collected is always an issue for any research method. Reliability and validity are treated separately in the positivist paradigm which believes that reality can be studied independently from the researcher. Golafshani (2003) argued that “these terms are not viewed separately in qualitative research. Instead, terminology that encompasses both [reliability and validity] such as credibility, transferability and trustworthiness is used” in qualitative research (p. 600). This research is based on the social constructivist paradigm, expressed through the adoption of sociocultural theories. The social constructivist paradigm asserts that reality is socially constructed through the interaction and shared by individuals; the research object and the researcher are inseparable. Therefore in this research, I adopted the perspectives of the Cochrane Qualitative Research Methods Group’s criteria to critically appraise findings from qualitative research (Cochrane Qualitative Research Methods Group, 2009). Based on Lincoln and Guba’s (1985) translation of criteria to evaluate the trustworthiness of findings, the following four aspects were considered in this research:

<table>
<thead>
<tr>
<th>Categories of curriculum</th>
<th>IL integration process</th>
<th>Levels of curricular design</th>
<th>Across a degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Offered curriculum’,</td>
<td>negotiation’,</td>
<td>‘Faculty’,</td>
<td>knowledge from</td>
</tr>
<tr>
<td>‘Received curriculum’</td>
<td>‘Implementation of</td>
<td>‘Departmental’,</td>
<td>a lower level</td>
</tr>
<tr>
<td></td>
<td>intended curriculum’</td>
<td>‘Course’,</td>
<td>to a higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘Class curriculum’</td>
<td>level’,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘Apply Bloom’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Taxonomy to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>develop IL</td>
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<td></td>
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<td></td>
<td>learning</td>
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<td></td>
<td></td>
<td></td>
<td>outcomes’,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘Apply six</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>frames for IL’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘Ongoing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>interaction’,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘Contextualisation’</td>
</tr>
</tbody>
</table>

Table 4.4: Data generating process from the curricular working group
1) Credibility – the representation of data fit the views of the participants studied, whether the findings hold true.

2) Transferability - the research findings are transferable to other specific settings.

3) Dependability - the process of research is logical, traceable and clearly documented, particularly on the methods chosen and the decisions made by the researchers.

4) Confirmability - findings are qualitatively confirmable through the analysis being grounded in the data.

Credibility - in this study, as the researcher, I was fully aware of the truth value of qualitative data during the process of interviewing, data transcribing, data analysis and reporting findings. During interviews, I followed the guides in order to be a qualified researcher as proposed by Kvale (2007): Knowledgeable, Structuring, Clear, Gentle, Sensitive, Open, Steering, Critical, Remembering and Interpreting. When I transcribed data, I listened repeatedly to all audio-recordings to make sure that I had reflected the conversations. I also sent all the transcripts to the participants to check for accuracy. Most of the participants sent the transcripts back with only grammatical changes except for a few who offered some suggestions for change. During the data analysis, the key points were summarised only after they had been mentioned a number of times by a variety of participants rather than being summarised from the perspective of my own interest and opinion. When reporting the findings in this thesis, as many of the participants’ quotes as possible were used in order that the true conversations from the interviews were reflected. For the working group meetings, all discussion details were summarised and sent to group members for double checking prior to the next meeting to ensure that the meeting and discussion details had been truthfully recorded. The participants’ opinions on IL integration have been genuinely reported in this research without using or quoting any favourite interview data.

Transferability – the demographics, key characteristics and subject areas of the participants have been fully described in this thesis. This enables readers to make an evaluation based on the question: For which target groups does the study provide valuable information? The findings from the interview phase were applied in the
development phase in IL integration and IL curricular design at an Engineering Faculty and they have been demonstrated to be applicable in practice. The model was developed based on the findings from the interview phase and the working experiences from the development phase therefore the model is practical and can be applied in IL integration practice in higher education.

Dependability – based on sociocultural theories, new knowledge is co-constructed in social activities when people interact through shared experiences. The findings from this research were co-constructed between the participants and the researcher based on their IL integration experiences. With the similar experiences of the same participants, the co-constructed findings would be likely to be similar as they still share the same experiences within the community of IL integration practice. In order to make the research process accurate, all the interview recordings, transcripts and curricular working group meeting briefs, IL curriculum design activities and the various versions of the model have been clearly documented. They can be traced at any time. A research log was kept to record all the meetings (date, who and what), conversations, ideas or reflections. A regular journal was also kept to record all participant information, including names, position, contact details, codes used in the report, as well as the dates that the information letter and consent form had been sent out, the dates of interviews or meetings or conversations, the dates transcripts had been sent and signed off, and so on. This documentation also helped the researcher to keep a track of accurate information whenever it was required in the course of the study.

Confirmability – this research is based on sociocultural theories which believe that new knowledge is interacted and co-constructed by participants in a community of IL integration practice. As a researcher I acted as a member of this community and dialogued and co-constructed with participants. Patton (2002) argued that in qualitative research, “the researcher is the instrument" (p. 14) so the trustworthiness of qualitative research “depends on the ability and effort of the researcher” (Golafshani, 2003, p. 600). As detailed in the data analysis section, all the findings were analysed and the IL integration model was developed based on the interview dialogues and the curricular group discussions. As a higher educator and also as the author of this study, I have been working in higher education for more than 25 years.
and understand the importance of an applicable IL integration model in helping students with their learning. I have worked carefully at every stage of this research to ensure that I have accurately recorded and reflected all dialogues and discussions. As a librarian, I need to use the IL integration model to implement IL integration into the curriculum in higher education. During the interviews, many participants expressed the fact that they were looking forward to reading the results of my research and that they hoped to use the model that had been developed through this research. I fully understand that I need to develop an IL integration model that reflects real IL integration practice and thus can be adapted or used in higher education practice by other librarians and academic staff. The processes described above illustrate the strategies used to ensure this research is a truthful reflection of what the participants and the researcher have experienced from four universities.

**Ethics**

Ethics issues associated with this research have been presented throughout the Methodology chapter in various sections such as: Research participants; Data generation; Data analysis and Quality of research.

In summary, the sociocultural approach was adopted in this research. This approach required that the researcher and participants were inseparable but that they interacted to share and generate new knowledge of IL integration. There were two phases in the research: the interview and development phases. There were a total of 47 academics, librarians and students from Universities A-D who participated in the interviews of both phases. Then four curricular working groups were formed at University D and worked collaboratively to integrate IL into the curriculum from Year 1 to Year 4 of an undergraduate Civil Engineering programme. The community of practice of IL integration was formed in both phases in which new knowledge of IL integration was generated and an IL integration model was developed. In the following two chapters I present the findings that emerged from the two phases of this research.
Chapter 5

FINDINGS PART I

THE KEY CHARACTERISTICS AND STAKEHOLDERS FOR THE CURRICULAR INTEGRATION OF IL

The interview process described in the preceding chapter enabled the identification of a set of 14 key emerging themes that relate both to the nature of IL integration and to its practical implementation. These themes are discussed in the next two chapters. The emerging themes from phase I are discussed in this chapter and the emerging themes from the development phase will be discussed in chapter 6. These emerging themes affirm contemporary practice and scholarship in the area. The themes both confirm and amplify our present understanding of integrated IL education and provide the cornerstones for the model of integration which was constructed as part of this study. These key themes are grouped in the Table 5.1 below:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of the curricular integration of IL</td>
<td>Emerging theme 1 Collaboration and negotiation - multiple partner collaboration in IL integration; Emerging theme 2 Contextualisation - pedagogies of IL contextualised in an academic curriculum; Emerging theme 3 Ongoing interaction - students interacting with information regularly in single and multiple academic courses;</td>
</tr>
<tr>
<td>Key stakeholders in IL integration</td>
<td>Emerging theme 4 Librarians- the main advocates in IL integration; Emerging theme 5 Course coordinators and lecturers - IL Integration will only happen if they are willing; Emerging theme 6 Heads of Faculties - important in the top-down approach to the IL integration; Emerging theme 7 Students – central to IL curricular integration;</td>
</tr>
<tr>
<td>IL curricular design strategies</td>
<td>Emerging theme 8 IL standards – used in IL curricular design; Emerging theme 9 Online teaching - a combination of online and face to face teaching as an emerging trend; Emerging theme 10 IL assessment tools – important in IL integration;</td>
</tr>
<tr>
<td>Process of IL curricular integration</td>
<td>Emerging theme 11 <em>Interpretation of curriculum</em> - IL integration into intended curriculum, offered curriculum and received curriculum; Emerging theme 12 <em>Process</em> - IL integration as a process of negotiation, collaboration and implementing intended curriculum; Emerging theme 13 <em>Negotiated curriculum</em> - IL curricular redesign and negotiation at different levels; Emerging theme 14 <em>Across degree</em> - IL integration across an academic degree progressively.</td>
</tr>
</tbody>
</table>

Table 5.1: Emerging themes
Each theme is considered in more detail in this and the subsequent chapters. In order to identify the source of particular quotes the codes are used as shown in Table 5.2.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Source of quoted data</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/A5/08</td>
<td>An interview conducted in 2008 with academic staff member, number 5</td>
</tr>
<tr>
<td>I/L10/07</td>
<td>An interview conducted in 2007 with the librarian, number 10</td>
</tr>
<tr>
<td>I/T2/07</td>
<td>An interview conducted in 2007 with the student, number 2</td>
</tr>
<tr>
<td>S/C1/07</td>
<td>A statement or quote from a course material obtained from the interview in 2007</td>
</tr>
<tr>
<td>S/C2/08</td>
<td>A statement from a course material that was developed during the development phase of this research in 2008</td>
</tr>
</tbody>
</table>

Table 5.2: Codes for sources of quoted data

**Characteristics of curricular integration of IL**

Three key characteristics for the curricular integration of IL were found in this study: collaboration and negotiation, contextualisation, and ongoing interaction with information. The integration of IL involves collaboration between multiple partners and this collaboration includes negotiation and is built on personal relationships. It includes pedagogies for contextualising IL in an academic curriculum and an ongoing interaction with information. This section looks at these key characteristics in detail.

**Emerging theme 1: Collaboration and negotiation – Multiple partner collaboration in IL integration**

This study affirms an important characteristic of IL integration is that it is a collaborative effort between multiple partners. Collaboration here means a partnership approach when two or more people from different departments in an institution work independently but are also interconnected by an agreed common goal to plan and design a curriculum with the integration of IL. The research found that collaboration occurs not only between academic staff and the librarians, but also, in many cases, it occurs with people from other departments such as learning designers, student learning advisors and IT support staff. In many cases, not only IL but also other generic skills or graduate attributes such as writing skills have been integrated together with IL into curriculum, as explained by a librarian:

“We are not just offering infolit [IL] skills or library skills. It is a combination of academic, critical thinking, writing, plagiarism, group work skill.” (I/L9/07)
During the interviews, both academic staff (coded: A) and librarians (coded: L) explained how they worked collaboratively with learning development support in designing IL curricular activities to equip students with writing, information seeking and evaluating, and information referencing skills:

“The learning development people had developed a support tool to use at our remote campus. I asked our learning development people if we could work together so we could produce a combined one that does both the writing skills and information finding skills.” (I/A1/07)

“It [IL online video] was produced by our in-house video production group. The librarian and I wrote the script” (I/A2/07)

“In the last year or two we [Learning development, IT support and the Librarian] have tried to work more closely with the faculty to help and support them in their teaching. The learning development staff are academics and interested in the writing aspect. We are on the research side of things and IT support focuses on more online stuff.” (I/L2/07)

“We work together quite well. For example, for the online tutorial, xxx [a name] in learning development did a lot of work on our latest module with writing and citing so we collaborated and put that module together. People have different areas of expertise and we [librarians] can call on them at any time to assist us.” (I/L1/07)

“We’ve started this year to put resources on our e-learning system for first year students. The IT support people look after the e-learning system. Me, the librarian, the coordinator, and also we’ve got another group we called learning developers work together. We work with academics to develop skills like avoid plagiarism, writing, how to write an essay properly.” (I/L4/07)

In some faculties there was a curricular collaborative working group or committee which consisted of multiple partners. They worked on an academic programme curriculum to provide support to students with different aspects, as explained by librarians:

“There was a first year working party which comprised of all the academics teaching staff in first year, plus us [librarians], and staff from learning development and from IT support. We meet regularly to talk about the first year programme.” (I/L1/07)

“I don’t think we [librarians] can do it [integration of IL] on our own; we have to do it with learning developers and lecturers. That’s happening slightly now that we have these committees when a new subject [course] is coming up. We get together with the lecturers, the learning developer and myself [librarian].” (I/L3/07)
Some of the curricular collaborative working groups also worked on mapping the university graduate attributes, including IL, to the course curriculum to ensure that these generic skills were implemented into the curriculum:

“[in order to] get graduate capabilities into the core units, teaching and learning staff, instructional designer and educational consultants run a workshop with different disciplines to see how they would map the graduate capabilities. The librarians were invited as well to work with them and that gave us a lot of opportunities to say we’d like to do this or to do that.” (I/L13/07)

“The whole philosophy of the programme is for them [course lecturers] to map the activities and assignments with the graduate capabilities…. The way of these courses organised, we had a design group which contained five lecturers, one educational consultant and one librarian.” (I/L8/07)

Librarians shared their experience of how they collaborated with academic staff in designing the IL curriculum:

“We met together in her office and talked about what we might be able to do. She [course coordinator] thought about it. We didn’t decide a lot during that first meeting. Then she got back to me and said I like this, this and this. Then I started developing possible assessment tasks which was the worksheet of search preparation filling in by students. I designed that activity and discussed with her to get some feedback.” (I/L13/07)

“We communicated the whole time and he [course coordinator] asked for my input. He has invited me to be on the curriculum team. We had regular meetings every few weeks.” (I/L15/07)

“You get to redevelop the assessment with the academics from scratch. You team up with them and they understand where you are coming from. They also understand their students so you can just build something that is more tailor-made for them.” (I/L5/07)

The collaboration between the lecturer and the librarian was also used in a lecture:

“I have a role in his lecture in that unit [course] in week 2 and 3, I go into the lecture. We [lecturer and librarian] co-presented the lecture.” (I/L17/07)

“The course coordinator or lecturer usually introduces us and tells students that these are the skills that you will need for your entire years at the university. You will not get good marks if you don’t have these skills, you probably won’t get a pass so you have to pay attention. These are really good and helpful. If for us to say, they don’t care. If the lecturer says that, they can see it is part of the course not just a library class.” (I/L10/07)
“This is a two hour lecture in the second week, a combined lecture that xxx [the lecturer] and I gave. We provided a collaborative approach, we taught information literacy skills which were my part and her part was academic skills..... It was conducting research and this was the actual PowerPoint that I put together with her [the lecturer] and we used that in the class.” (I/L9/07)

“As far as librarians teaching, I really feel it is highly important to have the tutor or the lecturer there because during the information literacy class, it is not just information literacy that you are learning. It is also contribution to that unit learning. They could have a number of questions about the assignment itself.” (I/L13/07)

The interview data showed that the librarian-academics collaboration had been formed through repeated contact via social and professional interactions. This was explained by both the lecturers (A) and librarians (L):

“The liaison librarian is not only involved in our course teaching, but she is also invited to our staff seminars and faculty social activities e.g. a farewell morning tea or lunch. … We make sure that our librarians have a profile. Our librarians sit on our faculty educational committee.” (I/A3/07)

“I email our librarian on a regular basis. I have just emailed him [the librarian] again this morning because I have another unit [course] for business school that I am doing. I am looking for appropriate texts so I go to the library and ask him if there is anything you know about or do you think particularly useful for teaching this unit [course]. He is very helpful!” (I/A6/07)

“Except teaching, we also offer workshops for academic staff as requested to support their research. A lot of academic staff know me from these workshops so it is a very good way of knowing them.” (I/L10/07)

“All these lecturers have very good relationships with the library so they come to you more and talk to you more so. I think building up the relationship with academics is actually very important if you convince them to build these IL skills into their units.” (I/L10/07)

“The more you get around, the more the faculty members that you work with know you, the more easily it will be. On the personal level, they have to see who you are and what you have done. You have to build up that relationship, credibility, the product that you deliver, whether it is online or face to face.” (I/L4/07)

The participants also shared their experiences of how the collaboration initially started. The interview data showed that it could start in various ways but one thing in common that it was always building on the personal relationships, as explained by an academic staff member:

“Whenever a new member of [academic] staff starts, on the starting day, we actually get a letter from the librarians, saying who they are; they would like to sit
down and understand what we are interested in teaching; how they can help and how they can fit in and other services they can provide. The letter comes from the librarians. It is well presented with a couple of leaflets, it is very well done. So I sat down with them after that.” (I/A1/07)

“I guess my approach is if I am not an expert in that field, I will go to the person who is and together we create something that is more effective. We [the lecturer and librarians] have been probably actively working for last 4 years together. Before then I was doing most things on my own, or with learning development staff. Then I got the point that the learning development staff, the person I paired with was on leave and I still needed help with something, I went to our librarian and we had been working together since.” (I/A2/07)

“At the time when I was working with our teaching and learning unit person, the teaching and learning unit was physically situated in the library so [she] had contacted with the library. [She] has brought her expertise in collaboration with the library to the table which automatically brought our liaison librarian to the table. It was recommended that we involve library more now in our teaching and learning activities so that’s really how it grew.” (I/A6/07)

Librarians also talked about how the initial collaboration started and how there was an opportunity when a new lecturer came in:

“She [a new lecturer] initially contacted me, just to introduce herself to me. I started chatting with her to find out what she was teaching and who she was and I also introduced myself to her as her liaison librarian. So I got to know a little bit about her unit [course]. We started talking about what the library could offer her and how we could support her and her students. The conversation blossomed so we had followed up meetings.” (I/L15/07)

“That was fairly new lecturer coming new to academia. She was given these new units to rework. I guess she was well aware information literacy and other generic skills because graduate capabilities and generic skills have been discussed at this university for some time and faculty is fairly good about these skills… My colleagues and I are targeting the faculty and discipline cores and we always try to work with these people…When I contacted the lecturer for the first time, she was also thinking of it….“ (I/L13/07)

“This is in fact how I started collaboration with one of our academic staff. We sat together at the engineering education conference here at the university. We had a paper; a guy from the University of Sydney presented how he worked with his librarian to embed IL into his curriculum. We thought well, we can do something like that here so that’s very useful thing.” (I/L16/07)

“Frequently, we develop our relationships through our collection development. People who are entering the library and care about putting resources in here that they want students to use, they also care about letting the students have the skills.” (I/L13/07)
A librarian told me that the collaboration with learning developers or student learning advisors had also helped the academic staff to understand more about IL:

“Because the academics are now working with learning developers a lot more, when they work with us, their questions are becoming a lot more focused. They are asking for annotated bibliography; they are asking for refereed sources or academic articles, things like that.” (I/L3/07)

Academic staff members benefited from the collaboration as well and they valued the personal relationship with the librarians:

“Because technology and databases are changing in such a constant basis, I really need someone who is in that role or who is up with it. I am not a librarian; I can’t be possibly expected to know where the most recent data for my specific research area is so I see the library staff.” (I/A6/07)

“I need Librarians to help me with teaching workshops, tutorials and providing information for subjects [courses]. (I/A1/07)

“Information literacy embedded needs to be seen as part of the unit [course] which means the library staff need to be seen as part of the unit. She [the librarian] did not only work with me on the grant application, she did the work on the project to redesign and then she actually taught some of the classes through the semester with another tutor.” (I/A5/07)

“I took our assignments to the librarian and checked if there were appropriate resources for the topics. She [librarian] said ‘I don’t think that students are going to find this resource, either the resource isn’t there or the topic is so obtuse. Students would struggle, I would delete it!’”(I/A3/07)

This research data showed that collaboration is a key characteristic of the integration of IL. IL education includes how to effectively find and evaluate quality information, how to apply information to generate new knowledge or ideas, how to summarise or communicate information found or newly generated knowledge, and how to use information with understanding of ethical, cultural and legal issues. Academic staff members are unlikely to be experts in all of these IL areas. Therefore, the collaborative group can provide specialty support in these different areas. Academic staff members benefit from this collaboration as they get expert support from many departments. More importantly, students benefit from this collaboration because they are provided with expert support for their study.

The IL integrating experiences at University D reinforced the importance of multiple partner collaboration and also indicated the negotiative nature of collaboration which will be discussed in theme 12 in the next chapter. The research indicated that
sometimes it is impossible or very difficult if only academic staff and librarians work together without involving other support partners in curricular design. For example, in a first year curricular working group, the IL assignment could not be implemented without IT support staff. In the newly designed assignment, students were required to submit a written report and a web resources evaluation form. There were approximately 600 students enrolled in that course and there was not enough staff resource available to mark so many student assignments. The IT support staff in the group provided a solution and suggested using an online peer-review system for students to review and mark the work of their peers. This not only solved the marking workload issue but also provided an online collaborative learning opportunity for students to share knowledge and to learn from each other. Without the online peer review system provided by the IT support staff, the IL assignment for that course would have been very difficult to implement. Therefore, collaboration between multiple partners makes the integration easier and provides practical and effective support to students.

The key elements of campus-wide collaboration in IL integration have also been identified and further confirmed from this research: 1) Shared understanding. All the partners need to have a shared understanding of the purpose and the importance of curricular integration of IL and the outcomes of the IL integration; 2) Shared knowledge. Partners share specialised knowledge and provide support from different areas of expertise, such as subject knowledge, information resources, writing, referencing, learning design, and IT; 3) Joint dialogue with respect and tolerance. All the partners need to interact, negotiate and communicate to achieve the same goals with mutual respect and tolerance; and 4) Joint efforts with trust and support. All partners need to work together to complete the agreed tasks with a high level of trust and support. The curricular integration of IL can involve an intensive workload such as the designing of assignments, the designing of class or online activities, the development of teaching resources and support material, and the development of assessment methods and the marking of IL work. All partners need to make a contribution and commitment to carry out the agreed tasks in the IL integration. This is a $S^2J^2$ collaboration model. It is also important to have an advocate in a collaboration team to ensure that ongoing communication between partners is
continued, the agreed tasks are completed on time, and that regular meetings are organised.

In summary, the first main finding is that integration is mainly achieved by collaboration between multiple partners such as academic staff, librarians, learning development people, and student learning advisors and IT support staff within the institution. In this collaboration, all partners work on the academic programme curriculum to provide support to students with different aspects. The key elements of campus-wide collaboration are also identified from this study. Students benefit from this collaboration as they are provided with expert support for their study. Academic staff members benefit from this collaboration as they gain expert support from various staff members who have expertise in areas other than their own. Collaboration is normally established through development of personal relationships and this collaboration includes negotiation.

**Emerging theme 2: Contextualisation – Pedagogies of IL contextualised in an academic curriculum**

The second characteristic of IL integration is contextualisation. ‘Contextualising’ here means to place IL in the context of a particular academic course. All 6 academic staff (A) and 16 librarians (L) interviewed at Universities A, B and C said that IL needed to be contextualised in the context of an academic course when integrating it into the curriculum:

“It [contextualisation] is a natural experience of what students are doing and it is more a part of their life. It is almost invisible within their primary learning experience and they have to accept it as it is an integral part of the unit [course] experience.” (I/L14/07)

“In my view, it [IL] has to be contextualised in the course. That [IL] was not what students come to learn, they come to learn about international business or managing people, or whatever. They haven’t come to learn library skills. Then they very quickly learnt that they have to learn these skills in order to learn their subject.” (I/A1/07)

“It [contextualisation] is the only way you can guarantee the students have done it, especially via an assessment [an example of an assessment]. They are given this [assessment] so they know what they are going to be tested on. They know what will be marked on. For example, how they cite other people’s work and how accurate it was.” (I/A4/07)
“That [contextualisation] is developed as part of the subject so it is seamlessly provided to students.” (I/A2/07)

According to sociocultural theories, learning is a process of interpreting and making sense (Nuthall, 1997). Contextualisation of IL makes sense to students as they can see the relevance or importance to what they are doing and learning, as mentioned by librarians:

“Because it [contextualisation] is actually connecting information literacy to what the students are learning and their learning outcomes. It is just a more relevant approach. It is more meaningful to them rather than an add-on or generic thing in which they may go through but may not see the relevance of it.” (I/L6/07)

“It is actually connecting information literacy to what the students are learning and their learning outcomes. It is just more relevant approach.” (I/L6/07)

“The information and research skills that students need to graduate are required through the courses doing their assessment and it is more relevant to them. What students care about mostly is their assessment, how I get a pass and how I achieve well. That’s where learning about library skills and research skills needs to be.” (I/L16/07)

“If you are aligning it with the curriculum, you are getting them to see the importance of information within their professional life at least. You would hope that they would go further than that and see it is as a lifelong skill.” (I/L15/07)

Contextualisation also motivates students to learn when IL is an integral part of learning activities such as course assignments, course assessment or research, as discussed by both librarians (L) and academic staff (A):

“I think it has to be contextualised. My experience with creative industries is that they [students] have so many exciting things to learn about in their disciplinary areas. If it [IL] is on its own, without any connection with what they are doing, it is probably dry and boring. If it is seen as an important part of the process of that discipline work, creative work or whatever they are doing, they would do it.” (I/L13/07)

“If you announce that next week the librarian is going to give a library lecture, you could guarantee that they will be dropping about 50% of attendance because they think they know it. By having it just as a part of the subject [course], with expectation of certain standards we map in the assignments, then you are starting to introduce that pedagogical thinking if it is assessed and worthwhile, students will take part in it.” (I/A2/07)

“It is great when these skills are integrated into the courses so students understand that information wasn’t just sitting on the note on p. 54 but also students are motivated to go out to find solutions to the problems without coming out with complete garbage.” (I/A8/07)
In summary, the research data showed that when integrating IL into an academic course, it is important to contextualise IL in the academic learning context so that students view IL as an integral part of their learning journey. Students are motivated to learn IL when they see the relevance and importance to their study and their future career.

The research demonstrated that different pedagogic approaches are used to contextualise IL in the course curriculum. The most common approach is to contextualise IL in a course assignment and/or in course lectures. In this research there are many examples of how to contextualise IL in academic course and two examples are presented here. The first one took place in a second year undergraduate business management course. Both the course coordinator (A) and the librarian (L) designed the IL curriculum collaboratively. Their approach to IL contextualisation was to integrate it into the course learning objectives, assignments, tutorial activities, and assessment.

IL was integrated into the course learning objective by including IL as one of the course learning outcomes as:

You should be able to demonstrate improved competence in information capability, oral and written communication, collaborative problem solving, decision making, reflective practice and sensitivity to ethical, social and cultural issues as they relate to organisations. (S/C1/07)

The students participated in six tutorial activities. They demonstrated that they had achieved the course learning outcome by completing an assignment which was worth 60% of the total grade of the course. The assignment required students to work in groups of four and to act as business consultants, as stated in the course material:

Your consultancy group is asked to analyse and make specific recommendations for improvements in the operations of a service firm in the hospitality industry. (S/C1/07)

In order to help students to complete the assignment, they were required to complete a series of six IL tasks in the group. These IL tasks were included in the tutorial activities and assessment. Table 5.3 below shows three of six IL tasks.
<table>
<thead>
<tr>
<th>Tutorial</th>
<th>Activities</th>
<th>Assessment criteria</th>
<th>ANZIIL standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial 1</td>
<td>1. Select two possible service firms; 2. Discuss operations activities that you might study and information items that related to each other; 3. Identify possible sources of information; 4. Consider how your group will collect the information. 5. Before you begin, write down any ethical issues you think may need to be considered when gathering information.</td>
<td>3 marks: demonstrates clear understanding of the value of different types of information, possible sources and related ethics issues; 2 marks: satisfactory understanding of the value of different types of information, possible sources and related ethical issues; but with gaps in clarity; 1 mark: little or no demonstrated understanding of the values of different types of information, possible sources of information and related ethical issues.</td>
<td>IL standard I: an information literate person recognises the need for information and determines the nature and extent of the information needed.</td>
</tr>
<tr>
<td>Tutorial 2</td>
<td>1. Brainstorm the key ideas, points or issues you need to know about; 2. Write done the key terms which you would like to search for; 3. Write down synonyms, alternative spellings; 4. Write down a ‘search statement’.</td>
<td>3 marks: demonstrates clear understanding of the use of Boolean operators in constructing a search strategy; 2 marks: limited demonstrated understanding of the use of Boolean operators in constructing a search strategy; 1 mark: poor understanding of the use of Boolean operators in constructing a search strategy.</td>
<td>IL standards II: an information literate person finds needed information effectively and efficiently.</td>
</tr>
<tr>
<td>Tutorial 5</td>
<td>1. Compare what you have found from the literature (both primary and secondary sources), relating to relevant operations management concepts and theories; 2. Consider whether the literature is: confirmed, or can be challenged or contradicted; whether the literature should be alerted or extended.</td>
<td>3 marks: demonstrated correct identification of information items matching operations aspects; high quality analysis of literature and practice and clear recommendations that address evidence gaps; 2 marks: demonstrates correct identification of information items matching operations aspects, sound analysis and recommendations that address some of the identified gaps; 1 mark: satisfactory identification of information items, some analysis of literature and practice; satisfactory recommendations.</td>
<td>IL standards V: an IL person applies prior and new information to construct new concepts or create new understandings.</td>
</tr>
</tbody>
</table>

Table 5.3: IL contextualised tutorial activities in an undergraduate business course
(Source: the course handout from University C)

The librarian explained that in the completion of these tasks, students needed to identify service firms that they would like to look at:

“They will start thinking about how they get information. For example, they would need a permission to interview a floor manager; they would need
permission to include any interview results in their written assignment, that kind of things. They would start to think actually there are different types of information, different sources and you just cannot use information ad hoc without any thought of ethics. These are all part of information literacy.” (I/L15/07)

This example demonstrated how IL is contextualised in the course learning objectives, assignment, tutorial activities, and assessment. In this learning journey, students learn how to define and articulate needed information. They need to be aware of the ethical issues surrounding the use of information and to develop a search strategy and search for needed information in various sources. They are required to evaluate the information they have found and apply it by comparing it with the real service management situation of a service firm. IL is seen by students as a part of the learning process that cannot be separated from the course context, as explained by the course coordinator:

“It [contextualising IL in a curriculum] is the way that learning is done so in that sense information literacy shouldn’t be something that is obviously separated from the learning process. It is part of the learning process.” (I/A5/07)

The second example of contextualisation focused on the integration of IL in classroom activities in an undergraduate education course - Learning Networks. This course explored the interacting social and technical systems that lead to collective sense-making and knowledge construction:

“We both [academic staff and the librarian] designed the class activities…. How to access resources and quality resources is absolutely central to the major assessment for that unit [course] because even it is a learning network unit, they learnt about case studies, examples of learning networks. They also had to design a website for an enquiry project so they worked in teams and they presented the enquiry project which absolutely depended on high quality, easily accessible information resources.” (I/L17/07)

During the class, when the course lecturer discussed a learning network, the librarian was introduced to the class as part of the student learning network:

“We co-presented the lecture. He [the lecturer] and I talked about the role that I play and I am part of the student learning network, to give them [students] a feel where the librarian fits in their whole learning experience.” (I/L17/07)
Students were required to find out about case studies and examples of learning networks. The librarian was invited again to co-present the class with the lecturer on how to evaluate information resources and find quality information:

“It has been done like an interview or role play. He [the lecturer] will say things like I found this piece of information on the net and I thought it was pretty good, but I might be wrong and it could be written by a learning geek. He looked at me and asked how would you deal with it? If you look for information, what would you do? Then I told him. It sounds a bit funny but definitely it helped students in this unit [course]. ” (I/L17/07)

The second example shows how a librarian was embedded in a class to contextualise IL in the course lecture and the learning process. Students viewed the librarian as part of their learning network who helped them to find and evaluate quality information to complete their learning tasks. In this learning process, students used information to learn and to complete their study tasks. Through this course it was intended that students IL capability would improve in conjunction with learning the subject knowledge.

In summary, the second characteristic of IL integration is contextualisation, whereby IL is integrated into a class activity in an academic course and cannot be taught independently of that academic subject’s domain. Contextualisation can be achieved through the course learning outcomes, assignment, the class activities, tutorial activities or assessment. Also, while IL is contextualised in curricular activities, students are using information to learn and to complete the learning tasks of their academic study. Therefore, IL integration and contextualisation are a parallel process for students to learn both subject knowledge and to improve their ability to use information to learn.

**Emerging theme 3: Ongoing interaction – Students regularly interacting with information in single and multiple academic courses**

The third characteristic of IL integration is the provision of ongoing IL activities for students through the course curriculum, rather than solely through a one-off IL teaching session. Ongoing IL interaction here means to provide students with opportunities for interacting with information at intervals through a single course, as well as throughout several academic course curricula in different academic years.
Interaction with information here implies that students recognise the need for information; can find and evaluate the required information effectively; manage the information collected; apply the information to create new understandings or new concepts; and understand the use of that information. All the integration examples mentioned in the interviews have the ongoing-interaction characteristic of integration. Two examples listed below demonstrate how students are engaged in ongoing IL activities through their course study.

The first example was in a business course. Both the lecturer and the librarian co-presented the classes in week one and week two:

“The first lecture was really an introductory lecture to students. The second lecture in week two was our combined two hour lecture, a special session on infolit with me and the lecturer.”(I/L9/07)

After the IL lectures, students participated in ongoing IL activities: the IL tutorial started from week two and an online forum started in week four:

“The other assessment we had was the discussion forum, an online forum. I designed some online tutorial questions. … There were three online information literacy questions that I designed. There were three questions, this one was put up in week 4, and this one was up in week five and then the annotated bibliography.” (I/L9/07)

The ongoing IL activities had been carried out through course study from week two to week ten. When the students were required to produce an annotated bibliography the librarian came to the class again:

“This was a written assignment which was due in week ten. They all had to do an annotated bibliography as part of that where they had to do in pairs six references which could be journal articles or books and they have to find six each. They also had to do, as part of the annotated bibliography, a critical annotation.” (I/L9/07)

The ongoing IL activities in this course are summarised in Table 5.4 below:

<table>
<thead>
<tr>
<th>Week</th>
<th>Curricular activities</th>
<th>IL related activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tutorial 1</td>
<td>IL pre-test, IL assessment overview</td>
</tr>
<tr>
<td>2</td>
<td>IL. Lecture</td>
<td>Research process and business resources co-presented by the lecturer and librarian</td>
</tr>
<tr>
<td>3</td>
<td>IL tutorial 2</td>
<td>Evaluate and record references; understand the annotated bibliography</td>
</tr>
<tr>
<td>4</td>
<td>IL tutorial 3</td>
<td>Review business information sources</td>
</tr>
<tr>
<td>4</td>
<td>Online forum – IL question 1 posted</td>
<td>Hot topic discussion - IL related question 1 was posted on the Learning management system</td>
</tr>
</tbody>
</table>
Table 5.4: Ongoing IL interactions in an undergraduate business course

The second example of students having ongoing interaction with information was in a Law first year programme, as explained by a Law librarian:

“What the first year working party did was they were mapping up in a piece of paper week by week with what every subject was covering and then when their assignment was going to occur, so there were some sorts of integration across the whole first year programme about what topic had been covered in particular weeks and how they related to each other and their assessment tasks.” (I/L9/07)

In this skill-based course, students interacted with information by completing a few ongoing IL activities: they first completed an online IL tutorial and quiz before coming to the class, then attended four IL sessions during a four week period:

“The online tutorial was based on the Native Title Act so we tried to focus on some legislation and cases that they were doing in their first year. We followed that up with some face to face class activities to reinforce their learning. We taught seven groups of students (seven repeats) for two hours hands on each week for four weeks. They were offered in different weeks in their tutorial times to reinforce what they have learnt.” (I/L1/07)

Students had IL activities from week one doing an online IL tutorial and online IL quiz, to four weeks of IL tutorials in mid and late semester to reinforce what they had learnt.

The above examples demonstrated that the integration of IL has an ongoing-interaction.

The research data also indicate that integration involves providing students with ongoing interaction with information not only through one course curriculum, but also throughout multiple course curricula. IL is understood as using information to learn in a disciplinary context. This includes searching effectively for information and critically evaluating and using information to solve real problems or to make a decision. IL cannot be taught in its entirety through any one academic course. The
multiple course integration approach enables students to reinforce what they have learnt and to build up their IL capability through multiple courses. During the student interviews at University D, the students (D) reported that they would forget the IL knowledge and skills learnt through a course if there were no ongoing IL activities provided for them:

“I had quite a few instances of in depth database teaching in the geology paper, 2-3 lecturers and a couple of tutorials that covered all sorts of databases and catalogue which were really helpful at the time, but we did not require to use them later so I forgot most of them. If I am required now, I probably will go back to my notes and use them again. But if it is too long, I would lose them.” (I/D6/07, 2nd year)

“We had a couple of library lectures and a tour in 140 and Land Information. But I forgot them as I didn’t go to the library and use them. In that course, these lectures were useful at that time, but I forget now.” (I/D3/07, 2nd year)

“I learned database from a course which is useful but I didn’t apply to later other courses as we don’t have much writing. We don’t really have any research based courses but a lot of calculations.” (I/D5/07, 3rd year)

Key stakeholders in IL integration

It was found from this research that librarians play a proactive role in the curricular integration of IL. However, the bottom-up approach to integrating IL will only happen when the course coordinators and lecturers are aware of IL and are willing to have it integrated into their course curriculum. The heads of faculties are important in the top–down approach. The bottom-up approach means that the curricular integration of IL is implemented by individual teaching staff including lecturers and librarians. The top-down approach here means the curricular integration of IL is endorsed by the institute or by the faculty. Student needs and student feedback are very important in IL integration. This section looks at these in detail.

Emerging theme 4: Librarians - The main advocates in IL integration

In the integration partnerships described in this thesis, librarians usually played a proactive role as advocates. Generally academic staff may not realise what the librarian can do. This was explained by librarians:

“I think a lot what we have achieved is being proactive. Many times people [academics] don’t come to us and ask for help. Academics don’t know librarians will do that for them as well.” (I/L13/07)
“When the [new] subject [course] is signed off, then we have a Faculty Education Committee meeting. We can just approach them to ask ‘do you want me to come and help when you are doing the subject outline’ or stuff like that, or if you would like us to be involved? They are normally happy to have us involved.” (I/L3/07)

“I introduced myself to the faculty; emailed to introduce myself; sent them a newsletter once a month; I go to the school morning tea once a week for half an hour which is really good to pick things up there. I have just started to get myself into the school meetings, like staff meetings once a month. …. For the teaching and learning one [meeting], I sent an enquiry of having me involved in this teaching and learning thing. The head of the school said: ‘yes, sure, we’d love to have you on.’” (I/L10/07)

This research conducted during the development phase at University D further confirmed that the librarians play an essential part in the whole process of the IL integration. In this process, the librarians acted as advocates, innovators, developers and implementers of the curricular integration of IL. Please refer to Finding 11 in Chapter 6 for details.

This research also found that having a teaching background or teaching qualifications empowered librarians who felt more confident when they designed IL curriculum and worked collaboratively with academic staff, as explained by librarians:

“I wasn’t an educator. It [teaching qualification] really did help me into the theory of pedagogy and a lot of that more scholarly approach to it. It gave a pedagogical framework for me to actually ‘do my stuff’ and I like the action learning/ action research methodology because it was very much applied and particularly suitable in my situation, and for what I was doing, how I interact with academics who I am working with.” (I/L14/07)

“My teaching skills and the design of learning are probably helped by the [teaching] graduate cert[ificate]. I did find it VERY, very useful!” (I/L13/07)

“Teaching is part of this position and I am also a tutor in education faculty and IT faculty as well. I was a teacher….. I have a teaching qualification which does help with my position.” (I/L17/07)

This section demonstrates that librarians plan a proactive role in IL integration. However, this research found that IL cannot be integrated into academic curriculum if the course coordinators and lecturers are not IL aware or not willing to be involved.
Emerging theme 5: Course coordinators and lecturers – IL Integration will only happen if they are willing

It was found that with the bottom-up approach, although librarians proactively promote IL integration, its success always depends on the willingness or IL awareness of the course coordinators and lecturers. This finding confirms that academic support is important in IL integration as stated in the literature, and also further reveals that it is impossible to integrate IL into a course curriculum if the course coordinator or course lecturer is not willing. Librarians explained below:

“This three librarians in [our faculty services] team had been trying to embed information literacy into [faculty] curriculum for a long time, but it was never successful. As our library director said you’ve only got have one change in staff in the faculty to make the change possible. Either a new Dean or new academic [staff member], who is passionate about information literacy.” He [the new lecturer] is so passionate about information literacy so I worked with him to redesign the major assignment and the tutorial activities.” (I/L15/07)

“Often it is very crowded curriculum and it depends really if academics want to engage with the librarians to embed [integrate] information literacy into their curriculum.” (I/L16/07)

“At the beginning of last year, she [the lecturer] indicated that she wanted to go further and to embed the [IL] skills and link it to assessment. So what we have decided to do is to put a small teaching and learning grant from the faculty.” (I/L9/07)

In the development phase of this research, the researcher’s experience of working with the academic staff at University D further confirmed that course coordinators and lecturers are vital in the curricular integration of IL. Collaboration only happens once academic staff members are willing to integrate IL into their course curriculum. The four curricular working groups in this research were only established once the course coordinators and lecturers were willing to work with the librarians and other parties to integrate IL into their curriculum, as explained by course coordinators from University D:

“I can see the value of doing it [an IL assignment]. If we could have learning designers and librarians to help me with peer assessment and other assistance, I am happy to do it. I need to document what we have done and what students will gain.” (I/A16/07)
“It sounds very useful to help students to make a career decision. We can try it in this course and if it works well, then it can be applied to other first year courses.” (I/A18/08)

“I am interested in your idea of asking students to do an annotated bibliography and doing a peer review of their work. We could have a meeting to discuss further about it.” (I/A9/07)

This research found that most academic staff supported the idea of enhancing students’ IL skills. However, many of them were not willing to join the curricular working group to integrate IL into their courses. The reasons can be summarised as:

- They thought IL was not relevant to their course or had a lack of understanding of IL;
- Their course content was too full to add any more content;
- Their current course has been running successfully and they did not want to make any changes which may drop the student rating for the course;
- They believe that IL and other study skills were taught in other courses.

This unwillingness makes IL integration difficult:

“Maybe what you suggested [of IL integration] is good but it is not for this class.” (I/A12/07)

“I am quite happy with my current teaching as I have a high ranking by students last semester so I will keep doing what I have done.” (I/A20/08)

“These [IL skills] are important skills, but if you put it in the course, something else has to go. There is always something people can put in but what is taken out? We used to have stuff about report writing but that’s gone because we cannot fit in any more. We need it and students need it but we cannot fit it.” (I/A11/07)

“I would assume that they have learnt these skills in early other courses.” (I/A9/07)

The student interviews also demonstrated that if lecturers provided all the needed information and did not require students to use information in order to learn, students would not have many opportunities to use information to learn or to solve problems via academic study, as explained by students:

“Most courses provide all resources needed in the course notes and ask you to apply them to solve the problem. They pretty much provide us with all the information on the first day.” (A 3rd year student)
“We don’t have many research assignments so I don’t need to use the databases.”
(A 2nd year student)

“I remember that in first year, we learnt database and Boolean search etc through the library. I was expecting them to do it all the time but the next year they gave us all the data. In most of our courses, they just gave us everything without telling us where to find them.” (A 3rd year student)

To require students to use information needed in their coursework is the most effective way to enable students to be information literate and the course lecturers play a critical role in this integration. The key role of course coordinators and lecturers in the integration of IL means that the librarians need to find course coordinators and lecturers who are willing to integrate IL and concentrate on developing a relationship with them.

**Emerging theme 6: Heads of faculties - Important in the top-down approach to IL integration**

It was found that the heads of faculties or academic programmes play an important role in the curricular integration of IL with the top-down approach. It was found that the advocacy and inclusion of IL as part of the generic capabilities of a faculty is dependent upon the degree of interest of the head of that faculty. The data also indicated that even if there is an institutional IL teaching policy, it also depends on the heads of faculties as to whether the policy would be implemented into the course curriculum of the faculty. One librarian explained how important the heads of faculties are in IL integration:

“Our old Dean was VERY very committed to IL in the undergraduate programme.” (I/L8/07)

She said that the faculty started a complete new programme from scratch in order to have an integrated approach to build graduate attributes together in the programme, and that IL was one of the graduate capabilities:

“You can see that in every activity that we have in the programme, we have to tie up with graduate capabilities which include information literacy capability. For each of the assignments and projects, they need to indicate which five capabilities that they included in and with two focused capabilities. These capabilities are
based on our graduate capabilities. We have what we called a curriculum map.” (I/L8/07)

However, when a new faculty Dean was appointed, the focus was changed; the integration of graduate attributes, including IL was not the main focus of the new Dean despite the IL policy at that university:

“The Dean we have now doesn’t have particular interests in education. He is more in research. He is supporting research so there has been a shift as far as the Dean’s interest is.” (I/L8/07)

The important role that the heads of faculties play in integration of IL was also described by the librarians from other universities. A librarian explained that they had a new Deputy Dean who was very interested in integrating generic capabilities into curricula and she believed that the changes would be made to the curriculum with the integration of generic skills including IL:

“Our Deputy Dean of the faculty knows that it is the key thing that has to take place, she knows the importance of generic skills. She is very supportive so the faculty is [now] very supportive. It is often the key people who come in. Because there has been changing the people in the faculty so now there is definitely interests to get it embedded into business curriculum.” (I/L9/07)

She explained that IL had not been the faculty focus because the previous Dean was not interested:

“We had a Dean who did all sorts of other things and was never interested in infolit [IL] skills, generic skills, and lifelong learning skills.” (I/L9/07)

A librarian talked about the key role that the head of the academic programme played in curricular integration of IL:

“We are lucky that the academic in charge is very IL aware. She is the one [who is in charge of the programme] wanted to integrate [IL] and she knows that from her previous study.” (I/L7/07)

A librarian explained that IL, as part of graduate capabilities, was integrated into the faculty’s core course curriculum because the head of the academic programme was aware of the importance of the generic skills:
“We had a new Director of academic programme around early 2000. He was very much aware of and supportive of having generic skills throughout. He has been one of the catalysts. Certainly he applied the [university] approach which is to write a unit to have generic skills combined as well. He tried to make sure that happened routinely….. When we worked with faculty back in 2004 to get graduate capabilities into the core units, teaching and learning staff, instructional designer and educational consultants run a workshop with different disciplines to see how they would map the graduate capabilities.” (I/L13/07)

The above conversations demonstrate that the Dean or the head of an academic programme plays an important role in IL integration into the curriculum with a top-down approach. In order to have a top-down approach to integrating IL into the curriculum, it is critical to raise the awareness of the Dean or the head of an academic programme that IL is part of generic capabilities.

**Emerging theme 7: Students - Central to IL curricular integration**

It was found from this research that students are central stakeholders. Student needs and student feedback are very important in the integration of IL because the purpose of providing IL instruction in higher education is to enable students to be information literate. When we design an IL curriculum with IL integration, we need to take the student-centred approach by understanding what the students’ needs are and to design an IL curriculum to support them in their learning. For example, at university C, a lecturer collaborated with librarians to integrate IL into his business management course. The IL integration mapped all six of the ANZIIL standards by requiring students to define their research topic, search for relevant information, compare the information found, apply it in selected service firms and then to compare their findings with literature. The assignment was worth 40% of the course total grade. Students complained that there was too much work in this course. The lecturer told me that:

“Most students felt it was useful because it gave them framework but they didn’t really understand why they were doing it. We probably should not include all six ANZIIL standards in one course as we cannot cover all of them in one course. …It is probably better to start with a smaller way.” (I/A5/07)

Based on the student feedback from this course, the lecturer and the librarian took a different approach to integrating IL into another course. They mapped with the first
three ANZIIL standards by requiring students to identify and evaluate information on a business issue.

The development phase of this study also demonstrated that student feedback is important in IL integration. When IL was integrated into a first year electrical engineering course, students were asked to explore their future career in the electrical and electronics field by searching and evaluating information. However, some students had already decided to study in other fields therefore they wanted to explore the subject of their field of interest rather than electrical engineering. However, the assignment required them only to explore the electrical field as the focus of the course was electrical engineering. Based on student feedback, a career exploration assignment was suggested as being integrated into a first year design course so that students would have the option of exploring their own interests in the engineering career field, as explained by a course lecturer:

“Students’ feedback showed that this was not an appropriate course to have this career exploration assignment integrated into. It is such a good assignment and we don’t want to lose it so we need to integrate it into another first year course.”

(I/A19/08)

In summary, this study indicates that librarians play a proactive role in IL integration and also that it is impossible to integrate IL into a course curriculum without the willingness and support of academic staff members. In addition, the heads of faculties play an important role in the integration of IL. Students are the central stakeholders as the purpose of providing IL education is to enable students to be information literate.

**IL curricular design strategies**

This section summarises findings from this study that are related to IL curricular design. These findings include: 1) IL policy and standards are used to support IL curricular design; 2) a combination of face to face and online IL teaching is an emerging trend; 3) the marking schedule is an important tool in the assessment of IL activity.
Emerging theme 8: IL standards - Used in IL curricular design

The interview data indicate that IL policy and standards were used in developing a curriculum for integration of IL. IL policy here includes the institution’s graduate attributes/profiles and institutional IL policy; IL standards include ANZIIL IL standards (Bundy, 2004). In some cases in this study, this selection of documents was used as a guideline for planning and designing curricula. For example, one of the Graduate Attributes at University C is an ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively. This example of expected Graduate Attributes was used in curricular planning by both academic staff and librarians:

“You will see every activity is mapped to one of these graduate capabilities. In assessment, you also need to demonstrate that you have applied the graduate capabilities. For example, if I tick this assignment [on their learning system], you can see what students have to do and you also see these capabilities including infolit [information literacy].” (I/L8/07)

“This [matrix] is the summary of how we fit into the Faculty of Law with their graduate attributes. That shows you the skills they have outlined and mapped in each subject [course]. IL is integrated in legal research.” (I/L11/07)

“There are graduate attributes here at the university and they are meant to be developing these. There are also teacher standards that students are meant to be developing.” (I/L4/07)

In the professional faculties, the IL attributes of graduate requirements from an accrediting professional organisation were also applied to curricular design in some of the professional faculties:

“For our students to be accepted as teachers, we have to meet the teacher professional teaching standards so the faculty has to be able to show where it is in the course that the students demonstrate all these professional teaching standards.” (I/L17/07)

“Xxx [An accrediting professional organisation] reviews the BE programme every 5 years. We had a matrix which has all the courses and list all the criteria in the Profile. We need to tick off which courses meet these criteria.” (I/A10/07)

“Xxx [an accrediting professional organisation], for instance, 10 years ago, wanted to know whether we were teaching these sorts of [generic] skills. Now they want to know whether we actually measure the student’s ability in these skills. So this is how we are demonstrating. We are measuring these skills. You can only do that by embedding it in the programme.” (I/A4/07)
The ANZIIL IL framework (Bundy, 2004) was used as a guideline in the IL curricular design in some examples. The standards were used in programme planning:

“IL was like a light on the path to learning so that each step on the path to learning was guided by one of these IL standards. In that sense, the whole project was embedding IL so it was very hard to distinguish where IL set was as it was part of the whole project.” (I/A5/07)

“The worksheet was to get the students to think about their topic. They also needed to think ‘Who will I be published with?’ ‘What audience I am writing to?’ ‘What do I already know and therefore what do I still need to find out.’ So we scaffold them to go through the process of thinking about their topics. This is mapping to the IL standards, in that they become aware that they have information need, they start to define it.” (I/L14/08)

The ANZIIL IL standards were also used in the design of assignments, tutorial activity and assessment:

“We started from the point of ANZIIL six standards. I had different parts of the assignment in which week of the semester and then down there I had standard I, standard II and standard III, etc. We looked at the first assignment which is a group assignment for this unit. I identified what he [the lecturer] wanted for the assignment, what is the learning outcome to be, what the steps to be to get there and which parts of the IL standards could be aligned and applied. So we did the mapping exercise.” (I/L15/07)

“What we did was in building that activity, we used the [ANZIIL] IL standards to give the structure and form so that every step of the process to do this project was in fact one of standards being implemented. From the tutorial programme you will see how each of these activities was tied to one of these IL standards.” (I/A5/07)

“They are assessed on a range of sources they found; they were assessed on evaluation of the sources; criteria coming from IL literature and they applied these criteria to the different sources that they found. This is a different approach, other than with a whole semester. The focus here was on the first 3 [ANZIIL] standards and it was tied to an assignment.” (I/A5/07)

In summary, this finding was that the IL competencies in Graduate Attributes and IL standards are used as useful tools or guidelines in planning and redesigning a curriculum when integrating IL into a curriculum. This finding was applied in the development phase of this study.
Emerging theme 9: Online teaching - A combination of online and face to face teaching as an emerging trend

Both academic staff and librarians from Universities A, B and C reported that IL classes were mainly taught by librarians and that they used various methods to teach these classes. The most commonly used method was the IL hands-on tutorial, as the academic staff explained:

“We have [IL] lectures and tutorials. I use tutorials for these IL skills…. I need librarians to help me with teaching workshops, tutorials and providing information for subjects.” (I/A1/07)

Librarians were heavily involved in face to face IL teaching and they could not take on more teaching workload as reported:

“Just to give you an idea, not talking alone about this subject [course] but for all subjects in the programme, in autumn session [semester], we gave 72 presentations, including 1 hour or 2 hours classes!” (I/L1/07)

“We’ve got drained in teaching because we have integrated IL into teaching quite heavily.” (I/L5/07)

“We do a 50 minutes lecture which is showing them the library resources that they are required to use for their first assignment. It is such a big class [1300 students] so three of us [engineering librarians] teach each class and we also sit in each other’s lectures and we also support each other in answering some questions.” (I/L10/07)

“I appeared in 2 subjects [courses] in the 1st session [semester]. One of them is an hour lecture with mixed groups of students.” (I/L5/07)

“We taught 7 groups [7 repeats] of students for 2 hours hands on each week for 4 weeks.” (I/L2/07)

One of the methods used in reducing librarians’ teaching workload was to train tutors to teach IL classes as reported by librarians (L) and academic staff (A):

“We had a tutor workshop prior to the semester beginning. I [with the lecturer] went through with what we are aiming to do to make sure they know all the details. From liaison librarian’s point of view, training the tutors is the way we need to be heading because you cannot embed information literacy in every unit if it comes back to the librarians to do the work.” (I/L15/07)
“The liaison librarian taught one lecture on it [IL] and all the tutors were trained by the librarian. So they delivered that material in the tutorials.” (I/A5/07)

“There were 2 lectures and 3 sets of tutorials with other tutors being involved as well so I [librarians] had to teach the tutors for the session before hand.” (I/L9/07)

Online IL tutorials were provided to students to reduce the face to face teaching workload or to complement IL face to face classes:

“We had both lecture and tutorial and support material for students, e.g. online tutorial on information literacy. Also all the marking criteria were shaped by the information literacy standards.” (I/A5/07)

“We certainly have created it [online resource] as part of this unit, an online guide and all sorts of resources they might need.” (I/L13/07)

“We link the quiz to the online tutorial so students can go there to read and come back to do the quiz.” (I/L10/07)

“They completed an online tutorial before coming to the class, then they completed some compulsory quizzes online through the online learning system and then we followed that up with some face to face class activities to reinforce their learning.” (I/L1/07)

Many librarians believed that the combination of online and face to face teaching is an emerging trend to provide IL education to a large number of students:

“Really my challenge now is to do that [developing online IL resources] rather than doing face to face. We’ve got drained in teaching because we have integrated information literacy into teaching quite heavily… I probably do it online next year. There is no need for me to be there to talk in the class so they can do it online.” (I/L5/07)

"When I first arrived here, they had to do about 20 or 30 tutorials so we just couldn’t do it now. Instead, we have a lecture in week 2, so I am working on an online tutorial now with help with the academic as well and he is very helpful.” (I/L3/07)

“The information literacy online tutorial is compulsory for all undergraduate and postgraduate course work students. So it is a way to get to a large population so it is kind of it was the way to do it.” (I/L4/07)

In summary, both the academic staff and librarians reported that the face to face IL lectures and tutorials are still the most commonly used methods for providing IL
teaching and learning activities. However, they also reported that librarians did not necessarily teach the IL classes as they could be taught by trained tutors or that IL activities could be provided online for students to learn for themselves. Providing a combination of online and face to face IL education is an emerging trend in order to provide IL education to large groups of students and to ease the heavy teaching load of the librarians. Online IL education also provides students with self learning opportunities and to be able to have access to IL resources twenty four hours per day and seven days per week.

**Emerging theme 10: IL assessment tools – important in IL integration**

The last finding in this section is that a marking schedule or grading rubric is a very useful tool for many different IL assessment methods, for example, in essay or report writing, portfolio preparation, peer review feedback, and compiling an annotated bibliography. Marking schedules, as a means of assessing IL, have many advantages. They provide clear measures of what students are expected to learn and to understand. The research data suggest that students can mark each other’s work based on a marking schedule and learn from each other or from a group of other students. This provides students with a collaborative learning environment in which they interact with each other. Marking schedules were used in many IL integration practices in this study. Table 5.5 below is an example of a marking schedule intended to assist the first year students with their online peer review process at University D; the schedule was designed by librarians, academic staff and a learning advisor, working in collaboration.
<table>
<thead>
<tr>
<th>100% corresponding to 5% of the final course mark</th>
<th>Mastered (25)</th>
<th>Proficient (19)</th>
<th>Limited (12)</th>
<th>Insufficient (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation overview (25%)</td>
<td>More than 3 well-known companies and more than 3 products, services or industries have been explored; the discussion is exceptionally well structured.</td>
<td>3 well-known companies and 3 products, services or industries have been explored; the discussion is generally well structured.</td>
<td>2 well-known companies and 2 products, services or industries have been explored; the discussion is satisfactorily structured.</td>
<td>1 well-known company and 1 product, service, or industry, has been explored; the discussion is poorly structured.</td>
</tr>
<tr>
<td>Occupation overview criteria: field coverage; industry area and products; associated professional societies and well known companies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career opportunities and skills needed (25%)</td>
<td>3 subject skills and 2 general skills have been discussed and, in addition, exceptionally well-structured evaluative comments have been provided.</td>
<td>3 subject skills and 2 general skills have been discussed and, in addition, generally well-structured evaluative comments have been provided.</td>
<td>There are some deficiencies in the discussion of subject and general skills and/or the evaluative comments provided are of limited use.</td>
<td>There are major deficiencies in the discussion of subject and general skills and/or the evaluative comments provided are insufficient.</td>
</tr>
<tr>
<td>Overall effectiveness of report (25%)</td>
<td>Writing is exceptionally well structured, relevant and informative. The report clarity is excellent.</td>
<td>Writing is generally well structured, relevant and informative. The report clarity is good.</td>
<td>Writing has some deficiencies in structure and relevance. The report is not particularly clear or informative.</td>
<td>Writing is poorly structured, while content is not informative and lacks relevance. The report clarity is poor.</td>
</tr>
<tr>
<td>Website selection, evaluation and referencing (25%)</td>
<td>The APA reference style was used accurately, for at least 6 references. Two websites have been evaluated using appropriate criteria and exceptionally well-structured evaluative comments are included.</td>
<td>The APA reference style was used satisfactorily for at least 6 references, with only minor errors. Two websites have been evaluated using appropriate criteria and generally well-structured evaluative comments are included.</td>
<td>The APA reference style was used poorly. Two websites have been evaluated using a limited number of criteria and/or the evaluative comments are of limited use.</td>
<td>No reference style was used at all. Two websites have been evaluated using an insufficient number of criteria and/or the evaluative comments were inadequate.</td>
</tr>
<tr>
<td>Website evaluation criteria: purpose, authority, accuracy, and currency.</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 5.5: A marking schedule for peer assessment at University D
In summary, the key characteristics for the curricular integration of IL found from this study are: collaboration and provision for students of contextualising and ongoing interaction with information via a course curriculum and multiple curricula. Collaboration occurs not only between the academic staff and librarians, but also extends to other partners such as student learning advisors, learning designers and IT support staff. Librarians play a proactive role and academic staff and students play an important role in the integration, collaboration and contextualisation. The institutional IL policy documents such as Graduate Attributes and IL standards can be used as guidelines in IL curricular design. The combination of class teaching and online IL teaching is an emerging trend. A marking schedule is an important tool to be used in the assessment of an IL activity. The next chapter will discuss the findings from the curricular working groups at University D.
Chapter 6

FINDINGS PART II

THE PROCESS OF CURRICULAR INTEGRATION OF IL IN HIGHER EDUCATION

This chapter provides the main findings from the development phase conducted at University D. This phase demonstrates that: curriculum can be viewed as the intended, offered and received curriculum; curriculum can be negotiated and redesigned at different levels; the process of the integration of IL is a process of negotiation, collaboration, and implementation of the intended curriculum; and that IL can be progressively integrated across an academic programme. The findings are discussed in detail in this chapter. The findings from the development phase were arrived at based on research question 3: What is the process of IL integration in curricular redesign in higher education?

The codes shown in the Table 6.1 are used in order to identify the source of particular quotes.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Source of quoted data</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/A5/08</td>
<td>An interview conducted in 2008 with academic staff member, number 5.</td>
</tr>
<tr>
<td>I/L10/07</td>
<td>An interview conducted in 2007 with the librarian, number 10.</td>
</tr>
<tr>
<td>I/D2/07</td>
<td>An interview conducted in 2007 with the student, number 2.</td>
</tr>
<tr>
<td>S/C1/07</td>
<td>A statement or quote from a course material obtained from the interview in 2007.</td>
</tr>
<tr>
<td>S/C2/08</td>
<td>A statement from course material that was developed during the development phase of this research in 2008.</td>
</tr>
</tbody>
</table>

Table 6.1: Codes for sources of quoted data

Emerging theme 11: Interpretation of curriculum - IL integration into the intended curriculum, offered curriculum and received curriculum

The findings of the development phase of this research conducted at University D demonstrated that IL should be integrated into the intended curriculum, the offered curriculum and the students’ received curriculum. The intended curriculum here
means what an institution expects to be taught and learnt in its educational system (Codd, 1981; Preedy, 2001). The offered curriculum or teachers’ curriculum is what teachers teach or plan to teach (Preedy, 2001). The received curriculum implies what students experience or knowledge and skills that are actually learned by students via the course (Kelly, 2009; Preedy, 2001). Understanding these interpretations of curriculum would help curricular developers to understand that curriculum may be interpreted differently and that IL needs to be integrated into all aspects of the curricula in question in order to enable students to become information literate. For example, if IL is only integrated into the intended curriculum without being implemented into the offered curriculum, students may not receive any tuition in IL.

The study has shown that IL was included in the intended curriculum at University D. For example, it was stated in the undergraduate Graduate Profiles that University D expects its graduates to have the following attributes: “an ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively” (University D, 2003, p. 1). There was also a specific university teaching and learning policy on IL. The objectives of the IL policy stated the intention, “to ensure that graduates enter the workforce with information literacy skills” and “to ensure that information literacy is embedded into the academic curriculum of the University” (University D, 2006, p. 2). The engineering undergraduate curriculum also needs to meet the capability requirements of the accrediting professional body. One of these is to require students “to recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments” (Engineering Professional Body, 2006, p. 3, 1.4). Based on the intended curriculum, University D expects its students to be information literate when they graduate from the university. In addition, the IL standards from the ANZIIL IL Framework (Bundy, 2004) are endorsed by University D so students who graduate from the university are also expected to be information literate, based on the ANZIIL IL standards.

However, the research participants at University D indicated that the intended IL curriculum is not the same as the offered IL curriculum. For example, although IL is clearly stated in the university intended curriculum as ‘required skills’, some
academic staff said that they did not intend to include these skills into their offered curriculum for various reasons, which included limited awareness and need. For example, one course coordinator said:

“I [have] heard of the Graduate Profile, but I am not sure what in it. We didn’t specifically consider or discuss about mapping these skills from [the Accrediting Professional Body] and Graduate Profiles to our teaching content as such.” (I/A8/07)

Whereas another lecturer commented:

“I knew them [Graduate Profiles] but I haven’t considered including these skills into my course. I am pretty new to the department and I am still in the survival stage of doing the job. I will be looking at these I guess as continuing opportunities.” (I/A20/07)

“I am not informed particularly of including the Engineering Professional Body [required] skills into the course but my senior colleagues may make sure that these things are covered.” (I/A7/07)

Below is what his senior colleagues told me, stating the contrast explicitly:

“We do include the subject skills, generic skills in our courses which are required by the Engineering Professional Body, but no one has looked at if we have done this or that. We may need to do it more.” (I/A9/07)

“I know the [requirement of] Engineering Professional Body and the Graduate Profiles, but we don’t look at them when we design a course.” (I/A16/07)

A few lecturers said that they had not even heard about the Graduate Profiles or the Engineering Professional Body requirements:

“I have never read the Graduate Profile. I have no idea what the Engineering Professional Body requirements are. Somebody may say it is in your contract but I don’t think so.” (I/A15/07)

“I have never seen the Engineering Professional Body Graduate requirements and the uni[versity] Graduate Profile.” (I/A7/07)

“I don’t know about the Graduate Profile.” (I/A9/07)

If academic staff members are not aware that IL is required in the institutional intended curriculum, they are not expected to integrate IL into course curriculum. Therefore, although IL may possibly be integrated into the intended curriculum, it is
Another view of the offered curriculum is from the librarians’ point of view. The engineering subject librarians, who participated in teaching IL in some of the engineering courses, explained how they variously implemented IL into the offered curriculum. They taught the IL component in a compulsory course for all first year students, in different departmental compulsory courses for second year students and they taught an IL seminar for fourth year project students:

“We [librarians] all participate in a first year course teaching. It is one hour, including catalogue, Scopus and library resources to help students with their assignment. Students need to do a 3% online quiz about the catalogue and database and they also need to search for information for their assignment. A Chemical and Materials website was developed to help students with their assignment and also to introduce students to the library.” (I/L21/08)

“Information literacy was forced into the second year courses in each department and each of us [librarians] liaised with our own department for a second year course. [We teach] one lecture and one tutorial to help second years with their assignment, they have to list references and use information resources.” (I/L20/08)

“We [librarians] co-teach our second year classes which focus on databases such as Compendex and Scopus, patents, e-books, journal articles. In my department, we give a lecture and a tutorial. There is an online test after the lecture and tutorial. It doesn’t have any marks but it is required, they will all have to do it.” (I/L18/08)

“For second year students, we gave one lecture and one tutorial talking about civil databases and the websites, with 5% online quiz.” (I/L19/08)

“We don’t really see any third year students and we all present a seminar to fourth year project students, focus on database, standards, patents and may be literature review.” (I/L21/08)

According to the librarians’ explanation, the offered curriculum was intended to offer students useful information to learn through their courses in Year 1, Year 2 and Year 4. In order to find out if students had received the IL curriculum through their university study, the researcher interviewed seven engineering students from Year 1 to Year 4 at University D. The interviews indicated that although the students had experienced IL activities through a first year course, they had not experienced them
in any of the other later courses. This differed from the offered curriculum described by librarians:

“We did research in first year about biofuels. We used the library and resources from that course. You had to work out yourself where to find information and what to look for. This was a real research assignment that made us to think and to search for information.” (I/D6/07, 2nd year)

“I remember that in first year, we learnt database and Boolean search etc through the library.” (I/D7/07, 3rd year)

“The library session in 140 taught us how to use the catalogue and it was useful for that course and other later courses, but I haven’t used it that much. …Most assignments we can just use the course menu.” (I/D2/07, 1st year)

The students revealed that course lecturers normally provided them with information that was needed for their assignment rather than asking students to find information by themselves, therefore they did not have opportunities to use resources to find information for their assignments or projects through their study:

“In engineering, all the things that we were given are the basic facts and it depends individual student’s motivation. The Design paper in first year gave us some creativity and left us to choose and do whatever we were interested in. (I/D1/07, 2nd year)

“We don’t have many research assignments so I don’t need to use the databases. So far, I have only done two research projects. If I am doing more, I probably use the library better. But I don’t use that much. (I/D3/07, 2nd year)

“We don’t have any research based assignment yet, may be next year. We were mainly given a problem and information and you solved the problem by using all information provided. They haven’t taught us how to do research.” (I/D7/07, 3rd year)

“Most courses provided all resources needed in the course notes and asked you to apply them to solve the problem. They pretty much provided all the information on the first day. Either codes or standards and we will need to apply them to solve problems.” (I/D7/07, 3rd year)

Students reported that they received IL education through the first year course and this was appreciated by many of them. However, they did not receive any further IL education in their later years and did not even retain what they have learnt as they did not need to search for, or evaluate, the needed information in later courses. Students reported that they would remember and reinforce what they had learnt about searching and applying information if the courses required them to do so. Student
opinions are important in curricular development as they indicate how well students receive IL education through their course curriculum. From these data we can see that the student received curriculum is different from the offered curriculum and again it is different from the intended curriculum. To ensure that students gain IL education, we need to make sure that IL is integrated into both the intended curriculum and the offered curriculum as well as the student received curriculum.

In summary, this research found that the intended curriculum may be different from the offered curriculum which may be different again from the received curriculum. Therefore, in order to provide IL education to students, IL needs to be integrated in the intended curriculum, the offered curriculum, as well as the received curriculum.

**Emerging theme 12: Process – IL integration as a process of negotiation, collaboration and implementation of the intended curriculum**

Findings arising from the development phase of this study conducted at University D indicated that the process of the integration of IL represents a process of collaboration, negotiation and implementation of the intended curriculum. Four curricular working groups worked collaboratively to design curricula by integrating IL across the Civil Engineering programme. The process of how IL was integrated into each course curriculum from Year 1 to Year 4 is described in this section, detailing the discussion and outcomes of the curricular working group meetings.

**The Year 1 IL curricular working group** consisted of the course coordinator and the course lecturer, the electrical engineering departmental subject librarian, a learning designer, a student learning advisor, IT support staff and the researcher. We collaborated and negotiated to design a career exploration research assignment to integrate IL into the course assignment.

Five meetings were held between February and July 2008 in order to redesign the IL assignment and to provide support for students in the completion of the assignment. During these meetings, we formed a community of IL integration practice. At the first meeting, all group members introduced each other. We discussed and agreed the purpose of this curriculum group. Then, the course lecturers introduced the course content and the researcher introduced the drafted IL assignment which required
students to explore what an electronic and electrical engineer does in the real world. Each member introduced their area of expertise and what they could contribute to the group. Then the group brainstormed the issues relating to the IL assignment, e.g. how to develop; the assignment, the requirements, the skills and the support needed to complete the assignment, how the assignment would be assessed, the possibility of using an online peer review system, and the percentage of marks the assignment would warrant. We agreed to provide support for students to complete this assignment e.g. in internet searching, the evaluation of information resources, report writing, referencing, online peer review, assignment marking schedule, etc. Finally, each member agreed with the work tasks and the timeline to complete them. The time of the next meeting was also confirmed.

At the next few meetings, we collaboratively developed scaffolding resources. The subject librarian modelled career research for librarianship on the Internet and documented the search strategies. She went through the research process and presented the evaluation sheet that she had used to evaluate the information found. Based on the information provided by the subject librarian, the student learning advisor then wrote a sample report on a topic of ‘what do subject librarians do?’ to demonstrate to students how to write a short report about a career. She also developed a report template for students. The subject librarian, the student learning advisor and the researcher worked collaboratively to develop a web resource evaluation template and examples of website evaluation. An online peer review system was introduced to students to provide them with a collaborative learning environment. The researcher worked with the course lecturers and the student learning advisor to draft a marking schedule for students to peer mark their fellow students’ work. IT support staff provided online peer review support for students to peer review and mark each other’s work online. Although there was no face to face IL, writing lecture or tutorial offered to students in this course, these multiple support materials provided scaffolded online support for the students. The curricular working group members all worked and collaborated behind the scenes in designing the curriculum, developing resources and providing support for students in their learning. The integration of IL provided an opportunity for collaboration in offering to students the best support possible.
In this community of practice, we not only worked collaboratively and respected each other but also negotiated in the whole process of the curriculum redesign. For example, we negotiated the percentage of the mark for the IL assignment. The researcher initially suggested having 10% of the final mark for the career exploration assignment, but the course coordinator said that the mark was too high for students to mark themselves. We considered that the mark could not be either too big for a trial assignment or so small that students would ignore it. Therefore, we agreed with the course lecturer’s decision of 5%. We negotiated what reference style would be required for this assignment as there are a number of reference styles used by the department. After a few discussions, we agreed with the librarian’s suggestion to use APA. In addition, we discussed whether the word limit for the report should be 750 words or 1000 words. We agreed with the student learning advisor’s suggestion of a 750 word limit being appropriate for first year students. We also discussed whether an IL writing lecture or tutorial could be offered to students to complete their tasks but the lecturers said there was no provision for an extra lecture or tutorial time in this course. It was agreed that all the support materials, such as how to search and evaluate Internet resources, and how to write a report, would be provided by the university online learning system. Tutors would also offer help to students for the assignment.

In the curricular working group community, we shared knowledge from our various areas of expertise, communicated and worked collaboratively to design an assignment, class activities and assessment and support material. The researcher acted as an advocate for the drafting of the initial IL assignment, to ensure ongoing communication and that the agreed tasks were done on time. The working group experience demonstrated that course coordinators and lecturers are vital in the process of the IL curricular integration and it only occurs with their involvement and consent.

The Year 2 IL curricular working group included the course coordinator and the Civil Engineering subject librarian, and the researcher. The group had six meetings from February to November in 2008. In order to build on what students had learnt in Year 1, we brainstormed, negotiated and worked collaboratively on the best ways of integrating IL into this second year course.
At the first meeting, we discussed the problems that students had encountered and brainstormed to see what we could do to help them. The researcher initially suggested contextualising IL in the course activities and assessment. However the course coordinator did not agree with this suggestion as he thought students should contextualise IL in all of their second year courses instead of limiting it to this course only. Therefore, the subject librarian investigated the course content and course assignments in other second year courses and contextualised the IL to wider course assignments and course research topics. In order to provide students with ongoing interaction with information, the course coordinator also agreed to provide one more information resource lecture and an additional IL related online quiz near the end of semester to reinforce what students had learnt earlier. The course coordinator provided the course related information-seeking questions for the subject librarian who worked with other subject librarians to develop multiple choice answers to these questions. We worked in different areas but we all had the same goal: to provide the best support for students. IL integration knowledge such as: contextualisation, ongoing interaction with information, and collaboration generated from the study at Universities A, B and C was applied to this curricular design process. This demonstrated that these key characteristics are useful findings in practice. It was found from the development phase that the IL integration process is also a process of negotiation.

In the curricular working group, we worked together closely; we negotiated, respected and supported each other. We shared our knowledge in different areas and committed to what we agreed to do. The subject librarian acted as a group coordinator, or advocate, to organise meeting times, ensure the tasks were completed and everyone was informed. From our experience in the curricular group we could see that the curricular design is both a process of collaboration and negotiation. Both the course coordinator/lecturer and subject librarian played an important role in this collaboration and negotiation.

The Year 3 IL curricular working group consisted of the course coordinator, the Civil Engineering subject librarian, a student learning advisor, a learning designer and the researcher. Seven meetings were held between Feb to July 2008. After
brainstorming and discussion with the course coordinator, the researcher drafted an
IL related assignment to build on the IL competency that students had gained in the
years prior to the first meeting. At the first group meeting, the lecturer talked about
the problems that his students had and we discussed what we could do to support the
students. Then, the course lecturer explained the course content, existing assignment
and method of assessment. The researcher introduced the drafted assignment and the
linking behind the assignment. The group then discussed how to help students to
think beyond the textbook and to find and apply information to solve a real
engineering problem. In order to encourage students to search and apply the
information found and to solve a problem, the group collaborated and negotiated the
design of a new assignment which was worth 15% of the final mark for the course.

We brainstormed as to the way in which the IL assignment could help students to
learn the subject more thoroughly at the same time as providing an opportunity for
them to use information to learn. We brainstormed some different ways to
contextualise the assignment with the course content. This assignment was finally
designed in such a way that it required students to act as engineering consultants to
present three different ways of measuring river flow by searching information from
different sources. Students were required to use information found from patents,
conference papers and academic journal articles to support their argument. Students
were also required to write a report which would argue why these two measures were
the best options.

After the assignment was agreed upon by the group, each group member worked
collaboratively on different tasks. The lecturers worked on checking and updating
the course objectives, the assignment percentage, and arranging for tutors to work on
a marking schedule. The Student Learning Advisor worked on the report writing and
referencing support and the subject librarian worked on how to find and evaluate a
variety of information resources to complete this assignment. These information
resources included patents, reports, standards, and academic journal articles. The
group had a few meetings in order to have the opportunity to interact and
communicate with each other concerning what we had done, why we did it in that
way and what could be improved. The group also collaborated and negotiated with
each other on the sources of information that students needed to search from; the
percentage of marks for this assignment, and the support provided to students and the lectures and tutorial times.

In this community of practice, we shared our expert knowledge of the subject, information resources, writing, and referencing. The researcher acted as an advocate, drafted the IL assignment, organised meetings and summarised the meeting briefs and discussions, emailed group members to remind them of the tasks needing completion, and collaborated with other partners on campus, such as student learning advisors and learning designers.

The Year 4 IL curricular working group consisted of the course coordinator and the course lecturer, the Civil Engineering Departmental subject librarian, a learning designer, a student learning advisor, IT support staff and the researcher. This was to be the final year of the research project and of two semesters’ duration. Between February and September 2008, the group met on six occasions. During this series of meetings, the goals of the group and the methods to attain them were identified. We discussed and identified the problems that students had e.g. lack of focus on the research topic; lack of knowledge of the production of a literature review. The curricular group discussed the best way to help students with these problems. For example, the group interacted and discussed the ways in which students could be assisted in focusing on their topic. This was a problem which had been prevalent for some years prior to the research project. As a result of the group’s interaction, it was agreed that the students were required to produce an annotated bibliography before they started writing to draft their report. This enabled students to search for information, to critique and evaluate what they found, to think about the relevance of their findings and whether or not these would contribute to their research topic. Students were also required to peer review each other’s annotated bibliographies. Through the peer interactions in a collaborative environment, students learnt from each other and came to understand how to improve their own work and that the responsibility for their learning was their own.

The lecturers were so interested in the online peer review system that they also wanted to use the system for students to review each other’s research summaries and literature reviews. However, in order to reduce student workload and also to avoid
the danger of student loss of interest, the Learning Designer suggested that the students should not be asked to do too many online peer reviews. As a result of negotiation, it was agreed that students would do two peer reviews: an annotated bibliography and a research summary. The subject librarian, Student Learning Advisor and the coordinator worked closely together to design the marking schedules to be used by students to peer review each other’s work. The group worked collaboratively to design and offer students a series of lectures. These IL related lectures included: how to write a summary; where and how to find information for research; how to compile a literature review; Endnote and referencing; how to do data analysis; how to present findings and to write reports, and so on. As a result of this collaboration and negotiation, increased support was provided for students in the scaffolding of their research.

The above IL curricular working group experience demonstrates that the IL curricular integration process is an exercise in collaboration and negotiation from the formation of content, development of class activities, assignments, and methods of delivery, to its method of assessment. An IL curriculum is actually a negotiated document produced by the collaborative effort of multiple partners. It further demonstrates that course lecturers/ coordinators are vital in IL integration.

From the above discussion we can also see that the process of integration of IL is also a process of the implementation of an intended curriculum. University D expects its students to have the following attributes, along with other attributes when they graduate: “A capacity to locate, contextualise, critically evaluate, synthesise, and use information effectively;” “A capacity to communicate ideas effectively in suitable formats;” “Respect for the ethics of research and scholarly activity” (University D, 2003). Since student skills are expected to be further developed by the integration of IL into the course curriculum, the integration of IL could also be considered to be a process of implementing the intended curriculum.

In summary, the process of IL curricular integration can be seen as a process of implementing the intended curriculum and a process of negotiation and collaboration with multiple partners. In this process, the programme or course coordinators or lecturers are the ones who make the final decisions. As the result of the collaboration
and negotiation of these IL curricular working groups at University D, IL has been progressively integrated into the Civil Engineering department from Year 1 to Year 4; this will be discussed further in the next section.

**Emerging theme 13: Negotiated curricula – IL curriculum redesign and negotiation at different levels**

The findings from the development phase that was conducted at University D demonstrate that the curriculum can be viewed at an institutional, faculty, departmental, programme, and course and class levels. Key findings in the research were that a curriculum may be viewed as a negotiated document and curricular negotiation can be achieved at the various levels indicated.

At the institutional level, the ‘curriculum’ refers to teaching and learning objectives, teaching plans or strategies, curricular policies, as well as to degree programmes. For example, the institutional curricula at University D include the university’s Graduate Profiles/Attributes, academic plans, and university teaching and learning policies, as well as its degree programmes. These degree programmes include undergraduate degrees, bachelors / honours degrees, post-graduate degrees (Doctoral and Masters), post-graduate diplomas and post-graduate certificate programmes.

At the faculty or departmental level, ‘curriculum’ refers to the faculty or departmental teaching and learning policies which are based on the institutional teaching and learning policies and professional graduate requirements of a professional body or organisation.

The faculty or departmental curriculum includes the official list of academic programmes and courses offered by that faculty or department. The Engineering Faculty undergraduate programmes at University D consist of general education, compulsory subjects, and electives. A faculty or departmental curriculum includes the organisation of the programmes and courses and the evaluation of student learning. At the course level, ‘curriculum’ refers to course organisation, learning outcomes, content, delivery and activities, assessment and evaluation. At the class
level, ‘curriculum’ refers to class learning outcomes, content, activities and evaluation.

The interview data and work experience in the development phase at University D demonstrated that collaboration and negotiation in curricular integration can be done at the levels previously mentioned. For example, a senior manager at University D explained how IL was integrated in the university curriculum. The University Teaching and Learning Quality Committee (TLQC) is responsible for developing and monitoring university policies associated with the improvement of teaching and learning. Two TLQC members, one from the Library and one from the staff professional development unit suggested that the University needed to ensure that its graduate students are both computer and information literate. In 2001, a working group was set up to work on an IT and IL policy as a result of committee discussions. This early initiative was relatively unfruitful:

“A draft policy on IT and information literacy was developed but feedback from the Faculties was not very positive about a combined policy. No further work was done on the proposed information literacy policy until 2005.” (I/L22/08)

However, in 2005 the library representative on the TLQC again raised the importance of IL through a discussion paper. The TLQC established a working group to develop an IL policy. The draft IL policy was approved by the TLQC, sent to Deans of all faculties for feedback, and, based on the feedback, was subsequently revised.

After discussion with all the faculties and at the Teaching and Learning Quality Committee meetings:

“The information literacy policy was approved by Teaching and Learning Quality Committee, sent to Education Committee for approval and then to Senate for final endorsement.” (I/L22/08)

The IL policy is now an institutional teaching and learning policy at University D. This demonstrates that curriculum can be negotiated and that negotiation can be successful at the university level.
The curriculum can also be negotiated at other levels such as the faculty or course level. The research participants indicated that the faculty curriculum was reviewed regularly by the university or the professional organization. The curricular review committee members, employers, academic staff and students were involved in the review process. For example, the result of a review could include the development of a new course to meet the employers’ needs, as explained by an academic staff member:

“XXX [the accrediting professional body] comes in a team who are from industry and other institutions. They meet with individual departments and individual people. They also talk to the students and graduates. For example, they have feedback from employers that they need graduates who write better so a new course was established.” (I/A9/07)

The Engineering Faculty curriculum was also negotiated by a relevant industrial advisory board. The curricular advisory board members and academic staff were involved in the negotiation process:

“We have an industrial advisory board which is very active. We seek advice from them in terms of relevance, currency and there might be new areas that the curricula need to cover. We meet formally 3 times year and they all attend our annual planning days at which curricular issues come out sometimes.” (I/A10/07)

“The academic programme committee people from industrial area will give us an update of what engineering companies like our students to be.” (I/A7/07)

Academic staff at University D indicated that the curriculum was often negotiated at the subject group level in the department. There were several subject teaching groups in the Civil Engineering department at University D and each group was responsible for teaching certain compulsory and elective courses in their subject area. The academic staff members in each subject teaching group were involved in the negotiation, for example, in terms of who was teaching what:

“The individual lecturers always review their courses and discuss them within their subject group. This makes sure that different courses are integrated well. There are 5 subject groups in this department.” (I/A10/07)

“We have group meeting to discuss who is teaching what. We map to the curriculum and see who is interested in or specialised in the subject.” (I/A7/07)
“People in each group normally rotate to take different courses so they should be able to teach all the courses within the group.” (I/A10/07)

Academic staff also said that the curriculum could be reviewed at the course level by the course coordinator/lecturer(s). The course lecturers could decide the course assignment, assessment, course activities and course delivery methods. However, there were some constraints when the course lecturers reviewed the course curriculum. For example, the content of a core course could not be changed by the course coordinator/lecturer(s):

“For the core courses, they [course lecturers] can change the way they teach but the fundamental content must be retained.” (I/A10/07)

“Our curriculum is a four-year of the engineering degree. We cannot do anything about the core components which are decided at the Faculty level or by XXX [the accrediting professional body]. We can only fill in the limited spaces / hours in the curriculum by each group. We can only decide how much we can put and where to stop.” (I/A9/07)

“We can deliver the content in whichever way we want but we have to teach according to what in the calendar.” (I/A9/07)

“The assignments, class activities and assessment can be revised by the individual lecturers.” (I/A10/07)

However, for elective courses, academic staff indicated that individual lecturers had more control over the course content, activities and assessment:

“A lecturer can draft a new course proposal but they are normally an elective in fourth year. It needs to get an approval by the department and the faculty in term of class size and resourcing, and if it is worth money and people. They will look at the number of courses and students. It also needs an approval from the University Academic Programme Committee which consists of reps from each faculty, maybe the Associate Dean for teaching. If the course gets approved, it will be taught as a special topic and after a couple of years if it works well, it will be offered as an elective course.” (I/A10/07)

“We can add electives in Year 3 and Year 4, but not in Year 2 and Year 1. It is easier to get into an elective course.” (I/A9/07)

Academic staff also mentioned that each individual lecturer might prefer a different type of assignment or assessment so even for the same course when it was being taught by different lecturers, the course might have different assignments or
assessments designed for it. It was normally up to the course coordinator/lecturer(s) to decide the assignment or assessment for that course:

“The assignment is up to the individual lecturers and may be discussed with the [subject] group. The lecturer can decide the proportion of the assignment and exam but that must be approved by the Faculty. The most typical proportion is 30% course work and 70% exam, but some of them may be 100% course work or 100% exam or 50% for course work and exam. It depends on the course and individual lecturer’s likes or dislikes.” (I/A10/07)

“The course content was decided by the department and the teaching group. The course lecturers can change the course assignments, class activities and assessment based on our personal interest.” (I/A20/08)

“I am the course coordinator and lecturer so it is not a problem to add a new assignment to ask students to do research to extend their knowledge.” (I/A16/07)

As outlined above, curriculum can be negotiated at different levels: university, faculty, subject teaching group or individual course. Therefore, IL can be integrated into these levels by negotiating with different groups of people. When the negotiation is done at the university or faculty level, it is a top-down integrational approach. In this approach, IL can be considered to be integrated into the university curriculum or faculty curriculum by negotiating with the university teaching and learning committee or with the faculty curriculum committee.

When the negotiation is done at the teaching group or individual course level, it is a bottom-up integration approach. With this approach, IL can be integrated into a course or a group of course curricula by negotiating with each teaching group or individual programme or course coordinators or course lecturers. When the negotiation is done at a course level, one needs to consider whether the course is compulsory or elective. The compulsory course content is normally out of the course lecturer’s control but they have more control over the elective courses. It might be easier to start IL integration into an elective course when the subject librarians initially start to work with lecturers. The research found that the course lecturers have full control of the course assignment, assessment and course activities for both compulsory and elective courses. When the subject librarians work with the course lecturers, there is the potential for librarians to negotiate with the course lecturer(s)
about the course assignments, assessments or course activities. IL assessment can also be negotiated as part of the course assessment.

Emerging theme 14: Across degree - Progressive integration across an academic degree

This section demonstrates that IL can be progressively integrated across an academic degree in higher education. This emerging theme is based on the research done in the curricular development phase at University D. The engineering degree offered at University D is a four year degree. Year 1 is a common year for all engineering students entering the BE (Bachelor Engineering) programme. The first year programme comprises of 105 engineering credits plus 15 credits from one General Education course. In the year 2008, there were about 560 students who had enrolled in the first year course. From the second year, students selected their major and studied in one of the engineering departments. The Year 2 curriculum offered by the Civil Engineering department comprised 90 credits of eight Civil Engineering subject courses and 30 credits from two general engineering courses. There were around 180 students enrolled in the second year of study in 2008. The Year 3 curriculum comprised seven compulsory Civil Engineering subject courses and three elective engineering courses. The Year 4 curriculum comprised of 30 credits from the two compulsory civil subject courses, one compulsory, two-semester long, final year research project and 75 credits from elective engineering courses.

The experience of integrating IL into multiple courses at University D demonstrates that IL could be progressively integrated across an engineering degree. Figure 6.1 below gives an overview of curricular mapping of the integration of IL across an engineering degree. The courses highlighted in yellow are those into which IL is currently integrated.
In order to implement the IL attributes of the intended curriculum to the offered curriculum, some examples of IL learning outcomes for engineering students from Year 1 to Year 4 were drafted by the researcher. These learning outcomes were drafted based on Bloom’s Taxonomy and the intended curriculum, such as the requirements of an accrediting professional organisation, graduate profiles/attributes and IL standards. The learning outcomes were discussed within each of the curricular working groups and also discussed by the engineering students at University D. The IL learning outcome examples are listed below as shown in Table 6.2 to 6.5.
By the end of Year 1, engineering students should be able to:

<table>
<thead>
<tr>
<th>Intended Outcomes</th>
<th>IL Standard / Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be familiar with the Engineering Library, e.g. how to get course readings, locate books, check out and return books, know the lending policies, and where to get study help.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirement 1.4 ANZIIL Standards 1 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand the assignment questions and requirements.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Locate items on a course reading list.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Use the online learning system for course work and communication.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand the Library’s catalogue: what it contains, what it is used for, how to search for course material, search for books by titles or authors, to recall and request a book.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand that the Internet does not contain everything; Internet resources may provide some excellent resources but may also be biased or contain wrong information so evaluation skills are required.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 and 2 Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Evaluate web resources by using basic evaluation criteria such as authority, currency, audience, etc.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 3 Evaluation level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand what plagiarism is and the university policy on plagiarism.</td>
<td>Graduate Attribute, Part II, Point4 Accrediting professional organisation requirements 1.8 ANZIIL Standards 6 Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Know how to cite references or bibliography.</td>
<td>Graduate Attribute, Part II, Point4 Accrediting professional organisation requirements 1.8 ANZIIL Standards 6 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
</tbody>
</table>

Table 6.2: Examples of Year 1 IL learning outcomes for an undergraduate BE degree
By the end of Year 2, engineering students should be able to:

<table>
<thead>
<tr>
<th>Intended Outcomes</th>
<th>IL Standard / Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyse the assignment topic and turn the topic into separate concepts and keywords.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Analysis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Search the Library’s catalogue by keywords and quick limit.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand the difference between the library catalogue, databases and Internet resources and when to use which.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Construct a search statement using Boolean operators.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Do advanced Internet searching.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Evaluate web resources on their authority, relevance and accuracy.</td>
<td>Graduate Attribute, Part II, Point1 Accrediting professional organisation requirements 1.4 ANZIIL Standards 3 Evaluation level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Be able to select appropriate databases for a research assignment or project.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Respect others’ work by giving credit to them and citing resources in a preferred reference style.</td>
<td>Graduate Attribute, Part II, Point4 Accrediting professional organisation requirements 1.8 ANZIIL Standards 6 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Be able to write reports, design documentation and give and receive an oral presentation.</td>
<td>Graduate Attribute, Part II, Point7 Accrediting professional organisation requirements 1.7 ANZIIL Standards 5 Synthesis level (Bloom’s Taxonomy)</td>
</tr>
</tbody>
</table>

Table 6.3: Examples of Year 2 IL learning outcomes for an undergraduate BE degree
By the end of Year 3, engineering students should be able to:

<table>
<thead>
<tr>
<th>Intended Outcomes</th>
<th>IL Standard / Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search the Library’s catalogue by using the advanced search functions e.g. field search, set limits, and save searches.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Name major reference books, academic journals and databases in their subject field of study.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Use a variety of information sources including standards, conference proceedings, reports and patents.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 1 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Construct an effective search statement using Boolean operators, truncation and/or limits and be able to revise it.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application and evaluation level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Carry out advanced Internet searching effectively.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Obtain fulltext articles online.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 2 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Analyse and evaluate information on its reliability, accuracy, authority and timeliness.</td>
<td>Graduate Attribute, Part II, Point5 Accrediting professional organisation requirements 1.4 ANZIIL Standards 3 Evaluation level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Summarise the main ideas from information obtained.</td>
<td>Graduate Attribute, Part II, Point7 Accrediting professional organisation requirements 1.7 ANZIIL Standards 5</td>
</tr>
<tr>
<td>Understand and appreciate current issues in the major fields of knowledge studied.</td>
<td>Graduate Attribute, Part I, Point2 Analysis and synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Apply information/knowledge to create new understanding and to solve a problem.</td>
<td>Accrediting professional organisation requirements 1.3 ANZIIL Standards 5 Synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Know when to give credit to information and ideas from others and how to cite resources using different reference styles.</td>
<td>Graduate Attribute, Part II, Point4 Accrediting professional organisation requirements 1.8 ANZIIL Standards 6 Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Write an effective report and give effective oral presentation.</td>
<td>Graduate Attribute, Part II, Point7 Accrediting professional organisation requirements 1.7; ANZIIL Standards 5 Synthesis level (Bloom’s Taxonomy)</td>
</tr>
</tbody>
</table>

Table 6.4: Examples of Year 3 IL learning outcomes for an undergraduate BE degree
By the end of Year 4, engineering students should be able to:

<table>
<thead>
<tr>
<th>Intended Outcomes</th>
<th>IL Standard / Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search the Library catalogue by using subject headings.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 2</td>
</tr>
<tr>
<td></td>
<td>comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Recognise when further information is needed and be able to find it by drawing</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td>conclusions from all pertinent sources of information.</td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 1 and 2</td>
</tr>
<tr>
<td></td>
<td>Application and comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Know experts or practitioners, professional organisations, professional</td>
<td>Graduate Attribute, Part I, Point2</td>
</tr>
<tr>
<td>associations, official and business organisations in one’s field.</td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 2.4</td>
</tr>
<tr>
<td></td>
<td>Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Apply database search skills to any new or unforeseen databases or search engines.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 5</td>
</tr>
<tr>
<td></td>
<td>Application level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Develop an effective search statement using subject headings or a thesaurus.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 2</td>
</tr>
<tr>
<td></td>
<td>Application and comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Obtain full-text articles both online and print.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 5</td>
</tr>
<tr>
<td></td>
<td>Knowledge level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Analyse and evaluate information by a variety of criteria such as reliability,</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td>validity, accuracy, authority, timeliness, and point of view or bias.</td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 3</td>
</tr>
<tr>
<td></td>
<td>Evaluation level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand and appreciate current issues and debates in the major fields of</td>
<td>Graduate Attribute, Part I, Point2</td>
</tr>
<tr>
<td>knowledge studied.</td>
<td>Analysis and synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Synthesise main ideas to construct new concepts and demonstrate the efficacy of</td>
<td>Accrediting professional organisation requirements 1.3; ANZIIL Standards 5</td>
</tr>
<tr>
<td>solutions to an engineering problem.</td>
<td>Synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Acknowledge cultural, ethical, and socioeconomic issues related to access to,</td>
<td>Graduate Attribute, Part II, Point4</td>
</tr>
<tr>
<td>and use of, information.</td>
<td>Accrediting professional organisation requirements 1.8; ANZIIL Standards 6</td>
</tr>
<tr>
<td></td>
<td>Comprehension level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Communicate effectively, comprehending and writing effective reports, making</td>
<td>Graduate Attribute, Part II, Point7</td>
</tr>
<tr>
<td>effective oral presentations and giving and receiving clear oral instructions.</td>
<td>Accrediting professional organisation requirements 1.7; ANZIIL Standards 5</td>
</tr>
<tr>
<td></td>
<td>Synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand how to do a literature review.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 1, 2 and 3</td>
</tr>
<tr>
<td></td>
<td>Analysis, evaluation and synthesis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Understand what makes a good research proposal.</td>
<td>Graduate Attribute, Part II, Point5</td>
</tr>
<tr>
<td></td>
<td>Accrediting professional organisation requirements 1.4; ANZIIL Standards 2</td>
</tr>
<tr>
<td></td>
<td>Knowledge and analysis level (Bloom’s Taxonomy)</td>
</tr>
<tr>
<td>Recognise the value of citation management software (e.g. EndNote).</td>
<td>ANZIIL Standards 4; Knowledge and application level (Bloom’s Taxonomy)</td>
</tr>
</tbody>
</table>

Table 6.5: Examples of Year 4 IL learning outcomes for an undergraduate BE degree
The above IL learning outcomes for the BE degree at University D were used to design the IL curriculum for different years in the development phase of this research. As shown above, Bloom’s Taxonomy was applied in this study in developing the IL learning outcomes for each year and also in designing curricular activities and assessment.

Bloom and his Associates (1956) identified six levels of cognitive development. This taxonomy has been widely used in education sectors to assist in developing learning outcomes, assessments and evaluation strategies (Crowe, Dirks & Wenderoth, 2008; Guskey, 2005; Valcke et al., 2009). Bloom’s Taxonomy presents a hierarchy of thinking from lower levels to higher levels. These are:

- **Knowledge** – “…involves the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting. ... The knowledge objectives emphasize most the psychological processes of remembering” (p. 201)

- **Comprehension** – “… represents the lowest level of understanding. It refers to a type of understanding or apprehension such that the individual knows what is being communicated ... without necessarily relating it to other material or seeing its fullest implications” (p. 204)

- **Application** – “The use of abstractions in particular and concrete situations, ... The abstractions may be in the form of general ideas, ... may also be technical principles” (p. 205)

- **Analysis** – “The breakdown ... into its constituent elements or parts such that the relative hierarchy of ideas is made clear and/or the relations between the ideas expressed are made explicit” (p. 205)

- **Synthesis** – “The putting together of elements and parts so as to form a whole ... involves the process of working with pieces, parts, elements, etc., and arranging and combining them in such as way as to constitute a pattern or structure not clearly there before” (p. 206)

- **Evaluation** – “Judgments about the value of material and methods for given purposes. ... Use of a standard of appraisal” (p. 207)

When applying Bloom’s Taxonomy in IL education, students need to know or to remember information; understand information; use information; analyse or think
about the information used; synthesise analysed information to create or to combine new ideas or theories; and to be able to evaluate newly developed/combined ideas or theories to further improve them. In this study, Bloom’s Taxonomy has contributed to the development of IL learning outcomes and to the design of curricular activities and assessment. For example, for the Year 1 and 2, we focused on developing student understanding and application of referencing skills by requiring students to understand what plagiarism is and to respect the work of others by giving credit to them and citing resources in a preferred reference style. In the Year 3 and 4, we focused on developing students’ synthesis skills by requiring students to analyse information from different sources, and to compare and summarise the best ways of solving a problem.

When IL is integrated across the degree, it is intended that a student’s IL capability will build up from a lower to a higher level. For example, based on the IL learning outcomes listed in Table 6.2-6.5, students’ ability in finding, identifying, evaluating and using information effectively is intended to be developed gradually through the Year 1 to Year 4 course of study. In Year 1 there is provision for the basic searching and evaluation of the library catalogue, a database, and Internet resources; in Years 2-3, discipline specific and multiple disciplinary database searching and evaluation is provided; in Year 4 there is a further emphasis on developing an effective search statement using subject headings in a variety of information sources and on synthesising the main ideas and the construction of new concepts for the final year project. IL standards and Bloom’s Taxonomy can be used to design different levels of IL learning outcomes to progressively integrate IL across academic programme. The ongoing learning process shows that the IL competencies not only provide a vehicle for the integration of IL and IL curricular design, but also enable students to be information literate.

In the course of the research each IL curricular working group from Year 1 to Year 4 designed IL curriculum by integrating IL based on the IL competencies. The details of the IL activities in each academic course are explained in Table 6.6 below. Among these six courses, two of them (identified by an asterisk *) already contained integrated IL prior to the research project. During the research we integrated IL into
the other four courses across a Civil Engineering degree to build up IL capability from Year 1 to Year 4.

<table>
<thead>
<tr>
<th>Year</th>
<th>Course title</th>
<th>IL component / activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Core course 1 *</td>
<td>IL was integrated into the course project which was worth 21% of the course grade. There were three parts in this project. In Part One, students were required to develop information research skills to find information about biofuels and bioenergy. IL tutorial and library tour were offered to students and this was followed up by an online IL quiz. In Part Two, students drew on the IL and research skills developed in Part One to find the definitions for a set of biofuel related terms and applied these terms in a learning context to further understand their meaning. Students were required to put together a list of the information sources that they had used in a bibliography using the Faculty of Engineering referencing style. Information on avoiding plagiarism and the relevant university policy were included in the course lecture and some questions were also included in the IL quiz which reinforced the students’ understanding of the avoidance of plagiarism.</td>
</tr>
<tr>
<td>Year 1</td>
<td>Core course 2</td>
<td>IL was integrated into a course assignment and course assessment. Students were required to search and evaluate websites and to find out what electrical / electronic or computer system engineers do. Students were each required to submit a web evaluation sheet for evaluating the web resources found and a report about their findings, with a list of references. Each student’s web evaluation form and report were peer-reviewed and marked by four other fellow students using an online peer review system and their final report was submitted via Turnitin, an academic plagiarism detector. There were no IL lectures or tutorials offered to students but scaffolding support was provided via the online learning system. These scaffolding documents included a web resources evaluation template and examples; the research process of how to find a professional career by taking librarianship as an example; an example of a report; APA reference style and how to reference web resources; the university plagiarism policy and how to avoid it; how to use the online peer review system and how to use Turnitin.</td>
</tr>
<tr>
<td>Year 2</td>
<td>Core course 3</td>
<td>IL was integrated into the course objectives and class activities. The objectives of the course were to introduce students to land information systems, and modern methods of gathering, processing and presenting information for engineering purposes. The first IL lecture was presented by the subject librarian and was designed to help students to find civil engineering resources and land information resources for their assignments, effectively. A hands-on tutorial followed to allow students to do hands-on exercises to reinforce what they had learnt during the lecture. After that, students were required to do an online test which focused on how to find civil and environmental engineering resources and databases search skills. The assignment was worth 5% of the course mark. Late in the semester, the subject librarian was invited to the class again to co-teach another IL lecture in which to analyse the common mistakes or problems found from the online test and also to introduce students to how to find specific land information such as the population in a certain area or zone information in Auckland. A set of land information related questions were provided to students in order for them to explore the answers by using databases and to reinforce skills learnt. There was another IL online test towards the end of the semester; this was worth 5% of the course mark. The questions were all related to land information, e.g., Please identify the number of different planning zones between Clifton Road and Hamilton Road. What are the main features of Residential zone 1?</td>
</tr>
</tbody>
</table>
The course was designed in a such way that students would work through drafting, designing and publishing a technical manual and accompanying web pages, a poster, an engineering report, and an oral presentation for an engineering product or component or an engineering problem investigation such as a cargo compartment fire investigation. Therefore, students learnt these communication skills in an engineering context.

IL was integrated into a course assignment which was worth 15% of the course final mark. Students were required to work in a group of three as engineering consultants to produce a 2000 word report to recommend three ways of measuring river flow. Each group was required to find information from books, academic journals, conference papers and patents. Student consultants were required to summarise what they had found, to evaluate the information and to write a report.

One IL lecture and one tutorial were offered by the subject librarians; a writing support lecture was offered by the Student Learning Advisor. Students were required to do an online IL test to further understand information sources and where to find appropriate information. Students submitted the final report via Turnitin, an electronic plagiarism detection system. Students were also required to hand in a printed copy of the report which was to be accompanied by a photocopy of the first page of each of the articles or book chapters that they had used. Students needed to list references used, including a variety of references from academic journals, books, conferences and patents.

To assist students in the completion of this project, in addition to offering lectures, scaffolding materials were also offered to students such as a report template; information on: how to search for information needed, how to evaluate and summarise information obtained, and access to referencing systems. This was provided via the university online learning system.

This was a two-semester research project and IL was integrated into the entire research process. Students were required to write a topic analysis, aims of the project, a literature review, and a summary of the report.

To support student learning, IL related lectures were provided by lecturers and the subject librarians including various information sources and how to search for and evaluate them, how to compose a literature review, how to use Endnote and referencing, reports writing and presentation skills etc.

As part of the literature review, students were required to complete an annotated bibliography containing at least 6 references. In the annotated bibliography, students needed to summarise and evaluate what they had found from a variety of sources and to apply them in their report. Support documents, including a template of an annotated bibliography, an example of a bibliography, advice on how to avoid plagiarism and appropriate styles for referencing, were provided via the university online learning system.

The curricular design outlined above applied the competency frame (Bruce et al., 2006). This design enables students to build IL competencies from a lower level to a higher level across the degree. Taking referencing skills as an example, it can be seen how IL competencies were gradually developed across the degree. One of the IL learning outcomes for first year students is to ‘know how to cite references or
bibliography’ (see Table 6.2). Thus, in their first year course, students were required to cite at least six references for books, online books and web resources via the completion of a course assignment. One of the IL learning outcomes for third year students was to demonstrate that they ‘know when to give credit to information and ideas from others and how to cite resources using different reference styles’ (see Table 6.4). Thus a writing and referencing lecture was offered to students to enable them to understand why they needed to give credits to information or ideas from others and how to cite different information sources by using the APA referencing style. One of the IL learning outcomes for fourth year students was to ‘acknowledge cultural, ethical, and socioeconomic issues related to access to, and use of, information and to use a bibliography management system to manage their research references’ (see Table 6.5). Therefore, related lectures and online support materials were developed through the final year project to further develop students’ referencing related knowledge and skills.

The curricular design outlined above also drew on two other IL frames: the personal relevance frame and content frame (Bruce et al., 2006). As an example of the personal relevance frame, in the first year IL curriculum, students were asked to complete an assignment to explore what engineers do. Students were required to search and evaluate web resources and to write a report which included: an overview of a selected engineering field; the major products or services; well known companies or organisations in the field, and career opportunities and types of skills needed in the field. This IL assignment tied-in closely with the students’ personal interest so that they could see its relevance to their potential future jobs and to take ownership of their own learning. With regard to the content frame, when they were exploring what engineers do, they were also interacting with information such as trying to find different information sources, searching for information, evaluating information, summarising information and applying information in their writing. Thus their IL competencies were intended to be developed through this course study.

This study shows that through integrating IL across a degree, IL can be built up gradually from a lower level to a higher level. In this learning process, IL learning outcomes were developed based on Bloom’s Taxonomy and the ANZIIL standards and university graduate attributes provided a vehicle in IL curricular design and
integration. Sociocultural theories of learning (Lave, 1988; Rogoff, 1990; Vygotsky, 1978) and six frames for IL education (Bruce et al., 2006) provided learning frameworks to enable students to become information literate.

In detailing the study’s findings, Chapters 5 and 6 present the key findings which answer the following research questions:

1. **What are the key characteristics for the curricular integration of IL in higher education?**
   The key characteristics for the curricular integration of IL in higher education are: collaboration and negotiation between multiple partners and building personal relationships; contextualisation, which includes pedagogic approaches that enable contextualising IL in an academic curriculum; and ongoing interaction with information throughout the academic curriculum.

2. **Who are the key stakeholders in the curricular integration of IL in higher education?**
   In a bottom-up approach, subject librarians play a proactive role in curricular integration of IL but it is impossible to integrate IL into a course curriculum without academic staff members’ willingness and support. The heads of faculties are important in the top-down approach. Students are central to IL curricular integration as the purpose of IL integration is to enable them to become information literate.

3. **What is the process of IL integration of curricular redesign in higher education?**
   Curriculum can be viewed as the intended curriculum, offered curriculum and received curriculum, as well as the negotiated document. IL needs to be integrated not only into the intended curriculum, but also into the offered and received curriculum. The curricular integration of IL can be negotiated and redesigned at different levels such as; the institutional level, the faculty/departmental level, and the course and class levels. The process of the integration of IL is a process of negotiation, collaboration and implementation of the intended curriculum.
Chapter 7

AN INTEGRATION MODEL FOR AN UNDERGRADUATE PROGRAMME

This chapter presents the IL integration model developed through this research. The model has two main purposes: 1) to be a conceptual representation of the findings from this study which will enable IL educators to understand the various aspects of the curricular integration of IL and the relationships between them; 2) to provide the theoretical foundation that guides curricular development and the implementation of IL integration, i.e. the model offers a framework for developing a curriculum that integrates IL, and pedagogic strategies for the implementation of the intended curriculum.

The IL Integration Model – Conceptually representing the findings

An IL Integration Model (see Figure 7.1 below) was developed based on the findings of this study. The model represents the importance of IL guidelines and pedagogic theories in IL curricular development. It demonstrates that IL should be integrated into the intended curriculum and the offered curriculum as well as the students’ received curriculum. The model also reveals that a higher education curriculum can be redesigned and negotiated at different levels: the institutional level, programme level and at course or class levels.
Figure 7.1: An IL integration model

This model represents the processes, people and resources essential for IL integration. The two-headed arrows indicate that this is a fluid, continuous process. The model consists of three inter-connected elements: *What* - the IL guidelines in the intended curriculum; *Who* - the IL curricular working group; and *How* - IL integration curricular development. The intended outcome of IL integration is to enable students to be information literate. The relationship between these elements is shown below in Figure 7.2 and will be discussed in detail below.

Figure 7.2: Key elements of the IL Integration model
**What: The IL guidelines in the intended curriculum**

The *what* element of the model (see Figure 7.3 below) represents IL guidelines in the intended curriculum. These include the institutional graduate IL attributes/profiles; the graduate IL requirements as required by an professional accrediting organization; and the institutional or national IL policies such as institutionally endorsed IL standards, institutional IL policies, or related national IL strategies. This part of the model deals with the *what* questions. *What* is IL? *What* should information literate students be like? *What* level of IL are students expected to have developed by the time they graduate from the university? *What* level of IL are the graduates required to achieve by the accrediting professional organisation? *What* are the roles of academic staff and librarians in IL education? It is important to understand the answers to these *what* questions before working on curricular integration of IL. Understanding the answers to these questions provides higher educators with a solid understanding of why IL education is important for students. The *what* element of the model also provides guidelines and a direction for the planning and designing of the IL curriculum. The *what* element can also be used as a guideline in developing IL learning outcomes across academic curricula from a lower level to a higher level.

**Who: the IL curricular working group**

The *who* element deals with the personnel indicated in Figure 7.4 below. *Who* are the key stakeholders in IL integration? *Who* are the roles of each of these stakeholders? *Who* can be invited to the IL curricular working group? *Who* are the roles of these people in IL curricular design? *Who* are the key elements of the collaboration? It also deals with the ways in which to analyse and understand an academic programme curriculum in order to identify core courses and core course coordinators. It answers questions such as: How should personal relationships be established between academic staff and librarians? Understanding the answers to these questions provides
higher educators with a clear understanding of the key stakeholders, the roles of the key stakeholders and how they can collaborate in IL curricular designed.

**How: IL integration curricular development**

The *how* element deals with IL curricular design, as shown in Figure 7.5 below. *How* can IL be contextualised to become part of the academic curriculum? *How* can students be provided with an ongoing interaction with information throughout a single course, as well as across multiple courses? *How* can learning theories / pedagogy and the six frames for IL education be applied in IL curricular design?
From the Figure 7.5 we can see that IL can be contextualised in the course learning outcomes, assignment, class activities, laboratory activities, self-study activities, online activities, course assessment and evaluation process. Sociocultural theories and the six frames for IL education as well as IL standards can be used as guidelines in the IL curricular design.

This section has summarised the three key elements of the IL Integration Model. Each of these key elements is now discussed in further detail in the following sections to demonstrate how the model provides the theoretical foundation that guides curricular development and the implementation of IL integration.

**IL learning outcome development**

This section presents the *WHAT* element of IL Integration Model in more detail. The research data showed that IL is included in the intended curricula of many universities such as: Graduate Attributes (Barrie, 2007; Bridgstock, 2009) or institutional teaching and learning strategies (Corrall, 2007). Therefore, in the integration model, IL is presumed to be included in these intended curricula. These graduate attributes and graduate requirements or teaching strategies can be used as guidelines; these guidelines state the importance of IL and what information literate students should be like.

This research data show that although most academic staff members agreed on the importance of generic capabilities, many of them did not know that these generic capabilities are formally specified in the institutional Graduate Attributes/Profiles of their particular university or that they are formally required by professional organisational body. If this is the case, academic staff may not proactively integrate these generic capabilities into their course curricula.
<table>
<thead>
<tr>
<th><strong>Accrediting Professional Organisation Requirements</strong></th>
<th><strong>A University Graduate Profiles</strong></th>
<th><strong>ANZIIL IL Standards</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4 Recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments.</td>
<td>II 5. An ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively.</td>
<td>1 and 2 and 3. The information literate person recognises the need for information and determines the nature and extent of the information needed; accesses needed information effectively and efficiently. Critically evaluates information and the information seeking process.</td>
</tr>
<tr>
<td>1.7 Communicate effectively, comprehending and writing effective reports and design documentation, summarising information, making effective oral presentations and giving and receiving clear oral instructions.</td>
<td>II 7. Ability to access, identify, organise and communicate knowledge effectively in both written and spoken English and/or Maori.</td>
<td>5. The information literate person applies prior and new information to construct new concepts or create new understandings. Communicates knowledge and new understandings effectively.</td>
</tr>
<tr>
<td>1.8 Understand the role of engineers and their responsibility to society by demonstrating an understanding of the general responsibilities of a professional engineer.</td>
<td>II 4. Intellectual integrity, respect for truth and for the ethics of research and scholarly activity.</td>
<td>6. The information literate person uses information with understanding and acknowledges cultural, ethical, economic, legal, and social issues surrounding the use of information.</td>
</tr>
<tr>
<td>1.3 Synthesise and demonstrate the efficacy of solutions to part or all of complex engineering problems.</td>
<td>II 2. An understanding and appreciation of current issues and debates in the major fields of knowledge studied.</td>
<td>5. The information literate person applies prior and new information to construct new concepts or create new understandings.</td>
</tr>
<tr>
<td></td>
<td>II 1. A capacity for critical, conceptual and reflective thinking.</td>
<td>2.4 The information literate person keeps up to date with information sources, information technologies, information access tools and investigative methods, 3. The information literate person critically evaluates information and the information seeking process.</td>
</tr>
</tbody>
</table>

Table 7.1: IL related attributes chart extracted from the intended curricula
The above comparison table demonstrates clearly the connection between graduate requirements and IL standards as well as the importance of IL. This research has found that most academic staff members are unfamiliar with IL or IL standards, and thus IL standards do not make much sense to them. Based on cognitive constructivist theories (Driver et al., 1994; Piaget, 1968), thinking and action will only occur when it makes sense. The above comparison chart of the graduate requirements and IL standards enables academic staff and other people who work on IL integration to see clearly why they need to integrate IL into the curriculum and to identify what it is that needs to be integrated into the curriculum.

Although IL standards are not an official publication of the institutional curricular documents at universities, the ANZIIL IL standards are endorsed by many Australian universities and all the New Zealand universities (ANZIIL, 2008). This means that the standards can be used as a guideline when integrating IL into a university curriculum. The IL standards provide not only information about what IL is and what information literate students should be like, but also IL learning outcomes and examples of how to apply each IL standard in curricular design. For example, the ANZIIL IL Standards (Bundy, 2004) include six standards and fifteen learning outcomes with examples. These learning outcomes state what IL students should be able to do. Table 7.2 below shows Standard Five as an example extracted from ANZIIL IL Standards:

<table>
<thead>
<tr>
<th>IL standard (what)</th>
<th>A learning outcome (what)</th>
<th>A curriculum activity (how)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard five: the information literate person “applies prior and new information to construct new concepts or create new understandings” (p. 20).</td>
<td>One of the learning outcomes for Standard Five is to compare and integrate “new understandings with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information” (p. 20).</td>
<td>A curricular activity associated with this learning outcome can be done by asking students to select information that provides evidence for the topic and to summarise “the main ideas extracted from the information gathered” (p. 21).</td>
</tr>
</tbody>
</table>

Table 7.2: Learning outcomes and learning activities associated with an IL standard

This provides useful guidance of what IL involves and how it can be integrated into a teaching and learning context in order to obtain the required learning outcomes. The IL standards not only provide a blue-print for what information literate students
should demonstrate but also act as a useful tool in designing a curriculum when integrating IL. The findings from this research, as discussed in Chapter 5, identified the usefulness of IL standards in IL curricular design.

**Communication and building relationships**

This section discusses the *who* element of the IL Integration Model. It outlines how to communicate and establish personal relationships between academic staff and librarians. Although librarians are in a good position to provide IL education to students in higher education, IL education is not a library issue. It is an educational issue (Rockman & Associates, 2004). Providing IL education and supporting the development of information literate students is every educator’s responsibility. This research affirms that the curricular integration of IL is a collaborative effort of multiple partners; librarians play a proactive role but IL integration cannot be accomplished without the willing cooperation of course coordinators or lecturers. It is important to establish relationships between academic staff and librarians in this collaboration. In order to provide examples of effective approaches for use by both academic staff and librarians, this section draws on the findings of the study.

Examples of the establishment of personal relationships with librarians from the viewpoint of academics are:

- Inviting the librarian to join the faculty or departmental teaching related committees or meetings, as well as to join the faculty/departmental email list;
- Welcoming the new librarian by introducing her/him to the academic staff at a faculty meeting or via an faculty email;
- Making a time to meet with the librarian and finding out how he or she can help with your teaching and research needs;
- Inviting the librarian to update the faculty regularly on new information technology, new databases or new book collections etc;
- Consulting the librarian regarding subject resources when developing a new course or new research area;
- Consulting the librarian when designing a course assignment to ensure that there are enough resources for that assignment;
- Consulting the librarian about collection development in the subject area;
- Inviting the librarian to join all levels of faculty/departmental social activity.
Examples of building personal relationships with faculty from the viewpoint of librarians:

- Introducing oneself and the services offered by librarians to the faculty or department at a faculty or departmental meeting or via an email;
- Developing a welcome pack for new faculty staff members to inform them of what librarians can do to help staff members and their students with their teaching and research. This can be followed up by face to face meetings to explore further opportunities for working collaboratively;
- Providing regular library updates, including new initiatives, new IT developments and new resources or services, by regular presentation to the faculty or department or office visits or by sending short, attractive emails or newsletters;
- Joining the faulty/departmental email list and being involved in the faculty/departmental activities and also identifying whether there are any gaps or difficulties with which the Library can help;
- Studying the faculty/departmental websites or faculty/departmental publications to ‘know’ your liaised faculty/department, academic staff; to be familiar with who is teaching what and the areas of research interest of each of the faculty members and the publications relevant to those areas of interest;
- Introducing oneself by visiting academic staff individually and explaining the library services offered or updating them on any new developments. Through this research it has been found that this is a very effective way of building personal relationships, of discovering the needs of individual academic staff members and their students, and of exploring the potential of IL integration;
- Observing (with the lecturer’s permission) appropriate faculty courses in order to understand the subject, what and how lecturers teach and how students learn. These class observations also provide an opportunity for librarians to identify students’ teaching and learning needs;
- Becoming involved in academic curricular planning and design process of the institution, faculty or department, such as attending their teaching and learning committees or meetings;
• Attending faculty seminars given by lecturers, PhD students and guest
lecturers to keep up to date in the subject’s latest research and teaching
developments;
• Taking any opportunity to build personal relationships with academics e.g.
via collection development, individual consultations, answering enquiries e.g.
finding specific information or a full-text article, helping lecturers to set up a
course page or with their research need;
• Joining in the social events at all levels of faculty / department. These may
include tea breaks, farewell parties, special events, sport activities and so on.

As these personal relationships are established between academic staff and librarians,
together, the two parties involved can further explore the development of IL
integration and IL curricular design. This will be discussed in the following section.

**IL curricular development**

This section details the *how* element of the IL Integration Model, i.e. the IL curricular
development for integrating IL into the academic curriculum. In order to explain the
process of the IL curricular development in detail, in this section, McGee’s curricular
development model (McGee, 1997) is compared with the IL Integration Model.

**McGee’s curricular development model and the IL integration model**

The IL integration process is in fact a process of IL curricular development. This
section will discuss the IL integration model developed through the study by
comparing it with McGee’s curricular model (McGee, 1997). Professor Clive
McGee is a Research Professor in an Institute of Educational Research in New
Zealand specialising in curriculum theory, design and development. McGee’s model
was chosen because its development was based on five well known models devised
between 1949 and 1992, including Tyler’s model. As shown in Figure 7.6, McGee’s
model contains five essential interconnected components: 1) Situational analysis; 2)
Aims, goals and objectives (Curricular intentions); 3) Selection of content; 4)
Teaching experience; 5) Evaluation and assessment.
1) Situational analysis means to analyse the situation in which a curriculum is planned and delivered. The situation includes both external factors, such as accrediting professional requirements and internal factors, such as resources and a student’s background and abilities. Setting clear intentions and objectives is an important part of curricular development and lecturers need to know the broader educational context in which they work, as well as their specific teaching context.

2) Curricular intentions should be based on requirements outlined in institutional documents, programme or course curriculum documents.

3) Curricular content includes organising knowledge into subjects or disciplines. It considers the central question in curricular development: *What should university teach?* The subject-based knowledge has been challenged by more recent views of knowledge such as: culture-based (Powers, 2006; Young, 2008), employment-based (Benefer, 2007; Choy et al., 2008; Evans et al., 2008) and student-based (Maher, 2004; Stes et al., 2008; Wiggan, 2007). The criteria for selecting content suggested by McGee are: validity, significance, interest, learnability and consistency with social reality.

4) Teaching experience involves how the planned curriculum might be put into practice in the classroom. It focuses on questions relating to what teaching
strategies are known to be effective and what learning experiences are appropriate for students.

5) The last component in McGee’s model is assessment and evaluation. This focuses on such questions as: How do lecturers know when their intentions and learning experiences have worked? How would they know if their students have gained knowledge? Has the course’s curricular design been effective?

According to McGee (1997), before lecturers start their teaching, they need to think about what happens before teaching something, what happens during the teaching, and what happens after it. The five components in McGee’s model reflect the thinking process of curricular development.

McGee’s model presents general curricular development and is useful when developing a curriculum. The IL integration model presents a specific curricular development model with an emphasis of integrating IL into the curriculum. The IL integration model also reflects the five key components that have been identified in McGee’s model as shown below in Figure 7.7:

The ‘Curriculum analysis’ component in the IL integration model is similar to the ‘Situational analysis’ component in McGee’s model; but it focuses on the intended curricular analysis, academic and programme curricular analysis. In the IL integration model, before designing the IL component, it is important to understand the intended
The ‘IL learning outcome’ component is similar to the ‘Curriculum intention’ in McGee’s model. However, McGee’s model focuses more on teachers than on students. The IL integration model focuses on students and is concerned more about the outcomes of student learning. Based on Bloom’s taxonomy, different IL learning outcomes can be developed for the junior and senior years. Based on these IL learning outcomes, the IL curriculum can be planned and designed. The ‘Contextualisation and ongoing interaction’ component is similar to the ‘Curriculum content’ component in McGee’s model. Contextualising IL in an academic curriculum and providing students with ongoing interaction with information is a key content requirement in the IL integration curriculum. The ‘IL learning activities’ component is similar to the ‘Teaching experience’ component in McGee’s model. Again, the IL integration model focuses more on students’ learning experiences while McGee’s is focused more on the teaching experience of teachers. The various IL learning activities identified in the course of this study are presented in the following sections. The ‘IL assessment and evaluation’ is similar to the ‘Curriculum assessment and evaluation’ in McGee’s model. The IL integration model focuses on IL assessment and evaluation. Various assessment and evaluation methods have been identified from this research and are discussed in the following sections.

From the above analysis, we can see that the IL integration model developed through this study is well supported by McGee’s model but with a focus on IL integration with a student-centred approach. The five key components of IL curricular development are outlined in turn in the following sections.

**Curriculum analysis and identifying potential courses**

This section outlines methods identified by the study for analysing an undergraduate curriculum and identifying potential or core courses for IL integration. Figure 7.8 below shows how curriculum analysis relates to other curriculum components in IL curricular development.
When integrating IL into academic curricula or programmes, it is important to analyse and understand the programme curriculum and to identify potential courses in which IL can be systematically integrated. Listed below are methods of analysing academic curricula that have been identified and found to be effective in the course of this study:

- Collecting all undergraduate course titles in each year with short explanations from the faculty/departmental websites or the institutional academic calendar or appropriate course publications;
- Identifying core or potential courses and course coordinators by contacting the faculty/departmental Manager or the programme coordinator;
- Organising all the faculty and departmental courses in each year with programme or course coordinators’ and lecturers’ names in a Word document or Excel file; mark the core or potential courses in a different colour to make them visible.

For example, in a 4-year degree programme, we can list all courses including core courses and electives from Year 1 to Year 4. Then we can identify potential courses by analysing course content, activities, assignments and assessment methods. From the analysis we can understand whether there is an opportunity to integrate IL into the course in question. Once potential courses are identified, we can colour code these courses as shown in Figure 7.9. The Figure below represents courses with potential for IL integration in a whole academic programme.
Once the core or potential courses are identified, then we can identify the course coordinators and lecturers of these potential courses who may be willing to integrate IL into their curriculum as shown below in Figure 7.10. Please note the names shown as course coordinators/lecturers in the Figure 7.10 are not real names.

Figure 7.9: Mapping IL across an academic programme
Core courses in Semester 1 Year 1:

- Core course 2 (10 points) J. Smith / D. Davis
- Core course 1 (15) J. Glyn / S. Grey

Core courses in Semester 2 Year 1:

- Core course 3 (10) G. Fisher
- Core course 2 (15) J. Funk / A. Black

Core courses in Semester 1 Year 2:

- Core course 3 (15) I. Jackson / H. Holly

Core courses in Semester 2 Year 2:

- Core course 3 (15) G. Aby / D. Zhang

Core courses in Semester 1 Year 3:

- Core course 2 (25) R. Irvin / B. Grove
- Core course 1 (15) H. Roger / J. Shawn

Core courses in Semester 2 Year 3:

- Core course 3 (25) J. Funk / A. Black

Core courses in Semester 1 Year 4:

- Core course 3 (15) G. Troy / D. Todd

Core courses in Semester 2 Year 4:

- Core course 3 (15) G. Hale / D. Bush
- Core course 2 (15) J. Wang / A. Bowen

Research project - independent study

Figure 7.10: Analysing academic programme curricula
Through curriculum analysis, the programme structure, potential or core courses and course coordinators and lecturers can be clearly presented. The course coordinators’ and lecturers’ willingness is vital in IL integration. Therefore, the potential course coordinators or lecturers need to be contacted individually to explore the possibility of integrating IL into course curricula.

This research found that when approaching course coordinators or lecturers, librarians need to emphasise that the purpose of IL integration is to help academic staff and to support their students with their learning and research, rather than to ask them for a few hours to allow librarians to teach IL sessions. Also, it makes more sense to talk with academic staff about the IL related attributes extracted from the institutional intended curricula instead of just talking about IL standards. In this way they can see the link between graduate attributes and their teaching. Many academics are not aware of IL standards therefore they are unlikely to make any connection between their teaching and IL standards.

When course coordinators or lecturers agree to integrate IL into their course curriculum, an IL curricular working group can be formed to design IL curriculum. Depending on the need of each IL curricular group, IL curricular working group members may include course lecturers, the librarian and other support people such as student learning advisors, IT support staff, learning designers and members of the faculty’s administration. In order to support student learning, this group will work collaboratively to design and implement IL curriculum lectures, tutorials, class and online activities, and IL assessment.

In a collaborative working environment, every member brings their specialised knowledge and skills to the task at hand. Course lecturers are well versed in their subject field and know what is expected of students in a particular course or degree programme. However, the lecturers may lack the specialist knowledge of librarians or IT staff. Librarians bring not only their expert knowledge on a variety of information resources and the skills required for effectively searching or information, but also for managing and evaluating information for subject discipline applications. They also have a greater awareness of the latest changes or the best information resources for a particular topic. Student learning advisors bring their expertise in
skills such as writing, summarising, annotating bibliographies, thinking critically, referencing and citing skills. Learning developers or learning designers can assist by supporting curricular design and assessment. IT technicians support online learning activities such as online learning resources, online peer-reviews or assessment. Such collaborations of multiple expertises provide strong support for students. Student feedback and suggestions are part of this collaboration as demonstrated in the model Figure 7.1. Administrative support is also a part of the collaboration, because such support smoothes the institutional requirements of both the academic regulations and the IL integration.

In summary, the process of curriculum analysis and the identification of potential academic courses are explained in this section. IL learning outcomes will be discussed in the following section.

**IL learning outcomes**

This section presents how institutional Graduate Profile/Attributes and the IL framework, as well as Bloom’s taxonomy, provide a basis for developing IL learning outcomes that allows for the building of IL capability from a lower level to a higher level. The Figure 7.11 shows how IL learning outcomes relate to other curriculum components in IL curricular development.

![Figure 7.11: The IL learning outcome component in the IL curricular development](Image)

IL learning outcomes describe what students are expected to gain from an IL activity in an academic curriculum. They focus on what students should learn from IL activities, exercises, or assessment. Learning outcomes need to be incorporated into
planning and designing the IL curriculum so that all of the course activities, assignments and assessments can focus on these learning outcomes. Learning outcomes and examples of how to obtain these learning outcomes are stated in the ANZIIL IL standards. They are useful when developing IL outcomes appropriate to the academic content.

Bloom’s Taxonomy of six levels of thinking (Bloom et al., 1956) is a powerful tool in IL curricular design. These levels of thinking need to be considered when developing outcomes, activities and assessment of an IL curriculum because different approaches to learning outcomes may enable students to develop different levels of thinking. Table 7.3 below gives examples of IL learning outcomes which reflect different levels of thinking when we teach the same skill, namely - constructing an effective information search strategy.

<table>
<thead>
<tr>
<th>Examples of IL learning outcomes</th>
<th>Levels of thinking based on Bloom’s taxonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The students are able to list three Boolean operators.</td>
<td>Memory / recall</td>
</tr>
<tr>
<td>When given a research topic, the students are able to identify the search terms and write a search strategy using Boolean operators.</td>
<td>Comprehension</td>
</tr>
<tr>
<td>The students are able to apply search strategy using Boolean operators to conduct the searches in different databases.</td>
<td>Application</td>
</tr>
<tr>
<td>The students are able to analyse the search results and refine their search by using Boolean operators.</td>
<td>Analysis</td>
</tr>
<tr>
<td>The students are able to synthesise different search results and to evaluate search strategies and reconstruct their search by using Boolean operators.</td>
<td>Synthesis and evaluation</td>
</tr>
</tbody>
</table>

Table 7.3: Different learning outcomes focused on the different levels of thinking

From the above example we can see that, based on various learning outcomes, different levels of IL activities and assessment can be developed in an academic curriculum to foster students’ different levels of thinking. We can use Blooms’ Taxonomy to integrate IL into different levels of courses and therefore to build IL
from a lower level to a higher level. Table 7.4 below gives examples of ethical use of information in IL integration from junior academic courses to senior academic courses based on Bloom’s taxonomy.

<table>
<thead>
<tr>
<th>Bloom’s taxonomy</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Know how to interpret references in course reading list or bibliographies.</td>
<td>Know how to cite resources in a preferred reference style and understand that different types of literature require different forms of citation.</td>
<td>Know when to give credit to information and ideas from others and how to cite resources using different reference styles.</td>
<td>Acknowledge cultural, ethical, and socioeconomic issues related to access to, and use of information.</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Understand basic methods of obtaining information, e.g. keyword or author search.</td>
<td>Understand the difference between keyword and exact searching techniques (title, author, journal, subject).</td>
<td>Understand the differences between books, journals, conference papers, reports or patents.</td>
<td>Develop a research proposal.</td>
</tr>
<tr>
<td>Application</td>
<td>Construct basic search e.g. title and author search in library catalogue, database and Internet.</td>
<td>Construct and implement effective keyword searches using appropriate synonyms.</td>
<td>Use the advanced search functions e.g. field search, set limits, and save searches.</td>
<td>Conduct a literature review.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Sort search results by title, author, publication date etc.</td>
<td>Analyse the number and relevance of information retrieved and refine search strategy as required.</td>
<td>Critically assess quantity and relevance of information retrieved and refine search strategy as required.</td>
<td>Recognise inaccuracies in information retrieved.</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Write a short report or essay by summarising information obtained.</td>
<td>Summarise the main ideas from information obtained.</td>
<td>Recognise interrelationships between concepts and draw conclusions based on information gathered.</td>
<td>Compare ‘knowledge gained’ with prior knowledge to determine the value added.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Evaluate web resources by using basic evaluation criteria such as authority, currency, audience, etc.</td>
<td>Analyse and evaluate information on its reliability, accuracy, authority and timeliness.</td>
<td>Distinguish facts, opinion, and bias of information retrieved.</td>
<td>Analyse and evaluate information by a variety of criteria such as reliability, validity, accuracy, authority, timeliness, and point of view or bias.</td>
</tr>
</tbody>
</table>

Table 7.4: An example of Bloom’s Taxonomy and IL learning outcomes from a lower level to a higher level
For example, at the comprehension level, a learning outcome in Year 1 can be ‘to understand basic methods of obtaining information, e.g. keyword or author search; in Year 2 it can be ‘to understand the difference between keyword and exact search techniques’; in Year 3, it can be ‘to understand the differences between books, journals, conference papers, reports or patents; while in Year 4, it can be ‘to develop a research proposal’. Based on these learning outcomes, IL activities can be designed in each year to scaffold students using information to learn.

Bloom’s Taxonomy can also be mapped with the intended curriculum, e.g. institutional Graduate Attributes/Profiles, Accrediting Professional organisation requirements and IL standards. Bloom’s Taxonomy and the intended curriculum can all be used as guidelines when designing the IL curriculum. Table 7.5 below shows an example of how Bloom’s Taxonomy can be mapped with the intended curriculum and IL learning outcomes from Year 1 to Year 4.
<table>
<thead>
<tr>
<th>Graduate Attributes (GA)</th>
<th>Accrediting professional requirements (APR)</th>
<th>ANZIIL IL standards</th>
<th>Bloom's Taxonomy of Cognitive Processes</th>
<th>Examples of IL learning outcomes in Year 1</th>
<th>Examples of IL learning outcomes in Year 2</th>
<th>Examples of IL learning outcomes in Year 3</th>
<th>Examples of IL learning outcomes in Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a) Respect for research and scholarly activity.</td>
<td></td>
<td></td>
<td>Knowledge</td>
<td></td>
<td></td>
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<tr>
<td>II.4. Intellectual integrity, respect for truth and for the ethics of research and scholarly activity.</td>
<td></td>
<td></td>
<td>Remember previously-learned materials by recalling facts, terms, basic concepts and answers, e.g. recall data or information.</td>
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<tr>
<td>1.8 Understand the role of engineers and their responsibility to society by demonstrating an understanding of the general responsibilities of a professional engineer.</td>
<td></td>
<td></td>
<td>Know about library services e.g. Reference and Lending services, how to get course material, where to get help;</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1.2 Understand the purpose, scope and appropriateness of a variety of information sources;</td>
<td></td>
<td></td>
<td>Be aware of the different types of literature (journal article, reference book, textbook);</td>
<td></td>
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<tr>
<td>4.1 Record information and its sources;</td>
<td></td>
<td></td>
<td>Remember that the Internet does not contain everything and quality of Internet resources varies;</td>
<td></td>
<td></td>
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<td>4.2 Organise information;</td>
<td></td>
<td></td>
<td>Know how to interpret references in course reading list or bibliographies;</td>
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<tr>
<td>6. Use information with understanding and acknowledging cultural, ethical, economic, legal, and social issues surrounding the use of information.</td>
<td></td>
<td></td>
<td>Create and manage bookmarks;</td>
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<td></td>
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<td>Know what plagiarism is and university policies on plagiarism.</td>
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<td></td>
<td></td>
<td></td>
<td>Know how to use document delivery services;</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Email/download / print/export information in a variety of formats from various sources;</td>
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<td></td>
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<td></td>
<td>Understand the www leads to some excellent resources but evaluation skills are required;</td>
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<td></td>
<td></td>
<td></td>
<td>View and save records in various formats;</td>
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<td></td>
<td>Record how to cite resources in a preferred reference style and understand that different types of literature require different forms of citation.</td>
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<td></td>
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<td></td>
<td>Recognise other types of information in additional to books and journals;</td>
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<td></td>
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<td>Be able to name major reference books, academic journals and databases in their subject field of study;</td>
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<td></td>
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<td>Understand the significance of the citation;</td>
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<td></td>
<td>Know when to give credit to information and ideas from others and how to cite resources using different reference styles.</td>
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<td></td>
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<td></td>
<td>Know of the core journals in studied subject;</td>
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<td>Recognise when further information is needed and be able to find it by drawing conclusions from all pertinent sources of information;</td>
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<td></td>
<td>Manage information by using a citation management system;</td>
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<td></td>
<td></td>
<td></td>
<td>Record all search strategies, sources used, locations of sources;</td>
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<td></td>
<td></td>
<td></td>
<td>Acknowledge cultural, ethical, and socioeconomic issues related to access to, and use of information;</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Understand concepts and issues relating to copyright, censorship, and intellectual freedom.</td>
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</tbody>
</table>

Table 7.5: Bloom’s Taxonomy and IL learning outcome mapping examples
Table 7.5 provides an example of how Bloom’s taxonomy, GA (Graduate Attributes), APR (Accrediting professional requirements) and the ANZIIL (Australian and New Zealand Institute of Information Literacy) standards can be mapped with IL learning outcomes. For example, regarding ethical use of information, GA, APR and ANZIIL all emphasise the importance of using information with an understanding of ethical and legal issues; the GA states: ‘to respect for truth and for the ethics of research and scholarly activity’ and the APR states: to understand “the role of engineers and their responsibility to society’. The ANZIIL framework defines an information literate person as using information with the understanding and acknowledging of cultural, ethical, legal and social issues. These requirements demonstrate the importance of using information to learn with respect of others’ work and ideas. Thus, different levels of IL learning outcomes of the ethical use of information can be identified based on Bloom’s Taxonomy with respect to different levels of learning from memory, understanding and comprehension to analysis, synthesis and evaluation. Therefore, these learning outcomes for each different academic year enable students to build on their IL capability from a lower level to a higher level. Please refer to Appendix VI for more examples of Bloom’s Taxonomy application in IL learning outcome design from a lower level to a higher level of learning. Bloom’s Taxonomy combined with the intended curriculum together provide us with a tool to integrate IL into each year in order to build up IL through student academic study in higher education.

In summary, this section has discussed the development of IL learning outcomes based on Bloom’s Taxonomy and the intended curriculum. The next step in the IL curricular development process is to decide on the required content, i.e. how to contextualise IL into the course curriculum and provide students with ongoing interaction with information. This will be discussed in the following two sections.
Curriculum content - Contextualising IL in academic curriculum

The next two sections present curriculum content in IL curricular development - that is contextualisation and ongoing interaction with information. Figure 7.11 shows how IL curriculum content relates to other two aspects of curriculum components in the IL curricular development. As shown in the IL Integration Model in Figure 7.12, IL can be woven into curricular learning outcomes, class activities, online activities, self-learning activities, assignments, and assessments.

![Diagram of IL Integration Model](image)

Figure 7.12: The contextualisation component in the IL curricular development

Contextualising IL is a key characteristic of integration of IL into the curriculum identified in this research. The findings show that IL cannot be taught in isolation. The curriculum should be designed in such a way that students view IL as part of their learning process. However, contextualising varies from subject to subject. In order to contextualise IL into subject content, an appropriate connection between IL and course content needs to be established. For example, the connection could be in: finding and evaluating resources in the problem-based, resource-based or enquiry-based learning models; preventing plagiarism whilst showing how to reference; aligning IL to the institutional graduate attributes with course learning outcomes; or in students finding and applying information for the completion of their assignment or project. The findings in chapter 5 include some examples of how to contextualise IL into course content. In these contextualising examples, IL
is not seen as something extra to be added onto the curriculum for students to learn. Rather, students see IL as part of the learning journey to complete their learning tasks in academic courses.

According to sociocultural theories, learning occurs when the human mind is embodied or situated in a social and cultural context (Vygotsky, 1978). The key question here is how to embody IL and situate it in the social context of academic study for the diverse student body? This is one of the major aspects of the IL practitioners’ pedagogic role. The research found that by encouraging students to use information to learn, IL can be contextualised in the learning outcomes of a course, in a course assignment, in class activities, lab activities, self-study activities and in online activities. IL can also be contextualised in the process of assessment and evaluation by requiring students to apply IL skills and to provide feedback for evaluation. Examples below demonstrate how IL is contextualised in these various curricular activities.

The research found that contextualising IL in course assignments is a common way of integrating IL into the curriculum. The ways of contextualising IL in an assignment vary between courses. In most cases, students are required to search for, and apply, information in order to solve a problem or to complete a task. Below in Figure 7.13 is an example of contextualising IL in an engineering course assignment that was developed from this research.
Group Research Project

Project overview and requirement

By doing this group research project, you will research and extend your knowledge on river flow measurements. This project will also develop a range of skills required by both the University of XXXX Graduate Profile and XXXX for accreditation of the University of XXXX BE. These skills include: Team work; Writing communication skills; Information literacy; Evaluation and critical thinking; Referencing skills.

Your group of three engineering consultants (the team will be randomly assigned by the lecturer) has been commissioned to produce a 2000 word report recommending three ways of measuring river flow in the xxxx River, downstream from the xxxx Power Station. Reliable measurements of river flow are important for water resources management and for the water supply to the xxxx region. Your report should provide arguments and evidence to support your recommendations.

There are two parts to this project:

Part I: you need to explore information from a variety of sources, including books, academic journals, conference papers and patents. You must demonstrate an understanding of the usefulness of different types of information sources. This will be evaluated/assessed via the online quiz and the final report.

Part II: your group will use the information resources identified in Part I to produce a consultant report. You need to use the same report template that you learnt in the XXXX 204 course. You are required to include a reference list using APA reference style at the end of the report to acknowledge the information sources that you have used. This list should contain, at the least, references from books, academic journals, conference papers and patents. For the details of the report requirement refer to the Marking Schedule. You are required to submit an electronic copy of the report via Turnitin. You are also required to hand in a print copy of the report. The print copy of the report must be accompanied by a photocopy of the first page of all the articles or book chapters that you have used.

Assessment

The project is worth 15% of the course final mark which comprises 3% Quiz and 12% final report as detailed below:

- Information resources individual online quiz: 3% and due by 4pm on Friday 29/08/xx
- Final group report – submitting both e-copy via Turnitin and print copy: 12% and due by 4pm on Wednesday 17/9/xx
- Statement of Contribution of Team Members to the Report Work (the form template will be available online): due by 4pm on Wednesday 17/9/xx.

Figure 7.13: Contextualising IL into a course assignment example
The above example demonstrates how to contextualise IL in an engineering course assignment. In Figure 7.13, the key words pertaining to IL integration are in bold and the identified names or date are replace by ‘xxxx’. This assignment requires students to act as engineering consultants and to work in a group of three to write a report recommending three ways of measuring river flow. In order to produce the report, students need to explore and evaluate information from required sources such as books, journals, conferences and patents. In this learning context, students view IL as part of their academic course study. When they use information to complete their tasks and to write a report, they not only learn the subject knowledge, but their ability to search for information and their capability of evaluation and of applying information will also be improved. In addition, by completing this assignment, their team work skills will also be enhanced.

IL can also be contextualised in class or lab activities. A typical example is to have both the course lecturer and librarian to co-present a class or conduct a role play in the class. For example, in a Learning Network course at University C, a librarian is invited to the class to co-present the class with the course lecturer. The lecturer can talk about his role in the student learning network and the librarian can talk about her role in that network and thus students know where both lecturer and the librarian fit in their whole learning experience. Another example is that both the course lecturer and librarian may do a role play; for example, the lecturer interviews the librarian in front of the class to demonstrate to students how to evaluate the information found from Internet to complete their assignment.

Another example of contextualisation is an IL online tutorial based on an engineering case study developed at University D as shown below:

“You are a student working at Criterion Furniture, reporting to the Business Innovation Manager.

Criterion is carrying out a life cycle inventory analysis on their products and processes.
They use polystyrene for packaging their products. This ends up in landfills and has an impact on the environment.

It is your job now to find out if this is really a problem and if there are viable alternatives to its use as packaging.”

Based on this case, students need to search for information from journal articles, government sites, patents, and standards. In order to support students in the completion of this assignment, the online tutorial can be designed in collaboration with multiple partners to scaffold students in completing their course tasks.

IL can also be contextualised in course assessment, including in diagnostic, formative and summative assessment. For example, IL can be part of self-checking questions or an online quiz in a diagnostic assessment. An IL class activity sheet or research process can also be part of the formative or summative assessment of an academic course. IL related questions can be part of final examination of a course. Please refer to the IL assessment section in this chapter for details of some methods of assessment.

In summary, this section discusses the fact that IL can be contextualised in course learning outcomes, course assignments, class activities, and online activities. The next section will discuss another key characteristic of IL integration – the ongoing interaction with information.

Curriculum content - Ongoing interaction with information

The previous section presented a part of curriculum content in IL curricular development. This section discusses the second part of curriculum content in IL curricular development – the ongoing interaction with information. This study suggests that when designing the IL curriculum, consideration needs to be given to the fact that students need to have an ongoing interaction with information at intervals during their undergraduate study. This regular interaction scaffolds students to experience information, to consume, evaluate and apply the information.
found to complete their study/research tasks throughout their academic study and
to develop lifelong learning skills. Figure 7.14 below is extracted from the
integration model and shows ongoing interaction with information horizontally via
one course from week 1 to week 12 at intervals or vertically through multiple
courses from Year 1 to Year 4 in an academic programme in higher education.

Figure 7.14: Ongoing interaction with information horizontally in one course and
vertically through multiple courses

From the above diagram we can see that the ongoing interaction provides students
with opportunities during their undergraduate study for using information to learn
throughout the various courses of study as well throughout a degree. During the
course of the research, students stated that if they were only offered a one-off
opportunity to experience using information to learn, they would be unlikely to
retain the skills and would be unable to apply them in other learning contexts. IL
activities need to be designed in such a way that students can have ongoing
opportunities to experience information learning. This can be done through such
mechanisms as tutorial activities, assignment activities, class activities, laboratory
activities or through course assessment. The ongoing interaction should be continued in later courses to reinforce and build on what students have learnt.

Another reason for providing ongoing IL activities via one course and across a degree programme is that IL has many different aspects. These aspects cannot be taught entirely in one class or in one course. IL education needs to be acquired through a variety of courses and on an ongoing basis. It is quite possible that different courses may need to incorporate different IL aspects and abilities. Through this ongoing IL interaction via the various courses, students’ IL abilities are expected to improve incrementally.

In summary, this section presents the ongoing nature of IL integration as part of IL content in the curricular development process. IL integration means providing students with ongoing interaction with information not only at intervals through one academic course but also across a degree through several courses from Year 1 to the final Year of undergraduate study.

In order to design the curriculum to meet student learning needs, curricular designers need to understand how students learn to attain learning outcomes. This is discussed in the next section.

Learning experience - How do students succeed in attaining learning outcomes?

This section summarises various types of learning theories in order to understand how students learn and therefore to guide curricular development based on student needs. Figure 7.15 below shows how IL learning experience relates to other curriculum components in IL curricular development.

To enable students to become information literate, it is important to design appropriate IL activities to meet student needs during the course of their learning. Biggs and Tang (2007) suggested teaching according to how students learn. They
see effective teaching as encouraging students to use learning activities, “to do this requires some knowledge of how students learn” (p. 15). Before undertaking any IL curricular design, one needs to understand how students learn and how their learning can be improved. Learning theories provide us with the fundamentals of understanding how students learn.

![Diagram of IL learning activity component in IL curricular development]

Figure 7.15: The IL learning activity component in IL curricular development

There are various learning theories. For example, behavioural theories focus on directed instruction, where a teacher transmits knowledge to students in a well-organised manner (Dewald, 1999). Behavioural theories underpin the basis of traditional learning environments where the teacher is the authority in the classroom and students do as the teacher says. Classes based on these theories are dominated by ‘showing’ or ‘telling’ and thereby knowledge is transmitted to students rather than engaging students in the learning process. Bundy (2003) argued that “the rapid obsolescence of much content in professional first degree programs, makes knowledge of how to learn, and how to find, evaluate and apply new information that more important” (p. 396-397).

Eisenberg (2008) argued that in the past in higher education, there was a reliance on one primary information resource: the textbook. However, this is rapidly changing due to the information explosion. Students are increasingly turning to web-based, electronic sources and services for information because, “every aspect of learning
and teaching requires the gathering, processing, and communication of information” (p. 39). Contemporary students must be able to identify problems, use information to solve problems and to be able to analyse, synthesise information and communicate their solution to others (Feldmann & Feldmann, 2000). They need to develop their critical thinking and lifelong learning skills to be able to keep up to date with the rapidly changing environment. The focus of IL teaching in higher education, as clearly stated in the ANZIIL IL Framework (Bundy, 2004), needs to shift from using recommended resources to critical selection and evaluation of resources; from how to use a particular database to understanding database structure and process; from specific skills to general, transferable and lifelong learning. The pedagogy based on behavioural theories no longer accommodates the change in focus of IL teaching.

The traditional pedagogic practices of the classroom have been challenged by the metaphor of collaborative learning in a community-of-learners. In the community-of-learners, the activity of teaching and learning is constructed through ongoing social interactions. The collaborative learning approach is based on sociocultural theories which see that learning and thinking are relations among people in activity in, with, and arising from the socially and culturally structured world (Lave & Wenger, 1991). Lemke (1990) described thinking as a socially visible process, occurring ‘out there’ in the social world. Moore (1998) explicitly explained that children are surrounded by other people who interact and communicate with them. As they mature, they become part of social networks (e.g. school, college, church, work, and organisation) that continue to shape their thinking, learning and development through social interaction. Therefore, when designing the IL curriculum and activities, a collaborative environment needs to be created to engage students in learning.

When designing an IL curriculum, six frames for IL education (Bruce et al., 2006) also provide a useful guideline for both academic staff and librarians. These six frames are content; competency; learning to learn; personal relevance; the social
impact frame and the relational frame. The content frame focuses on what learners should know about IL; the competency frame focuses on what learners are able to do and at what level of competence; and the personal relevance frame focuses on learners’ interests in order to engage them in the learning process. The IL curriculum can be designed by underpinning one of the frames or multiple frames to engage students in learning.

Various student-centred IL teaching methods have been identified by this research: hands-on tutorials; lectures; online interactive tutorials; online instructions and self-paced learning workbooks via a learning management system or other web-based mechanisms. All of these learning activities can be designed to engage students in a community-of-learners collaborative environment.

At the universities involved in this study, hands-on IL tutorials held in computer laboratories are a commonly used method to provide IL education. During hands-on tutorials, students can engage in the learning process by interacting with online information tools such as databases, online books, online journals, and web resources in a collaborative learning environment. Hands-on class activities can be designed by using these information tools for students to interact with information, interact with peers and the teacher. However, this research found that it is difficult to teach hands-on IL tutorials to large classes because of the organisational challenges. These include: staffing multiple tutorials and providing computer space for tutorials. Therefore, IL lectures are normally organised for large classes in these universities.

It is a challenge to create a collaborative learning environment in a large lecture situation. The study identifies some possible interactions between the lecturer and students and among the students. Below are some examples that promote collaborative learning in a lecture theatre environment.
- Students are provided with an academic article and a popular magazine article to compare the differences and evaluate the quality of each article;
- Students discuss the assignment topics with peers and turn the topics into search terms or keywords and then report back to the class;
- Students discuss the synonyms of the keywords and develop their understanding about why they need to use these synonyms when searching for information;
- Students practice Boolean exercises to understand how to build a good search strategy;
- Students are provided with a large full text article and summarise it into a 100 word summary and report back to the class;
- Students compare the plagiarised and correct versions of a piece of writing and then discuss, identify and understand what plagiarism is and how to avoid it;
- Students in groups or pairs create a list of references from different sources in a selected reference style, discuss with peers and then report back to the class.

The research demonstrated that librarians struggle when teaching many IL classes. In this situation, IL education can be provided online by combining with face-to-face course lectures or tutorials. These online IL instructions or supports can include online IL tutorials, self-learning IL workbooks, or self-paced IL instructions.

In summary, according to sociocultural theories, learning happens through social interaction and is situated in a specific cultural environment. Collaboration plays a key role in thinking and learning. A collaborative learning environment provides learners with opportunities to interact with others and to engage in completing a shared inquiry or task. It encourages them to listen, think and communicate their thinking and to explore their answers to the inquiry or task. Six frames for IL education also provide us with a student-centred approach to the designing of an IL
curriculum with a variety of curriculum focuses. Therefore, whenever it is possible, IL activities need to be designed to create a collaborative environment to foster student learning, as described in the next section. In hands-on classes, databases and online information resources can be used as tools to engage students in learning. IL resources and activities can also be provided online, these can be accessed at any time and at a student’s own pace. Online teaching also solves the problem of finding a sufficient number of course hours for IL classes and having enough IL course presenters to teach a large number of classes. The next section discusses the IL assessment and evaluation methods found from this research.

**IL assessment and evaluation**

This section presents the way in which IL can be integrated into the course assessment and evaluation identified from this research. Figure 7.16 shows how IL assessment and evaluation relate to other curriculum components in IL curricular development.

![Figure 7.16: The assessment and evaluation component in the IL curricular development](image)

As indicated in the IL integration model, IL can be integrated into course learning outcomes and course assignments, as well as course assessment. In IL assessment, the curricular designers, academic staff and/or librarians, need to think why students are assessed or what they are trying to achieve, how to provide support to
students and how to judge their achievement. IL assessment can be done before, during, and after the IL classes or activities. If it is done before an IL class, it is normally called prescriptive assessment. Prescriptive assessment can be used for understanding participants’ existing knowledge and skills in order to design IL activities to build new knowledge and skills (Lau, 2006). Formative assessments can be used during the IL activities or instruction in order to provide corrective action to enhance or support student learning (McMillan, 2004). Formative assessments may carry marks, but their principal purpose is development rather than judgment (Butcher et al., 2006). Summative assessment can be used after the IL activities or instruction and its primary purpose is to measure the sum of the learning, to produce marks or grades.

Below are some of the recommended methods of IL assessment arising from this research:

- Student completion of self-checking or assessment checklist (prescriptive)
- Reviewing students previous or current work (prescriptive);
- Completion of a hands-on worksheet (prescriptive or formative or summative);
- Requirement for essay or report writing, including essay / report plan with a marking schedule for students to peer review each other or reviewed by a lecturer (formative and/or summative);
- Requirement of annotated bibliography with a marking schedule or rubric for students to peer review each other or to be reviewed by a lecturer (formative and/or summative);
- Requirement for completion of a project, including a project proposal, project plan, research log or reflective journal with or without a marking schedule (formative and/or summative);
- Requirement for a portfolio, including progress files, reflective writing, self-assessment of own work with a marking schedule (formative and/or summative);
• Provision of online multiple choice tests or quizzes (prescriptive or
  formative or summative);
• Requirement for students to contribute to online resources, e.g. blogs,
  combined with peer review (formative and/or summative).

These assessment methods can be used in different learning contexts depending on
the nature and requirements of the course as well as the time required for both staff
marking and students completing tasks. For example, online quizzes or self-
marking multiple choice IL questions are commonly used in IL assessments and
they are easy to mark. It is time consuming initially to create these multiple choice
questions and tests do not contain rich information about students learning because
students may make a guess and get the right answers. In contrast, IL components
can also be included in the assessment of a written essay or report. Essay/report
writing or the writing of reflective journals provides rich information about students’
learning and knowledge gain in IL and communication. However, these
assignments are time-intensive for students to write and for staff to mark.

One of the methods identified by this research, as a solution to the time issue, is to
use marking schedules or grading rubrics. These are powerful tools to be used in IL
assessment, such as essay or report writing, portfolio, peer review feedback, and
annotated bibliography. Marking schedules, as a means of IL assessment, have
many advantages, as Knight (2006) argued. Firstly, the learning outcomes are easily
adapted, and can be based on the IL standards and graduate attributes. Secondly,
they provide clear measures of the level of learning attained and explicitly state
those measures at the outset. Marking schedules are useful in both summative and
formative IL assessments as they enable students to understand what they are
expected to do in the IL learning process and also provide students with guidelines
for peer reviewing each other’s work, with or without marks.
In order to determine the effectiveness of IL integration into a curriculum, various methods can be used to evaluate the effectiveness of an IL teaching programme or IL integration. During this research, the following methods were identified to evaluate IL teaching classes or programmes:

- Pre-/post-test analysis;
- Student feedback, including student survey or student focus group studies;
- Student work analysis, including students’ bibliographic analysis, their literature review analysis, their annotated bibliography analysis.

Pre-/post-testing is a commonly used method in IL evaluation that was found from this research. The same set of IL related questions are provided to students before and after the IL sessions. The two tests are compared and analysed to see the improvement and gaps that need to be improved. This is a quick and easy way to obtain information about student improvement and knowledge gaps. However, the pre-/post-test questions are normally multiple choice questions which may not reflect students’ real knowledge or skills gained through the IL integration activities. Gross’s research (2009) concludes that “the pre-/post-test questionnaire was not a reliable method for assessing student success” (p. 5). Therefore, it is important to carefully develop the pre/post-test questions in obtaining accurate evaluation information. IL survey questions can be distributed during the last teaching class or provided online for students to complete. A survey can provide quantitative and some qualitative feedback about the IL programme. The survey is normally completed by students at the end of an IL class. Therefore, because of the limited time available, it is difficult to get in-depth information from students. Student focus groups provide in-depth qualitative feedback and can be used or in combination with a survey to further clarify any unclear questions that may arise from the survey. However, this research shows that focus group meetings are not commonly used in practice. They involve user-study knowledge of generating
interview questions and conducting focus group meetings, as well as effort and time to organise meetings with students.

Evaluating the effectiveness of IL teaching can also be done by analysing students’ work. For example, students’ level of understanding and thinking can be identified and evaluated by analysing their bibliographies, literature reviews, annotated bibliographies, and IL online tests or assignments (Lloyd & Williamson, 2008). This is an effective way of evaluating what students have gained or understood from an IL programme. However, this can be time consuming with a large class when analysing each student’s work.

In summary, this section has presented various effective IL assessment and evaluation methods found from the study. Marking schedules can be used as an important tool in IL assessment for students to understand requirements and also to support/peer review each other’s work. Commonly used evaluation methods are: obtaining student feedback, analysing student work and pre-and post-test analysis.

The previous sections explained the IL curricular development based on McGee’s curricular model (McGee, 1997). The next section presents how to apply the IL Integration Model in the higher education curriculum.

**IL Integration Model application in higher education**

This section draws on the findings to demonstrate how the model reflects the real IL learning context. The model can be used or adapted by anyone who is working in the area of curricular integration of IL in higher education. The section discusses how to apply the IL integration model to integrate IL into a curriculum in higher education.

As explained in chapter 6, curriculum can be viewed as institutional curriculum, programme curriculum, course curriculum and class curriculum. The IL Integration
Model can be adapted into the programme curriculum integration as well as course and class curricular integration of IL. This section demonstrates, step by step, how to adapt the model to integrate IL into the higher education curriculum.

Step 1: Understanding intended curricula

Based on the IL integration model, firstly librarians or IL educators need to analyse the intended curricula. Intended curricula include the institutional or faculty teaching and learning policies, such as Graduate Attributes/Profile, institutional teaching and learning strategies, and IL policies. In a professional faculty/school such as law, engineering, education, nursing, the professional accrediting organisation requirements also need to be analysed as shown in Figure 7.17 below:

![Figure 7.17: Intended curriculum in the IL integration model](image)

All IL related components from these policy documents can be extracted and put in a comparison chart as demonstrated in chapter 6. This comparison chart clearly incorporates the answers to the questions such as ‘What is IL?’ ‘What should information literate students be like?’ ‘How are students expected to be in terms of IL when they graduate from the university?’ ‘What are the graduates required to know by the accrediting professional organisation in terms of IL?’ It is essential to clarify the answers to these questions in order that both academic staff and librarians have a clear understanding of why IL is important and why it needs to be
integrated into the curriculum. These intended curricula can be used as guidelines for discussions with academic staff or librarians or when planning and designing the IL curricula.

The first step enables the establishment of a clear goal. The next step is to analyse the departmental curriculum and establish an IL curricular working group in each academic year.

Step 2: Establishing a curricular working group

The second step, as shown in Figure 7.18 below, involves analysing the departmental curriculum and establishing a curricular working group in each year from Year 1 to Year 4 to work on curricular integration of IL.

The curricular group members should include course coordinators and lecturers, a librarian, a learning designer, a student learning advisor, and IT support staff when there is a requirement to work collaboratively. Once the IL curricular working group has been established, the next step is to design the IL curriculum and to integrate IL into the curriculum from a lower level to a higher level.
Step 3: Developing the offered curriculum

The IL curricular working group needs to design the IL curriculum by contextualising IL into a course and providing students with ongoing interaction with information at intervals in a course as well as across the academic programme from Year 1 to Year 4. IL can be integrated into course learning objectives, assignments, class activities, lab activities, self-learning activities, online learning activities, assessment and outcomes as shown in Figure 7.19 below.

![Figure 7.19: IL curricular design across a degree in higher education](image)

In this IL curricular design process, sociocultural theories, Bloom’s taxonomy, six frames for IL education and IL framework/standards can all be used as guidelines. Sociocultural theories can be used as a basis in the designing of IL learning activities; Bloom’s Taxonomy and IL standards can be used to develop IL learning outcomes and the design of IL activities; six frames for IL education can be applied in IL curricular design. This will ensure that the IL curriculum is designed with a student-centred approach and integrated seamlessly into the academic curriculum.
Step 4: Developing the received curriculum

The IL curricular working group needs to assess whether students have learnt what they have been offered and whether IL integration has achieved what the group expects. There are different ways of assessing student learning and evaluating the IL integration programme, as already discussed in the previous section. Based on the result of the assessment and evaluation, further improvement can be considered when designing the future curriculum with IL integration.

In summary, this section summarises four steps of applying the IL Integration Model into an academic programme curriculum in order to integrate IL into the programme from a lower level to a higher level in higher education.

Conclusion

This chapter has presented the three main elements of the IL Integration Model developed through this research. These are: what (What is IL and what should information literate students be like?), who (Who is involved in the IL integration?) and how (How can IL be integrated into a curriculum?). IL guidelines, including the intended curriculum and IL standards, are used when planning the IL curriculum. Learning theories and pedagogy can be used in curricular redesign to weave IL into the course learning process and to engage students in the learning process. Curricular redesign is the collaborative effort of academic staff, librarians and other partners in an institution. The IL curricular development in the IL integration model is very similar to McGee’s generic curricular development model but with a focus on IL integration. When IL is integrated into a degree programme, students have the opportunity to consistently interact with information. Thus, their ability in searching, evaluating and applying information is likely to develop throughout their undergraduate study. The next chapter will discuss the issues and challenges raised by this research.
Chapter 8

IMPLEMENTATION AND FUTURE DEVELOPMENTS OF CURRICULAR INTEGRATION OF IL – REVIEW AND DISCUSSION

This chapter reviews the major findings from this study and their contribution to the body of knowledge. The findings and the IL integration model developed provide the answers to the following research questions:

1. What are the key characteristics for the curricular integration of IL in higher education?
2. Who are the key stakeholders involved in the curricular integration of IL in higher education?
3. What is the process of IL integration in curricular redesign in higher education?

The chapter also presents the contribution of this study to the practice of IL education, to IL curricular development, and to IL research. Issues of the curricular integration of IL in higher education have been raised. The limitations of this research, future directions of IL research and suggestions for further research are summarised at the end of the chapter.

Review of the findings and their contribution to the body of knowledge

The findings indicate fourteen significant emerging themes in IL integration. These are designated by the following categories: characteristics of IL integration, key stakeholders in IL integration, IL curricular design, and the process of IL integration. Table 8.1 below shows how the four categories align with the three
research questions. The following sub-sections discuss, in turn, the implications of the findings relating to each of the four categories.

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Categories</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the key characteristics for the curricular integration of IL in higher education?</td>
<td>Characteristics of IL integration</td>
<td>Emerging theme 1 <em>Collaboration and negotiation</em> - multiple partner collaboration in IL integration; Emerging theme 2 <em>Contextualisation</em> - pedagogies of IL contextualised in an academic curriculum; Emerging theme 3 <em>Ongoing interaction</em> - students interacting with information regularly in single and multiple academic courses;</td>
</tr>
<tr>
<td>2. Who are the key stakeholders involved in the curricular integration of IL in higher education?</td>
<td>Key stakeholders in IL integration</td>
<td>Emerging theme 4 Librarians- the main advocates in IL integration; Emerging theme 5 Course coordinators and lecturers - IL Integration will only happen if they are willing; Emerging theme 6 Heads of Faculties - important in the top-down approach to the IL integration; Emerging theme 7 Students – central to IL curricular integration;</td>
</tr>
<tr>
<td>3. What is the process of IL integration in curricular redesign in higher education?</td>
<td>IL curricular design strategies</td>
<td>Emerging theme 8 IL standards – used in IL curricular design; Emerging theme 9 Online teaching - a combination of online and face to face teaching as an emerging trend; Emerging theme 10 IL assessment tools – important in IL integration;</td>
</tr>
<tr>
<td></td>
<td>Process of IL curricular integration</td>
<td>Emerging theme 11 Interpretation of curriculum - IL integration into intended curriculum, offered curriculum and received curriculum; Emerging theme 12 Process - IL integration as a process of negotiation, collaboration and implementing intended curriculum; Emerging theme 13 Negotiated curriculum - IL curricular redesign and negotiation at different levels; Emerging theme 14 Across degree - IL integration across an academic degree progressively.</td>
</tr>
</tbody>
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Table 8.1: Emerging themes associated with research questions

**Category 1: Characteristics of IL integration (themes 1-3)**

Emerging themes 1-3 answer the first research question: *What are the key characteristics for the curricular integration of IL in higher education?* These findings indicate that IL integration has three key characteristics, which are:
• **Collaboration and negotiation:** the integration of IL involves collaboration between multiple partners and this collaboration is built on personal relationships and includes negotiation;

• **Contextualisation:** IL integration includes pedagogies of contextualising IL in an academic curriculum; and

• **Ongoing interaction:** IL integration includes an ongoing-interaction with information throughout single course or multiple courses.

Previous research has identified each of these characteristics individually. However, no previous research has identified all three aspects of the IL integration in higher education. Some examples are:

Collaboration:
- Collaboration between academic staff and librarians (Bennett & Gilbert, 2009; Callison et al., 2005; Cunningham & Lanning, 2002);
- Librarian partnership with staff administration and development areas such as scholarship, curriculum, policy and supervision in higher education (Bruce, 2001);

Contextualisation:
- IL curricular design in context (Chiarelott, 2006; Eisenberg, 2008; Harley, 2001; Pilerot & Hiort af Ornäs, 2006);

Ongoing interaction:
- Providing students with opportunities of using information to learn from junior years to senior years (Nerz & Bullard, 2006; Nerz & Weiner, 2001; Welker et al., 2005).

In contrast, this study provides multiple perspectives and synthesises the curricular integration of IL in higher education around three key characteristics. These key characteristics provide a deeper understanding of the nature of IL integration. When integrating IL into the curriculum, IL needs to be *contextualised*; this
involves *collaboration* between multiple partners on campus; students need to be provided with the opportunity to have an *ongoing interaction* with information, at intervals, in a single course, or across an academic degree.

The findings of this study also extend the notion of *collaboration* beyond academic staff and librarians to campus-wide multiple partner collaboration, including with: course lecturers, librarians, student learning advisors, learning designers and IT support staff. While research literature shows that collaboration is essential to the IL integration and curricular design, it is usually portrayed as being situated between academic staff and librarians (Bennett & Gilbert, 2009; Black et al., 2001; Dhanesar, 2006; Floyd et al., 2008; Li, 2007) or between librarians (Bernnard & Jacobson, 2001; Elrod & Somerville, 2007). There are a few reports about librarians collaborating with other support people: for example, with administrators (Fitzwater et al., 2003); with IT support staff (Lightman & Reingold, 2005; Rosen & Castro, 2002); with writing and tutoring centres (Cleave, 2007); and with learning support and IT in designing IL e-tools (Braaksma, McLean & Tittenberger, 2006) or, online IL tutorials (Tucker & Palmer, 2004).

This research investigation supports the importance of these collaborative developments and affirms the existing literature which proposes the need for collaboration. It demonstrates clearly that in IL integration, collaboration between the librarians and faculty is important but is not the most effective in many cases. It needs to improve on the aspect of multiple partner collaboration. As discussed in chapter 7, when multiple partners engage in the collaboration process, a community of IL practice is formed. In this community, each partner provides expert knowledge in IL curricular design such as subject content (course lecturer), information resources, search and use information (librarian), writing and communication (student learning advisors), IL curricular design (learning designer), online learning or learning tools (IT support). As a result of this diversified collaboration, students are provided with the best possible support.
The key elements of effective collaboration in IL integration identified from this research have also extended the view from previous research. Ivey (2003) summarised four essential behaviours of successful collaboration between librarians and academic staff. These essential behaviours include “a shared, understood goal; mutual respect, tolerance and trust; competence for the task at hand by each of the partners, and ongoing communication.” (p. 102). This research agrees with these key elements but also extends the key behaviours from academic/librarian collaboration to the diversified campus-wide multiple partner collaboration in IL integration as \( (S^2T^2) \):

- **Shared understanding.** All the partners need to have a shared understanding of the purpose and importance of curricular integration of IL and the outcomes of IL integration;

- **Shared knowledge.** Partners share specialised knowledge and provide support from different areas of expertise, such as subject knowledge, information resources, writing, referencing, learning design, and IT;

- **Joint dialogue with respect and tolerance.** All the partners need to interact, negotiate and communicate to achieve the same goals with mutual respect and tolerance;

- **Joint efforts with trust and support.** All partners need to work together to complete the agreed tasks with a high level of trust and support. The curricular integration of IL can involve an intensive workload including the designing of assignments, designing of class or online activities, developing teaching resources and support material, developing assessment methods, and marking IL work. All partners need to make a contribution and commitment to carry out the agreed tasks in the integration of IL.

These key elements of campus-wide collaboration provide higher educators with an insight into successful collaboration in IL integration. When the multiple partners
work collaboratively, they need to engage in these key elements in order to achieve a successful result.

In summary, the study affirms existing scholarship and professional practice and also makes a significant contribution to IL integration and IL research in higher education by identifying the key characteristics of IL integration, extending the collaboration campus-wide, and identifying the key elements of collaboration. These findings enable higher educators to have a deeper understanding of the nature of IL integration, and a knowledge of with whom and how to collaborate and negotiate in practice when integrating IL into a curriculum.

**Category 2: Key stakeholders in the curricular integration of IL (themes 4-7)**

Emerging themes 4-7 answered the second research question: *Who are the key stakeholders involved in the curricular integration of IL?* Although providing IL education is the responsibility of all concerned, the key stakeholders in IL integration are identified in this research. These key stakeholders are:

- **Librarians** - the main advocates in IL integration into the curriculum;
- **Course coordinators/lectures** - the IL integration will only happen if they are willing to do so;
- **Heads of faculties** - play an important role in the top-down approach to the curricular integration of IL;
- **Students** – the purpose of providing IL education is to enable students to be information literate; thus, IL integration and IL curricular design needs to consider student needs.

Research, to date (Bruce, 1997; Cmor, 2009; Stubbings & Franklin, 2006), shows that librarians are the main driving force in IL integration in higher education. This research further confirms that librarians are still its main advocates and they play a proactive role in IL curricular integration.
This research also confirms that IL integration will only happen if programme or course coordinators or lecturers are willing to engage in IL integration. This reinforces the statement reported in the literature that academic support is the key to success in IL integration (Bennett & Gilbert, 2009; Dorner, Taylor & Hodson-Carlton, 2001; Li, 2007) and that it is impossible to integrate IL into a course curriculum if the course lecturer is not willing or not interested in IL integration (Chiste et al., 2000; McGuinness, 2007; Young & Harmony, 1999). McGuinness (2007) named these academic staff as academic champions. This research demonstrates that it is more effective for librarians to initially identify these academic champions and then to work with them to integrate IL into curriculum.

The important role that the heads of faculties and students play in curricular integration of IL has also been identified in this research. It is important to raise the awareness of the Dean or the head of an academic programme of IL, as being a part of graduate attributes or generic capabilities. It is vital to take a student-centred approach when integrating IL into the curriculum by designing an IL curriculum that focuses on student needs and that involves student feedback.

In summary, the key stakeholders in IL integration in higher education are: librarians, the programme or course coordinators or lecturers, the heads of faculties and the students. Limited research was found from literature in regard to the role of the heads of faculties and the students. Therefore, this research provides a multi-perspective of the key stakeholders in IL integration and also further affirms the role of librarians and course lectures in IL integration.

Category 3: IL curricular design strategies (themes 8-10)

Emerging themes 8-10 answered the third research question: What is the process of IL integration in curricular redesign in higher education? Useful IL curricular design strategies were identified in the process of IL integration, these include:
• *IL Standards* and IL policy may be used in IL curricular design;

• *Online teaching* - Face to face teaching is the main way, but a combination of face to face and online is an emerging trend;

• *IL assessment tool* – Important in IL integration.

This research further confirms that IL standards may be usefully employed as a guide or vehicle in planning and designing the IL curriculum in practice. Literature gives many examples of such use. The ACRL’s IL standards were used in planning an IL curriculum within an upper division discipline programme (Fiegen et al., 2002). The ACRL’s IL standards were used in designing a survey and a checklist to measure students’ IL levels (Brown & Krumholz, 2002; Holliday & Fagerheim, 2006), in designing IL assessment tools (Donaldson, 2004; Elmborg, 2003; Emmett & Emde, 2007), and to identify learning outcomes as well as to develop an IL matrix (Cmor, 2009). The seven pillars of IL (SCONUL, 2004) were used in developing IL learning outcomes in IL integration into each year of an academic programme (Harrison & Rourke, 2006).

This research confirms that face to face teaching is a preferred strategy but a combination of face to face and online teaching is an emerging trend. This finding agrees with literature that traditional face to face IL teaching is challenged by online teaching for the following reasons, based on research conducted by Vishwanatham (1997), Bridges (2000), Donaldson (2000) and Helvoort (2010):

• the reality that librarians have only a finite amount of time and places in which they can teach hands-on classes;
• the increased demand to access information from remote locations;
• the ‘just-in-time’ form of support needed by students;
• the omnipresent changes in technology;
• the Internet is a multi-layered, multimedia, multi-dimension learning space through which learners interact, co-construct, and revise their own learning.
A combination of face to face and online IL tutorials is offered to engineering students at Deakin University (Tucker & Palmer, 2004) and at the University of Surrey (Helvoort, 2010). Online IL blogging has been successfully used in a course at Hong Kong Baptist University (Chan & Cmor, 2009). Yang (2009) randomly surveyed 100 academic libraries in the USA and found that one-third of these libraries have developed their own IL online tutorials. Research (Burkhardt, Kinnie & Cournoyer, 2008; Means et al., 2009) showed that students involved in online learning performed as well and possibly a little better than those who learned in face-to-face sessions. Therefore this study further confirms the emerging trend of online IL education.

Another finding from this study is that an IL assessment tool such as a marking schedule could play an important role in IL integration. The marking schedule is an important element of the IL curricular design strategy. This confirms the importance of the marking schedule or grading rubric in IL integration, as reported in the literature (Knight, 2006; Oakleaf, 2006; Welker et al., 2005). Oakleaf’s study (2006) demonstrates that the marking schedule is a very useful tool in assessing IL skills. Knight (2006) reported that the researchers used a rubric to score bibliographies to determine student levels of mastery of the objectives and their use of library subscribed databases vs. freely available web sources. They found that a rubric is a valuable assessment tool that provides a reliable and objective method for analysis and comparison. The marking schedule was also used to grade student assignments which measured students’ ability to locate, retrieve, evaluate, and incorporate sources into their assignments (Bowler & Street, 2008).

IL assessment is an important part of IL integration. This research demonstrates that in many cases, especially those with large classes, course coordinators or lecturers are reluctant to engage in IL integration because they lack time to mark students’ research assignments. The marking schedule enables students to self-mark or peer-mark each other’s assignments and thus the course lecturer’s marking
workload is not increased. Therefore, appropriate assessment tools such as the marking schedule increases the possibility of IL integration in practice.

In summary, this research identifies some useful IL curricular design strategies including: the use of institutional IL policies, IL standards and Bloom’s Taxonomy as guides in IL curricular integration and design, especially in IL learning outcome development; a combination of face to face and online as an emerging trend in IL teaching; and the use of a marking schedule as an important tool used in assessing an IL activity, in order to reduce the IL assignment marking workload for lecturers and librarians in IL integration.

Category 4: The process of IL curricular integration (themes 11-14)

Emerging themes 11-14 answered the third research question: What is the process of IL integration in curricular redesign in higher education? These findings identified the nature of curriculum and the process of IL curricular integration. They include:

- curriculum is viewed as the intended curriculum, the offered curriculum and the received curriculum,
- curriculum can be redesigned and negotiated at different levels such as; the institutional level, the academic programme level, the course or class level;
- the process of the integration of IL is a process of negotiation, collaboration and the implementation of the intended curriculum, and
- IL can be progressively integrated across an academic degree.

Much research has been discussed about the working experiences of curricular integration of IL (Haraldstad, 2002; Nerz & Bullard, 2006; Rader, 1995). However, limited research in the IL or library literature can be found on the nature of the IL curriculum and the process of the IL curricular integration. Understanding the nature of IL curriculum in higher education and the process of the IL integration
would significantly help academic staff and librarians, as well as other curricular developers in IL curricular integration and curricular design. Based on these findings, when they integrate IL into the curriculum, higher educators could consider how they can integrate IL into the intended curriculum and the offered curriculum, as well as, the students’ received curriculum. When the course lecturer and librarians work collaboratively with multiple partners, they can negotiate and design or redesign the IL curriculum at different levels. The findings also enable higher educators to have a deeper understanding of the fact that the process of the IL integration is a process of negotiation and collaboration, as well as of the implementation of the intended curriculum into the offered curriculum. The IL curriculum can be integrated across an academic programme horizontally across curricula and vertically in each course. This provides students with ongoing opportunities to interact with information throughout their university study.

In summary, this section has summarised the key findings of the research and the significant contribution of these key findings to IL integration and IL research.

**Contributions to the practice of IL integration**

The IL integration model developed through this research integrates curriculum, pedagogy and learning theories, IL theories, IL guidelines, people and collaboration together. The model includes all the key findings identified from this study. It provides a framework of how IL can be integrated into multiple courses across an academic degree in higher education. The model provides a practical solution to the implementation of the intended curriculum into the offered curriculum.

Literature searches have found that many practitioners have reported practical examples of how they worked with academic staff and librarians in order to integrate IL into a course, or multiple courses. Limited research can be found to provide a research based model that combines both theory and practice in IL curricular integration, although some IL instructional models and frameworks have
been reported in the literature. These IL instructional models or frameworks include: IL curricular design theoretical model (Bjorner, 1991); a seven pillars model (SCONUL, 1999); an IL instructional model (Curl, 2001; Harrison & Rourke, 2006); an IL instruction model with Indian perspectives (Varalakshmi, 2007); a tiered IL model developed at California State University, Los Angeles (California State University, 2006); a collaboration model (Bennett & Gilbert, 2009; Dhanesar, 2006; Li, 2007; Loo & Chung, 2006; Walter, 2000); QUT Information Literacy Framework and Syllabus (QUT, 2010) and Research skills development framework (Willison & O'Regan, 2006). These models and frameworks focused on the IL instructional design perspective.

The IL integration model developed through this research extends this perspective. It includes the process of IL integration, from initially analysing institutional graduate attributes and IL policy, accrediting organisation graduate requirements and the academic curriculum; to establishing personal relationships and working collaboratively in an IL curricular working group; as well as to designing and delivering the IL curriculum in higher education. The model represents the processes, people and resources essential for IL integration.

The model was developed based on IL integration experiences from four universities and underpinned by sociocultural theories and learning theories. The practical contribution of the model is to provide a practical framework for higher educators to understand from initially how to analyse the intended curriculum and the offered curriculum and establish personal relationships to work collaboratively to design and deliver an IL curriculum. It provides a workable solution for higher educators to design an IL curriculum and to systematically integrate IL into the curriculum. The model makes a theoretical contribution to curricular development for IL education. The model can be used in curriculum integration in a single academic course as well as multiple courses across a degree. When the model is used in a single course, all the key elements of the model can be applied. These include the strategy of identifying the potential course; effective ways of
communicating and establishing personal relationships between the course coordinators and lecturers and librarians; contextualising IL with course content; providing students with ongoing interaction with information at intervals throughout the courses; collaboration and negotiation with multiple partners; and application of learning theories, IL standards, and six frames for IL education in IL curricular design. When the model is used for multiple courses, all the above key elements can be applied and in addition, we need to provide students with ongoing interaction with information through multiple courses across an academic degree. The model enables IL educators to understand the various interpretations of the curricular integration of IL and the relationships between them. It also offers a framework for developing a curriculum that integrates IL and pedagogic strategies for implementing the intended curriculum. In this way, the model provides a practical solution of implementing the intended curriculum in the offered curriculum therefore it also contributes to the curricular development in higher education.

Contributions to IL curricular development in higher education

This section summarises the contribution of this research to IL curricular development in higher education. The contributions are described from three perspectives: the practical application of curriculum theories to IL integration; the practical application of Bloom’s Taxonomy to IL curricular design; and the curricular focus shifting from subject only to a combination of subject and generic skills.

Application of curriculum theories to IL integration

There are many examples of curricular integration of IL reported in the literature (Haraldstad, 2002; Holliday & Fagerheim, 2006; Jackson & Mogg, 2005; Nerz & Bullard, 2006; Rockman & Associates, 2004). However, there is scant information in the IL or library literature discussing issues concerning curriculum and
curriculum theory application in IL integration. This study bridges this gap by applying curriculum theories to IL curricular integration and curricular design.

This research explores different aspects of curriculum and concludes that curriculum in higher education is an educational plan to engage learners in obtaining the knowledge and skills leading to a degree or certificate. Curriculum refers not only to the official list of courses and their content offered by a university, but also its purposes, organisation, delivery and activities, and the evaluation programme developed in an institution. Based on this definition, when we integrate IL into the curriculum, it not only includes integrating IL into the academic course curriculum, but also the curricular purpose, organisation, delivery and activities, as well as curricular evaluation.

Curriculum theories inform us that curriculum can be viewed as the intended curriculum (Codd, 1981; Preedy, 2001), the offered curriculum (Preedy, 2001) and the received curriculum (Kelly, 2009; Preedy, 2001). This research found that the intended curriculum may not be the same as the offered curriculum, which, in turn, may not be the same as the received curriculum. When working towards integrating IL into the curriculum, we need to ensure that IL is integrated into all of these curricula. The application of curriculum theories of IL integration provides higher educators with a deep understanding of curricular integration of IL.

This study also identifies that the curricular integration of IL can take place at different levels. That is, curriculum can be redesigned and negotiated at institutional level, faculty or departmental level, programme level, course level and class level. This view enables higher educators to understand the various perspectives of IL integration. For example, when it is integrated at the institutional level, institutional teaching and learning policy can be revised by integrating IL as part of the required graduate attributes. When IL is integrated at a course level, the course assignments, class activities and assessment can all be negotiated and redesigned.
Application of Bloom’s Taxonomy and the intended curriculum to IL curricular design

This study also contributes to curriculum redevelopment by creatively developing IL learning outcomes based on Bloom’s Taxonomy and the intended curriculum. Developing IL learning outcomes is very important in IL curriculum integration and IL curricular design because it decides the specifications for what students learn and achieve in each year. However, limited research was found in the literature on IL learning outcome development for IL integration across curricula.

The study demonstrates that Bloom’s Taxonomy provides an excellent guideline in the development of IL learning outcomes from a lower level to a higher level as discussed in chapter 7. Bloom’s Taxonomy (Bloom et al., 1956) identified six levels of learning within the cognitive domain, from the simple recall of knowledge through increasingly more complex mental interaction such as understanding, application, analysis and synthesis to evaluation. Bloom’s Taxonomy provides the scaffolding knowledge and skills with which to build IL learning outcomes from a lower level to a higher level. The intended curricula provide the key competencies which the institution expects its students to obtain when they graduate. IL standards provide the knowledge of what information literate students should be and the IL competencies to be attained. This approach of mapping the intended curriculum with IL standards and Bloom’s cognitive domain provides higher educators with a useful practical framework for the development of IL learning outcomes. This has extended the research done by Robley et al. (2005), who pre-listed the learning outcomes of generic skills from years 1 to 5 of an academic programme. However, they did not explain the basis on which these outcomes were developed and thus the learning outcomes of Robley et al. would be difficult to adapt in other disciplines. In contrast, the learning outcomes developed in this research are based on a cognitive learning domain, the intended curriculum and IL standards and thus IL learning outcomes can be easily adapted or developed based on the various intended curricula of a university.
Shifting curricular focus from subject only to a combination of subject and capability

This section discusses the contributions of the study to curricular development. As discussed in the literature review in Chapter 3, research has shown that the curriculum in higher education still focuses on subject knowledge only. This subject only focused curriculum ignores education and learning as processes of inquiry; as argued by Freire (1970) this is a ‘banking’ concept of education. In the rapid expansion of the knowledge world, it is impossible for teachers to transmit enormous amounts of new knowledge in a subject to their students through academic courses. This subject only focused curriculum no longer meets student needs in our information explosion society, in which students are required to have lifelong learning and critical thinking skills.

IL is a catalyst of curriculum reform in higher education (Bruce, 2008). Research (Edler, 2003; Mondschein, 2007; Serotkin, 2006) shows that the curricular integration of IL provides an opportunity for students to learn where and how to find information and how to solve a problem by finding and applying appropriate information. IL integration into the curriculum has played an important role in a collaborative learning environment, for example, in problem-based learning (Eldredge, 2004; Hoffman & Ritchie, 1997; Mondschein, 2007; Ribeiro & Mizukami, 2005) and resource-based learning (Dennis, 2001; Hannafin & Hill, 2008; Parker & Jackson, 1998). With the integration of IL and other generic attributes into the academic curriculum, curricular development will shift its focus from subject only to a focus on both subject and skills. This will enable students to not only learn subject knowledge but also to improve their ability to search for and use information to learn. These strategies will empower students with lifelong learning skills and the ability to be information literate and thus able to meet the challenges of an information explosion world.
The findings of IL integration and the IL model developed through this study provide a process of integrating IL into the academic curriculum. They contribute to a shifting curriculum focus from subject only to a combination of subject and generic capabilities in higher education. In this way, the study contributes to curriculum redevelopment in higher education.

Overall, this research adds to the body of knowledge by applying curriculum theories and Bloom’s Taxonomy to IL integration and IL curricular design. The research findings and the IL integration model also contribute to the curricular focus, shifting from subject only to both subject and skills development in higher education.

**Contributions to the sociocultural approach to IL research**

Although sociocultural theories have been mentioned recently in IL research (Lloyd & Williamson, 2008; Newell, 2006; Tuominen et al., 2005; Wang, 2007), literature searches show that, to date, the adoption of sociocultural theories has been limited in IL research. Little has been written about the principles of sociocultural theories and how to apply them in IL research and IL curriculum design in higher education. This research is intended to bridge this gap by providing a brief overview of sociocultural theories (in Chapter 4) and by introducing the way in which these theories can be used in the research process and IL curricular design.

Sociocultural theories inform every aspect of this study from the research methods and the process of research data analysis to IL curricular design and delivery. As discussed in chapter 4, the sociocultural approach adopted in this research is based on Vygotsky’s sociocultural theory (Vygotsky, 1978, 1986). Sociocultural theories claim that human cognition is developed through engagement in social activities and interaction through shared experience. External social interaction will be internalised to a transformed version of interaction and become part of human independent developmental achievement.
According to sociocultural theories, the process of this research was actually a process of a high level of interactions between participants and the researcher in a community of IL practice. A socially interactive environment was established in this research from the interview phase to the development phase in which a community of IL integration practice was formed. In the interview phase, the participants were provided with an opportunity to dialogue and share their experience and perspectives of IL integration with the researcher. In the development phase, four curricular working groups were formed as a community of IL integration practice. In this community of practice, all community members interacted and co-constructed a common understanding of curricular integration of IL. Adopting sociocultural theories, the concept of cultural tool was extended by the development of an IL tool. This IL tool helped higher educators to understand IL integration and also to explore the possibility of integrating IL into their course curriculum and to design IL curriculum.

In summary, sociocultural theories adopted in this study worked well in practice. The benefits of applying sociocultural theories in this study are summarised below:

- Research data were generated instead of being collected from both the Interview phase and the Development phase;

By applying sociocultural theories into IL research, instead of collecting research data, data were generated by both the researcher and participants. According to Vygotsky, human cognition is formed through engagement in social activities (Vygotsky, 1978). Through discussion and interaction between the researcher and the participants, richer research data were generated which could give rise to a higher level of thinking when compared to a process of data collection.

- A community of IL integration practice was formed in order that all members would be able to share knowledge and provide the best possible support for students;
Based on sociocultural theories, a community of IL integration practice was formed in this research. The members of the community included the academic staff, librarians, learning designers, student learning advisors, IT support staff and the researcher. In this community of IL integration practice, people learnt from each other, shared their expertise and provided the best solution for IL integration and IL curricular design and also provided the best possible support for students.

- Cultural tools were developed and used successfully in the IL integration practice;

In the underpinning of sociocultural theories, the IL tools were used in the interview phase to obtain better understanding of IL integration and IL curricular design. New IL tools were also developed through this study to enable both the academic staff and the librarian to understand the importance of IL and also to provide students with the best support in their learning.

- Student-centred approach to IL curricular design and delivery.

Vygotsky (1978) described learning as being embedded within social events and occurring as a learner interacts with other people, objects, and events in the environment. Based on sociocultural theories, with social interaction, students talk to learn, and the affective and subjective aspects of learning are brought into play as students must articulate their viewpoints and listen to the views of other group members (Stacey, 2005). This is a student-centred approach which focuses on what students have learnt. In the IL curricular design of this research, all the IL assignments, class and online activities were designed to enable students to learn in a collaborative environment. Students interacted with information, with each other and with the lecturer and the librarian. They also learnt by doing and by discussing questions and finding solutions. In this collaborative learning environment, students are responsible for their own learning.
In summary, this study has adopted sociocultural theories both as a research approach and in the process of curriculum design in higher education. All the people who participated in this research benefited from this study in our community of practice. The experience of applying sociocultural theories to this entire research worked very well and I recommend this research approach to other qualitative IL researchers.

**Issues arising from this research**

This section discusses the issues and concerns raised from this study. These include identifying long term solutions for IL integration; the need for pedagogic training for both academic staff and librarians; and the various understandings of the concept of IL.

**Identifying a long term solution for the integration of IL in higher education**

This research found that integration responds to challenges. One of the main challenges identified was the needs to find a long term solution for the integration of IL, and its sustainability, into the curricula of higher education. Most examples of integration found from the study were from a bottom-up approach. This approach is dependent upon the skills and efforts of individual librarians and on the interests of, and efforts made by, the academic staff members of the institution in question. The problem with this approach is that many best practice integration examples may fall down when a course coordinator/lecturer leaves the course or the librarian leaves the institution. For example, the research found that the IL component was well integrated into one course curriculum. When a new course coordinator/lecturer took over a course, she was not interested in IL, or had a different understanding of it; the IL component was reduced to minimum. Therefore in order to keep IL integration sustainable, a long term solution for integrating IL into the curriculum across a degree has been suggested in this study. One solution is to take a top-down approach to ensure that there is a mechanism in place to implement the intended curriculum into the offered curriculum. In some
universities, information literacy is not even included in the intended curriculum or specified in graduate attributes (Corrall, 2007). In this case, it also needs to target the integration of IL into the intended curriculum of the institution.

For those universities that have integrated IL into their institutional Graduate Attributes, this research has revealed that if there is no mechanism to ensure that IL related teaching policies are implemented into the offered curriculum, it is still difficult to allow for the long term integration of IL across curricula. The research found that a top-down mechanism of implementing the intended curriculum in the offered curriculum could be accomplished by requiring all courses to demonstrate evidence of the integration of the required attributes into course curricular activities. This can be achieved at the faculty or departmental level by mapping all of the Graduate Attributes with the faculty or departmental curriculum. In this instance, every course is required to demonstrate learning activities that have been mapped to one of the graduate capabilities. This ensures that all the required attributes, including IL, are implemented into all the faculty courses and are built on from the first to the final year of study.

In summary, the question of the sustainability of IL integration is raised from this research. It is important to provide IL education in higher education. One of the solutions found from the research was to develop a mechanism for ensuring that the intended curriculum is implemented in the offered curriculum.

**Pedagogic training needs for both academic staff and librarians**

The study demonstrates that integrating IL into a curriculum involves the acquisition of pedagogic knowledge of curricular design. This includes: developing lesson plans; designing assignments, assessments and class activities; promoting student-centred learning and using information to learn; contextualising IL in the course context; and providing ongoing IL activities to enable students to interact continuously with information. In the IL integration process, pedagogic knowledge
is critical for both academic staff and librarians. However, in many institutions, a teaching qualification is not required for either the academic staff or the librarians. For example, only one of the twenty (5%) academic staff members and six out of the twenty librarians (30%) who were interviewed in the course of this study had a teaching qualification. Most academic staff and librarians that the researcher interviewed did not have a teaching qualification and they had gained teaching experience either from their own experience in teaching or from that of their colleagues.

The study found that librarians with teaching qualifications felt that the qualification provided them with greater confidence when they worked with academic staff in redesigning the IL curriculum. For example, a librarian said that her teaching qualification “helped me into the theory of pedagogy. It gave a pedagogic framework for me to actually ‘do my stuff’” (L/14/07). However, those librarians who did not have teaching qualifications felt that the integration of IL and the teaching involved was a challenge and presented a huge learning curve for them. This agrees with the findings from Selematsela’s information literacy survey (Selematsela & Toit, 2007) from nine academic libraries in South Africa. Selematsela & Toit found that either instructing librarians are not trained educators, or that they do not have a pedagogic background. The findings of the research conclude that “there is a serious need to have understanding, knowledge and skills regarding the dynamics involved in the teaching of IL skills, in order to make the program a success” (p. 119). The study reveals that it is necessary to have learning designers involved in the IL integration curricular group to provide the expertise with which to support teaching and instructional design. However, it is essential to provide pedagogic knowledge and IL integration training for both academic staff and librarians. In one of the universities where interviews were held, all new lecturers are now required to attend the internal block training course on teaching and learning. A lecturer, who was attending that training when she was interviewed, intimated that the training gave her real confidence in teaching and curriculum design (I/A1/07). Unfortunately, through this research, the researcher did not find
any pedagogic training material specifically designed for librarians. The librarians interviewed had generally learned, either from their colleagues, their own experience, or by attending a one or two year teacher training qualification (I/L4/07; I/L5/07; I/L10/07; I/L15/07; I/L9/07; I/L18/08). There is a real need for a teaching and IL integration training to be available for librarians who are involved in IL integration and IL teaching.

The various understandings of IL

Through this study, I have further come to understand the concept of IL and its application in practice. As discussed in the literature in Chapter 2 there are many different perspectives pertaining to IL. IL is defined by many library associations as a set of skills to enable individuals to recognise when information is needed and to locate, evaluate, and use effectively the needed information (ALA, 1989; Bundy, 2004; SCONUL, 1999). However, IL researchers argue that IL is more than just a set of skills. It involves “the comprehension of an entire [academic] system of thought and the ways that information flows in that system” (Elmborg, 2006). IL is viewed by IL researchers as a way of learning (Kuhlthau, 1988; Limberg, 2000; Lupton, 2004; Todd, 2000). Bruce (2008) has reconceptualised IL as using information to learn which she called informed learning. This study clearly demonstrates that the curricular integration of IL is also a process of enabling students to use information to learn. IL integration is underpinned by information practices relevant to a discipline or a profession of study. By integrating IL into the curriculum, students have an opportunity to learn by interacting with information in a variety of ways and in different contexts. Understanding IL as using information to learn helps IL curricular designers to introduce explicit attention to the information practices in a curriculum in order to enable information literate students or informed learners.

Jacobs (2008) argued that “using the ACRL standards to quantify or map information literacy skills or curricula are fraught projects that need to be carefully
considered” (p. 258). However, in practice, IL frameworks and standards are still very useful guidelines in IL integration and IL teaching. In IL integration practice, IL standards not only provide the curricular working group with a blue-print of what information literate students should demonstrate, but also provide learning outcomes and examples of how to apply each standard in curricular design. IL standards provide useful guidance of what IL involves and how to integrate it into a teaching and learning context to obtain the learning outcomes. If we understand IL as using information to learn in different subject contexts and in different ways, IL standards can be used as a useful guideline or vehicle for academics and librarians to plan and design an IL curriculum which will enable students to use information to learn.

In summary, this section outlines the issues and concerns raised from this research. The limitations of the current research and the possible direction of any future study will be discussed in the next section.

**Limitations, future direction and recommendations**

Through the sociocultural theories that underpin this study, valuable practical IL integration experience has been gained via the dialogues and interactions with front-line academic staff and librarians from four universities. The findings of IL integration in a community of practice were applied in order to integrate IL into a professional academic programme from Year 1 to Year 4. The development phase further confirmed the findings of the study. Through the interaction and collaboration with the participants in two phases, the researcher developed an IL integration model. Thus, two phases of study in this research worked really well. However, the study did, nonetheless, have some limitations.
Limitations

The research findings led to the development of an IL integration model which can be used or adapted to other courses or programmes of IL integration. However, there are some limitations of the model that are identifiable:

1. Although I considered the IL integration experiences in different faculties, the model was developed mainly based on a professional programme (an engineering programme) in a Western higher education system. The model can be enriched if it includes other subjects and through a wider education system. There are generally compulsory core courses in each professional faculty year level. If IL is integrated into these core course curricula, all students in that faculty will have an opportunity to use information to learn through the integration of IL into the curriculum. However, in a non-professional faculty, such as an Arts faculty, there may not be a core course that is available every year; in which case, it may be difficult to integrate IL into courses that target all faculty students. Therefore the model may need to be modified to meet non-professional faculty needs.

2. The purpose of the model is to enable students to be information literate in order to meet their future needs in a work environment. However, this research did not involve the employer needs. As a key to lifelong learning, IL capabilities are required by students not only when they are studying at the university, but also when students graduate and work in the real world. Due to the time constraints of the study, descriptions of the points of view of employers have not been documented in the provision of IL learning in higher education. Through the process of further research, the point of view of the employer on how to provide IL education needs to be explored in order to strengthen the model in curricular design.
3. This research has identified various aspects of curriculum: the intended curriculum, the offered curriculum and the received curriculum. This study focuses on both the intended curriculum and the offered curriculum. However, due to time constraints and the availability of the required personnel, the student received curriculum has not been included in this research. Therefore, the study does not include any evaluation and or student feedback on curricula integration. The model could have been improved if student feedback had been included and evaluated in the IL integration programme for each year.

4. Subject librarians in these universities that I studied all have non-academic status. However, in the USA, subject librarians in many universities have academic or faculty status so they are treated as academic staff. The findings of this study may be affected by whether the librarians in the participating institutions are considered to be academic staff or not. It may have an influence on how librarians are perceived and the degree of influence they have in their institutions.

**Recommendations**

The study recommends the following areas for further study:

- The identification of the characteristics of IL integration in other disciplines and in comparison with this model;
- The extension of the IL model to the integration of other academic skills into the curriculum in higher education;
- A study of employers to identify the essential skills that tertiary graduates should have from an employer perspective;
- The identification of the main reasons why some academic staff are willing to work toward the integration of IL into the course curriculum while others are not;
• The identification of the most effective ways of communicating with Deans or the heads of faculties, course coordinators, and lecturers concerning the integration of IL into academic curriculum;

• Making a comparison of the offered curriculum with the student-received IL curriculum and identifying areas for the improvement of the IL curriculum;

• The exploration of pedagogic and IL integration training programmes for librarians to empower them with pedagogic knowledge of curricular design when integrating IL into curriculum;

• The development of IL assessment and evaluation tools to be used in IL integration.

Conclusions

This study has explored the curricular integration of IL in higher education. It has innovatively applied sociocultural theories to investigate conceptual and practical challenges associated with curricular integration of IL. The findings present original insights concerning the understanding of the key characteristics for the curricular integration of IL, the stakeholders of IL integration, the process of curricular integration and IL curricular design. As an outcome of this investigation, an IL integration model has been developed and this supports the ongoing collaborative initiatives in IL curricular design. In this way the study advances IL theory and practice, whilst providing a foundation for further research of potential benefit to IL educators and learners. For example, the IL integration model can be further developed by exploring the employer perspectives on IL integration.

Three key components of educational performance in higher education have been recognised by both the Australian and New Zealand governments, these are; knowledge, skills, and capability or attributes (Bradley, 2008; NZ Ministry of Education, 2009). IL is one of the graduate attributes required by many institutions (Barrie, 2007: Bridgstock, 2009) and it is a key component and prerequisite for lifelong learning (Candy et al., 1994). Indeed no one can be judged educated unless
he or she is “information literate” (Lloyd, 2006). The importance of IL integration into the curriculum is also recognised by three major organisers of the high-level colloquium on IL and lifelong learning (Garner, 2006). These three organisers are the United Nations Education, Scientific, and Cultural Organisation (UNESCO), the International Federation of Library Associations and Institutions (IFLA) and the National Forum on Information Literacy (NFIL). They strongly recommend that “formal education supports information literacy by including instruction and practice in all subject areas at all educational levels” (p. 11). The findings and the model developed through this study provide insights into curricular integration of IL and a practical guide to IL integration and IL integration curricular design. The IL integration model provides a framework of how IL can be integrated across academic curricula in higher education. The study is significant to IL education and IL research in higher education.

Providing IL education is everyone’s responsibility. To ensure that IL is seamlessly integrated into the academic curriculum, it requires institutional IL policy as well as a mechanism to implement the integration; it needs librarians, academic staff, students and other support to work collaboratively; it needs to have a pedagogic approach to ensure that IL activities and assessment are more relevant to the course, to students’ needs and to their personal interests; it needs to provide students with ongoing interaction with information through a single course as well as multiple courses across an academic study.

This is my entire journey from a librarian, to an academic, librarian again and to a researcher. In this journey, I have learnt so much and gained much confidence when working with academic staff and librarians to design the IL curriculum in order to integrate IL across academic curricula. My colleagues in the workplace have also benefitted from my study by sharing my research findings and the IL integration model, curriculum and learning design knowledge. I hope the result of this journey is useful for librarians and academic staff when they integrate IL into the curriculum. In this journey, not only the findings, the IL integration knowledge
and the model that I gained and developed, but also the thinking and process involved is enormous and I have gained so much from it. This has been a long but an enjoyable journey!
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APPENDIXES

Appendix I: Publications authored by the researcher associated with this study

   Abstract:
   Collaborative learning improves students’ learning and enhances their lifelong learning skills. This paper describes how the information literacy courses at a university library are being redesigned with a student-centred focus in a collaborative learning environment, based on sociocultural learning theories.

   Abstract:
   This article introduces models of collaborative learning based on sociocultural learning theories and their application to developing more effective learning opportunities in information literacy teaching. Collaborative learning is an effective means of increasing student achievement and cognitive development. As described by Vygotsky and other theoreticians, sociocultural learning theories provide insight into collaborative approaches to student learning. These theories take into account the social and cultural aspects of acquiring knowledge and a learner’s potential performance level is increased in a community-of-learners. Several collaborative learning models are introduced in this article. These models are the jigsaw model, the reciprocal model, and the collaborative peer group model and include problem-based and resource-
based learning. These models are applied to information literacy teaching to demonstrate how collaborative learning approaches enhance information literacy teaching. Ultimately, the comparison of the traditional library classroom and the community-of-learners environment is introduced and it concludes that the information literacy community of learners is an effective learning environment to improve student learning.


Abstract:
Current information literacy education in higher education has four main types of approach: intra-curriculum, inter-curriculum, extra-curriculum and the stand-alone curriculum. All of these four approaches have one goal, to improve a students’ information literacy and lifelong learning skills to meet the needs of the modern world of information. These four types of information literacy education have their own advantages and disadvantages and they will coexist and be developed over a long period of time.


(available online at: [http://researchspace.auckland.ac.nz/handle/2292/4747](http://researchspace.auckland.ac.nz/handle/2292/4747))

Abstract:
This paper focuses on the changes that have been made to the compulsory Civil & Environmental Engineering Year 4 research-based project paper. The curriculum was redesigned by introducing a series of lectures and tutorials to lead students through the project process. These lectures and tutorials covered literature reviews, annotated bibliographies, searching and evaluating information resources, writing and presentation skills, data analysis, referencing and use of Endnote. Academics, librarians, student learning support staff and IT staff collaboratively designed sessions on information
literacy resources and annotated bibliographies using a student-centred approach. The collaboration between academic staff, librarians, student learning advisors and IT support staff proved time-consuming, but achieved excellent results in curricular development. In this paper we will discuss the aims, methods used, results achieved, lessons learnt and proposals for future improvements.

Appendix II: Introductory letter, Information Sheet and Consent form

Introductory letter:

May 2007
Dear xxx,

I wish to invite you, as a lecturer / librarian at xxx university, to be involved in a research for my PhD study. The aims of this research are to investigate ways to integrate information literacy systematically across academic curricula in higher education; and to develop a model of integrating information literacy into academic curricula in higher education.

In order to achieve these aims and to gain first hand information of how you have integrated information literacy into academic courses at your university, I, as a researcher, would like to visit your university and conduct some individual interviews. I would like to invite you, as an experienced academic staff member / Librarian, to participate an interview.

Involvement in this research will mean for an academic staff:
- Participating in a one hour individual interview, which will be audio recorded, in June / July 2007.
- Confirmation of transcript

Your acceptance of this invitation is voluntary. The research data will be held in a secure place indefinitely in accordance with University of xxx Human research regulations, and be available only to the researcher (myself).

Your name and identity will remain confidential, be known only to myself and the research group, and therefore, not used in any analysis of the research data, published articles or books resulting from this research.
You have the right to withdraw up to the time of confirmation of the interview transcripts.

If there are any concerns regarding this research, please contact Li Wang on xxxx or email xxxx@xxxx.

An information sheet is attached. Please do not hesitate to contact me for any further information.

I hope you are able to join this research team and I look forward to hearing from you.

Kind Regards,

Li Wang

Information sheet:

**Information sheet for participants**

**Integrating information literacy into higher education curricula - a IL curricular integration model**

A PhD candidate Li Wang, Phone: xxxxxxx, email: x.xxx@......

This research is to investigate ways to integrate information literacy systematically across academic curricula in higher education; and to develop a model of integrating information literacy into academic curricula in higher education.

Information literacy is defined by Australia and New Zealand Institute for Information Literacy (ANZIIL) as a set of abilities requiring individuals to recognise the need for information; find needed information effectively and efficiently; critically evaluate information and the information seeking process; manage information collected or generated; apply prior and new information to construct new concepts or create new understandings; and use information with understanding and acknowledges cultural, ethical, legal, and social issues.

The need to graduate students who are life-long learners is central to the mission of a university, and information literacy is a key competency for
lifelong learning. The important knowledge and skills in the world of information are subject to rapid change. Content aspects of the curriculum, which are important today, may be obsolete tomorrow as a result of the technological changes. The information literate individual should be able to keep up to date in an environment in which relevant professional skills and knowledge are rapidly replaced. As stated in the American Library Association Presidential Committee on Information Literacy: Final Report that information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can find the information needed for a task or decision at hand.

This research will explore information literacy and curriculum in higher education; why information literacy should be integrated into academic curriculum; and how to integrate information literacy into curriculum in higher education. This research will then develop a model of information literacy integration across an undergraduate programme in higher education.

In order to explore some examples of integrating information literacy across academic curricula in higher education, Li Wang, the researcher, will visit your university to obtain first hand information of how you have integrated information literacy into academic curricula. During Li’s site visit, she will conduct individual interviews with academic staff, curricular developer and librarians who were involved in the integration.

The involvement in this research group will mean:
- Participating in a one hour individual interview, which will be audio recorded, in June / July 2007.
- Confirmation of transcript.

The research data will be held in a secure place indefinitely in accordance with the University of XXXX Human research regulations, and be available only to the researcher (myself).

Participation in this research group is voluntary. You can withdraw from this research at any time until up to the time of confirmation of the interview transcripts, by contacting the researcher Li Wang.

This research has been approved by School of Education Human Research Ethic Committee. If there are any concerns regarding this research, please contact Li Wang on phone xxxxxxx or email…….
Appendix III: An example of coded interview transcript

An example of coded interview data (R=Researcher; L=coded librarian):

<table>
<thead>
<tr>
<th>Recording</th>
<th>Respondent's comments (L.14)</th>
<th>Researcher’s note</th>
</tr>
</thead>
<tbody>
<tr>
<td>R: 11’29’’</td>
<td><em>Can you tell me about the course and programme that you are involved in with IL integration?</em></td>
<td>The examples that she gave me are kept in the University C folder.</td>
</tr>
<tr>
<td>L: 12’19’’</td>
<td>Yes, sure. I did bring some documents for you and I have 2 examples and you will see the similarities between them. Both of them are from one school. Creative Writing and Cultural Studies is one of the disciplines that I am working with and they are actually two sub-disciplines joined together as well. It is within the Creative Industries Faculty. These are two units, one is the core unit and the other one is just a disciplinary unit and it is not a core unit, it is elective unit.</td>
<td></td>
</tr>
</tbody>
</table>
### When you talk about disciplinary core unit, does every student have to take it?

R: *When you talk about disciplinary core unit, does every student have to take it?*

L: Well, yes and no. That is one of our challenges. There have been 5 faculty core units [courses] and there still are at the moment. They are going to review what they call the ‘faculty core units’, redevelop the bachelor of creative industries to give students more of a ‘whole of course’ experience and develop a one - three year course experience. *Note when she mentioned course, actually means programme and unit means course in this study*

### Could you please tell me details of how you worked with academic / library staff to integrate IL into this programme/course?

R: *Could you please tell me details of how you worked with academic / library staff to integrate IL into this programme/course?*

L: The Bachelor of Creative Industries students are required to do, I believe, 4 out of 5 of the faculty core units and Bachelor of Fine Arts students are required to do 2 out of 5 the faculty cores. Even though they are required units, they can choose any of these faculty cores, any of these 5. Most of them presumably may choose in their first year, but they are not obliged to. In some cases, for example the faculty core that I worked with is really like an academic scholarship unit; writing for academic purposes, referencing. It has kind of basic foundation of academic scholarship component. Most first years will do that, they can do it even first or second semester. But there are always some students who do this in their final semester of their final year. This is the unit which teaches them how to write essays, how to write references, how to structure an argument, how to research for an academic environment. So at the moment, we have no guaranteed information literacy developmental pathway for the students. By the time these students get to these core units, they would...
either tell us this is too late for me why didn’t we have it in the first year or why are you are telling me this I already know it. This unit is now part of the faculty core unit review process and what will come out of this review is what will be called “foundation units”. We can actually then set some foundations and develop through the years. So we are working at the moment with faculty cores. There are faculty core units. There are discipline core units and also other units.

15’52’’
R:
L:
16’09’’
The other example I have got is a discipline elective unit. *Why have you selected an elective course?*
Because it was an opportunity, because the academic was new and was very enthusiastic. We had a rapport; she was switched on to the Library. She really likes what we did with the unit; I guess it was at a one-on-one consultation together that we devised the idea for the information literacy strategy. She saw that for her unit, the students needed to get a handle on how to find information. They are writing creative non-fiction; biographies, autobiographies, web-blogs, family histories, that type of writing. They’ve got to get to know their topics, their subjects, so she knew that the students needed these skills. When she was new to the University environment [last year], she contacted me for support. It is a 2nd semester unit and it is not particularly for any year. There will be first years, 2nd years and 3rd years. She has contacted me again this year so we will be rolling out the same programme again. There are about 70-100 students enrolled in this unit.

16’26’’
17’27’’ *How did you initially contact her?*
She initially contacted me, just to introduce herself to me. I started chatting with her to find out what she was teaching and who she was and I also introduced myself to her as her liaison librarian. So I got to know a little bit about her unit. We started talking about what the library could offer her and how we could support her and her students. The conversation blossomed so we had follow up meetings. Another component with this is really good, because she is a practitioner, she was a journalist. As part of the unit, students actually research and write a piece of their own creative non fiction. They are also looking for a publisher and some students do go on to publish their work. The lecturer is a ‘life writer’ and she needed to research her topic and needed help. What she was doing with the unit is that she modelled the same process that the

18’29’’
18’51’’ This is a very useful way of establishing relationships with between librarian and academic staff. This approach is for academic staff to realise what support the librarian can
students would experience so while they are researching a creative non-fiction piece, she is researching a creative non-fiction piece too. She uses the journey that she is on to model their journey.

R: *This sounds an excellent example of student-centered learning approach.*
L: Yes, that’s right; basically she works with them [students]. When we talked about it - if the lecturer needed these skills and she needed the librarian’s help with information of her topic, of course her students need help as well. It was natural that we have rolled the support that I gave to her out to the students as well. We have worked out quite a well developed and intensively scaffolded sort of programme for the students.

R: *Can you provide examples of IL related assignments, learning outcomes, assessments or class activities? Any material available?*
L: Yes, I’ve got it all here. There is also a teaching & learning plan because I was coordinating with her and also 2 or 3 tutors as well. I actually facilitated some of the tutorials. The tutors write as well so they needed to be brought up to speed with what was happening so I also briefed the tutors. The lecturer and I joint-lectured. We talked to the students about the task, what they were doing, talked about the journey that the lecturer had gone through, her research and writing her story. We were modelling the process. She would say, “look, I am doing what you will be doing. This is where I am at, I am researching and xxx [librarian] and I worked together to analyse and to find information for my story”. Then I presented to the students and gave them examples of types of information resources that may be useful for their topics. The challenges are that they can choose any topic they like, so I may not know in advance what they are exactly going to be looking at - from researching their grandparents, but their grandparents may have lived in particular age, country or area or had particular challenges, etc, but there are still things, such as family background they need to find.

R: *The joint lecture sounds great. Did students choose their own research topic?*
L: Yes, but the lecture set the theme, introduced the tasks and demonstrated the resources. The joint lecture was good, that gave me the credibility of working with the lecturer. She could demonstrate the applicability of information skills because she was modelling the whole process. The
A: lecture about in week 2 or 3, they are introduced to the
tasks, at the time that they are going to find out what life
writing is. There are two pieces of assessment and this
piece of life writing is the major assessment worth 70%. It
is 2000 word piece of original life writing that they do.

How do you assess student IL skills?

L: The process of finding information is not assessed as such
but obviously they won’t produce a decent piece of life
writing unless they do research. After the introductory
lecture, students had two worksheets. The first worksheet
was facilitated by the tutors. It was to get the students to
think about their topic, because they actually need to come
up with a topic. I have got the work sheets for you. The
thinking process was for them to come up with a topic, and
they have to think about where they may be ‘pitching it’,
the piece of writing. They may choose to write a memoir
or a piece of biography. They also need to think ‘who will
I be published with?’ “what audience I am writing to?”
They need to think about things like that. They also need
to think about “what do I already know and therefore what
do I still need to find out.” They are looking for lead.
They’ve got a topic; what is the interesting lead? So we
scaffold them to go through the process of thinking about
their topics. This is mapping to the information literacy
standards, if you like, in that they become aware that they
have information need, they start to define it; but they
don’t know they are “doing” infolit standards. I don’t even
explain the term “information literacy”, I don’t use the
term, I don’t talk to them about it, but they DO it. They
don’t need to know, they don’t need to conceptualise it.
They are not library students. So they go through that
process of working out “what I am going to write about,
what I know and what I don’t know, what is the lead and
what is the lead to follow up.” Then, next they start to
reframe their research, their research journey. Then they
know what they are looking for and THEN, only then they
can start to think “where will I look and how will I
structure my search?” That was all done in the first
tutorial, it is done without me. The tutors facilitate that. I
drafted the worksheets, provided them to the tutors and
took them through it. Obviously, the tutors are the life
writing experts not me. They work with students to
contextualise it. They facilitate with their own expertise. I
cannot be in all the tutorials, I cannot do it all myself.
There are about 100 students and there are several tutorial
also carried out in a few weeks to scaffold students’
learning.

Contextualisation!
Providing students with scaffoldin support and assist
students with their thinking process!
groups. The tutors are the key part of that and they’ve got the credibility.

Do you offer any follow up sessions?

Yes, the next tutorial after that, in week 4, there is a lecture immediately followed by the “step-by-step” tutorial where tutors used the concept mapping worksheet to help students think about their topic and plan for the following week when they will actually search for information on their life writing topic. The lecturer goes through the same process in the lecture. In fact, one of examples we showed is her topic actually modelled using the worksheet that the students will use. So students understand how they are going to use the worksheet when they go to the tutorial and they’ve got a real life example. The lecturer talks about how she has searched for information and what she was looking for and where she had to look, that type of thing. Then the next tutorial is facilitated by librarians working with the tutors. By that stage, the students have an idea of what they are going to be writing and what they are looking for. They’ve gone through a more structured worksheet which has turned their topic into the conventional search strategy with Boolean operators. So by the time when I and other librarians who helped me with the teaching load see them in the next tutorial, they have already thought about their topic and they all know what they are looking for so I can start working with them intensively, focusing on the information tools they may use. Librarians (with my colleagues) facilitate the tutorial with tutors [sit in the tutorial] is helpful because students come out with questions that may be information literacy related, but it may be actually “I’ve found information, how do I integrate it into my story?” For these kinds of things, I need the tutors to work with me. So it is very important to have a tutor as well as a librarian helping students in the tutorials. If students ask “I’m using the databases but I cannot find the full text”, then they need me not the tutor. The worksheets aren’t assessed and they won’t get marked on it, but they do it, they have to do it because they need to find information to write their piece, they do do it. I guess they come to the tutorial and go through this stuff. Also they know that to write a story, they need to find information.

Build on IL skills through an academic course.
Appendix V: An example of curricular group discussion meeting briefs

The Year 1 IL curricular working group consisted of the course coordinator and the course lecturer, the electrical departmental faculty librarian, a learning designer, a student learning advisor, IT support people and the researcher. We had six meetings between Feb and July 2008 to redesign the IL assignment and to provide support for students to complete the assignment.

- First meeting (18\textsuperscript{th} Feb 2008): All the group members introduced each other. The researcher introduced the proposed career exploration assignment which required students to use information and to explore what engineers do in engineering fields. The lectures explained the course content, existing assignments and assessments in this course. They agreed that it was useful to integrate this assignment. However, they didn’t have enough staff to mark students’ assignment as there were 600 students enrolled in the course. The group brainstormed the possibility of peer marking. The IT support introduced an online peer review system which enabled students to do online peer review, online peer marking, marking markers and it could also collect students’ feedback for the assignment. He confirmed that it was not a problem for the system to manage 600 students to peer review each others’ work. He pointed out that a clear marking schedule or rubric was very important in the automatically peer review system. After the marking issue resolved, the lecturers generally agreed with the assignment proposal and agreed to review the assignment details and to get back to the group. After then, we discussed who would do what to support students to complete this assignment successfully. Each member would work on different tasks. For example, the faculty librarian would write an example of how to effectively find information, evaluate information and use information for a task; the student learning advisor would work on report writing and referent styles; IT support would provide the online peer support; course lecturers world develop a marking schedule for students to peer review the assignment.
Second meeting (22nd April 2008): the faculty librarian and Student Learning Support and the researcher met and discussed the scaffolding support documents needed by students. We brainstormed the online support material for students. We came out with an idea of providing students with a sample research process (using librarianship as an example), research report and web resources evaluation form to scaffold students with their learning. Then each of us would work on these support material separately and report back to the project group.

Third meeting (6th May 2008): both the faculty librarian and the student learning advisor reported back the scaffolding documents that they developed to support students. The lecturers appreciated these support documents and they would upload them on the online learning system for students to use. The following topics were then discussed, negotiated and finally agreed by the course lecturers: students needed to evaluate two web sites including one site from a professional organisation; the report should include three parts: introduction, body and conclusion and no abstract was needed for this report; APA reference style was used for this assignment; avoiding plagiarism instruction was important and should be provided to students. The lecturers continued to work on the marking schedule, assignment requirement, the length of the report, how many required references in the report, due date for the assignment, number of peer reviews, assignment mark, and if there was any tutorial time available for this assignment.

Fourth meeting (27th May 2008): the course lecturers reported back to the group with their decision. The following was discussed and agreed: each students would review four other students’ work as suggested by the IT support; 5% final mark for the assignment rather than 10% which was suggested by the researcher and the faculty librarian; tutors would provide tutorial support for the assignment and the lecturers would work through with them; report required 750 words excluding references; avoiding plagiarism instruction provided by the department.
would be included in the assignment requirement; the marking schedule was revised and confirmed. The lecturers suggested asking students to use Turnitin to submit their final assignment which was agreed by the group. The student learning advisor would work on the report example based on the revised marking schedule.

- Fifth meeting (14\textsuperscript{th} July 2008): finalised the assignment requirement and the peer review marking schedule, as well as support documents including web resource evaluation template and examples, an example of career research process, peer-review marking schedule; peer-review student guide; student guide for Turnitin.

\textbf{Appendix VI: Bloom’s Taxonomy and IL learning outcomes mapping}
<table>
<thead>
<tr>
<th>Graduate Attributes (GA)</th>
<th>Accrediting professional requirements (APR)</th>
<th>ANZIIL IL standards</th>
<th>Bloom's Taxonomy of Cognitive Processes</th>
<th>Examples of IL learning outcomes in Year 1</th>
<th>Examples of IL learning outcomes in Year 2</th>
<th>Examples of IL learning outcomes in Year 3</th>
<th>Examples of IL learning outcomes in Year 4</th>
</tr>
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</table>
| 5(a) Respect for the ethics of research and scholarly activity. | II 4. Intellectual integrity, respect for truth and for the ethics of research and scholarly activity. | 1.8 Understand the role of engineers and their responsibility to society by demonstrating an understanding of the general responsibilities of a professional engineer. | **Knowledge**
Remember previously-learned materials by recalling facts, terms, basic concepts and answers, e.g. recall data or information.
**Related terms:** define, name, memorise, list, duplicate, label, order, arrange, repeat, recognise.

- Know about library services e.g. Reference and Lending services, how to get course material, where to get help;
- Be aware of the different types of literature (journal article, reference book, textbook);
- Remember that the Internet does not contain everything and quality of Internet resources varies;
- Know how to interpret references in course reading list or bibliographies;
- Create and manage bookmarks;
- Know what plagiarism is and university policies on plagiarism.

- Know how to use document delivery services;
- Email/download / print/export information in a variety of formats from various sources;
- Understand the www leads to some excellent resources but evaluation skills are required;
- Record all pertinent citation information;
- Recognise important elements within a record and understand that different types of literature require different forms of citation.

- Recognise other types of information in addition to books and journals;
- Be able to name major reference books, academic journals and databases in their subject field of study;
- View and save records in various formats;
- Recognise cultural, ethical, and socioeconomic issues related to access to, and use of information;
- Understand concepts and issues related to copyright, censorship, and intellectual freedom.

- Know of the core journals in studied subject;
- Recognise when further information is needed and be able to find it by drawing conclusions from all pertinent sources of information;
- Manage information by using a citation management system;
- Record all search strategies, sources used, locations of sources;
- Acknowledge cultural, ethical, and socioeconomic issues related to access to, and use of information;
- Understand concepts and issues relating to copyright, censorship, and intellectual freedom.
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<td>1(b) An understanding and appreciation of current issues and debates in the field of study.</td>
<td>4(c) An ability to identify, define, analyse, and solve problems in a flexible manner.</td>
<td>1.4 Recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments.</td>
<td>Comprehension Understand facts and ideas by organizing, comparing, interpreting, explaining or stating main ideas. E.g. state a problem in one's own words.</td>
<td>• Identify the main concepts in a given assignment or topic and information needed for the assignment or topic;</td>
<td>• Distinguish scholarly, popular, official, historical, current, primary and secondary information;</td>
<td>• Be aware of unpublished materials (e.g. theses, manuscripts);</td>
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<td></td>
<td>1.1 Defines and articulates the information need.</td>
<td>1.2 Understands the purpose, scope and appropriateness of a variety of information sources.</td>
<td>• Understand basic methods of obtaining information, e.g. keyword or author search;</td>
<td>• Construct and implement effective keyword searches using appropriate synonyms;</td>
<td>• Examine the scope, methodologies and potential boundaries of the topic;</td>
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<td>2.3 Obtains information using appropriate methods.</td>
<td>2.4 Keep up to date with information sources, information technologies, information access tools and investigative methods.</td>
<td>• Recall an item when it is on loan;</td>
<td>• Understand that search results are presented according to various ordering principles (relevance ranking, author, title, date, or publisher);</td>
<td>• Develop a research proposal;</td>
<td>• Develop a research proposal;</td>
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<td>Related terms: classify, describe, discuss, explain, express, identify, indicate, locate, recognise, report, restate, rewrite.</td>
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<td>• Locate items on a course reading list;</td>
<td>• Understand that databases may index other resources in addition to journals (e.g. conference papers, reports);</td>
<td>• Identify current issues and debates in the studied subject through literature search, set up email alerts or RSS feed;</td>
<td>• Demonstrate an understanding of the different stages involved in the literature search process;</td>
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<td>• Use the institutional Online Learning System to access course work and keep informed with course information;</td>
<td>• Use relevant email discussion groups, chat-rooms, newsgroups;</td>
<td>• Know about literature on scholarly methods and writing.</td>
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<td>(b). A capacity to locate, contextualise, critically evaluate, synthesise, and use information effectively.</td>
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<td>3.1.4 Recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments.</td>
<td>3.1.4 Use diverse sources of information to inform decisions.</td>
<td>3.1.4 Selects the most appropriate methods or tools for finding information.</td>
<td>3.1.4 Constructs and implements effective search strategies.</td>
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<td>II 5. An ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively.</td>
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<td>2.1.4 Selects the most appropriate methods or tools for finding information.</td>
<td>2.1.4 Constructs and implements effective search strategies.</td>
<td>2.1.4 Limits or broadens the search result effectively.</td>
<td>2.1.4 Formulates appropriate search strategies.</td>
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**Application**

Use previously learned knowledge in a new situation to solve problems or to complete tasks. E.g. apply what was learned in the classroom into novel situations in a workplace.

**Related terms:**

- apply, use, choose, solve, write, employ, show, demonstrate, illustrate, operate, practice, schedule, sketch.

- Use the Basic Search and Advanced Search and Login functions of the library search;
- Construct basic search e.g. title and author in library catalogue, database and Internet;
- Understand what information is required to locate the item;
- Understand the call number and how to use it to locate books and journals in the library;
- Use the help function for support and advice.

- Use keyword and exact searching techniques (title, author, journal, subject);
- Conduct advanced Internet searching;
- Use 'history'/'saved search' functions to access and modify previous searches;
- Select the appropriate government and statistical publications that are relevant in the discipline;
- Check citations in library catalogues or national bibliographic database to find needed items.

- Use previous learned search skill to construct and implement effective search to find variety of resources e.g. conference papers, patents and journal articles;
- Use the advanced search functions e.g. field search, set limits, and save searches;
- Use thesauri or subject headings where available;
- Formulate appropriate search strategies.

- Demonstrate competency in using a range of databases and other online tools;
- Apply database search skills to any new or unforeseen databases or search engines;
- Understand how to do a literature review;
- Understand what makes a good research proposal;
- Know of other experts and practitioners, professional organisations, official and business organisations, community resources.
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<td>3(c) An ability to analyse information, where relevant, using appropriate tools, technologies, and methods.</td>
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<td>4(c) An ability to identify, define, analyse, and solve problems in a flexible manner.</td>
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<td>II 5. An ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively.</td>
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<td>Break down information or concepts into parts to understand its organizational structure or causes. E.g. distinguishes between facts and inferences.</td>
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<td>Related terms: analyse, appraise, critique, examine, calculate, categorise, compare, contrast, differentiate, distinguish, experiment, question, test.</td>
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<td>1.3 Re-evaluates the nature and extent of the information need.</td>
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<td>3.1 Assess the usefulness and relevance of the information obtained.</td>
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<td>3.3 Reflects on the information seeking process and revises search strategies as necessary.</td>
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<td>1.4 Recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments.</td>
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<td>• Recognise limitations of a search strategy;</td>
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<td>• Analyse the quality and relevance of information retrieved and refine search strategy as required;</td>
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<td>• Analyse the assignment topic and turn the topic into separate concepts and keywords;</td>
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<td>• Repeat the search using the revised strategy as necessary;</td>
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<td>• Sort search results by title, author, publication date etc.</td>
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<td>• Recognise the difference between the library catalogue, databases and Internet resources and when to use which.</td>
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<td>• Critically assess quantity and relevance of information retrieved and refine search strategy as required;</td>
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<td>• Modify the information by focusing on the research topic;</td>
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<td>• Use subject heading to limit or broaden the search results;</td>
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<td>• Identify gaps in the information retrieved;</td>
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<td>• Recognise inaccuracies in information retrieved;</td>
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<td>• Understand that different research outcomes (essay, dissertation) require different research strategies.</td>
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<td>2(b). An ability to communicate effectively using written and spoken English and/or Māori, or where appropriate, other languages.</td>
<td>1.3 Synthesise and demonstrate the efficacy of solutions to part or all of complex engineering problems.</td>
<td>5.1 Compares and integrates new understandings with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.</td>
<td>Synthesis Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions. E.g. put parts together to form a whole, with emphasis on creating a new meaning or structure. Related terms: create, develop, compose, assemble, construct, design, develop, invent, plan, formulate, manage, organise, propose, set up.</td>
<td>• Write a short report or essay by summarising information obtained;</td>
<td>• Summarise the main ideas from information obtained;</td>
<td>• Recognise interrelationships between concepts and draw conclusions based on information gathered;</td>
<td>• Compare ‘knowledge gained’ with prior knowledge to determine the value added;</td>
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<td>1.4 Recognise when further information is needed and be able to find it by identifying, evaluating and drawing conclusions from all pertinent sources of information, and by designing and carrying out experiments.</td>
<td>1.3 Re-evaluates the nature and extent of the information need.</td>
<td>Evaluation: Make judgments about information, validity of ideas or the quality of a work, based on a set of criteria.</td>
<td>• Analyse and evaluate information on its reliability, accuracy, authority and timeliness;</td>
<td>• Understand the difference between the academic journals and popular magazines and evaluate the articles published from these sources;</td>
<td>• Analyse and apply criteria for evaluating the information retrieved and its sources such as: accuracy, validity, relevance, completeness, and impartiality;</td>
<td>• Analyse and evaluate information by a variety of criteria such as reliability, validity, accuracy, authority, timeliness, and point of view or bias;</td>
</tr>
<tr>
<td>3(d) A capacity for critical appraisal of relevant scholarly literature.</td>
<td>1.3 Re-evaluates the nature and extent of the information need.</td>
<td>3.1 Assesses the usefulness and relevance of the information obtained.</td>
<td>Related terms: argue, value, evaluate, criticise, critique, weight, appraise, assess, judge, predict, rate.</td>
<td>• Assess number, accuracy and relevance of sources retrieved;</td>
<td>• Evaluate information found from academic journals or conferences or patents;</td>
<td>• Understand inaccuracies, misinformation and deception in information retrieved;</td>
<td>• Use the components of a citation (date, format, subject headings or elements of a URL) to choose those most suitable;</td>
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<td>5. An ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively.</td>
<td>3.2 Defines and applies criteria for evaluating information.</td>
<td>3.2 Defines and applies criteria for evaluating information.</td>
<td>*</td>
<td>• Evaluate search results in terms of the original information need.</td>
<td>• Evaluate search results in terms of the original information need.</td>
<td>• Summarise and evaluate information found by creating an annotated bibliography.</td>
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