

Researching an essay:
Undergraduates' ways of
experiencing information
literacy

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*Two roads diverged in a wood, and I –
I took the one less traveled by,
And that has made all the difference.
(Robert Frost, The Road Not Taken)*

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Abstract

This thesis presents a study of students' ways of experiencing information literacy when researching an essay in a first year university course. The aims of the study were to contribute to an understanding and awareness of information literacy from the students' experience, and to inform curriculum design for information literacy education.

The study involved semi-structured interviews with 20 undergraduate students enrolled in a first year environmental studies course at the Australian National University in 2002. A phenomenographic approach was used as the methodological and theoretical basis for the study. This research was modelled on Limberg's (1998) study of Year 12 students researching an assignment. It is positioned between Limberg's study and Bruce's (1997) study of higher educators' conceptions of information literacy.

The experience of information literacy included the interrelationship between the essay, information and learning. The way in which students experienced a focus on learning, focus on the essay task, use of information in the course, use of information in the essay, use of contrasting perspectives and development of argument formed the qualitative differences in experience. Students experienced information literacy when researching an essay as: looking for evidence to backup an existing argument; using background information to develop an argument; and applying learning to help solve environmental problems. A further outcome of the study is that information literacy is framed as a learning approach. These outcomes may have significance for students, teachers, librarians, academic skills advisors, academic developers, policy makers and administrators in higher education.

Chapter 1 - Introduction

This thesis is about the experience of information literacy. Information literacy has been described as the experience of searching for, locating, evaluating, selecting, and using information to learn, analyse, synthesise, create new knowledge, communicate, make decisions and problem solve. It encompasses and extends traditional library skills, information skills, information seeking and use, visual literacy, graphical literacy and information and communication technology (ICT) literacy. It is a way of learning through engaging with information. As such, it is an essential component of critical thinking, independent learning and lifelong learning (American Library Association & Association for Educational Communications and Technology, 1989; Australian School Library Association, 1994; Bruce, 1995; Association of College and Research Libraries, 2000a; Council of Australian University Librarians, 2001; UNESCO, US National Commission on Libraries and Information Science et al., 2002).

Over the last decade, information literacy has become a significant agenda in higher education. It is commonly defined as a graduate attribute, and as such has influenced discourse and curriculum practice within universities. Information literacy education has emerged from a long tradition in library practice in educating information users. Consequently, information literacy education has been based on the perceptions and practices of librarians. In this thesis, I explore the legacy of this history and the impact this tradition has had on information literacy theory and practice. I describe alternative ways of understanding information literacy as a broad educational concept associated with learning, understanding and finding meaning.

This study examines students' ways of experiencing information literacy while engaged in researching an essay in an undergraduate course¹. I have used phenomenography as a research approach and framework for designing and interpreting the study.

Phenomenography is a research approach 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, 1986a p. 31).

¹ The terms course, subject and unit are synonymous. In Australia these terms are used to describe a semester of study in one subject. A typical first year, full time student studies four courses per semester.

In this thesis, I explore the literature in regard to phenomenography, information literacy, information seeking, essay writing, learning and curriculum design. A major focus of my study has been to provide a link between my research and how the results of my study can be used in information literacy education. Practical applications of my study include the design of curriculum (encompassing teaching, learning, assessment and evaluation strategies) and the influence the results of my study will have on alternative ways of understanding and conceptualising information literacy.

Throughout this thesis, I link understandings of information literacy to theory and practice, including teaching, learning and assessment activities. I examine how information literacy is portrayed in definitions, descriptions and models presented by library and information bodies, educators and researchers. I discuss the similarities and differences between different ways of seeing information literacy as demonstrated in theory and practice. I compare educators' understandings of information literacy with students' understandings. I analyse the implications of these understandings for teaching and learning.

The research project

The aim of my study is to describe undergraduates' ways of experiencing information literacy in a defined context. I seek to contribute to an understanding and awareness of information literacy from the students' experience, and to provide to an understanding and awareness of issues in designing effective and relevant teaching, learning and assessment strategies for developing information literacy learning outcomes.

My primary research question asks 'How do students experience information literacy when researching an essay in a first year course?' In order to answer this question, I have interviewed students engaged in researching and writing an essay in a first year environmental studies course. I have collected examples of their assignment work, including information literacy tasks and specific essay tasks.

Using a phenomenographic approach, I have sought to:

- understand the variation in students' ways of experiencing information literacy while researching an essay
- explore the implications of this variation
- investigate the learner's experience of information literacy (Marton, 2000 p. 104).

With this study I also seek to contribute to an understanding of information literacy in a formal educational environment. Consequently, in this study I have addressed the following questions:

1. How do students' ways of experiencing information in the course relate to their ways of experiencing information literacy in the essay?
2. How do students' ways of experiencing information literacy relate to existing models, descriptions and definitions?
3. How can curriculum be designed to facilitate the development of information literacy?
4. Is there a link between learning approach and ways of experiencing information literacy?

Scope of the study

Within this study I have drawn extensively on the phenomenographic literature. This is relevant for the exploration of my topic because of the strong educational focus of phenomenography. It is also due to the influence of two phenomenographic studies on which I have based my research:

- Limberg's (1998) study of Year 12 students' information seeking and use and learning; and
- Bruce's (1997b) study of higher educators' conceptions of information literacy.

Further, I have utilised the theory and practice of information literacy as it relates to formal educational environments. I have not explored issues concerning workplace and community information literacy.

My study focuses on one assessment item in a first year course. In this sense, it has a narrow context. However, the ways in which students experience information literacy through researching one assignment can be linked to the way students search for and use information in the context of a first year course. Furthermore, it illuminates the way first year students in particular experience information literacy. The findings of my

study contribute to building up a holistic picture of how this phenomenon is experienced by students in a formal educational environment.

Organisation of thesis

In Chapter 2, I provide a review of relevant literature from the librarians' perspective, incorporating examination, comparison and analysis of existing definitions, descriptions and models of information literacy, information seeking and use, and the higher education context.

In Chapter 3, I provide a review of relevant literature from a learning and relational perspective. I describe empirical studies into information seeking and use, information literacy and essay writing. I explore the phenomenographic perspective on learning, and relate this to curriculum design.

Chapter 4 describes the methodological framework for the study. I explore how phenomenography fits into an interpretative, qualitative research tradition, and I describe the assumptions and framework of a phenomenographic research approach. I examine the contribution that phenomenography can make to library and information studies and education and I offer my rationale for using a phenomenographic approach.

Chapter 5 outlines the study method. Here I describe the context of the study, the participants, interview procedure and data analysis. I end the chapter with a discussion of validity and reliability within a phenomenographic framework.

In Chapter 6 I outline the results of the study within the phenomenographic framework of categories of description and outcome space.

Chapter 7 is a discussion of the results. Here I relate the outcome of the study to the questions raised by the study. I compare the outcomes of my study to other relevant phenomenographic and qualitative studies. I discuss how information literacy theory and practice might be enhanced by my results. I discuss the significance and implications of my results for teachers, learners, librarians, staff developers, academic skills advisors, library and information bodies, policy makers and administrators. I offer recommendations and suggestions for further research. Finally, I summarise the contribution my study has made to a new understanding of information literacy.

Chapter 2 – Literature Review Part One

Librarians and information literacy

Introduction

My study was initiated by my discomfort as an educator with the prevailing librarian-centric views of information literacy. In teaching in the secondary and tertiary education sectors, I saw information literacy being limited to information skills, information seeking and information behaviour. I was dissatisfied with being required to teach information literacy as decontextualised and generic. In my exploration of the information literacy discourse, it became clear that information literacy education was indeed primarily based on the practice of librarians rather than in the experiences of students.

To help redress this imbalance, I have investigated students' ways of experiencing information literacy when researching an essay in a first year university course. In this chapter, I compare the various definitions, descriptions and models of information literacy from a librarian's perspective. I explore the literature in regard to information literacy; information seeking and use; information behaviour and information literacy education. I examine the place of information literacy in higher education and I discuss information literacy curriculum frameworks. In Part Two of the Literature Review I describe empirical studies of information literacy, information seeking and use and essay writing. I explore learning from a phenomenographic perspective and I advocate the relational model of curriculum design for information literacy education.

What is information literacy?

Information literacy is a concept that has rapidly evolved over the last decade as a field of research, scholarship and educational practice. During this period, information literacy has been subject to a number of definitions, descriptions and models. The plethora of these descriptions, definitions and models of information literacy in the literature illustrates a range of understandings of information literacy. In this review, I focus my discussion on the definitions, descriptions and models widely used in education. It is important to note

however, that any discussion of information literacy in formal education must be seen against a backdrop of information literacy for workplace learning, lifelong learning and participative citizenship, as information literacy extends far beyond formal educational environments. This is clearly expressed in the Australian Library and Information Association (ALIA) (2001) *Statement on Information Literacy for all Australians*:

Object:

To promote the free flow of information and ideas in the interest of all Australians and a thriving culture, economy and democracy.

Principle

A thriving national and global culture, economy and democracy will be best advanced by people able to recognise their need for information, and identify, locate, access, evaluate and apply the needed information.

Statement

Information literacy is a prerequisite for:

- participative citizenship;
- social inclusion;
- the creation of new knowledge;
- personal, vocational, corporate and organisational empowerment; and,
- learning for life.

Library and information services professionals therefore embrace a responsibility to develop the information literacy of their clients. They will support governments at all levels, and the corporate, community, professional, educational and trade union sectors, in promoting and facilitating the development of information literacy for all Australians as a high priority during the 21st century.

The ALIA statement portrays information literacy as being able to seek and use information in order to engage in creating knowledge and lifelong learning. In turn this supports the development of community and society.

The most prominent definition of information literacy continually cited in the literature is that of the American Library Association (1989). The Council of Australian University Librarians (CAUL)(2001 p. 1) utilises the main elements of the American Library Association's (ALA) definition in stating that information literacy is:

an understanding and set of abilities enabling individuals to recognise when information is needed and have a capacity to locate, evaluate, and use effectively the needed information.

As demonstrated by the ALIA statement, information literacy is associated with learning. Both ALA and CAUL state that an information literate person is one who has learned how to learn, but the ALA (1989) goes further:

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 prepared for lifelong learning, because they can always find the information for any task or decision at hand.

Similarly, the Australian School Library Association (1994) states that ‘information literacy is synonymous with knowing how to learn’.

Definitions and descriptions of information literacy differ in regard to the emphasis placed on the dimensions of information seeking and information use. For example, the definition presented by UNESCO, the US National Commission on Libraries and Information Science, and the US National Forum of Information Literacy (2002) reads as follows:

People are information literate who know when they need information, and are then able to identify, locate, evaluate, organize, and effectively use the information to address and help resolve personal, job-related, or broader social issues to problems.

The UNESCO and ALA/CAUL definitions are generally regarded as official definitions of information literacy. Differences between these definitions are apparent. The UNESCO definition goes much further in outlining the effective use of information as addressing and resolving personal, workplace and social issues that closely corresponds with the ALIA statement as described earlier.

Others describe information literacy similarly as:

- the ‘ability to locate, manage, critically evaluate, and use information for problem solving, research, decision making, and continued professional development’ (Orr, Appleton et al., 2001 p. 457)
- ‘the ability to access, evaluate, and use information from a variety of sources’ (Doyle, 1992 p. 8)
- ‘the adoption of appropriate information behaviour to identify, through whatever channel or medium, information well fitted to information needs, leading to wise and ethical use of information (Johnston & Webber, 2001).

However, some writers see information literacy as a more holistic concept:

- ‘a way of learning and finding meaning’(Kuhlthau, 1993 p. 3)
- ‘going through an information seeking and use process to acquire new meaning and understanding’ (Cheuk, 2000 p. 178)
- ‘a way of engaging with, and learning about, subject matter; it is about using information in a variety of meaningful ways’ (Bruce & Candy, 2000 p. 7).

In Table 2.1, I have classified keywords from the definitions and descriptions above to illustrate the differences in complexity. This qualitative difference between the definitions and descriptions was noted by Bawden (2001) in his review of the debate associated with various understandings and nomenclature associated with information literacy. He concluded that ‘*understanding, meaning and context* must be central’ (p. 24)(my emphasis) to a description of information literacy.

Similarly, in an analysis of the discourse on information literacy, Bruce (1997b p. 28; 2000 p. 97) summarised different ways of understanding information literacy as:

- using information technology
- a combination of information and technology skills
- acquiring mental models of information systems
- a process
- an amalgam of skills, attitudes and knowledge
- the ability to learn
- a complex of ways of experiencing information use.

Table 2.1 illustrates narrow and broad understandings of information literacy. Exploring this range of understandings and examining the implications of this range is a major focus for this thesis.

Table 2.1 – Comparison of definitions and descriptions of information literacy

Authority	Processes & skills	Personal, professional & societal impact	Personal meaning
Doyle	Access Evaluate Use		
CAUL/ALA	Recognise need Locate Evaluate Use effectively	Lifelong learning	
Orr, Appleton et al	Locate Manage Critically evaluate Use	Problem solving Research Decision making Professional development	
UNESCO et al	Recognise need Identify Locate Organise Use effectively	Address and solve personal and social problems	
Johnson & Webber	Appropriate information behaviour	Wise and ethical use	
Cheuk	Information seeking and use		New meaning & understanding
Bruce & Candy		Learning about & engaging with subject matter	Using information meaningfully
Kuhlthau		Way of learning	Finding meaning

The variation in understandings of information literacy is exemplified by the outcome of an Australian Interim Coalition for Information Literacy Advocacy meeting held in November 2002 with information literacy practitioners and representatives from schools, higher education, further education, government, adult education, libraries, and library and information organisations. The group considered the ALA and UNESCO definitions described above and decided to adopt the ALA definition, which can be regarded as

narrower than the UNESCO definition. One participant reported on a discussion of the link between information literacy and learning:

Quite a lot of discussion on whether learning is part of IL, or whether it is an added extra. Lots of people can locate and use information without learning anything! (Costello, 2002).

The perception of the workshop participants that information literacy is not necessarily about learning is a fundamental issue in the confusion surrounding definitions and descriptions of information literacy. Indeed, I argue that this group was describing a more limited phenomenon such as information skills or library skills rather than information literacy.

The relationship between lifelong learning and information literacy

As described above, part of the confusion about the nature of information literacy is whether it involves learning or whether it leads to learning. For example, the relationship between information literacy and lifelong learning is mentioned frequently in the literature. Candy, Crebert and O'Leary (1994 p. xi) define lifelong learning as 'all formal, nonformal and informal learning – whether intentional or unanticipated – which occurs at any time across the lifespan'. Lifelong learning is regarded as necessary due to rapid technological, social, cultural and economic change (Association of College and Research Libraries, 2000b). The Australian Library and Information Association (2001), describes information literacy as a prerequisite for lifelong learning while the Association of College and Research Libraries (2000b) states that 'information literacy forms the basis for lifelong learning'. Further, Breivik (2000b) describes information literacy as an 'essential enabler' for lifelong learning.

Lifelong learning is intertwined with self-directed/independent learning and participative citizenship. The American Library Association (1989) states that information literacy is 'a means of personal empowerment. It allows people to verify or refute expert opinion and to become independent seekers of truth.' Therefore, information literacy can be seen as a subset of independent learning that in turn is a subset of lifelong learning.

In 1994, Candy, Crebert and O'Leary's report *Developing Lifelong Learners Through Undergraduate Education* identified information literacy as a component of lifelong

learning. Their profile of the lifelong learner included the following information literacy qualities/characteristics:

- knowledge of major current resources available in at least one field of study;
- ability to frame researchable questions in at least one field of study;
- ability to locate, evaluate, manage and use information in a range of contexts;
- ability to retrieve information using a variety of media;
- ability to decode information in a variety of forms: written, statistical, graphs, charts, diagrams and tables; and
- critical evaluation of information (1994 p. 43).

These characteristics could be associated with information skills, and therefore can be seen as a limited view of information literacy. However, when taken in conjunction with the full profile of a lifelong learner, elements of independent learning, inquiry and critical thinking are evident. These include:

- An inquiring mind
- Helicopter vision
- A sense of personal agency
- A repertoire of learning skills (Candy, Crebert et al., 1994 pp. 43-44).

In recognition of the symbiotic relationship between information literacy and lifelong learning, the Australian *Information Literacy Standards* (Council of Australian University Librarians, 2001 p. 19) includes the outcome 'the information literate person recognises that lifelong learning and participative citizenship requires information literacy'.

Information seeking and use and information behaviour

The varied definitions of information literacy described above are further confused by the phenomena of information literacy, information seeking and use, and information behaviour existing as separate and parallel fields in the literature. The relationship between these phenomena is unclear. For example, some researchers have chosen to describe the area they are investigating as information seeking and use and information behaviour rather than information literacy.

Wilson (1999 p. 249) regards information behaviour as:

Those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information.

Wilson (p. 263) sees information search behaviour as a subset of information seeking behaviour, which in turn is a subset of information behaviour. In contrast with Wilson, Case (2002) does not see information use as part of information behaviour. In a survey of the literature on information seeking, information needs and information behaviour, Case (2002 p. 5) described information seeking as ‘a conscious effort to acquire information in response to a need or gap in your knowledge’, while information behaviour:

encompasses information seeking as well as the totality of other *unintentional* or *passive* behaviors (such as glimpsing or encountering information), as well as purposive behaviors that do not involve seeking, such as actively *avoiding* information.

Examining the information seeking and use and information behaviour literature in detail is beyond the scope of this study, however, it is worth noting that the literature includes a range of ways of seeing these phenomena as:

- mental models
- cognitive structures and transformations
- affective elements
- behavioural psychology
- information processing
- information systems
- stages of development
- cycles or feedback loops
- a sequence of interactions and episodes
- judgements, tactics and strategies
- behavioural patterns
- linear models
- non-linear models
- information retrieval systems
- processes
- seeking meaning

(Wilson, 1981; Kuhlthau, 1988; Kuhlthau, 1991; Fister, 1992; Ellis, 1993; Jacobson & Jacobson, 1993; Kuhlthau, 1993; Valentine, 1993; Pitts, 1994; Limberg, 1996; Limberg, 1998; Limberg, 1999; Macpherson, 1999; Wilson, 1999; Limberg, 2000a; Case, 2002).

Meanings and understandings of the above terms differ in the studies examined. For example, Limberg (2000a p. 193) describes information seeking and use as including elements such as selection, relevance, evaluation, analysis and synthesis of information. Kuhlthau (1988 p. 258; 1991 p. 361) describes the information search process as a way of finding meaning, but in contrast to Limberg, Kuhlthau regards the *use* of information as organisation and control rather than analysis and synthesis.

The fields of information behaviour and information seeking and use predate information literacy. It is possible that the studies published in the 1980s and early 1990s used the term information seeking and use rather than information literacy, as the concept of information literacy was still emerging at this time. For example, when describing her study of the *Information Search Process* in 1993, Kuhlthau (p. 154) acknowledged information literacy as having a relationship with lifelong learning, however Limberg (1998) chose to use the term information seeking and use despite writing her doctorate in the late 1990s. However, a more recent example of how information literacy is seen as separate from information seeking and information behaviour is illustrated by the absence of the term information literacy in Case's book *Looking for Information. A Survey of Research on Information Seeking, Needs, and Behavior* (2002).

In summary, there appears to be at least three ways of viewing the relationship between information literacy and information seeking and use/information behaviour:

1. information literacy is parallel to information seeking and use/information behaviour
2. information literacy intersects with information seeking and use/information behaviour
3. information literacy subsumes information seeking and use/information behaviour.

In comparing the understandings of the above phenomena in the literature, a distinction has emerged between information seeking and use, information behaviour and information literacy. In particular, the strong educational aspect of information literacy appears to be the crucial distinction. This includes the link between information literacy, independent learning and lifelong learning.

Issues relating to information literacy in the higher education context

Information literacy is regarded as a functional literacy of the 'information age' and the 'information society'. It has emerged from the fields of information behaviour and information seeking and use, and the disciplines of library and information studies and education. The term information literacy implies an educative process. In recognition of the educational significance of information literacy, primary advocates have been teacher librarians and academic librarians. Consequently, information literacy education has emerged from user education programs in schools and universities. In this section, I focus on information literacy education in the higher education context.

There are a number of influences and agendas driving information literacy education in the higher education sector. The first issue I discuss is the move to identify graduate attributes, the second is the shift from a teacher focused to student focused culture and the third is the accompanying dual shift in the roles and responsibilities of academic librarians, from service providers to educators and from trainers to teachers.

Over the last decade, there has been a strong move in Australian universities towards identifying attributes that are defined as the outcome of a university education. These attributes have been described not only for graduates of the university as a whole, but also for graduates of particular degree programs in professional areas such as accountancy, engineering, law and medicine (see for example Australian Medical Council, 2002). The interest in graduate attributes has been due in part to universities wishing to promote the employability of their students, as a response to government quality assurance policies, and for accreditation of curriculum for professional bodies. In parallel, there has been government interest in promoting a generic, standardised Graduate Skills Assessment test

(Australian Council for Educational Research, 2002) for benchmarking purposes and to provide a reporting instrument for employers.

Graduate attributes (also described as graduate qualities or capabilities) are closely linked to, and often regarded as synonymous with generic skills or transferable skills. These skills include information literacy, teamwork, critical thinking, problem solving, independent learning, cultural awareness and written and oral communication. For example, the Graduate Skills Assessment test is structured around the generic skills of written communication, critical thinking, problem solving and interpersonal understandings (Australian Council for Educational Research, 2002). In their report on the *Generic Capabilities of ATN University Graduates*, Bowden et al (n.d.) make a distinction between graduate attributes and generic capabilities:

Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include, but go beyond, the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. These are qualities that also prepare graduates as agents for social good in an unknown future. In this report those attributes that go beyond the disciplinary expertise or technical knowledge are called generic capabilities.

The information literacy agenda has gained momentum due to the graduate attributes movement. Information literacy features in the graduate attributes of many Australian universities (see for example University of New England, 2000; Griffith University, 2002; University of Canberra, 2002; University of South Australia, 2002; University of Wollongong, n.d.). This inclusion is significant, as in some universities curriculum renewal and accreditation processes are linked to graduate attributes. Each university presents different understandings of information literacy via their graduate attribute statements. For example, in 1995 the University of Canberra presented information literacy as primarily information technology (IT) literacy while the updated 2002 version confines it to information seeking and information management rather than information use, and IT literacy is included as a separate attribute (see Appendix A).

Another issue that has supported the information literacy movement has been a shift from a teacher centred to student centred culture. This move is illustrated by Barr and Tagg's (2000 p. 198) comment:

A paradigm shift is taking hold in American higher education. In its briefest form, the paradigm that has governed our colleges is this: A college is an institution that exists to provide instruction. Subtly but profoundly we are shifting to a new paradigm: A college is an institution that exists to produce learning. This shift changes everything. It is both needed and wanted.

The increasingly widespread introduction of student centred constructivist pedagogy such as inquiry-based learning, problem-based learning and resource-based learning has provided momentum to the information literacy agenda (Council of Australian University Librarians, 2001 p. 3). Characteristics of inquiry-based and problem-based curriculum design include an emphasis on experiential learning. In these models, a learning environment is provided that enables students to construct learning through asking questions and framing problems. The process of solving/investigating problems involves active, student-driven learning, and there is a strong implicit and explicit emphasis on effective use of information.

In tandem, the explosion of information available to teachers and students and the move to electronic sources of information (including digitisation of journals and web-based information) has made it critical that evaluation of resources, computer literacy and use of electronic sources be integrated into the curriculum.

Librarians and information literacy education

As higher education moves to a student centred, active learning culture, the practice of information literacy education is changing. This is exemplified by the change from describing library-based programs as 'library skills', 'information skills', 'user education' and 'bibliographic instruction' to describing such programs as 'information literacy'.

Academic librarians have been proactive in taking responsibility for information literacy education, mainly due to it being a natural extension of the traditional role of librarians in offering user education and bibliographic instruction. However, this has led to some critical issues in the provision of information literacy education. These issues include

'rebadging' the old ways, thereby limiting information literacy to the library and not taking into account contemporary constructivist pedagogy (Bundy, 2002; Lupton, 2002a; Marcum, 2002).

A further concern is the issue of 'competing' with academics for resources and teaching time. Issues of power and control over curriculum arise when librarians are perceived as taking over academic territory (Snaveley & Cooper, 1997a; Snaveley & Cooper, 1997b; Chiste, Glover et al., 2000; Blackall, 2002). This perception also entrenches the separation of information literacy from the academic curriculum.

What is the difference between traditional library-based programs such as user education, library skills, bibliographic instruction, information skills and information literacy education? Young and Harmony (1999 p. 1) make a distinction between bibliographic instruction and information literacy. They describe bibliographic instruction as being librarian and library centred, print-based, involving information location and retrieval, and set within a formal educational environment. In contrast, they state that information literacy is an educational outcome, involves all information formats, includes evaluation, analysis and synthesis, is learner centred and involves the learner in all aspects of their lives – education, work and personal.

Bruce (1997b p. 47) also sees bibliographic instruction as having a narrower definition, as it focuses on the use of 'formal, library based, information systems', while information literacy involves learning from all kinds of sources. Booker (1995 p. i) explains that library skills or information skills are components of information literacy which include learning how to use the library and the 'bibliography' of a specific subject. Graham and Lester (1999 p. 122) emphasise the difficulty in the use of terms and explain that bibliographic instruction has a strong focus on using search tools. They see information literacy as including transferable skills and concepts that have a wider application.

The terms information literacy and information skills are often used interchangeably in the library and information studies literature dealing with education, training and instruction (see for example ACT Department of Education and Training, 1997; Society of College

National and University Libraries, 1999; McKenzie & Oak Habor Schools, n.d.). In recognition of this, the authors of the *Big Blue Project*, a report into information skills training for senior secondary, further and higher education, claim that the concept of information literacy predates information skills and conclude that there is no difference between the two concepts. They point out that ‘possession of particular skills is implicit in all definitions of information literacy’ (Joint Information Systems Committee, Manchester Metropolitan University Library et al., 2002) which implies that information skills are a subset of information literacy. Similarly, the authors of *Information skills in higher education: a SCONUL position paper* (Society of College National and University Libraries, 1999) see information skills as part of information literacy.

The confusion surrounding the nature of information literacy education is exacerbated by the provision of an extended range of educational programs, some of which mirror traditional user education and bibliographic instruction while others involve collaboration with academics to incorporate information literacy into the course structure (Hepworth, 2000; Rockman, 2002). The current practice in university libraries is to offer an information literacy program that comprises of a mix of generic, parallel, integrated and embedded components (see Table 2.2):

Table 2.2 - Information literacy program components in higher education

Generic	Extra-curricular classes and/or self-paced packages	Responsibility of the library
Parallel	Extra-curricular classes and/or self-paced packages that complement the curriculum	Responsibility of the library
Integrated	Classes and packages that are part of the curriculum	Partnership between librarian and academic
Embedded	Curriculum design where students have ongoing interaction and reflection with information	Partnership between librarian and academic, primary responsibility with academic

(Adapted from Bruce, 2002c)

The inadequacies of teaching generic programs due to their content and context free nature have been addressed in part by the design of integrated and embedded information literacy programs. As Nimon (2001 p. 46) argues, generic programs are an ‘educational nonsense’. Furthermore, Booth (1997 p. 146) states ‘separating the *what* from the *how* of learning and attempting to train the *how* without reference to the *what* appears to be doomed to failure’.

A further response to the provision of information education has been to design formal coursework/credit bearing subjects that present information literacy as a discipline. One example is a course offered at the University of Strathclyde (Webber & Johnston, 2000). However, as outlined above, providing generic and stand-alone courses is at odds with the view that 'achieving information literacy fluency requires an understanding that such development is not extraneous to the curriculum but is woven into its content, structure, and sequence' (Council of Australian University Librarians, 2001 p. 3). Furthermore, Bruce (1994a) states that information literacy 'cannot be the outcome of any one subject. It is the cumulative experience from a range of subjects and learning experiences which creates the information literate person'.

A change in focus from information literacy training to information literacy education can be seen in the broadening of programs from generic to embedded. Generic programs are separate from the curriculum and usually consist of developing search skills and information technology skills. Smith and Ragan (1999 p. 3) describe training as involving 'acquiring very specific skills that they [students] will normally apply almost immediately'. However, Bruce (1997a p. 7) points out that:

teaching specific skills and knowledge is fundamentally at odds with the very idea of information literacy which suggests that knowledge and skills are quickly outdated, and that information literacy involves being able to learn and relearn in the face of constant change.

Laurillard (2000 p. 140) makes the distinction between education and training when stating that the aim of further education is to give students a 'grounding in the practice of a skill or subject area'; while graduates of a university education should be able to 'understand that knowledge is neither static nor discrete...it is relational, context-dependent and complex to transfer from one context to another'. The shift from a training paradigm to an education paradigm is a challenge for current information literacy practice in higher education. Even though the rhetoric may espouse embedded programs, the reality is that training specific generic skills is cheaper and easier and thus more common. Integrating and embedding information literacy requires librarians to have an understanding and awareness of subject content, context and pedagogy which in turn requires extensive professional development, collaboration and time away from more traditional library duties.

To facilitate the shift in educational focus from user education and bibliographic instruction to information literacy there has been widespread acknowledgement of the need for academic librarians to be provided with professional development in educational theory and practice. In addition to the 'scholarly disciplinary knowledge' that academics and librarians have developed in their field, another form of knowledge and awareness is 'didactic disciplinary knowledge' (Booth, 1997 p. 139). Scholarly knowledge is knowledge of subject content, while didactic knowledge is knowledge of the pedagogy of the subject. Information literacy educators may have knowledge of information as an object, but they also need awareness of how and what people learn when seeking and using information. In the library and information studies literature there have been a number of advocates for librarians engaging in teaching development (see for example Peacock, 1999; MacAdam, 2000; Peacock, 2001; Lupton, 2002a; Nimon, 2002) and encouraging academic-librarian partnerships (see for example Stein & Lamb, 1998; Nimon, 1999; Young & Harmony, 1999; Chiste, Glover et al., 2000; Bruce, 2001; Grafstein, 2002). The Australian and New Zealand Institute for Information Literacy (ANZIL) has responded to this need by creating a professional development working party to design and coordinate teaching development for librarians while the US Institute for Information Literacy coordinates the 'Immersion' program (Dorskatsch, 2002). Many librarians also undertake qualifications in adult education and higher education such as a graduate certificate in higher education.

Assessment and evaluation of information literacy education

The need for pedagogical development to facilitate a holistic and learning focused approach to information literacy education can also be seen in an analysis of approaches to assessment and evaluation in the literature.

Assessment of information literacy learning is reported as being undertaken as a diagnostic tool, to measure and describe learning and to evaluate programs. Assessment occurs for a number of reasons, some educational, some operational, some political. As university libraries have expended resources on information literacy education, in turn they are required to evaluate and report on their activities (Orr & Cribb, 2003). Often this is to satisfy institutional, professional and government accountability requirements. Further, as

information literacy is often identified as a graduate attribute, it is subject to pressure to measure and describe attainment.

An example of assessment being undertaken to justify the resources expended on information literacy education is given by the authors of *Project for the Standardized Assessment of Information Literacy Skills* (Project SAILS) (Kent State University Libraries & Media Services, 2002):

Assessment has become a key initiative both for programmatic improvement and to fulfill the obligation for accountability. At Kent State University, we realized that if university administrators were to be persuaded to allocate resources necessary for us to grow our information literacy program, then we must be prepared to substantiate the claim that these skills indeed make a difference institutionally.

The authors state that they aim to develop a tool to measure student learning and program effectiveness that:

- Is standardized
- Contains items not specific to a particular institution or library
- Is easily administered
- Has been proven valid and reliable
- Assesses at institutional level
- Provides for both external and internal benchmarking (Kent State University Libraries & Media Services, 2002).

It is difficult to see where enhancing student learning might fit into the above goals. They are library- and institution-centric. Furthermore, this approach is based on the assumption that information literacy can be measured in a standardised test, thereby representing information literacy as simplistic, mechanistic and generic. A similar paradigm is evident in a suggestion for an 'International Information Certificate' (Urena, 2003) which proposes the design of a generic, standardised competency-based test to measure information literacy skills using the International Computer Driving License as a model.

Some information literacy assessment practices have reflected a library service-orientated approach rather than a teaching and learning orientated approach based on holistic educational outcomes. For example, the University of California Los Angeles Library administers a multiple choice questionnaire that measures 'general information competence' (Caravello, Herschman et al., 2001). The University of Southern Queensland

Library (2002) requires students enrolled in a foundation course to take a diagnostic test and demonstrate a 'satisfactory standard of information literacy'. If they do not achieve a minimum standard they must attend information literacy classes. Others in the same genre include:

- Information competency diagnostic assessment, (California State Polytechnic University Pomona Library, n.d.)
- Internet skills proficiency test, Ohio State University (O'Hanlon, 2002)
- Pre-test and post-test instruments evaluating library user education (Knight, 2002).

This approach to assessment and evaluation illustrates the difficulty faced by librarians in grappling with the concept of information literacy and teaching and learning. It could be argued that by assessing information literacy as dissociated from the course context and content, librarians are perpetuating a divide between information literacy and the curriculum and are misrepresenting information literacy as being library-based. By using superficial measuring instruments librarians are reducing information literacy to lower order skills, and to that which is observable (behavioural) and generic (Bruce, 1997a; Council of Australian University Librarians, 2001; Johnston & Webber, 2002; Lupton, 2002b).

The standards and graduate attributes agenda has also been problematic in representing complex learning concepts in terms of outcomes that can be measured discretely. Further, the terminology of 'information literacy skills'; 'information literacy competencies'; 'generic skills'; and transferable skills' implies that if a 'skill' is learned it can be applied directly to other contexts regardless of topic, subject, discipline and purpose. The content and presentation of the Australian and US information literacy standards (Association of College and Research Libraries, 2000a; Council of Australian University Librarians, 2001) include a range of learning outcomes encompassing skills, knowledge, attitudes, values and characteristics. Some are phrased as behavioural objectives, while others are broad and aspirational goals such as lifelong learning. The checklist nature of the presentation of the standards models and graduate attributes could lead to poor educational outcomes. Clancy and Ballard (1995 p. 159) strongly argue that:

The checklist approach to 'graduate attributes' is extremely dangerous. It inevitably encourages a fragmented curriculum and mechanistic approaches to teaching and learning. Checklists have their place. They are fine, for example in service stations. They are not appropriate in higher education. If embraced there, they will encourage 'skills courses' that are decontextualised from discipline and content, and 'check-off' assessment procedures – fine for motor cars, disastrous for students.

It is simplistic and reductionist to assume that information literacy can be assessed through the use of self-rating scales and multiple-choice tests. Rather, an integrated 'rich task' assessment activity that incorporates content (topic and concepts), process and product (e.g. seminar, essay, report) is more appropriate.

The dominant models of information literacy in formal education influence the way that information literacy is taught, assessed and evaluated. In the next section, I explore the models used in schools and universities to design curriculum and programs for information literacy education.

Information literacy curriculum frameworks

The predominant models used as frameworks for information literacy curriculum in formal education are the standards and information seeking process models. Taken separately and together they offer an understanding and description of information literacy from a librarian's perspective.

Information literacy standards models

The *Information Literacy Standards*, produced by the Council of Australian University Librarians (CAUL) were released early in 2001². They were based on the US Association of College and Research Libraries (ACRL) *Information Literacy Competency Standards for Higher Education* (2000a). Both standards documents consist of a collection of headline statements with a number of learning outcomes listed under each statement. Taken as a model of information literacy the standards expand and extend the basic definitions previously discussed.

² The CAUL *Information Literacy Standards* are being revised by a group of practitioners under the auspices of the Australian and New Zealand Institute for Information Literacy (ANZIIL) and the second edition is due for release in late 2003.

The seven headline statements of the CAUL standards are as follows:

The information literate person:

1. recognises the need for information and determines the nature and extent of the information need
2. accesses needed information effectively and efficiently
3. evaluates information and its sources critically and incorporates selected information into their knowledge base and value system
4. classifies, stores, manipulates and redrafts information collected or generated
5. expands, reframes or creates new knowledge by integrating prior knowledge and new understandings individually or as a member of a group
6. understands cultural, economic, legal, and social issues surrounding the use of information and accesses and uses information ethically, legally and respectfully
7. recognises that lifelong learning and participative citizenship requires information literacy (Council of Australian University Librarians, 2001).

The concepts that are included in the above standards encompass traditional library skills, information skills and information and communication technology (ICT) literacy. They extend to academic skills, communication, critical thinking, learning, lifelong learning and participative and responsible citizenship. This extension is significant, as it has served to redefine librarians' roles and responsibilities in the higher education environment. The representation of information literacy as a broad educational concept has implications for the way information literacy curriculum and programs are taught, and the place that information literacy occupies in the higher education agenda.

The rapid evolution of the concept of information literacy is exemplified by the comparison (described below) of the ACRL and CAUL standards, published just one year apart, in 2000 and 2001 respectively.

The ACRL standards have five headline statements:

The information literate student:

1. determines the nature and extent of the information needed
2. accesses needed information effectively and efficiently
3. evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system
4. individually or as a member of a group, uses information effectively to accomplish a specific purpose
5. understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally (Association of College and Research Libraries, 2000a).

The ACRL standards refer to the information literate *student* while the CAUL standards are broader in referring to the information literate *person*. The CAUL standards have the critical difference of the inclusion of a seventh statement that recognises the importance of a capability for lifelong learning and participative citizenship (Council of Australian University Librarians, 2001 p. 19). It is clear that in the CAUL standards, information literacy is regarded as essential for learning and functioning in a contemporary society, which is consistent with the ALIA *Statement on Information Literacy for all Australians* described earlier in this chapter.

In addition to the CAUL and ACRL standards, the UK Standing Conference of National and University Libraries (SCONUL) has presented the 'Seven Pillars' information skills model for higher education outlined in *Information skills in higher education: a SCONUL position paper* (1999):

The ability to:

1. recognise a need for information
2. distinguish ways in which the information 'gap' may be addressed
3. construct strategies for locating information
4. locate and access information
5. compare and evaluate information obtained from different sources
6. organise, apply and communicate information in others in ways appropriate to the situation
7. synthesise and build upon existing information, contributing to the creation of new knowledge (Society of College National and University Libraries, 1999).

In contrast to the CAUL and ACRL standards, the authors of the SCONUL model state that the model is designed for 'iterative' skill development where the learner moves from novice through to expert. They have chosen to use the term 'information skills' rather than

information literacy, however, they state that learners at a more advanced stage are information literate. The authors claim that first year students will use the first four skills, while 'postgraduate and research students will aim to be towards the expert end, and will be aspiring to the seventh' (p. 7). The assumption that certain year levels will be at certain stages seems to be at odds with the expressed iterative model. Further, it is potentially limiting to both students and teachers and also does not take into account disciplinary differences in seeking and using information. In contrast, both CAUL and ACRL avoided describing their standards as a developmental model and emphasised the non-linear and discipline specific nature of information literacy. It is however interesting to note that the ACRL/CAUL standards do not further develop the implications of information literacy being discipline specific (Association of College and Research Libraries, 2000b; Council of Australian University Librarians, 2001 p. 4).

The CAUL, ACRL and SCONUL models have been designed for higher education. The '*Information Power*' *Information Literacy Standards* (American Library Association & Association for Educational Communications and Technology, 1989) have been designed for the use of teacher librarians³ in primary and secondary sectors. These standards, which predate the higher education standards, are arranged in a hierarchy from information literacy to independent learning to social responsibility. Explicit in the *Information Power Standards* is that information literacy is fundamental to independent learning and that information literacy and independent learning is fundamental to social responsibility (see Appendix B for a list of the standards).

A comparison of the standards models is illustrated in Table 2.3:

³ Teacher librarians are also described as 'media specialists' in the US literature.

Table 2.3 – Comparison of standards models

	ACRL	CAUL	SCONUL	Information Power
Search process	Recognises need Sources (types, formats) Assesses costs benefits Reviews & evaluates need Accesses Constructs search strategy Implements search Retrieves Refines search strategy Extracts and manages Evaluates and revises search	Recognises need Purpose & scope of sources Assesses costs & benefits Reviews & evaluates need Accesses Constructs search strategy Implements search Retrieves Evaluates and revises search	Recognises need Knowledge of sources Selection of sources Search strategy Search tools Accesses Locates	Accesses Evaluates content
Organisation	Summarises Evaluates Organises	Evaluates sources & content Summarises Organises Manages Preserves	Compares & evaluates content Extracts Organises	Accurately uses
Use	Analyses Synthesises Integrates Creates Analyses values Engages in discourse Prepares Communicates	Engages in discourse Compares Creates Synthesises Integrates Reflects Communicates	Applies to problem Communicates Synthesises Creates	Creatively uses
Ethical & legal use	Understands ethical, legal and socio-economic issues Uses information ethically, legally	Understands cultural, economic, legal and social issues Uses information ethically, legally and respectfully	Uses information legally	Uses information ethically
Personal meaning		Engages in independent learning leading to lifelong learning Awareness of values and beliefs		Engages in independent learning Pursues personal interests Appreciates creative forms Strives for excellence
Social impact		Engages in participative citizenship		Contributes to the community & society Participates in social creation of knowledge

(adapted from American Library Association & Association for Educational Communications and Technology, 1989; Society of College National and University Libraries, 1999; Association of College and Research Libraries, 2000a; Council of Australian University Librarians, 2001)

It is of interest to note that the SCONUL and ACRL standards from 1999 and 2000 respectively do not associate information literacy with personal meaning and social responsibility, whereas these aspects are regarded as part of information literacy to a greater degree in the 1989 *Information Power* standards and to a lesser degree in the 2001 CAUL standards. When compared with the definitions and descriptions contrasted earlier in Table 2.1, the same range of qualitative variation can be seen from those who see information literacy as primarily information seeking and use through to an emphasis on personal meaning.

The higher education and school standards give an indication of how information literacy is viewed by experts in these sectors. They pay homage to the legacy of traditional and historical ways of seeing information seeking and use, but they also offer an understanding of information literacy as a broad educational concept, encompassing traditional literacies and contemporary literacies. Their limitations are due to a representation of information literacy as mainly an individual characteristic and endeavour. In addition, the list format of the models is easily interpreted as a 'tick box' approach thereby:

reducing a complex set of skills and knowledge to small, discrete units. The assumption seems to be that the skills have been mastered for good once each unit can be labelled as completed (Webber & Johnston, 2000 p. 384).

To summarise, information literacy as represented in the standards models is seen variously as a set of understandings, skills, attributes, attitudes and knowledge essential for independent learning and lifelong learning. This view of information literacy has implications for the design of curriculum in all educational sectors.

Information seeking process models

In addition to the standards models, a number of models illustrating an information search process have been presented as a framework for information literacy education. These models have been primarily developed for primary and secondary education (see Table 2.4).

Table 2.4 - Information process models

Information Search Process Kuhlthau	Big Six Eisenberg & Berkowitz	Information Process ACT Department of Education	Pathways to Knowledge Papas & Tempe	Research Cycle McKenzie	Info Zone Pembina Trails School Division
Task initiation	Task definition	Defining	Appreciation	Questioning	Wondering
Topic selection	Information	Locating	Presearch	Planning	Seeking
Prefocus exploration	seeking strategies	Selecting	Search	Gathering	Choosing
Focus formulation	Location & access	Organising	Interpretation	Sorting & sifting	Connecting
Information collection	Use of information	Presenting	Communication	Synthesizing	Producing
Search closure	Synthesis Evaluation	Assessing	Evaluation	Evaluating Reporting	Judging

(Eisenberg & Berkowitz, 1990; Kuhlthau, 1993; ACT Department of Education and Training, 1997; McKenzie, 2000; Pappas & Tepe, 2002; Pembina Trails School Division, 2003)

A widely used process model is that developed by Eisenberg and Berkowitz (1990), and is detailed in their book *Information Problem-Solving: The Big Six[®] Approach to Library & Information Skills Instruction*. Eisenberg and Berkowitz present the *Big Six* as a way of using information at school and in everyday life. The *Big Six* skills are represented as stages of the information seeking process and are intended to be non-linear (see Table 2.4).

Other similar process models include (see Table 2.4):

- Information Process (ACT Department of Education and Training, 1997)
- Research Cycle (McKenzie, 2000)
- Info Zone (Pembina Trails School Division, 2003).

A more complex process model developed for schools is *Pathways to Knowledge* (Pappas & Tepe, 2002)(see Table 2.4). The *Pathways* model represents a more complex and sophisticated understanding of information seeking and use than the *Big Six*, *Information Process*, *Research Cycle* and *Info Zone* models. It uses student centred language and incorporates stages of reflection and interpretation. It refers to creating new *knowledge* rather than the emphasis in the other models on synthesis and presentation of *information*. As such, it is the only example of the process models that can be regarded as more closely related to information literacy than information seeking.

The difficulty with the term 'process' is that it can be understood differently: as a systematic or sequential series of actions, or as an act of learning. A phenomenographic view is that learning has two dimensions: one is the process as an act of learning and the other is the content of learning (Marton & Ramsden, 1988 p. 273). The implication inherent in the presentation of the information seeking process models is that there are defined stages that students must pass through in order to complete the task; and that the stages are linear. Despite this implication, the authors of the *Pathways to Knowledge* model have made a deliberate attempt to explain their model is non-sequential, non-linear and recursive (Pappas & Tepe, 2002 pp. 1-3). Eisenberg and Berkowitz (1990 p. 5) state that it is necessary to go through each stage of the *Big Six*, but 'the exact order of stages and the amount of time spent on a given stage may vary greatly from situation to situation'. Similarly, Kuhlthau (1993 p. 113) states that the pace of progress through the model may vary depending on the individual and the task. She explains that two levels of process complicates the stages: 'the process of construction for meaning which overlays the process of information seeking' (p. 113). Unfortunately, she does not go on to explore the meaning construction dimension in her model.

Are the process models synonymous with information literacy? Some see an information seeking process as *synonymous* with information literacy while others see it as a way to *achieve* information literacy. Many elements of the process models are evident in Table 2.3 illustrating the standards models. It is possible to use the standards and process models as a combined model. For example, students go through an information seeking process where they learn and experience discrete skills and competencies and demonstrate behaviours and attitudes. This view is exemplified by the ACT Department of Education and Training (1997) in their Information Access curriculum policy document. In this example, the terms information skills and information literacy are used interchangeably, while the Information Process model advocated in the document (see Table 2.4) sits alongside the information skills associated with each step of the Information Process.

Conclusion

In the first part of the Literature Review I have compared and contrasted a number of library based definitions, descriptions and models of information literacy and related phenomena. I have explored a number of elements of higher education and lifelong education in order to set the development of information literacy in a context of current and past theory and practice. I have concluded that the library-centric view of information literacy has lead to a limited approach to information literacy education.

In Part Two of the Literature Review, I examine the empirical studies that investigate information seeking and use, information literacy and essay writing. The studies I have chosen to describe are mainly those that relate closely to the formal educational environment. They investigate learners using information while completing course requirements. Further, I have chosen studies that use a qualitative approach, as these are complementary to my study. Finally, I present and support the relational model as an alternative model for the design of curriculum and compare and contrast it with the standards and process models.

Chapter 3 – Literature Review Part Two

Empirical research studies and the relational model

Introduction

In this chapter, I describe the empirical research into information literacy, information seeking and use and essay writing which has directly influenced this study. I explore a phenomenographic view of learning and deep and surface approaches to learning. I describe the relational curriculum model and contrast it with the standards and process models outlined in Chapter 2. Lastly, I outline the significance of the study.

Research studies exploring information seeking and use and information literacy

I have used Limberg's (1998) phenomenographic study *Experiencing Information Seeking and Learning, a Study of the Interaction Between Two Phenomena* as a model for my study. Limberg identified the ways a class of 25 Swedish Year 12 students experienced information seeking and learning while researching an assignment. She interviewed students three times over four months during the course of the assignment and investigated how they searched for, located, evaluated, selected and used information. In addition, she interviewed the teacher and librarian, and collected the students' assignments. The second dimension of her study was to investigate students' learning of the topic as an outcome of the assignment. Limberg studied the link between information seeking, information use, and learning outcomes, as she was concerned that models for user instruction treated information seeking in isolation, rather than linking it to subject content (2000a p. 194).

Limberg found three primary ways that students experienced information seeking and use (see Appendix C for a summary):

- Category A – *Fact-finding*
- Category B – *Balancing information in order to choose the right side*
- Category C – *Scrutinising and analysing*

Limberg found that the qualitative differences between the above categories were the ways students described handling relevance criteria, information overload, cognitive authority, bias and deciding when they had enough information. In addition, Limberg mapped students' learning processes and outcomes. She found that the ways of experiencing described above were linked to learning outcomes of subject content. For example, Category C students demonstrated a more sophisticated understanding of the topic, while Category A students demonstrated a fragmented understanding (2000a pp. 199-200).

Limberg (2000a p. 200) saw implications in her results for the way in which librarians teach information seeking and use. She reported that 'no relationship was found between learning outcomes and the more technical aspects of information searching, such as the formulation of queries, the combination of search terms, or technical skills connected to computer use.' Consequently, she hypothesised that the approach often taken by librarians in emphasising the technical aspects of searching may actually encourage fact finding and surface learning (2000a p. 201). This conclusion has implications for information literacy education practice.

The other research I have used as a basis for my study is Bruce's (1997b) phenomenographic study *The Seven Faces of Information Literacy*. Bruce interviewed 16 educators in Australian universities, including lecturers, librarians, staff developers and learning counsellors⁴. In addition, she used written data from 44 educators. Bruce asked educators about how they used information effectively in their work and everyday life. The outcome of Bruce's study was the mapping of seven categories or 'faces' (see Appendix D for a summary of the categories and outcome space structure):

⁴ In Australia, staff developers are also known as academic developers, while learning counsellors are also known as study skills advisors or academic skills advisors.

1. Using *information technology* for information retrieval and communication
2. Finding information located in *information sources*
3. Executing a process (*information process*)
4. Controlling information (*information control*)
5. Building up a personal knowledge base in a new area of interest (*knowledge construction*)
6. Working with knowledge and personal perspectives adopted in such a way that novel insights are gained (*knowledge extension*)
7. Using information wisely for the benefit of others (*wisdom*).

Bruce's study is notable in illuminating relationships between information, knowledge and wisdom. A critical distinction in Bruce's first four categories is that information is experienced as external and objective where information is outside the person, while in the fifth category this shifts to an internal and subjective experience where information is internalised and personalised. Finally, the six and seventh categories represent an experience of information as internal and transformational, i.e. the person is transformed by the information and/or the person transforms the information (Bruce, 1997b pp. 115-116).

Bruce's study reveals the complexity behind higher educators' ways of experiencing information literacy in their work and life, while Limberg's study provides an insight into Year 12 students' ways of experiencing information seeking and use through researching an assignment. My study has been designed to fill the gap between these studies and to link with these studies. I compare the results of my study with the results of Limberg and Bruce in Chapter 7.

Another study relevant to students' experiences of information literacy is Pitts' (1994) study of a class of Year 10, 11 and 12 marine biology students engaged in researching an assignment. Pitts (1994 p. 389) concluded that when investigating information seeking and use, one should look at the whole context of the learning experience:

In a school setting, this means that it is important to look both at information seeking and use and at production as learning strands that are inextricably intertwined with other learning strands... To understand a person's information-seeking-and-use-behavior, the researcher must understand the impact of all the strands involved in any one learning experience.

It may seem axiomatic that one should take into account the holistic learning experience, however historically Pitts' study was set against a backdrop of a number of generic process models described earlier where the subject matter or context of the information was regarded as irrelevant. This situation was summed up by Bruce (1997b pp. 75-76) when she discussed the limitations of existing research into information literacy:

- existing understandings of information literacy are not questioned
- there is an assumption that information literacy is transferable across disciplines and problems
- there is an assumption that information is generic.

Further, Limberg (1999) concluded that 'a common trait of the [information seeking] models is the effort to describe information seeking processes and behaviour on a general level and to disregard variation in information seeking'. Kuhlthau's information search process is one such study that looked at the similarities in experience rather than differences.

Of the process models outlined in Table 2.4, Kuhlthau's model is the only one based on an empirical study of information users. Kuhlthau (1988; 1991; 1993) undertook a group of studies investigating information searching from the user's perspective. The outcome of her study was a series of stages with common feelings, thoughts and actions identified for each of the stages. The affective aspects she identified addressed a significant gap in knowledge about information seeking.

In further studies, Kuhlthau found that library users did not adhere to her model, as nearly 50 per cent of participants did not focus their topic (1993 p. 114). In addition, she found that library users identified the tasks of gathering and completing in every stage rather than the tasks in the model identified as 'recognizing, identifying, investigating and formulating':

A 'gather and complete' mentality might explain users' expectations after they had selected a topic that they would be able to proceed directly to collection without anticipating a need to explore and formulate (1993 p. xxii).

Kuhlthau (1993 p. 112) admitted that 'the Information Search Process may not always be as clear-cut as the six-stage model might imply'. Further, she explained that even though the sequence is accurate, the pace of progress through the stages is highly individual, with a more cyclic characteristic (p. 113). When Pitts (1994) compared the process of the students in her study with existing process models such as those represented by Eisenberg and Berkowitz (1990) and Kuhlthau, she found that students progressed through the models in the same order, 'however, they did not always finish a step before beginning another and often went back and reperformed or completed steps they had begun earlier' (p. 164).

A characteristic of Kuhlthau's research was the assumption that information seeking is generic, i.e. that the process was unaffected by context and subject matter. Further, Kuhlthau identified the similarities in peoples' experiences rather than critical differences in experiences that were described by the phenomenographic studies of Limberg and Bruce.

A further group of studies explored the research processes of undergraduate students and implications for library instruction. Seamans (2001; 2002) studied first year university students' perceptions of information literacy. She found that students felt they did not have to look for extra information as they saw the information given to them by their teachers as sufficient. When they did look for information they primarily used search engines. When searching, they looked for information to support a predetermined viewpoint (2002 p.114, 116).

Fister (1992) interviewed students about their topic focus, process, sources and writing. In common with Limberg, she was concerned about librarians' advice for narrowing a topic as these may encourage using methods that are 'concrete, settled and defined' (Fister, 1992 p. 168). Fister found that students' experience in developing a topic focus was creative and intuitive. She concluded that traditional library instruction techniques 'work better for finding answers than for identifying questions' (p. 168). In addition, Valentine (1993) found that no students used an organised search strategy as advocated by librarians.

In regard to the process of writing and research, Fister found that students integrated these activities throughout the development of the essay. She concluded that librarians tend to treat the search process as separate from the writing process which leads to an artificial distinction between the two dimensions (p. 168). Further, Limberg (1999) pointed out that:

Teachers tend to stress the subject matter of a learning assignment and underestimate the complexities of information seeking for students. Librarians, on the other hand, will prefer to focus on the information search process and disregard subject content or learning outcome.

The final example of a research study is Cheuk's (2000) study of the ways in which a group of eight auditors used information in the workplace. I have selected this study to illustrate the common issues between investigations of information literacy in formal educational environments and of those based in the workplace. Cheuk asked auditors about their process of information seeking and use and used a sense-making methodology that looked at the similarities and differences in peoples' experiences. Cheuk found that there was a general process or procedure that auditors used, however the differences with which they interacted with information were striking. She concluded that:

- Information literacy is not necessarily an orderly and systematic process, but rather a creative, diverse and personal process;
- Information is not necessarily something homogeneous for auditors-as-a-group, but can be different for each individual;
- Information literacy is not seen as a rigid process with guidelines and steps to be followed, but rather as a flexible, creative and reflective thinking process used to decide what steps to take for seeking and using information (p. 184).

The studies reviewed in this section demonstrate that students' experiences do not necessarily reflect strategies advocated by librarians or taught in library instruction. Indeed, it may be that traditional library education actually inhibits and limits students' experiences. Consequently, there is a need for further studies into students' experiences of information literacy in the context of their formal learning environment. Furthermore, there is a need to use the outcome of these studies to design curriculum that will facilitate information literacy learning.

Research studies exploring students' experiences of essay writing

In order to research students' experiences of information literacy in a formal educational context, it is important to study students while actually engaged in researching an assignment. The students in my study were engaged in researching an essay; therefore an examination of research studies relating to essay writing is of relevance to my study. I have limited my exploration of essay writing to phenomenographic studies as they are complementary to my study and can be compared directly with my study. One such study is Hounsell's (1984; 1997) research into students' conceptions of essay-writing. Hounsell (1997 p. 109) asked second year history students about the content of their essay, how they went about preparing it, to describe how it compared with other essays written for the course and to describe various aspects of the task and the course setting.

Hounsell found three categories that included three areas of focus comprising of data, organisation and interpretation (see Appendix E for summary):

1. *Essay as arrangement* - Ordered presentation embracing facts and ideas
2. *Essay as viewpoint* - Ordered presentation of a distinctive viewpoint on a problem or issue
3. *Essay as argument* - Ordered presentation of an argument well-supported by evidence (Hounsell, 1997; Marton & Booth, 1997 pp. 27-29).

Prosser and Webb (1994) investigated the essay writing process of undergraduate sociology students. They found that students held two conceptions of the process of essay writing: *multistructural* and *relational* (terms based on Biggs & Collis, 1982). Students who experienced the essay as *multistructural* used isolated facts to support a predetermined opinion and experienced the essay as a collection of points (Prosser & Webb, 1994 p. 128). Students who experienced the essay as *relational* used their reading to form 'a view on the question, not just for the purpose of collecting facts and quotes' (p. 128), and experienced the essay as an argument.

I return to these empirical studies when I relate them to my results in Chapter 7.

The phenomenography of learning

As discussed in Chapter 2, there is a strong link in the literature between information literacy and learning. As my study is based on a phenomenographic view of learning, uses a phenomenographic approach, describes other phenomenographic studies and discusses phenomenographic approaches in teaching and learning, it is consistent that I now examine learning from a phenomenographic perspective.

Marton (1992 p. 603) describes the ‘phenomenography of learning’ firstly as ‘the study of the differing conceptions of *how* we learn, it concerns conceptions of the *act* of learning’ and secondly as ‘studying learning as a change between qualitatively different conceptions of one and the same phenomenon’. Limberg (1999) describes learning as a change in the relationship between a person and the world, while Prosser (1993 p. 21) explains ‘learning occurs when we come to see and understand something in a qualitatively different way to the way we saw or understood it previously’. Further, Marton and Ramsden (1988 p. 271) state that:

learning should be seen as a qualitative change in a person’s way of seeing, experiencing, understanding, conceptualising something in the real world – rather than a change in the amount of knowledge which someone possesses.

Therefore, not only is learning regarded as a change, it is a ‘change from one way of understanding to another, *qualitatively more complete* one’ (Dall’Alba, 2000 p. 99)(my emphasis). Similarly, Marton describes learning as ‘an individual’s successive growing within the complex of differing understandings’ (1996 p. 183). If there are qualitatively different ways of experiencing something, then the implication is that some ways of experiencing are more complete, complex or inclusive. It is more desirable to experience something in a more complex way. Therefore, learning is the transition from a less complex to a more complex way of experiencing (Marton, 1992 p. 603).

How do we know whether one way of experiencing something is more complete, complex or inclusive than another way? This question has led to a number of phenomenographic studies that investigate aspects of learning including those that explore students’ conceptions of concepts in mathematics, physics and economics. The outcome of a phenomenographic study is the mapping of ways of experiencing into categories of

description. The categories of description are presented in an outcome space that shows the structural relationships between the categories. These relationships may be structured as a hierarchy of inclusivity. Therefore, the outcome of a phenomenographic study can be used by teachers to ascertain ways of experiencing that are more complete, complex or inclusive.

Searching for and using information can be seen as including two interrelated learning dimensions - learning information literacy while learning about a subject. The content and process (what and how) of learning are interlinked, therefore one may learn something (content) in a certain way (process) (Marton, 1986b p. 205; Marton & Ramsden, 1988 p. 273). Within information literacy education, information literacy can be seen as content by those who teach skills generically (without integration or embedding in curriculum), or as a process or act of learning by those who use it as a vehicle for engaging with content.

Bruce (1997b p. 60, 174) adapts a number of Ramsden's (1988b p. 26) phenomenographic principles of learning (in bold) and relates them to information literacy education:

- **Learning is** about changes in conception – teachers need to assist students in developing new and more complex ways of experiencing information literacy
- **Learning** always has a content as well as a process – students need to learn about discipline content as they seek and use information
- **Learning is** about relations between the learner and the subject matter – the focus is not on the student or the teacher or the information, but on the relation between these elements
- **Improving learning** is about understanding the learner's perspective – teachers need to understand the variation in students' conceptions of information literacy.

In order to achieve these principles of learning for information literacy, phenomenographic studies that describe the relation between the learner, the subject matter and process should be conducted.

Deep and surface approaches to learning and information literacy

The discourse on deep and surface approaches to learning is prominent in the higher education literature. Further, Limberg (1998), Hounsell (1997) and Prosser and Webb (1994) all analysed their results in terms of approaches to learning. Educators developing teaching, learning and assessment strategies for information literacy need to have an

awareness of the variation in learning approach amongst students and an understanding of how curriculum design affects learning approach.

Marton and Säljö, in their seminal phenomenographic study of 1976, identified two qualitatively different learning approaches which they described as surface-level processing and deep-level processing (later called surface and deep approaches to learning) (1976; 1997). They asked students to read an article and interviewed students on the content of the article, and how they went about reading it and thinking about it. Marton and Säljö found that some students focused on the text itself, while others looked at what the text was about, the author's intention, the main point and conclusions. In the former approach (surface), students tried to memorise aspects of the text while in the latter approach (deep) students tried to understand the ideas in the text.

A surface learning approach is characterised by passive engagement and using strategies such as memorising and rote learning. A deep learning approach is active and includes theorising, applying and searching for meaning (Marton & Säljö, 1976; Ramsden, 1992; Booth, 1997; Laurillard, 1997; Prosser & Trigwell, 1999). Booth (1997 p. 145) explains 'the essential quality is that deep approaches are seeking meaning in the task viewed in the overall learning situation, whereas the surface approach is more focused on the task *per se*'. A common misunderstanding with surface and deep approaches to learning is to attribute these approaches to a static characteristic of the individual. As Ramsden (1987 p. 276) observes:

An approach to learning is a description of a relation *between* a learner and a learning task - the description of an intention and an action. An approach is not something inside a student. It is dynamic: it has the idea of change tied up in it: it only has meaning with reference to a situation and to certain types of content.

Taking a different perspective, Svensson (1977; 1997a) identified two categories of learning approach as atomistic and holistic. He found that the difference between the two approaches was the use of an organising principle. The atomistic approach consisted of the parts being delimited, ordered and grouped without the use of an organising principle, while the holistic approach integrated the parts into a whole (1997a p. 65). Within the approaches, variation existed:

The most atomistic approach means a memorisation of very specific details. A less atomistic approach means the integration of details into bigger parts and into main parts (p. 67).

Svensson found that it was the interrelationship between the student and learning material that resulted in an atomistic or holistic approach. Therefore, the approach was not a characteristic of the individual, but of the interrelationship between the individual and the particular learning situation.

Furthermore, Ramsden (1987 p. 277) points out that 'performance depends not only on ability, motivation, and skills but on whether the student decides they are needed or not, in a particular situation.' Similarly, Laurillard (1979 p. 403) explains that a learning approach is influenced by the students' perceptions of the context, orientation towards the task, reasons for doing the task and aim of doing the task. Consequently, it follows that learning and assessment strategies to develop information literacy should be designed to encourage deep learning approaches. In their analysis of curriculum integration for developing information literacy, Bruce and Candy (2000 p. 7) offer an alternate perspective to the traditional view of information literacy as a characteristic of learners:

If it can be considered a 'way of learning' or about 'ways of using information', then it becomes a way of working with information that can be encouraged or discouraged by particular learning activities.

Therefore, information literacy can be regarded as a learning approach and associated with an act of learning, or a way of engaging with subject matter.

Limberg (2000a p. 201) hypothesised that the strategies often taken by librarians in emphasising the technical aspects of searching may encourage surface learning approaches. She found that students who experienced *fact-finding* took a surface and atomistic approach, while students who experienced *scrutinising and analysing* took a deep and holistic approach. Similarly, Ramsden, Beswick and Bowden (1986) examined the effects of 'learning skills' classes. They found that teaching learning skills actually increased students' surface learning approaches, possibly due to students strategically choosing surface techniques in order to satisfy assessment requirements and time pressure. Ramsden (1987 p. 280) also criticised learning skills programs as they 'do not take account of how

students think about specific content within particular contexts'. The same criticism can be made of information literacy programs, as many are provided in a generic, content free environment.

In the next section, I examine the relational curriculum model for information literacy education that is based on the outcome of phenomenographic studies.

Relational curriculum model

In Chapter 2, I outlined the library-centric standards and process models for information literacy education. An alternate curriculum model that I am supporting in this thesis is the relational curriculum approach that is based on the outcome of phenomenographic studies. It differs from the standards and process models, as it is a general curriculum approach that can be used for any phenomena, rather than relating to information literacy in particular. In Table 3.1, I compare the assumptions and understandings that underpin the standards, process and relational models.

Bruce (1997a) and Limberg (2000a) advocate the relational model for information literacy education. Bruce (1997a p. 5) states that the relational model 'focuses on the need to develop, or change, the ways in which people relate to and experience what is being learned'. This model is based on an empirical identification and description of peoples' ways of experiencing information literacy using a phenomenographic research approach. The relational model has also been referred to as 'constitutionalist' (Trigwell & Prosser, 1997; Bruce, 2002a), on the basis that our understanding of a phenomenon is constituted as an internal relationship between the phenomenon and the person experiencing it.

Marton and Ramsden (1988 p. 277-280) identify teaching strategies suited to a relational model:

1. Make the learners' conceptions explicit to them
2. Focus on a few critical issues to show how they relate
3. Highlight inconsistencies within and consequences of learners' conceptions
4. Create situations where learners centre attention on relevant aspects
5. Present the learner with new ways of seeing

The outcome of my study is the identification of the qualitatively different ways in which students experience information literacy. This is made explicit through the categories of description and the outcome space that identifies relationships between the categories. Within this structure there is also an identification of the structure of awareness of the student, i.e. what is at the core of the students' awareness, what is in the background, and what is at the fringe of awareness. The structure of awareness is related to the elements of discernment, simultaneity and variation in experience of different aspects of a phenomenon which are then related to learning:

Learning in terms of changes in or widening of our ways of seeing the world can be understood in terms of discernment, simultaneity and variation. Thanks to the variation, we experience and discern critical aspects of the situations or phenomena we have to handle and, to the extent that these critical aspects are focused on simultaneously, a pattern emerges (Bowden & Marton, 1998 p. 8).

Therefore, learning is seen as a change in the structure of awareness, as the different ways of experiencing something will have different aspects of discernment, simultaneity and variation (Runesson, 1999 p. 2; Pang, 2002b p. 10). Further, Bowden and Marton (1998 p. 12) state that to be capable of 'discerning certain aspects and patterns of certain aspects derives from having encountered variation in those aspects and in the combination of those aspects'. They go on to explain that preparing students for encountering an 'unknown future' is by them having experienced variation in the past (p. 12, 24). The idea that elements of discernment, simultaneity and variation are needed for learning is an extension of the relational curriculum approach and represents an evolution in the way phenomenographic approaches are used for curriculum development.

Another way of enhancing learning is to examine teaching. A new direction in phenomenographic research has been to reveal and make explicit the variation in the ways teachers present content. This direction is described as 'variation theory' and is grounded in phenomenographic principles (Pang & Marton, 2002). This is a change in focus in phenomenographic tradition as it has moved from looking at how the learner experiences learning (second-order perspective), to how teachers present content (first-order perspective). These studies have included mathematics teaching in primary school (Runesson, 1999) and teaching of accounting at university (Rovio-Johansson, 1999).

Rovio-Johansson also studied the learners' experience, and found that the variation experienced by the students was related to that presented by their teacher.

Further studies of this genre have included quasi-experimental studies based around an action learning framework. Lessons are designed and taught to provide explicit variation in presenting and handling content and student learning outcomes are measured or described (Pang, 2002a; Pang & Marton, 2002).

In order to enhance learning, students need to experience variation in the different aspects of a phenomenon. Therefore, teaching and learning activities should be designed to facilitate these experiences. In Chapter 7, I give examples of how the results of my study can be applied to information literacy education using a relational curriculum model.

Comparison of the standards, process and relational models

The standards, process and relational models represent particular ways of understanding and representing information literacy (see Table 3.1).

Table 3.1 – Overview of curriculum models

	Standards	Process	Relational
Presentation	<i>List of:</i> <ul style="list-style-type: none"> • Skills • Attitudes • Attributes • Knowledge 	<i>Series of:</i> <ul style="list-style-type: none"> • Steps • Stages • Phases 	<i>Map of:</i> <ul style="list-style-type: none"> • Ways of experiencing
Perspective	Librarian	Primarily librarian ⁵	Information user
Assumption	Individual characteristic	Individual experience	Collective experience
Basis for model	Elements of information literacy	Common experiences of information seeking	Variation in experiences of information literacy
View of learning	Achieve each characteristic	Move through stages	Adopt a broader range of increasingly complex ways of experiencing information literacy

⁵ Kulthau's Information Search Process is based on an empirical study of information users' experience, but the other process models as seen in Table 2.5 are based on the perspective of the librarian.

There are differences in the philosophical basis of the standards, process and relational models. The standards consist of a list of skills, attributes, attitudes, and knowledge. They describe the information literate person or the information literate student, therefore implying that information literacy consists of individual attributes or characteristics. The process models consist of a series of steps, stages and phases that the individual progresses through.

The phenomenographic studies on which the relational models are based have as their outcome a map of information literacy as represented in an outcome space. The categories of description in the outcome space are not representative of individuals, but of the group, therefore, they are not seen as individual characteristics. Inherent in the standards models is the assumption that a student is information literate or has learned to be information literate when they can demonstrate application of the standards. Within the process models is the assumption that if a student has progressed through the stages they have become information literate. In contrast, the assumption of a relational model is that people should experience information literacy in a range of ways. It is also assumed that learning occurs when the individual moves to a more complex, complete or inclusive conception. Therefore, the conception is not necessarily a stable characteristic of the person. In other words, the person who has experienced a more complex conception has awareness of a range of ways of experience and can respond to the particular situation with an expanded awareness. If a person has not experienced a more complete or inclusive conception, they are not aware that other ways of experiencing exist. Therefore, their response will be limited. A relational view is that an extension of learning to novel contexts is more likely to occur if students have experienced information literacy in a range of ways.

Whichever model is used, Bruce (2002c) argues that the critical elements of learning to be information literate are:

1. Experiencing information literacy (learning);
2. Reflection on experience (being aware of learning); and
3. Application of experience to novel contexts (transfer of learning).

Significance of this research

My study is based on the question ‘How do students experience information literacy when researching an essay in a first year course?’ My research is significant in that it builds on existing studies and contributes to filling a gap in existing research. It is modelled primarily on Limberg’s (1998) study of Year 12 students’ conceptions of information seeking and use while researching an assignment and is positioned between Limberg’s study and Bruce’s (1997b) study of higher educators’ conceptions of information literacy. As such, it offers a more complete understanding of information literacy from the experience of senior secondary students through to students and educators at university.

This study contributes to filling a gap in existing research investigating undergraduates searching for and using information for a specific assignment. Furthermore, Bruce and Limberg’s research are the only studies that have investigated information literacy with a phenomenographic approach.

Bruce identifies a research need in this area as ‘people’s varying conceptions of learning information literacy in specific contexts’ (1997b p. 80) and ‘information literacy experiences of individuals and groups’ (2000 p. 105). She recommends that research into students’ conceptions of information literacy be conducted in order to see the similarities and differences between students and teachers (1997b p. 183). Further, she recommends that research into how information is used in learning be undertaken (1997b p. 184; Bruce, 2000 p. 104).

In particular, Bruce (1997b p.157) describes the lack of research into students’ ways of experiencing information literacy in the higher education sector as a significant gap. She states that:

Students’ experience of information literacy will need to be explored, through further research, to strengthen any curriculum developed and to help in the diagnosis of learning difficulties (p. 157).

Todd (1999 p. 30) has encouraged researchers to build a theoretical base for information literacy including investigating ‘understanding the voice/perspective of the everyday information user and non user; and a focus on people making sense and constructing

meaning through information.’ Finally, Breivik (2000a p. xi) identifies as a key issue the ‘need for research and practice to work hand-in-hand’.

My study addresses a need for an understanding of students’ experiences of information literacy and offers strategies for curriculum design based on these experiences. When taken separately and in conjunction with the research of Bruce and Limberg it offers librarians, academics, academic skills advisors, staff developers, policy makers and administrators in higher education a greater understanding of the ways in which students engage with information.

Conclusion

In this chapter I have selected research studies that explore information literacy, information seeking and use and essay writing to illustrate existing research and knowledge in areas related to my study. I have described a phenomenographic approach to learning and relational curriculum design.

To conclude, as demonstrated in Chapters 2 and 3, it appears from the various definitions, descriptions, models and research studies that there are a number of critical qualitative aspects that constitute information literacy and that distinguish information literacy from other phenomena such as information skills, information behaviour and information seeking and use. These qualitative differences include the dimensions of knowledge and wisdom and the relationship of information literacy with critical thinking, independent learning and lifelong learning. In Chapter 7, I relate these aspects to the results of my study.

In the next chapter, I outline the methodological framework that underpins this study.

Chapter 4 - Methodological Framework

Introduction

The purpose of this chapter is to describe the methodological basis for my research and to present my rationale for choosing a phenomenographic approach. I discuss the characteristics of qualitative research and how this approach is appropriate for the questions I am exploring in my study. I include the perspective that I bring to the research. I outline the theoretical framework of phenomenography and include a description of the evolution of phenomenographic research. I discuss the significance of a phenomenographic approach in library and information studies and education. Finally, I examine criticisms of phenomenography and confirm the value of phenomenography for my investigation.

Qualitative research framework

The methodological basis for my study is phenomenography, which is an interpretative research approach that fits within the qualitative research tradition. In tracing the history of qualitative approaches, Denzin and Lincoln (2000a p. 3) offer a generic definition of qualitative research as a 'situated activity that locates the observer in the world'. They describe it as an approach that makes the world 'visible'. Qualitative researchers work in natural settings and contexts such as classrooms and communities rather than laboratories. They attempt to 'make sense of, or to interpret, phenomena in terms of the meanings people bring to them' (p. 3). Key assumptions held by qualitative researchers are that the meaning of situations can only be understood through the eyes of those experiencing them, and that the researcher attempts to become part of the subjects' world in order to understand their experience (Gorman & Clayton, 1997 p. 23).

The qualitative researcher may draw on data such as interviews, observation, conversations, photographs, recordings, artefacts and diaries. Qualitative studies focus on the 'qualities of entities and on processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency' (Denzin &

Lincoln, 2000a p. 8). The emphasis in qualitative research is on an inductive approach where an interpretation is developed based on data gathered. (Guba, 1981 p. 78; Entwistle, 1997c; Gorman & Clayton, 1997 p. 26; Trosow, 2001 p. 368).

In a qualitative study the researcher is regarded as a tool or as a research instrument. Eisner (1991 pp. 33-34) describes this process as 'self as instrument' where the researcher frames, makes sense of and interprets the situation. Eisner (p. 34) regards subjectivity as a 'unique signature [which] is not a liability but a way of providing individual insight into a situation'. In this research I have been a tool for data collection as I have designed the study, constructed the questions, probed the responses and identified the outcome space framework of meanings, categories of description and foci of awareness. My background as a teacher has heavily influenced my choice of research approach, research questions and research context and has contributed to my focus on learning. My experience as a librarian has resulted in an expert's knowledge of information processes and systems, which has influenced the way I view students' responses. My understanding of the discourse into models and definitions of information seeking and use and information literacy have framed my research design, research questions and research context.

Information literacy is an emerging field that is dominated by the librarians' perspective. This has lead inevitably to a limited view of the phenomenon. In order to learn more about information literacy, it is essential to design a qualitative study that investigates other perspectives, especially that of the learner/information user. For example, the few qualitative research studies that have been conducted from the users' perspective have changed the way we think about information literacy. As described in Chapter 3, Bruce's (1997b) study was the first to define the breadth of information literacy as including knowledge and wisdom, Limberg's (1998) study linked information seeking and use with learning outcomes of subject content and Kuhlthau's (1991) study found a number of affective elements associated with the search process. In investigating undergraduate students' ways of experiencing information literacy I have positioned my study between two of these studies: Limberg's (1998) phenomenographic study of Year 12 students researching an assignment and Bruce's (1997b) phenomenographic study of higher educators' conceptions of information literacy. It is therefore essential that I use a

phenomenographic research approach to enable my research to be directly compared with that of Limberg and Bruce. When taken in conjunction with this research, my study will contribute to a greater understanding of information literacy in a formal educational environment as the range of experience from senior secondary students to university students to university educators will be mapped. This is of benefit to the educational community as taken in conjunction with existing studies it offers a richer description and understanding of information literacy.

My choice of a phenomenographic research approach reflects my 16 years experience as a teacher in a number of educational settings:

In a sense, phenomenographic research mirrors what good teachers do. It tries to understand what the students are doing in their learning. It attempts to discover what different approaches students are taking and to understand these in terms of the outcomes of their learning activities. Good teachers do that as a preliminary to further action to help their students come to understand the concept concerned and, of course, many do it instinctively (Bowden, 1986 p. 10).

Bowden (2000 p. 48) uses the term 'phenomenographic pedagogy' to describe the phenomenographic way of thinking about learning as an approach to curriculum design. Bowden's observation affirms my own conclusion that phenomenography is the most appropriate approach to achieve student centred understandings. In addition, it is a powerful way of combining my own educational philosophy with a research approach.

As outlined in Chapter 1, the aim of my study is to describe undergraduates' ways of experiencing information literacy in a defined context. I seek:

- to contribute to an understanding and awareness of information literacy from the students' experience
- to contribute to an understanding and awareness of issues in designing effective and relevant teaching, learning, assessment and evaluation strategies for developing information literacy learning outcomes.

In order to achieve these aims I have asked 'How do students experience information literacy when engaged in researching an essay in a first year course?'

I have based my inquiry on the following overarching aims identified in the early phenomenographic studies of Marton and Säljö. They sought to:

- understand variation in learning
- explore the meaning underlying the variation
- investigate the learner's experience of learning (Marton, 2000 p. 104).

Similarly, in my study, I seek to:

- understand the variation in students' experiences of information literacy
- explore the meaning underlying this variation
- investigate the learner's experience of information literacy.

The primary assumption I have made in conducting this study is that ways of experiencing researching an essay represent ways of experiencing information literacy. I have assumed that investigating information literacy involves:

- understanding information literacy from the information users' perspective
- studying information users while engaged in a task that involves information literacy
- examining, questioning and challenging existing definitions, descriptions and models of information literacy.

Further, I have assumed that descriptions, definitions and models of information literacy have influenced understandings of information literacy and have affected information literacy education. I have also made the assumption that information literacy is linked with learning.

Assumptions apparent within the phenomenographic approach that underpins this study are explored in the next section.

Phenomenography

The emphasis of this study is on learners and learning in the context of a formal educational environment. I have chosen phenomenography as the methodology and theory that underpins my study, as it is learner centred, experiential and focused on meaning (Marton,

1981 p. 182). In addition, it provides a way to explore information literacy that is complementary to the studies of Limberg and Bruce.

Phenomenography was developed in Sweden in the 1970s as an alternative qualitative research approach to study learning. It is a 'rigorous, empirical exploration of the qualitatively different ways in which people experience and conceptualise various phenomena in aspects of the world around us' (Marton, 2000 p. 103). Phenomenography looks at the relation between the person experiencing (subject), and the part of the world in question (object) (Marton, 1994 p. 4426). Phenomenography describes the variation, meaning and critical differences in the way people experience a phenomenon. The outcome of a phenomenographic inquiry is the identification of the different ways people experience a phenomenon and the structural relationships between those different ways of experiencing.

The assumptions behind phenomenography are:

- people experience phenomena in a limited number of ways that are qualitatively different
- each way of experiencing is constituted as a relationship between the person and the phenomenon
- the critical features of these ways of experiencing can be described by the researcher in categories of description
- the categories can be logically structured by the researcher into an outcome space representing the relationship between the different ways of experiencing.

Further, there are a number of aspects that are assumed about the nature of the outcome space:

- each individual category describes something distinct about ways of experiencing
- the categories are structured in a logical relationship that may be hierarchical
- as few categories as possible should be constituted to capture the critical variation.

The overall goal is to describe the collective variation as completely as possible, but with parsimony (Marton & Booth, 1997 p. 125).

A conception is the internal relation between the person and the phenomenon, while the categories of description are themselves internally related as they form the outcome space. The relation of the researcher to the categories and outcome space is that the researcher discovers and constitutes these from the data. A further relationship exists between the data, the nature of the outcome space and the conceptual framework guiding the analysis (Bruce, 2002b).

In phenomenographic studies, the terms conceptions, perceptions, understandings, apprehensions and ways of experiencing are used interchangeably. In recent years, 'ways of experiencing' has become more prevalent. I prefer to use 'ways of experiencing' as it is more readily understood by those outside the phenomenographic research community. However, in this thesis I use both 'ways of experiencing' and 'conceptions' for clarity of expression and because I am analysing the phenomenographic discourse which frequently uses the term 'conceptions'.

Variation in experiencing the phenomenon is identified through mapping ways of experiencing into a limited number of categories of description (Marton, 1994 p. 4424; Marton & Booth, 1997 p. 125). A basic assumption of phenomenography is that 'ways of experiencing' refers to *what* is described, while 'categories of description' refers to the *way* in which it is described (Marton & Booth, 1997 p. 127). Ways of experiencing a phenomenon can be represented in categories of description but are not equal to categories of description. One way of experiencing constitutes one facet of the phenomenon (Marton & Booth, 1997 p. 124). An individual's way of experiencing may not be directly reflected in a category of description as the categories are formed using the collective experience. Ways of experiencing come from the collective experience of the participants in the study, while categories of description are the way in which the researcher constitutes critical differences in ways of experiencing. The variation described is distributed across the group, and even a single way of experiencing something can be distributed (Marton, 1996 p. 182; Marton & Booth, 1997 p. 124). Therefore, the variation in ways of experiencing can be generalised, rather than related to a particular individual's experience.

Since the same categories of description appear in different situations, the set of categories is thus stable and generalizable between the situations even if

individuals move from one category to another on different occasions (Marton, 1981 p. 177).

The categories of description are necessarily an abstraction of the data. These abstractions are made in order to represent the data.

Conceptions may be described in terms of their reduced content, where the reduction which is also an abstraction, is a reduction of the meaning of the main parts of the phenomenon conceptualised, with preserving of the main content of the parts as parts of an organised whole (Svensson, 1997b p. 168).

Sometimes the categories will form a hierarchical relationship where the lower levels are subsumed by the higher levels. The structure demonstrates how the category relates to other categories.

The hierarchical structure can be defined in terms of increasing complexity, in which the different ways of experiencing the phenomenon in question can be defined as subsets of the component parts and relationships within more inclusive or complex ways of seeing the phenomenon (Marton & Booth, 1997 p. 125).

The categories have additional dimensions consisting of an external and internal horizon. The 'external horizon' is the way a phenomenon as a whole is discerned from its context; while the relationships between the parts and the whole is the 'internal horizon' (Marton & Booth, 1997 p. 87). To experience something means to have discerned it from its context, and therefore to have given it a meaning. Within ways of experiencing a phenomenon, some aspects will be in the fore, while others will have receded to the background, but still be present in awareness. These layers of awareness include what is at the core of awareness, what is surrounding the core, and what is on the fringe of awareness. Together these elements form a structure of awareness which becomes part of a phenomenographic analysis (Marton, 1996 p. 179).

In addition, Åkerlind (2003 p. 155) describes a type of hierarchical structure of awareness as 'themes of expanding awareness', where there are 'groupings of logically related dimensions of variation that run through all of the categories of description, with each level of awareness within a theme comprising a new dimension of variation'.

Elements of awareness can also be described in terms of elements of discernment, variation, contemporaneousness and simultaneity (Marton & Booth, 1997 pp. 100-102). For discernment to occur, variation must have been experienced. Contemporaneousness is the way of combining and drawing upon past experiences to have a point of reference for noticing variation, while simultaneity refers to the aspects of the phenomenon that are focused on at the same time (Marton & Pang, 1999 pp. 5-7). A phenomenographic analysis identifies these elements and uses them to develop an outcome space.

The outcome space is the structure that describes the relationship between the categories of description. Consequently, the collection of categories of description in the outcome space form a complete description of the ways in which people experience a phenomenon.

Evolution of the phenomenographic approach

The evolution of phenomenographic research into learning has progressed from initially asking ‘Why are some students better at learning than others?’ to ‘How can we improve learning?’ This can be traced through the various ‘lines’ of phenomenographic research into learning:

1. studies of general aspects of learning such as the association between learning outcome and learning approach
2. learning in particular content areas such as physics and economics
3. studies of variation in the way teachers present content
4. studies of student learning outcomes where teachers have presented variation in particular aspects of content (Marton, 1986a; Marton & Pang, 1999; Rovio-Johansson, 1999; Runesson, 1999; Dall’Alba, 2000 pp. 73-74).

All these areas of research relate to the understanding and improvement of teaching and learning. However, the third and fourth areas (based on variation theory⁶) present more recent developments in phenomenography, where there is a direct application of phenomenographic principles to the classroom.

⁶ It is beyond the scope of this thesis to examine variation theory in detail.

My study fits into the first area of research as it is not looking at the learning of particular concepts in a discipline area, but rather the way students learn through using information. The identification of these ways is valuable for teachers and librarians in designing teaching, learning and assessment activities. It may be possible to use the results of my study to conduct a further phenomenographic study consistent with the fourth line of research in which teachers present content using the variation in ways of experiencing information literacy as a framework.

Phenomenographic approaches in library and information studies

Library and information science practitioners and researchers have traditionally used quantitative methods within a positivist paradigm (Trosow, 2001). Lincoln (2002 p. 4) reviews library research literature and reports that a broader spectrum of research methods are now being used. She concludes that interpretative approaches ‘see possibilities which might illuminate aspects of libraries, library services, and library users’ perspectives in ways we have not had access to in previous research’. Others have advocated the use of various qualitative methods and approaches in library and information studies in order to address complex research problems and to see the experience through the participants’ eyes (Bradley, 1993; Ellis, 1993; Sutton, 1993; Sutton & Bradley, 1993; Bruce, 1999; Limberg, 2000b; Thomas & Nyce, 2001; Trosow, 2001).

Bruce (1997b pp. 64-65) compares traditional and alternative research paradigms in library and information studies and describes a traditional paradigm as focusing on information as measurable, external and objective while the alternative paradigm is concerned with information as constructed by the user, is able to be interpreted and is defined in terms of the user’s cognitive structure. She lists the alternative ‘descriptive’ approaches as constructivist, naturalistic and interpretative (p.33). Bruce (1999 pp.33-34) promotes interpretative approaches and summarises the benefits of their use. They:

- break down the prevailing subject-object dichotomy that often takes the form of attention to either users, systems or some other information objects;
- allow access to the subjective world of the user;
- are based on principles of reflection and contextualisation; and
- have the potential to revolutionise LIS [Library and Information Studies] practice.

An interpretative research perspective that Bruce (1997b; 1997a; 1999) and Limberg (2000b) advocate is the relational approach. Phenomenography is relational as it looks at the holistic relationship between the user and the world:

The research subject, the person experiencing something, and the object, that which is experienced, are not viewed as separated. The way in which the subject experiences the object forms a relation between the two (Limberg, 2000b p. 54).

Therefore, the relational approach is ‘second-order’ as it looks at how people experience the phenomenon. Many studies of information behaviour come from a ‘first-order perspective’ as they examine ‘what people do and how they act’, while the ‘second-order’ perspective investigates ‘phenomena as they appear to people’ (Limberg, 2000b p. 54). In a second-order perspective the researcher attempts to describe the world as the person views it, not as the researcher views it, or as other research views it. This is particularly appropriate for research about learning, as understanding the students’ experience should be the basis for enhancing learning.

Bruce’s (1997b p. 13, 16) table contrasting the traditional model with the relational model illustrates this difference (see Table 4.1):

Table 4.1 – Comparison of traditional and relational models

Traditional	Relational
Derived from scholars’ views	Derived from users’ experiences
Derived from seeking consensus	Derived from seeking variation
Sees information literacy as measurable	Does not see information literacy as measurable
Sees information literacy as definable	Sees information literacy as describable
Asks how much has been learned?	Asks what has been learned?
Portrays information literacy in terms of attributes	Portrays information literacy in terms of varying conceptions
Views learning as acquisition of skills	Views learning as change of conception

(adapted from Bruce, 1997b p. 13, 16)

By using a phenomenographic approach the meaning of the learning experience for students can be understood (Marton, 2000 p. 103). In order to understand and enhance learning, it is essential to ask questions such as ‘How do people experience information literacy?’ (second-order perspective) rather than to ask ‘What is information literacy?’ (first-order perspective). As Bruce outlines in Table 4.1, rather than asking ‘How much has

been learned?', it is more illuminating to ask 'What has been learned?' This understanding and illumination can then be used to develop pedagogy grounded in experience.

In relation to information literacy, Bruce (1997b p. 40) describes a phenomenographic approach as:

- experiential, based on the lived experience of people interacting with the world around them;
- relational, it focuses neither on the person, nor on the object of interest, but on the relation between them; and
- second order, it represents the views of information users, through their discourses rather than the views of experts.

My study is based on students in the natural context of researching an essay for an undergraduate course. As such it represents the voices of the learners, rather than the voices of experts that are heard via the information literacy standards and process models.

Phenomenographic approaches in education

An extensive body of literature explores the value of qualitative approaches in education including phenomenography (see for example Ramsden, 1988a; Eisner, 1991; Marton & Booth, 1997; Marton, Hounsell et al., 1997; Prosser & Trigwell, 1999). A key phenomenographic study that has strongly influenced discourse on teaching and learning has been the identification of deep and surface approaches to learning by Marton and Säljö (1976).

In describing research into learning, Entwistle (1997a p. 13) contrasts traditional quantitative paradigms with alternative qualitative approaches such as phenomenography. He states that the traditional paradigm tends to produce formal or mechanical models, makes assumptions about cause and effect and explains behaviours from outside as a detached, objective observer. The alternative phenomenographic/relational paradigm involves a shift of methodology and perspective, is derived from students' descriptions; and seeks emphatic understanding. Further, Säljö (1988 p. 34-35) explains that understanding and improving learning 'entails rigorous description of the activities of teaching and learning in educational settings' and that the learner's perspective is paramount. In understanding learning, it is valuable to identify a particular way of experiencing something that is more preferable, complex or inclusive. In a phenomenographic study, the

identification of these experiences form an outcome space which frequently has an 'identifiably hierarchical structure of increasing complexity, inclusivity, or specificity' (Marton & Booth, 1997 p. 126). This understanding should influence educators to design teaching, learning and assessment strategies that develop students from less complex to more complex ways of experiencing.

Criticisms of phenomenography

Phenomenography has been criticised by some authors despite the advantages of taking a phenomenographic perspective. Critics of phenomenography have included Richardson, Webb and Säljö. Richardson (1999) presents a case for a constructivist reworking of phenomenographic research, while Webb (1997 p. 202) argues that phenomenography 'claims an orientation towards human subjectivity and qualitative explanation, yet is method driven in an attempt to make the kind of generalisation associated with positive science'. Säljö (1997 p. 188) warns that phenomenography risks becoming 'pseudoempirical' and 'abstract' which is contrary to the original aim of the approach.

I attempt to address some of these issues when responding to trustworthiness criteria in the next chapter. In deciding to use a phenomenographic approach as the basis for this study I have given consideration to the strengths and limitations of this approach.

Conclusion

In conclusion, I have chosen phenomenography as a methodology and theoretical framework as it offers a powerful way of investigating information literacy from the students' perspective and it allows me to juxtapose my research with the studies of Limberg and Bruce and therefore offer a broad picture of information literacy. In addition, it is consistent with my own teaching philosophy.

Although phenomenography is not without its critics, it is nevertheless able to provide an understanding of information literacy that is not accessible through other research frameworks. The last word regarding the efficacy of phenomenographic research should go to Entwistle (1997b p. 129), who in response to criticism of the approach stated 'the test is

generally not its theoretical purity, but its value in producing useful insights into teaching and learning.' The reader may judge whether my research has achieved such insights.

In the next chapter, I further explore the phenomenographic approach in relation to interview procedure, question formation, the role of the researcher in data analysis, analysis procedure and the evaluation of phenomenographic inquiry.

Chapter 5 - Study Methodology

Introduction

The phenomenographic methodological and theoretical framework as described in Chapter 4 has influenced and formed a basis for the entire study. This framework includes the empirical studies of Limberg and Bruce, the phenomenographic view of learning and pedagogy and the relational curriculum approach as discussed in Chapter 3.

In this chapter, I outline the methodology for my study, including the process and procedures I used to carry out the study. This includes a description of the pilot study, question formation, interview procedure, selection of participants, context, data collection and data analysis. I also address concerns of validity and reliability in phenomenographic inquiry. All of the steps undertaken have been underpinned by a phenomenographic approach.

Pilot study

The aim of the pilot study was to trial the interview questions and to practise interviewing techniques. The pilot study was conducted during February and March 2002. Four Australian National University students participated in the first round of pilot interviews. Three students were commencing second year, while one was commencing his Honours year. Two students were male, two female. The pilot interviews were taped and ranged in duration from 45 to 60 minutes.

The questions for the pilot study were originally designed based on the studies of Limberg and Bruce, however for this thesis I used data gathered only from the first interview which covered questions modelled on Limberg's study. I therefore hereafter only refer to the first interview in this thesis (see Appendix F for a brief description of the second interview).

I constructed questions using the brief summaries in Limberg's (1999; 2000a) published works as a guide. Subsequently, (after obtaining a copy of an unpublished draft translation of Limberg's 1998 thesis) I discovered that Limberg conducted her student interviews with

a highly structured approach covering 15 or 16 specific questions in each of her three interviews. In contrast, I used a semi structured, open ended approach with few predefined questions. The initial questions for the pilot study were as follows:

1. *What types of information did you use in this class?*
2. *How did you go about searching for information for your assignment?*
3. *Where did you search for information?*
4. *How do you decide when you have enough information?*
5. *How do you decide on the quality of the information?*
6. *What sources did you find most useful and why?*
7. *Would you do anything differently?*

Issues that arose from these initial interviews were the phrasing of the questions and my interviewing technique. When questions were asked, I noted whether I had to reframe or clarify the question due to uncertainty or confusion. I also asked at the end of the interview if any questions were difficult to understand and how comfortable the student felt during the interview. The outcome of this feedback was the amendment of some questions and the development of a script to advise students of how the interview was going to be conducted (see description later in this chapter).

I made verbatim transcriptions of the interview tapes through the process of listening to a few seconds of tape at a time and dictating the words into the computer using voice recognition software. Upon listening to the tapes and reading the transcripts, it became apparent that I was not allowing enough space for the participants to keep talking and elaborating, as I tended to speak whenever there was a pause. I also showed the transcripts to a colleague who observed that my probing techniques needed improving as I was accepting an answer too early and not following up aspects that the participant had raised.

In order to improve my interviewing techniques, I conducted a second round of pilot interviews (30 minutes) with three University of Canberra Honours students and one Masters student (all female). While conducting the interviews I wrote keywords on a notepad in order to follow up aspects of the student's response. I also controlled my

tendency to speak while the student was thinking. These interviews were transcribed and the probing techniques analysed.

It was apparent from the pilot study that students had difficulty with the first question (*What types of information did you use in this class?*), as they were confused about the definition of 'information'. I considered asking students directly what they thought of as information, but decided against this, as I wanted students' understanding of 'information' to emerge naturally from students' responses to their context.

The study

The aims of the study were to contribute to an understanding and awareness of information literacy from the students' experience and to use this understanding for the design of effective and relevant teaching, learning and assessment strategies for developing information literacy learning outcomes. The basis of the study was the question "How do students experience information literacy when researching an essay in a first year course?"

Context

Resources, Environment and Society (SRES1001) is a first year inter-disciplinary course offered by the Faculty of Arts and Faculty of Science at the Australian National University (ANU). It is an environmental studies course that has an emphasis on geography and sociology. The course is part of the ANU iLearning Project administered by the Centre for Educational Development and Academic Methods (CEDAM) to encourage inquiry-based learning curriculum design. The iLearning Project supported the development of theme-based interdisciplinary first year curriculum around a framework of inquiry learning methods, integrated academic skills (including information literacy) and collaborative learning.

I chose the study participants from Resources, Environment and Society because of the strong focus on the use of information in the curriculum. The course design included embedded information literacy learning outcomes that were facilitated by information literacy teaching, learning and assessment activities. These were as follows:

- Lecture segment and hands-on tutorial covering searching the web and evaluation of web resources. The tutorial included a class brainstorming session of keywords, phrases and synonyms related to the topic
- Submission of a 'webography' consisting of a critical analysis of five websites including purpose, currency, viewpoint and the way the information will be used in a tutorial debate. The webography was completed in pairs and mounted on the course website
- Lecture segment and hands-on tutorial covering searching library databases for scholarly journal articles related to the essay topic. The tutorial included a brainstorm of the essay topic with students choosing a particular environmental problem to explore in the essay
- Submission of an annotated bibliography containing five websites and five journal articles on the students' choice of essay topic
- Tutorial covering critical reading and referencing skills and concepts
- Tutorial where students peer reviewed essay drafts
- Hands-on tutorial covering PowerPoint skills
- Lecture segment on presentation skills when giving PowerPoint presentation
- Individual tutorial presentations (PowerPoint) at the end of the course that included:
 - What I learned about doing research
 - What I learned about learning
 - Key concepts of the course
 - Key questions the course has raised
 - Key myths the course has exploded

My involvement with the course included the initial planning of the information literacy aspects in Semester 2, 2001 as a member of the ANU's Information Literacy Program team. In March 2002, I was appointed as Coordinator for the iLearning Project at the Centre for Educational Development and Academic Methods. This gave me direct involvement with the course, as it was a part of the iLearning Project. I participated in weekly teaching team meetings and attended lectures, panel discussions, the field trip and the class barbeque. I attended the last week of tutorials where students gave a short seminar presentation. I also taught eight of the information literacy tutorials (four per week for two weeks),

co-presented an information literacy lecture and presented a short lecture on delivery of PowerPoint presentations.

Students viewed me as a staff member as I had a strong association with the teaching team (two lecturers and three tutors) and I presented some tutorials and lectures, but they were made aware that I did not assess their work and that I did not discuss their interview with the teaching team (see Appendix G and H for consent form and information sheet). As there were a large number of presenters involved with the subject (guest lecturers from ANU, research centres, industry, government, indigenous community and support staff from the Information Literacy Program), students were accustomed to a number of different people with authority being involved in the course.

Recruitment of participants

During March 2002, I invited the group of 110 students enrolled in Resources, Environment and Society to volunteer for the research project. In the first lecture of the semester I distributed the information sheet (see Appendix H) and invited students to volunteer. In the second week of tutorials I went to the start of every two-hour tutorial and distributed consent forms (see Appendix G). I returned to the tutorial at the end of class to collect forms and answer questions. Subsequently, 27 students agreed to volunteer for the project.

I scheduled the interviews in the week after the essay was due. This was to enable students to be able to describe their experience of searching for and using information for the essay. I contacted students by email and asked them to nominate a time for an interview. From the initial group of volunteers, 20 students agreed to be interviewed. The students were offered a photocopy card to the value of ten dollars as an encouragement to participate in the study. The majority of interviews were held in the week following the essay submission. These interviews have formed the basis of the data for this dissertation.

The participants

In a phenomenographic study, in order to elicit variation in experience it is necessary to include participants who range in characteristics and background. Therefore, purposive

sampling procedures are appropriate. The number of participants is usually between ten and 30, and there seems to be agreement that a sample of 20 participants (if heterogeneous) is sufficient to capture the range in experience (Sandberg, 1994 p. 72).

The 20 students ranged in age between 17 and 45, eleven of whom I considered as school-leaver age (17-19). A further four students were aged in their early 20s, and five were aged from 28-45. Eight students were male, twelve female (see Table 5.1).

Table 5.1 - Breakdown in terms of gender, age and degree program

Gender	Male	8
	Female	12
Age	School-leaver	11
	Early 20's	4
	Mature (28-45)	5
Degree	Science	16
	Arts	8
	Double	9

The Science and Arts Faculties jointly offered the course, which has resulted in students in the sample being enrolled in a Bachelor of Science, or a Bachelor of Arts, or a double degree that included either Arts or Science or both. Sixteen students were enrolled in a Science degree (double and single) of which seven were doing a single Science degree. Nine students were doing a double degree, which is consistent with the overall ANU population of 50% of undergraduates enrolled in a double degree. Of the sixteen students doing a Science degree, five combined with Arts and four with other areas such as Information Technology, Economics, Commerce and Asian Studies. Of the eight students enrolled in an Arts degree (double and single), three were doing a single Arts degree (see Table 5.2).

Seventeen students were in first year, while one student was in the second year of a double degree, one was an overseas exchange student and one was not enrolled in an award (see Table 5.2).

Table 5.2 - Demographics of participants

Age	Gender		Degree	Academic major
	M	F		
28	X		BSc	Forestry
36	X		BSc	Forestry
17	X		BSc	Forestry
22	X		BSc	Resources & Environmental Management
18	X		BSc	Resources & Environmental Management
19	X		BSc/Econ	Forestry/Economics
45	X		Non-award	NA
18	X		BSc/IT	Forestry/IT
18		X	BSc/Asian Studies	Indonesian
19		X	BSc/Arts	Human Ec/Aust Studies
17		X	BArts	English
21		X	BSc/Arts (2 nd yr)	Forestry/Visual Arts
19		X	BSc/Comm	Biology/Finance
18		X	BSc/Arts	Sociology, German, Geology, Human Ecology
17		X	BSc	No response
23		X	BSc/Arts	Forestry/Visual Arts
18		X	BArts	Development Studies
21		X	BSc (exchange student)	Environmental Policy
32		X	BSc/Arts	Human Ecology
30		X	BArts	Development Studies

Interviews

The semi-structured interview is the most commonly used form of data collection in a phenomenographic study (Marton, 1994). Denzin and Lincoln (2000b p. 633) describe the interview in the qualitative research tradition as:

a conversation, the art of asking questions and listening. It is not a neutral tool, for at least two people create the reality of the interview situation. In this situation answers are given. Thus the interview produces situated understandings grounded in specific interactional episodes. This method is influenced by the personal characteristics of the interviewer, including race, class, ethnicity, and gender.

Kvale (1996 p. 125) also sees the interview as a conversation, where ‘knowledge evolves through dialogue’. He outlines the value of the qualitative interview as being able to describe and understand the ‘lived world of the interviewee and his or her relation to it’ (p. 30). The role of the interviewer is to read between the lines and to clarify meaning. The interviewer should maintain a ‘deliberate naivete’, therefore being open, curious and self-critical (p. 33). Similarly, Ashworth and Lucas (2000 p. 302) view the phenomenographic interview as a ‘conversational partnership’ and advise that the interviewer should engage in ‘empathic listening’.

Most questions in a phenomenographic interview will follow from the participant's responses. As the aim of the interview is to fully explore the different aspects of a participant's experience of a phenomenon (Marton, 1994 p. 4427), it is essential to probe responses to reveal these aspects. The participant will respond according to their focus and to what is important to them at the time. The set questions act as a starting point, with the response directing subsequent questions. The interviewer makes the decision about which aspects of the response to probe. At all times, the interviewer is attempting to discover the way in which a phenomenon is being experienced and to see the phenomenon through the interviewee's eyes. In order to do this, the underlying intent of the participant needs to be revealed through descriptions and examples. The interviewer's role is to 'pursue areas of confusion' and to encourage reflection (Bruce, 1994b pp. 50-51).

Interview procedure

The interviews were held in a student study room in the ANU's Hancock Library, which holds the Science and Mathematics collection. All the students had used the Library and had attended tutorials in the computer classroom. The interview (30-40 minutes) concentrated on seeking and using information for the essay.

Before each interview, I briefed the students with the following script:

'In today's interview I'm going to ask you to describe how you seek and use information in SRES1001. There are no right or wrong answers as I'm interested in how YOU describe your experiences. I'll ask general questions, listen to your answer and then ask more detail about what you have said. I'll ask you to give detailed examples because I want to understand what you experience from your perspective and in your words. I don't want to assume anything. You may find that it is difficult as you are being asked questions that you may not have been asked before.'

The interview questions were as follows:

1. *How do you use information in this class?*
2. *How did you go about searching for and using information for your essay?*
3. *How did you decide when to stop searching?*
4. *Is there anything that you would do differently?*

These questions were designed to be open-ended. The first question *How do you use information in this class?* was designed as an orientating and warm-up question. The phrasing of this question differed slightly from interview to interview. In order to create a relaxed, informal environment I engaged in an introductory conversation without the tape running. I then started the interview with the tape running. Therefore, the first question differed slightly according to the atmosphere created by the informal conversation. For example, two ways I phrased this question were:

- *'How do you use information in this class?'*
- *'How did you go about using information in this class?'*

Sometimes I substituted 'course' or 'Resources, Environment and Society' for 'class'. As predicted by the pilot interviews, many students had difficulty with the notion of 'information'. When they asked for further clarification, I responded that information was whatever they thought of as information.

The other questions dealt specifically with the essay task. The opening question regarding the essay (*How did you go about searching for and using information for your essay?*) was again kept open-ended to elicit the student's focus. The question *How did you decide when to stop searching?*, was designed specifically to reveal students' decisions and intent behind judging when they felt they had enough information. *Is there anything that you would do differently?* was designed as a reflective question looking back over the whole process of the essay.

As students answered the broad questions I noted down keywords and phrases relating to aspects they raised such as sources used, processes, decision-making and problem solving. I then asked students to give more detail on each of the areas I had noted. My decision to probe certain aspects was designed to investigate students' intent behind searching for and using information.

Follow-up questions included:

- *What other sources did you use?*
- *What was your angle on the topic?*
- *What were you looking for?*

These questions were designed as probes if students had not already mentioned these aspects. If students had not explained the nature of their essay topic I asked *What was your angle on the topic?* If they had not been detailed about the types and variety of sources they used, I asked *Did you use any other sources?* The question *What were you looking for?* was designed to move students to a deeper description of their experience beyond a step-by-step description of their process.

Probes included:

- *Can you tell me more about that?*
- *Can you give me an example?*
- *Why was that important?*

These generic probes were used to dig deeper into the students' experience. For example, if the student had not given a concrete example, I would ask them for one.

Data were transcribed using voice recognition software as described previously.

Annotations referring to affective elements and body language (Ashworth & Lucas, 2000) were included in the transcripts. These indicated prominent contrasts in tone of voice, laughter and long pauses. I also made a note if a student seemed particularly uncomfortable or embarrassed. This was evident with one student who had not started writing her essay when the interview was conducted. It was obvious that she felt uncomfortable and was unable to answer some of the questions.

I collected additional data from 15 students in the form of their assignments. These students were self-selected from the original 20 participants. The extra data included the staged sections of the essay (annotated bibliography, draft and final copy), Learning Portfolio, PowerPoint tutorial presentation slides and a tape recording of their five-minute presentation.

In consultation with members of my supervisory panel, I decided to restrict the data analysis to the interview, the annotated bibliography, essay draft, final essay and reflections in the Learning Portfolio. The end of semester tutorial presentation was not used for the study. I collected this data because in the presentation students were required to reflect on what they had learned about doing research over the semester. After attending the presentations and reviewing the data, I decided that the comments from students were too brief to be of value to the study and I did not proceed with an analysis.

Data analysis

The role of the researcher in data analysis

In a phenomenographic study, the aim of data analysis is to uncover and identify the variation in ways of experiencing. Walsh (2000) describes the processes of ‘construction’ and ‘discovery’ as two ways of approaching data analysis. According to Walsh (p. 20), construction involves the interpretation of the data from the researchers’ perspective and by the researcher influencing the data. The discovery approach involves the assumption that the categories exist in the data and are independent of the researcher (Walsh, 2000 p. 23). Bruce (1997b p. 103) sees the data analysis as both approaches:

It is a process of discovery because the conceptions reveal themselves through the data and it is a process of construction because the researcher must identify and describe these conceptions.

During the data analysis the researcher should ‘bracket’ or suspend their own experiences of the phenomenon and concentrate on the similarities and differences between the participants’ ways of experiencing the phenomenon (Marton, 1994 p. 4428).

Procedure

The accepted procedure in a phenomenographic data analysis is to use an iterative process where there is a search for meaning (how the phenomenon is experienced) and structure (the relationship between different ways of experiencing). The iterations take the form of reading the transcripts and searching for similarities and differences in ways of experiencing the phenomenon. Marton (1996 p. 182) describes this as iterating between two contexts:

What an individual has said about something is interpreted partly against the background of what the same person has said about other things and partly against the background of what the other participants in the investigation have said about the same thing.

In practice, this means that the transcripts are read many times – the full transcript is used on some occasions, while on others the answer to one particular question or one particular aspect of similarity or difference is the focus of that stage of the analysis.

Bruce (1999 p. 43) summarises the analysis procedure as follows:

- becoming familiar with the data;
- identifying relevant parts of the data;
- comparing extracts to find sources of variation or agreement;
- grouping similar segments of data, articulating preliminary categories;
- constructing labels for the categories; and
- determining the logical relationships between the categories.

The above procedure is carried out repeatedly, as categories of description and outcome space are identified and refined.

My data analysis procedure was informed primarily by Bruce's (1997b) description of her procedure. In addition, I used descriptions and guidelines by Åkerlind (2003), Marton (1986a; 1994; 1996), Walsh (2000), Sandberg (1997) and Bowden (2000). The data were analysed over a period of six months.

The first step⁷ in the data analysis was to take ten transcripts at random and concentrate on these. This served to initially limit the amount of data being examined. When I moved onto looking at the remaining data it also enabled me to check the draft categories against a fresh

⁷ In response to queries from colleagues in the ANU Information Literacy Program about the results of my research, early in the analysis procedure I went through the 20 transcripts and did a basic summary of the types of information used, the search tools used, the approaches to essay writing, library use and other issues arising from comments students had made regarding the Library. I felt it was important to advise my academic and Library colleagues of issues that they needed to address immediately in their teaching and provision of Library services, and that if I had waited for the phenomenographic analysis to be completed then students may have been disadvantaged. These issues included: students not using the ANU Library because they felt daunted by the system; teaching strategies and materials in information literacy lessons that encouraged surface approaches to learning and students reporting a lack of understanding of the catalogue and Library databases. I also felt it was important to report praise for Library staff. This simplistic analysis was important as it gave feedback to academic and Library staff regarding the effectiveness of the design and delivery of the course curriculum and information literacy component.

set of transcripts. I then used foci based on Bruce's (1997b pp. 104-106) 'phases' of analysis. The areas of focus were recursive in that I moved backwards and forwards between the phases. On other occasions I focused on a number of phases simultaneously. My procedure was as follows:

Becoming familiar with the transcripts

I read the ten transcripts as whole straight through and made notes of my impressions of similarities and differences between the experiences of the group. This included distinct themes that emerged. I then went through each transcript and made notes on the individual experience of the participant. At the end of the notes I summarised the ways that individuals experienced 1) information seeking and 2) information use. This served to focus my attention on these two aspects of the data.

Focus on meaning

In these iterations I looked for meaning by asking 'How does the student experience information literacy?' and 'How does the student experience researching an essay?' I looked for themes that emerged within the transcripts and coded these with coloured flags. The outcome of this series of transcript readings was the generation of draft categories of description based on the statement 'Information literacy is experienced as ____'. I then analysed the remaining ten transcripts using the same procedures and generated more drafts of the categories. For the remainder of the analysis I worked with the full 20 transcripts. After a number of drafts I included illustrative quotes with the categories. At all times I was aware of the need to look at the intention behind the experience, as some students spoke of similar aspects with similar words but when the intention was examined by looking at the whole transcript in context, a different focus or meaning was revealed (Svensson, 1997b p. 170). This emphasised the need to iterate between the transcript as a whole, between sections of the transcript and between the group of transcripts (Bowden, 2000 p. 53).

Focus on structure

In this series of iterations I focussed on ascertaining what was in the foreground and background of students' awareness. These critical elements emerged from the students' approach to using information in the course and for their essay. Again I focused on looking

at critical differences and examining where students had said similar things but with different elements in the foreground and background.

Constitution of the categories of description

This phase consisted of drawing together the meaning and structural elements into the categories of description. At this stage I included a description of the qualitative differences that made up each category.

The dimensions of variation emerged during the focus on structure and constitution of the categories. The dimensions of variation consisted of a number of themes that ran through the categories, but were experienced in qualitatively different way in each category.

Establishing the outcome space

This phase involved constituting the outcome space by arranging the categories of description into a logical structure. The structure drew on both the meaning and structural aspects. A critical aspect was that of inclusiveness. A basic assumption of a phenomenographic approach is that the outcome space consists of categories that range from less complete to more complete ways of experiencing. Thus some ways of experiencing are subsets within more inclusive ways of experiencing (Marton, 1996 p. 183). This inclusiveness could be seen visually when observing the mix of coloured flags on the transcripts.

Åkerlind (2003 p. 86) analyses past and current phenomenographic practice in constituting an outcome space and concludes that there are two extremes, the first giving priority 'to producing a tidy and internally logically structured outcome space' and the second giving priority to 'empirical evidence grounded in the transcript data.' My practice has been to favour the latter, as I regarded the transcript text as primary and was wary of descriptions which surpass the individuals' experience, as warned by Sandberg (1997 pp. 209-210).

Analysis of students' assignments

After proceeding through most of the phases of the transcript analysis, I turned to the students' assignment work, which 15 students had submitted as part of the research project.

The Learning Portfolio assignment included a webography, annotated bibliography, essay draft and essay. In addition, it contained reflections on the course, including the lectures, panel discussions, tutorials, field trip and response to the essay feedback. I limited my analysis to the components of the Learning Portfolio that referred to the essay and using information in the course.

Analysis of the Learning Portfolio was conducted in order to provide triangulation of data and a 'thick' description as described later in this chapter. I did not use the same phenomenographic process to analyse the Learning Portfolio as I had done for the interview transcripts. Rather, I used the assignment data to provide a context of the phenomenographic analysis. I did not feel it was necessary to conduct an analysis of the essay text, as the scope of the study did not include examining essay writing.

The reflections in the Learning Portfolio contributed to a greater understanding of the context of the essay and information use within the course and of the influence of the curriculum design on students' experiences. In one example, (see p. 139) I discovered that a particular student's reflection confirmed Category 1. The annotated bibliography, essay draft and final essay were also used to verify some aspects of the individual student's experience, for example to crosscheck their description of the sources they used and their argument.

Evaluating phenomenographic inquiry

The evaluation of phenomenographic studies is an area that has generated debate in the research community (Sandberg, 1994; 1997; Ashworth & Lucas, 2000; Cope, 2002). In general, qualitative studies can be evaluated using 'trustworthiness' criteria (Guba, 1981; Lincoln & Guba, 1985), however, Sandberg (1997) argues that it is inconsistent to attempt to establish mainstream concepts of validity and reliability in phenomenographic research. In particular, he discusses the practice of establishing interjudge reliability and replicability. He states that these practices follow a positivistic approach and objectivistic epistemology that is at odds with the phenomenological assumptions underlying phenomenography (p. 207). Sandberg draws on the phenomenological tradition to describe 'interpretative guidelines' under which to conduct phenomenographic research. These include:

- describing the ways of experiencing rather than explaining why it appears
- avoiding descriptions which surpass the individual's experience
- treating all aspects of the experience as equally important
- adopting different interpretations of the variation in individuals' conceptions through stages of the data analysis (pp. 209-210).

Marton (1986a p. 35) confronts the question of reliability in stating questions asked of a phenomenographic study:

Would other researchers find the same conceptions or categories if they were doing the study for the first time? ... Can a conception or category be found or recognized by others once it has been described to them by the original researcher?

In reply, he states that the first question is not relevant for a phenomenographic study, but the second is, as once the categories have been 'discovered', it is necessary that there is agreement from others in regard to their presence or absence.

Cope (2002) also states that replicability of results is not appropriate in phenomenographic studies and proposes interjudge communicability as a solution. Interjudge communicability is when other researchers are given the outcome space and sample quotes/transcripts to ascertain whether they can see in the data the categories as constituted by the researcher. He goes on to state that the need for validity in phenomenographic research can be addressed by rigorous design and implementation of the study and the description of the study including:

- Researcher's background knowledge;
- Attempts to approach data analysis with an open mind;
- Processes used to control and check researcher's interpretations; and
- [Presentation of] results in a manner which permits informed scrutiny (Cope, 2002).

It is also possible to use other phenomenographic studies in the same field to check reliability. For example, I have been able to compare my findings with other studies in library and information studies, and in education. Indeed, I have positioned my study so that it is complementary to two existing studies of information literacy (see analysis in Chapter 7).

In accordance with issues raised by Sandberg (1994; 1997), Cope (2002), Säljö (1988), and Ashworth and Lucas (2000) I have attempted to address aspects of validity and reliability specific to a phenomenographic study. I have designed the study from the outset using a phenomenographic framework which has influenced my research questions, aims and objectives, choice of data collection, interview questions, interview techniques and data analysis. I have sought to maintain an 'interpretative awareness' (Sandberg, 1994; 1997) by regarding the transcript text as primary, by being aware of the experience and assumptions I am bringing to the study and by attempting to adopt different interpretations during the data analysis. I have checked the communicability of my results with colleagues (informally and formally via seminars and conference presentations as described below) in order to see if others can see the same differences in ways of experiencing as I have done (Säljö, 1988).

I regard 'trustworthiness' practices for the evaluation of naturalistic research as relevant to interpretative studies (Guba, 1981; Lincoln & Guba, 1985; Guba & Lincoln, 1999). Examination of trustworthiness is not usually conducted with phenomenographic studies, however, I enjoyed 'prolonged engagement' (as described below) with all aspects of the course, which contributed an ethnographic and case study aspect to the study. These aspects are apparent in Chapter 7, where I discuss the link between the results and the course.

Trustworthiness practices include:

- prolonged engagement with participants and persistent observation
- peer debriefing
- triangulation and collection of thick data
- member checks
- purposive sampling
- stepwise replication
- audit trail.

The ways in which I have addressed these are as follows:

Prolonged engagement is necessary in order to gain a rich description of the research setting and the place of the participants within it. My study occurred within the context of a first year university course over a semester. In addition to conducting interviews, I

immersed myself in the course by attending lectures, discussion panels, selected tutorials and the field trip. I also took part in weekly teaching team meetings and evaluation sessions throughout the semester. This level of involvement was ongoing and continuous. The importance of this immersion was evident as I progressed through the data analysis. I was able to understand the context of the students' responses in relation to the teaching, learning, assessment activities and choice of content. Consequently I was able to see the influence of the curriculum design on the students' experiences.

Peer debriefing has been essential to check my methods, analysis and progress. I have discussed my interviewing techniques and transcripts with colleagues from the Australian National University, University of Canberra and Queensland University of Technology. I have shared my transcripts and analysis with colleagues in order to see if my analysis is understood and accepted. I have presented my findings in draft and complete form for discussion and dissemination at seminars and conferences including:

- Current Issues in Phenomenography Symposium, 27th November, 2002
- Masters work-in-progress seminar, 4th February, 2003
- Australian Library and Information Association URLS seminar, 9th April, 2003
- Peer reviewed paper accepted for presentation at Junior Researchers (JURE) preconference, the European Association for Research on Learning and Instruction (EARLI), August 2003.

The collection of 'thick' data is important to provide a richer description of students' experiences. I collected written and oral work as a secondary source of data. This included the students' Learning Portfolio and tutorial presentation. Consequently, I have been able to crosscheck students' descriptions of searching for and using information with the actual assignments.

There has been no provision in the study to do a 'member check', that is to check the data and analysis with the participants, however many showed interest in the results and I verbally promised to send them the findings. A form of member check during the interview was to recap on some of what the student had said. In some cases I referred back to their

responses and asked for more detail. This enabled them to have an opportunity to clarify and/or expand on their response.

Stepwise replication involves separate research teams analysing data and comparing the analysis. This practice for phenomenographic studies is strongly advocated by Bowden (2000). Due to the scope of my study I was not able to have research teams, however I was able to deal with the data in stages. For a period I worked with half the transcripts to establish initial categories of description. I then worked with the remainder of the transcripts to cross check and further develop the categories.

I have maintained a data analysis journal as an 'audit trail' in order for the development of my analysis to be examined. This has also proved useful as a record of the stages of the data analysis to share with colleagues. In the journal I have described my data analysis procedures and processes and I have reflected on the development of the analysis.

Conclusion

In this chapter I have outlined the methods I undertook to carry out this study. I have attempted to address trustworthiness issues in order that my study might be evaluated. In the next chapter I present my research findings including categories of description illustrated by quotes from the transcripts, awareness structure and outcome space.

Chapter 6 – Results

Introduction

In this chapter I present the results of my study of students' ways of experiencing information literacy when researching an essay in a first year course. Students in the environmental studies course Resources, Environment and Society, researched their choice of environmental problem with which to address the essay question 'Managing resources is about managing people, not resources'. The outcome of the study included the identification of three primary categories with a number of subcategories:

Category 1 - *Seeking evidence*

- Seeking statistics
- Seeking opinions and ideas
- Seeking contrasting perspectives

Category 2 - *Developing an argument*


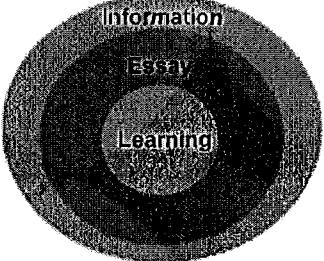

- Learning about the topic
- Setting the topic in a context
- Rethinking the argument
-

Category 3 - *Learning as a social responsibility*

- Helping the community
- Effecting social and political change

These experiences are described in the categories of description and outcome space that include the referential (meaning) and structural (awareness) aspects. Each category is accompanied by a figure depicting an expanding awareness structure where an increasing number of areas of focus are present in awareness, some in the foreground, some in the background (as described in Chapter 4). In this study, these areas of focus consist of the essay task, information, learning and applying learning (see Table 6.1).

Table 6.1 - Overview of categories and awareness structure

Category	Awareness structure
<p>Category 1 Seeking evidence</p> <ul style="list-style-type: none"> a) Seeking statistics b) Seeking opinions and ideas c) Seeking contrasting perspectives 	
<p>Category 2 Developing an argument</p> <ul style="list-style-type: none"> a) Learning about the topic b) Setting the topic in a context c) Rethinking the argument 	
<p>Category 3 Learning as a social responsibility</p> <ul style="list-style-type: none"> a) Helping the community b) Effecting social and political change 	

Students' experiences of information literacy as illustrated above were comprised of the interrelationship between the essay task, information and learning (see Figure 6.1).



Figure 6.1 – Information literacy

The following dimensions of variation that run through the categories have been identified and described:

- focus on learning
- focus on essay task
- use of information in the course
- use of information in the essay
- use of contrasting perspectives
- development of argument.

The critical variation in ways of experiencing these elements form the way in which the categories are delimited from each other and are logically structured. The way that these elements are constituted in each of the categories is summarised in Table 6.2.

Table 6.2 – Dimensions of variation

	Category 1	Category 2	Category 3
Focus on learning	<ul style="list-style-type: none"> • Not learning • Not building knowledge base 	<ul style="list-style-type: none"> • Learning • Building knowledge base 	<ul style="list-style-type: none"> • Applying learning • Building knowledge base
Focus on essay task	<ul style="list-style-type: none"> • Essay as product • Course requirement 	<ul style="list-style-type: none"> • Essay as topic • Learning about the topic 	<ul style="list-style-type: none"> • Essay as communication • Communicating and learning about the discipline and field
Use of information in the course	<ul style="list-style-type: none"> • Search for information to answer questions posed by teachers and for course requirements 	<ul style="list-style-type: none"> • Search for information to ask questions posed by self 	<ul style="list-style-type: none"> • Use information to make connections and links between the topic, field, discipline and other disciplines
Use of information in the essay	<ul style="list-style-type: none"> • Trustworthiness of websites is important • Information is limited to that which supports an existing argument 	<ul style="list-style-type: none"> • Use of a variety of sources 	<ul style="list-style-type: none"> • Use of variety of sources for different purposes • Enjoyment of information that communicates well
Use of contrasting perspectives	<ul style="list-style-type: none"> • Use of contrasting perspectives to enhance argument 	<ul style="list-style-type: none"> • Use of contrasting perspectives to get the big picture 	<ul style="list-style-type: none"> • Use of contrasting perspectives to understand
Development of argument	<ul style="list-style-type: none"> • Personal viewpoint is synonymous with essay argument • Existing argument 	<ul style="list-style-type: none"> • Development of argument while searching • Rethinking argument 	<ul style="list-style-type: none"> • Development of argument while searching • Rethinking argument

The structure of the outcome space is hierarchical, therefore the higher level categories subsume the lower categories. Figure 6.2 depicts this inclusive structure where Category 2 subsumes Category 1 and Category 3 subsumes Categories 1 and 2.



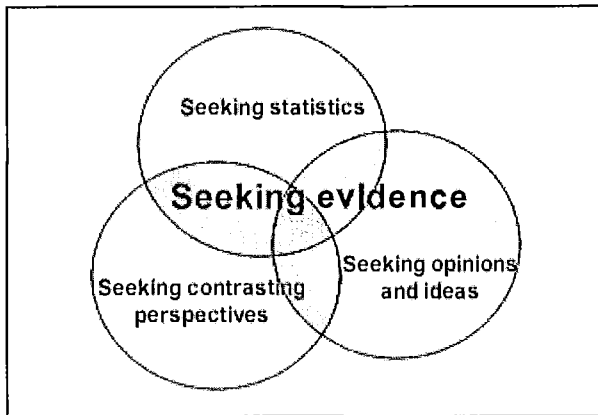
Figure 6.2 – Inclusive structure of the categories

The categories have been illustrated with quotes⁸ from the transcripts to provide a richer description. The experiences of individual students are used to illustrate the experiences represented in the category and to give more meaning to the dimensions of variation. It is important to note however, that as in all phenomenographic studies, the categories do not represent individuals. The experience of the individual may be distributed across the categories. The categories of description and outcome space form an abstraction that represents the collective experience as analysed and described by the researcher.

⁸ Student names are pseudonyms.

Category 1: Seeking evidence

Information literacy is experienced when researching an essay as seeking evidence to backup an existing argument.



This evidence consists of statistics, opinions, ideas and contrasting perspectives. There were three subcategories (see Figure 6.3):

- a) Seeking statistics
- b) Seeking opinions and ideas
- c) Seeking contrasting perspectives

Figure 6.3 – Category 1

As students were able to choose an environmental problem to research, many chose a topic that they already had learnt about and in which they were interested.

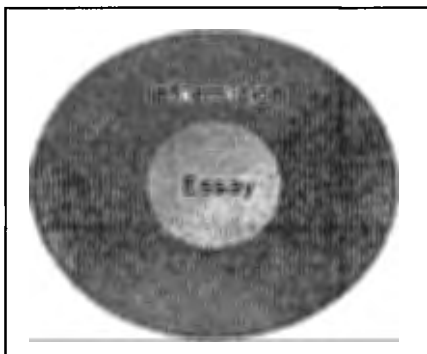


Figure 6.4 – Structure of awareness

Their search for information was to find evidence to backup their existing ideas or an existing argument. The students' personal viewpoint was synonymous with their essay argument.

Information was seen as external to the person and was associated with the essay task rather than with learning or building a knowledge base. The essay was a primary focus of the students' awareness, while the information they were searching for and using was in the next level of awareness (see Figure 6.4). The essay was regarded as a product and was completed to fulfill course requirements.

Students took two approaches to evidence in this category. In Subcategory A and B, students experienced looking only for information that supported their argument and did not consider contrasting views as useful. In Subcategory C, students actively sought contrasting perspectives in order to present a good argument.

Prior to searching for information, students wrote the essay draft or essay outline using their existing knowledge base. They then searched for evidence to backup their views.

Tom: Basically I map out the essay in my head... I chose a topic that I already knew a fair bit about and that I was interested in... So really I was just looking for evidence to backup what I already had in my head... I wasn't really learning anything new, I was just trying to put what I had in my head in a logical manner onto the page, if you see what I mean.

Becky: I kind of ended up writing this essay about all of the thoughts that I had, and then figured out that I had better tack on some evidence.

Subcategory A - Seeking statistics

The students valued statistics to 'prove' or 'disprove' their argument. Utility and trustworthiness of sources was judged in terms of the presence of statistics. Statistics were seen as substantial information on which to base an argument. Students actively searched for 'facts and figures' to backup their argument. Some students restricted their search to sources that contained statistics.

OK, so you found a lot of different websites. How did you use those in your essay?

Sally: I used statistics from them. Most of the essay was just my general knowledge and I just backed it up with facts that I found. Statistics and things.

Ross: There were kind of lots of facts and figures. With those ones there was a lot of stuff in there that I just couldn't understand... I really just pulled out some numbers that supported what I wanted to say.

Subcategory B - Seeking opinions and ideas

Opinions and ideas were used to quote and paraphrase as references in the text of the essay. Opinions were seen as the author's argument.

Greg: I basically wrote my argument - as much as I could - off my memory... I went back and I picked one that supported my argument. Referenced or paraphrased... Until I could find one which supported my point of view. Came close to it... I was just looking for things that would fit in with the arguments I was trying to pose... I just tried to limit it to things that fitted in as closely to the arguments.

Sally described using quotes and paraphrasing ideas from the resources she found.

How did you use them in your essay?

Sally: I basically read word for word these books. I found them very interesting and I used a few quotes and paraphrased a lot.

How did you combine the stuff you found in books and the stuff you found on the Internet to talk about that topic?

[Long pause] Well I just wrote my essay with my opinion to start off with. Just wrote down what I thought. Then I went back and added stuff from the books and websites... Well, I guess I would just write something that was my opinion and then I would use the sentence in my own words from a book or website and just reference that.

Subcategory C - Seeking different perspectives

Finding and presenting different perspectives was regarded as important to present a wider view. Students actively sought views that differed to their own in order to 'balance' their argument. Students had chosen their argument, but felt it was important to understand and present alternative views in terms of an intellectual debate that would strengthen their argument.

Jill: I already knew my viewpoint on it kind of thing. I was trying to find ways to say OK what is out there, there is left and there is right and there is centre and I'm following the centre viewpoint because you know it is the consensus -- most scientists kind of thing. I wasn't so much trying to find my own viewpoint as I was trying to find the viewpoints of the debate that I could then present in the essay.

Alice: I've found a couple arguing against me so I threw them in just to balance the side. I've found some arguing for my point so I used them as more evidence... I tried to get some where the management had worked and some where it hadn't worked. That differed... I tried to get some that had different problems, different ways they managed it, different success rates.

Anna: I wanted a bit of variety of the kinds of people who were writing the articles... different perspectives... So I could have quotes for different reasons.

Different perspectives -- what sort of different perspectives?

Anti greenie perspectives, people from the government, people from organisations, greenies... that was pretty much... scientists... I've got a lot of different points of view, different people talking about the issues. I think that's important for the essay and I think it would be useful.

Dimensions of variation

Focus on learning

Learning about the topic was not a focus. Students drew upon their existing knowledge base.

Focus on essay task

Students were focused on the essay task. This involved finding trustworthy information to use as evidence to cite, and contrasting perspectives to enhance their argument. Students experienced the essay as a product.

Use of information in the course

Within the course students were searching for and using information in order to complete assignments and to do the tutorial preparation. The focus was on completing the requirements of the subject. Students did not go searching for extra information for the class, but relied on information given to them by teachers and panel discussion presenters.

Lee: Mostly it's for when there's something to hand in... Basically information for handing in assignments.

Ellie: The information that I look up for myself that the week for the tutes, or whatever, and to be able to understand whatever it is we have to do for the tute.

Greg: For the essay. That's about all I've used information for.

Sally: I don't actually do all that much extra finding information.

Use of information in the essay

In this category, trustworthiness of information was important. Information was regarded as trustworthy or authoritative by using a mixture of criteria and intuition. Students evaluated credibility and reliability of information by the presence and cross-referencing of statistics and references. When evaluating websites, they checked the author and provenance of the website, and whether it looked 'right'. Students were anxious not to use information that had been 'made-up'.

Authority of statistical information was established via cross-referencing statistics with other sources. If the figures from different sources coincided they were trusted, if they were disputed the student tried to find another source to backup the first source.

OK. So what made you trust the statistics more than the opinions?

Diana: Because I found them in other places as well.

Can you give me a direct example of that?

Some of the journal articles had similar statistics. I can't recall if they were exactly the same, but they were close enough that I could trust them.

Lee: The information I had, had some numbers that were disputed by other ones I had. So I had to look for other sources to back it up which is hard.

The presence of facts and statistics was seen as important in making the source more credible.

Sally: Well, say it was from a green activist perspective. It is usually quite outlandish. They don't have very many facts. You know. If it was from a scientific perspective they often back it up with statistics.

Lee: I didn't like the places where they were just talking with no facts to back it up... at least they had put a little bit of work in.

Similarly, the existence of references was important in adding credibility to the resource. Authority was established via checking sources of references and recognising references from other sources.

Greg: I didn't check too much on their references. Some of them referenced each other and I had read the articles. There were a few by the same author and I knew he was -- among the other ones -- he seemed like a very credible source. That's basically how I used the references and things.

Students were concerned with the reliability of websites. They used surface signs to evaluate the resource including date, author, provenance, contact details and the general look and feel of the webpage.

Ross: I try not to -- the Internet is funny because I don't really know -- unless you can be really, really be sure about how... you know, I could write a website, anyone could make a webpage up and put it on the Internet. I could say fossil fuels are actually helping the environment and if someone did a Google search they could come on this website and say oh my God I never knew that, I'm going to put that in my essay! You just have to be careful about how -- you can verify some web stuff. It depends on how much time you are going to put in tracking down, you know the organisation, the qualifications that they have... I try not to use too many websites, I like to get ideas from them but not too many. They are good for backing up stuff that you have already got. But I try not to rely on websites too much, just because of that reason, I'm a bit wary of them.

Lisa: I would look at the site and see if it looked reliable and... I just looked at the information. What they were doing with people, and kind of decided if it was useful or not.

You mentioned the word reliable. How did you work that out?

Some of them were government organisations and they had a lot of credibility. You could contact them and the information seemed up-to-date. But some of them seemed a bit sus. May be some little group that just formed themselves. I didn't use those ones. Just the ones that seemed supported by governments or -- I don't know -- reliable organisations.

How could you tell whether they were supported by government?

Sometimes in the address. If it is .org, .gov or whatever. Some of them were like that. I don't know -- they were government websites so I guess I just assumed they would be reliable. [Laughter] Hopefully they are.

The following excerpt illustrates one way in which resources were evaluated. Jacqui described initially selecting the webpage because it looked authoritative. Next, she checked for surface signs of authority such as the date, author and the presence of references. She also described following a reference trail. Jacqui's experience in trusting resources from the web that were in pdf format has also been mentioned by a number of other students.

Jacqui: So I went into them and I kind of looked at where they came from. If the webpage looked organised and not just some bodgy person doing their own thing. So then I would check it for dates and copyright and look to see if there was the name of an organisation or whatever. If it was a paper that you could go into Acrobat reader I think that was easier maybe for me to say yeah that's okay because it is a paper and it is kind of sourced. If it showed its own references I thought that was a good thing too. Then I would go into some of the references that it claimed as its references and I looked at them as well. And also some web pages I went to the -- what you call that when they give a whole list that they like.

A set of links?

Yeah, links. I went into their links as well. So that's how I got the stuff.

Why was it important to find the date and who wrote it and that kind of stuff?

Because I didn't want it to be just kind of stuff that people have made up. I wanted there to be evidence behind it.

How could you tell there was evidence?

Well, when they gave facts and figures and percentages and stuff they would usually say -- I used it when it said this is from the national centre for blah blah blah. So I used stuff that they said had come from somewhere that sounded good, reliable.

How could you tell that that was reliable?

I suppose I couldn't. I just took it for granted.

Sally described not wanting to use information that has been 'made up'.

You mentioned some had facts and some didn't. What do you mean by a fact?

Sally: [Long pause] I don't know. [Laughter]. Actually I suppose all of the websites that I used were factual. There wouldn't be any point to using one that wasn't.

Why?

You can't base an essay on something which someone has made up.

How can you tell whether it is made up?

[Long pause] I don't know, it is just the feel of it.

Diana compared websites with journal articles and described how she prefers to use statistics from websites rather than 'opinions'.

Diana: I'm always a little dubious using websites for written work, my own written work just because it's hard to know who has written a lot of the stuff that you find on websites, and if the people are worthy basically of being addressed.

Why is that important?

I don't want to base my argument on something that could be completely untrue or biased. I don't want to have my own opinions -- let alone submit them to somebody else -- influenced by something I can't find out for myself. I think that most journal articles have been reviewed by a lot of other experts in the field, and I feel easier about trusting them, than some person off the street who wants to write an article for the Wilderness Society or whatever. I'm not saying the Wilderness Society just picks up people off the street because I did use the Wilderness Society in my essay. But I used statistics that I got there, not really opinions.

Students regarded 'facts' to be commonly held beliefs or generally acknowledged truths such as the presence of salinity. These facts could be backed up with figures or statistics. Statistics were also regarded as 'facts'.

Lisa: One of the journal articles I found then turned out to be quite all round information and I used the general facts in that as a basis for some of my argument. So that was quite good.

What do you call a fact?

It seems to be a generally acknowledged truth. I guess it's not really a truth but lots of people think it is. [Laughter] It is hard to write an essay when nothing is true!

How do you know lots of people think -- [it is a truth?]

You know, you look at a couple of different sources and see if they have references to where they have got their information from. You see if that is reliable. I don't know, you just say that's a fact now. I decide it is. [Laughter].

So when you look at the references to see where they had got the information from -- what is that telling you?

That it is more reliable than if they have just made it up.

What is reliable about it?

The fact that more than one person thinks this and has researched the idea and maybe there is some truth to it.

Louise described looking for facts. When asked what facts are she found the question difficult and illustrated her answer with an example from her essay topic.

What's a fact'?

Louise: Come on, that's a tough question. What is a fact. I suppose a fact is something that can be proven to occur and it has become -- no that doesn't work -- I was going to say accepted into common knowledge over time.

OK, rather than what is a fact -- [student cuts in]

How do I work out what a fact is?

How do you work out what a fact is, or how do you use a fact?

Historical facts are kind of easy. Things that have happened in the past that you can put at a distance and say well that actually did happen, it actually has happened... because you know, it is a fact that rising water tables cause salinity and that mobilises ground soils. Everyone was saying it so I thought it must be true. I haven't actually seen it happen but pretty much everybody across the world no matter what their opinion was on salinity.

Becky described 'scientific fact' as research-based evidence. She made a distinction between fact and opinion.

Becky: I got scientific fact from journals, which was good. They were pretty dry reading but they had the information that I needed to backup what I wanted to say.

OK, what is scientific fact?

I guess -- I was going to say empirical evidence -- but I guess it's not because you've always got, you know, an opinion that you put to scientific fact. I guess it's experiments and stuff like that. Research that other people have done concerning forest management and how it has been done.

Alice chose not to use websites as she felt they were 'biased'. She chose journal articles as she felt that they were more balanced in presenting both sides of the story. Her approach to the essay was to present a number of case studies where management of people had worked and where it had not worked and then gave her view. She modelled her essay structure and argument on the approach she was seeing in the journal articles.

What was an example of something that was unbiased?

A lot of the academic reports, basically journal articles... Stuff that's actually being properly researched and often have pulled out bits of information from these places just to have a look at all sides of it.

When you say properly researched, tell me more about that.

Papers written. Basically a lot of them [inaudible] journal articles or have .edu on the end or a pdf file. They've been peer reviewed and stuff like that and actually often present both sides of the story before saying this is what I think.

Use of contrasting perspectives

As described previously in Subcategory C, contrasting perspectives were valued as a way of enhancing the students' argument in order to present a good essay.

Development of argument

The essay argument was seen as being synonymous with the student's viewpoint. Students searched for and used information to backup their existing viewpoint rather than to develop an argument or find an argument.

Summary of Category 1 - Seeking evidence

Students searched for information as evidence to backup an existing argument. Their argument was synonymous with their own viewpoint. Evidence took the form of statistics, opinions, ideas and perspectives that students used to cite to support their argument.

Students limited their search to sources that they could use as evidence. Students judged the trustworthiness of information by surface signs including the presence of statistics and references, author, origin and 'look and feel' of the source. Students' focus was primarily on the essay task while their secondary focus was on the information. They experienced the essay as a product. Information was external to the person – it was out there ready to be found, and when found it was used for the essay task.

Category 2 – Developing an argument

Information literacy is experienced when researching an essay as using background information to develop an argument.

Students looked for information in order to learn about the topic, develop their argument and gain a greater understanding of the context of the topic. They searched for broad and background information and then narrowed their search to more specific information. This category has a number of subcategories (see Figure 6.5):

- a) Learning about the topic
- b) Setting the topic in a context
- c) Rethinking the topic

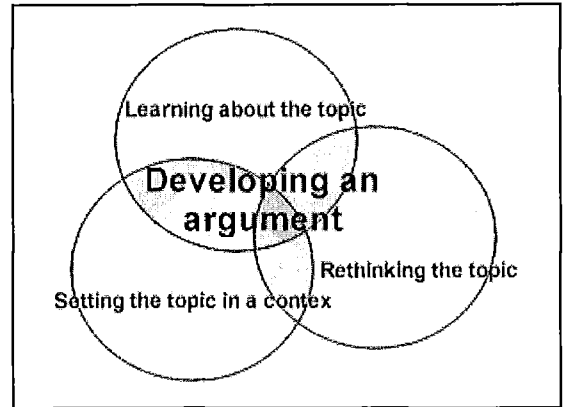


Figure 6.5 – Category 2

Students developed their argument as they searched and learnt more about the topic. They did a number of rounds of research and kept searching as they wrote and thought about the essay. Information was internalised and personalised as it was being used to learn and develop a knowledge base and understanding of the issues relating to the topic. Students asked themselves questions about the topic and argument as they searched.

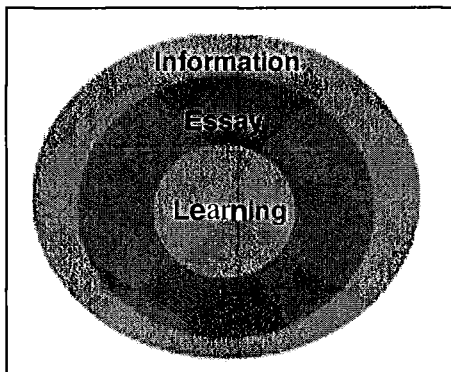


Figure 6.6 – Structure of awareness

Students' primary focus of awareness was on learning about the topic and building a knowledge base by 'filling in the gaps'. The essay was a secondary focus, while information was in the background (see Figure 6.6). The essay was experienced as a topic rather than a product as in Category 1.

Students' descriptions of writing were tied up with the way they engaged with information. Skye described her essay writing process as searching continuously, reading broadly, mapping out the main points of the essay and filling in the gaps.

OK, so you worked out the topic the week before the draft was due?

Skye: And then I basically, I just wrote down a lot of main points and tried to link at things as to how they fit in or relate to water quality. Like I wrote down that the shortage and the uses and human impacts. How people's attitude affects how they use water, the quality of the water. Stuff like duty of care. Things like the main points I put down on diagrams, then I expanded on them in paragraphs. Then I wrote it. Actually before I wrote anything in detail, I tried to read a lot of things. Like I read a whole lot of books which I didn't put into the bibliography because I didn't cite specific research or specific details from them. A number of other things, trying to get the general idea and the main picture and the main points. I think I read about six things which are didn't put into my bibliography... Just trying to get the picture before I wrote anything specific down. Then I started writing and typed it up.

How did you decide when to stop searching for information?

When you have your idea formulated. Basically I didn't stop searching as such. I wrote what I wanted to write down and then if I found there was something missing in my argument or something that I had overlooked or something that was contradictory then I would go back to it and try to find what happened, or what went wrong, or what was missing.

Similarly, Diana searched for journal articles, read them, planned her argument then searched further.

How did you decide to stop searching?

Diana: I basically found as many articles as I could. I gathered them, and after reading through those and trying to come up with a plan for my argument, there were a few questions that I still had to answer. A few facts that I still needed to look up. I did further a search for those, and I found one or two articles maybe that answered my questions. After that, I figured I had all that I needed to write my essay. I just used whatever information I had and started the actual writing process.

Louise described continually searching, and found the Internet was useful to fill in the gaps while writing:

Louise: I like doing a couple of rounds of research. Rather than just doing one and trying to work with that. Information overload, that's a really scary thing. I don't know quite how to cope with that. Because you are always reading something and thinking... there could be something more out there that is related to this.

When did you decide to stop looking?

I didn't actually. Even when I was writing -- that's the scary thing about having web access when you're writing. I was thinking, this feels a little bit thin here, I want to go and find something. That is the great thing about the web. If you need a fact, and you can find a fact that can back something up. I kept searching all the way up to finishing the writing.

Sally described writing a lot of notes, feeling like she had enough background information, and then writing the essay.

When did you actually decide to stop searching for information for your essay?

Sally: Before I started my essay, I just wrote notes, and notes, and notes from books and websites and things. When I realised I had pages and pages of notes I started writing my essay. I thought that I probably had enough background information to start, so that was when I stopped.

While you were writing your essay, did you have to go find any more information?

Occasionally I would just go and look up a term that I didn't quite understand or something. But I didn't look up background.

Jacqui described learning about the topic while she was searching, writing a draft and then doing another round of research to fill in the gaps.

Jacqui: So then while I was searching ideas came. Reading web pages, reading journal articles, ideas came to me... I had a bit of information and there were some gaps missing that I really needed examples for and more information. So I wrote out all the stuff that I kind of knew about and had examples for and had learnt about. Then the gaps down the bottom I kind of wrote what I thought. Then I went searching and found the examples to back it up. So doing a huge kind of biased search. I pulled that all back into my essay and then I just decided that I had to hand it in pretty soon.

Ellie did some initial searching and found the annotated bibliography task useful. This gave her a basis on which to build her essay.

Ellie: So I read all those and I made notes. I had a basic idea of what my essay was going to be about, just the main points I wanted to include and stuff like that. I tried writing it and I realised I had all these gaps so I went back and did more research.

Subcategory A - Learning about the topic

Students did not have a knowledge base in the topic. Looking for information involved learning about the topic and developing understanding of the topic..

Anna: A lot of the information was new to me. I was just learning from what I was reading -- Just trying to relate it to the question -- think of ways of tackling the essay.

For some students, getting background information involved looking for definitions of basic concepts in encyclopaedias, dictionaries and textbooks.

Ellie: So it gave a context so that I could understand what I was talking about instead of having to read an article that used really big terms that I didn't understand. As I said, the World Book was about giving you a basic overview so that you knew where you were going from because I don't know about environmental problems and particularly about waste and solid waste management. I hardly know anything so to have a base to go from was really useful... At the beginning I was sort of struggling to see where everything fitted in to the picture. Once I read the World Book, it sort of put it all into perspective. So that was really useful, and to do that first I would be able to tie everything in together and get a better understanding of it.

Subcategory B - Setting the topic in a context

Students looked for background information to enable them to see an historical, social, cultural and political context.

Ellie was interested in the historical context of waste management.

Ellie: I ended up going to some more general sources like the dictionary and the World Book just to give me some basic history. How we coped with that sort of stuff before... So I went to the more general sources and the dictionary to get clear in my mind about what I meant by a resource and waste and stuff like that.

So you looked up definitions?

Just some so I could get clear in my head about what I was talking about.

You took an historical perspective?

It was just put it into perspective. Say OK, this is the problem, how long has it been a problem and that sort of thing. Because most of my articles didn't have that so the World Book just gave a quick analysis of that for me.

Sam was interested in the cultural issues in his country and how they affected water usage.

Sam: You have to understand the culture, how it's built, you have to understand the perspectives within the culture and how they may change, or have changed.

Sam's awareness of what needed to be done in his country came out strongly in his essay. He discussed water management, and was heavily influenced by an article he found on the web which analysed gender roles in relation to water in his country. In his essay he drew on gender, culture, social systems, agricultural and grazing practices, water storage practices and technical information relating to ground water and rainfall.

Jack looked at the development of urban forestry from its emergence as a field through to a discussion of recent tree protection legislation passed by the Australian Capital Territory (ACT) local government. He discussed the social, historical and political situation.

Jack: Urban forestry in Australia is a relatively new discipline [inaudible] fairly established overseas, but I couldn't believe how advanced they were in 1974. The book from 1968 was the Victorian symposium of street trees and ways to go about managing them. We are such a young country that street trees were only getting big enough to need managing. There was a comment made in 1968 and there are four tree surgeons in Melbourne in the Yellow Pages, whereas now there are hundreds of them all over the country. There is a whole industry based on tree surgery. It was good to look at the history of it.

Students spent a lot of time reading background information that they did not later cite in their essay. This indicated that they were exploring the breadth, depth and possibilities of the topic.

Hannah: But when I start an assignment and I'm doing my initial research it is always just like bits of everything and that later on I'll end up throwing away -- like I can't use that, I've got to focus on it. Not the most efficient way of researching, but I find it good to get some background ideas, different sources of information. If you don't use it all later, well at least you learnt something out of it.

Louise: Initially when I started looking for information I got bogged down in a lot of stuff that was to do with the... particularities of the problem... I mean that was really good to learn all of that background information and I used that in my essay, but it was only about one fifth of what I ended up talking about.

Skye: Actually before I wrote anything in detail, I tried to read a lot of things. Like I read a whole lot of books which I didn't put into the bibliography because I didn't cite specific research or specific details from them. A number of other things, trying to get the general idea and the main picture and the main points.

Sam found background information as an important basis for understanding the topic, even if he did not cite it directly in the essay.

Sam: I guess if I felt that I might be able to use it as background info. I'm big on background info. I really want to know what I'm talking about... I didn't use any of them in the essay, but just in a pause while typing I would read through some of the stuff.

Subcategory C - Rethinking the argument

Students developed an argument from their existing knowledge base, and found they had to change their standpoint or rethink their argument as they discovered more information. For some this was a 'Eureka' moment where certain aspects of the topic were clarified or a new perspective was revealed that changed their thinking.

Diana: There was a point where preliminarily I had this idea of what I was going to write my essay on. Then I looked further into the documents I was using and realised I was completely wrong. So I had to read more carefully the documents and come up with a different argument. It was actually supported more by the journal articles I had, than the other argument that I was trying to make. So it seemed to work out! So when I started writing my second argument it just flowed better.

Louise: The worst is when you are almost finished and you read something and it just completely adds a whole new dimension to what you were saying. That happened to me the day before I had to hand in. I sort of rewrote a whole section. Sometimes you have just got to stop looking.

Greg: Yeah, well I tried to keep my point of view fairly neutral actually. When I started the essay I thought that commercial fishers were completely to blame as everyone else does, for fishing decline. Then I read an article by a New South Wales fishery researcher who went through and estimated how many fish are caught by amateur fishermen. His estimate was one third of the commercial take. That's a pretty frightening thought. He actually had reasonable figures to back it up. You couldn't really dispute it. So after that I had to rethink the topic.

Dimensions of variation

Focus on learning

Learning about the topic was in the foreground. Students learnt more about the topic as they progressed. They actively tried to fill in the gaps in their knowledge by asking themselves questions about the topic as they searched.

Focus on essay task

The essay task is not the core focus of searching for and using information. The essay is experienced as the topic.

Use of information in the course

Within the course students were focused on learning more about the field and the topic. They pursued information for their own interest. They searched for information to answer the questions they had posed. Students used the information given to them in class as a starting point.

Tom: Generally I pick on the things that interest me that have come from the lectures... I click on some of the links to the different websites on the class web page and go and read them and perhaps get a book out if I'm really interested... It's difficult to get me to study anything that I'm not really interested in. I'm really interested in SRES 1001, again I'll pick on the things that I love, if you know what I mean.

Jack: Morsels of bait. To grab a hold of to go off and research.

Use of information in the essay

Trustworthiness of information was not a primary concern. There was more discussion of books and journal articles than in the first category. Encyclopaedias, dictionaries and textbooks are used. Resources from other subjects were consulted, including lecturers.

Students used different sources for different purposes. Becky describes how she used books for ideas and as an introduction to the topic, journal articles for scientific fact to use as evidence and websites for different viewpoints.

Becky: I had all these ideas about what I wanted to write and I got scientific fact from journals, which was good. They were pretty dry reading but they had the information that I needed to backup what I wanted to say... I guess the books were a real sort of introduction to the topic for me. They were a really enjoyable way to sort of get to know about the issues. From there I sort of did my exploring stage of the research which was mainly through the Internet. That was where a lot of ideas got [started moving?] because you can get the different viewpoints and just jump around. Then the journal articles were partly because we had to do it for that thing that we had to hand in [annotated bibliography], so I looked at those. And I ended up having some pretty good information that I could include to sort of backup my ideas.

Tell me about how you used that information from the books in your essay.

I read them cover to cover really, they were really interesting books. I had read them before, but I sort of re read them. I think they just sort of -- not so much the factual content of my essay but more the ideas and everything. They were really well articulated books. A big scope of ideas, like especially Dargavel's one. It's got, you know, he tries really hard to speak from the timber industry point of view, conservationist's point of view, political point of view and stuff like that. It was just a really good broad introduction to the topic. They're really good books actually.

Jack, a mature-aged student who had worked in forestry was concerned with referencing correctly as he drew on personal experience which included intuition and 'feeling'. He used previous study in psychology when relating managing people to managing resources.

Jack: Anyway, the books were good in that they were thought provoking in that way. It just took my head off and into all those other things that I had thought about and it helped consolidate lots of things. The one thing that I find hard about -- in answer to the question -- drawing information out of a book and then referencing it, is that it is often hard to reference in that way is when so much of what I learn is a feeling. That's the way I learn, I feel it. That might have something to do with age and observation and those kinds of things. It is often hard to -- you know I wrote some sentences and then I thought, how do I account for that? Well that's me, but it is also common knowledge as well. If I say a sentence that is common knowledge, is it common knowledge? Did I read it? So it is tricky. I tried deliberately to go, OK I need to define urban forestry, I'm going to use the definition I found in that book and I used a dictionary.

Use of contrasting perspectives

Contrasting perspectives were used to learn about the topic, get an understanding of the breadth of an issue and to get the big picture.

Matthew: You do get some very conflicting views at times, that makes it interesting... As well it's very good to get contrasting views I think. Get a big picture perspective... I think the contrasting views part was very important on my initial research, reading through great bricks of information -- or at least skimming it. Contrasting views sort of, helped me to find the big picture, in the process of picking out information that I thought was relevant, that I thought was reasonable. And that I could go back through, I could sort through what I wanted. It helped me get a picture of what I thought was a good medium. The way I saw it. Then I could go back and read the stuff that I had actually picked out at that stage in more depth.

Development of argument

As described earlier, students developed their argument as they searched.

Summary of Category 2 - Developing an argument

Students searched for background information to 'fill in the gaps'. Some already had a knowledge base that they were broadening, while others were building a knowledge base and learning about the topic. Background information was important to set the essay topic in a context, to learn about the topic and to 'get the big picture'. Students did a number of rounds of searching and developed an argument as they searched. They asked themselves questions about the topic and issues as they searched. Students used a wide variety of sources and pursued information for their own interest. They internalised and personalised information by incorporating it into their knowledge base and developing an understanding of the topic.

Category 3 - Learning as a social responsibility

Information literacy is experienced when researching an essay as applying learning to help solve environmental problems.

Students felt a responsibility to learn about the topic, field and discipline so that they could work to effect change. Students already had background knowledge of the topic and were interested in understanding different perspectives on the issues.

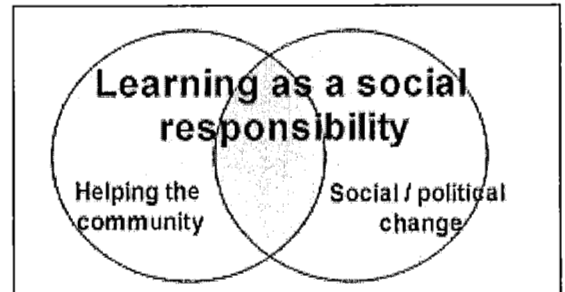


Figure 6.7 – Category 3

Students chose their topic based around the issues for which they wanted to raise awareness and help solve. Information is internalised and transformational, as using the information will change people.



Figure 6.8 – Structure of awareness

There were two subcategories (see Figure 6.7):

- a) **H**elping the community
- b) **E**ffecting social and political change

Students' awareness was focused on applying their learning and understanding of the topic, field and discipline to solving environmental problems. Information was a secondary area of focus while the essay was in the background of awareness (see Figure 6.8). The order of the expanding awareness structure has changed in relation to the previous two categories. The essay is not seen as a product or topic, but as a vehicle for communication. The essay has moved to the background as it is almost peripheral to the experience. The transformational aspect of the use of information has pushed the essay to the background,

as it is not the essay or the topic that is the focus of social responsibility, rather it is the use of information in applying learning.

This way of experiencing was characterised by strong affective elements, including regret, passion and feeling daunted and overwhelmed by the amount of work students had in front of them in order to effect change.

Becky: I just feel I wasn't as thorough as I could have been. Because I found it all a bit funny, all a bit much really. I guess I'm a little bit scared of it too, it's so huge... I would have really liked to be brave and gone with that, contacted Val earlier, contacted forest industries earlier. And treated it as a bigger deal than I did. I sort of thought, oh yeah, I can do this. I'm a bit, very disappointed in that.

Louise: And that I think it will be constantly my battle because I feel the gaps in my knowledge are so enormous... it can almost stop me from asking questions because I just think... it's like a giant wall that I feel sometimes I just can't climb over... Just actually trying to come to terms with the massiveness of what I want to know I suppose. I could get away with doing a little bit of work and cruise through. SRES has kind of given me a real sense of responsibility to actually trying to know stuff as best I can. It would be like letting down the workers! [laughter] You can't slack off!.. I think well I'm not going to be much of a use to the rest of the world am I, if I can't come up with the best question in question time in panels! [laughter] It's like, come on think of a good question [laughter].

Subcategory A - Helping the community

This subcategory was represented by one transcript only. This experience was characterised by the desire to work directly with the community to solve environmental problems.

Sam chose his essay topic to relate to a problem his country is facing, as he wanted to go home to his country and help his people.

Sam: I might be able to, if I got the funding or whatever, actually help people raise their living standards and give them a better outlook for life.

Subcategory B - Effecting social and political change

Students were politically aware and were interested in social change and political activism.

Becky wanted to do her essay on a particular forest where she had taken part in a blockade. She found that as the Regional Forest Agreement was so recent there was not much specific literature on the forest. She had intended on interviewing a local activist and resident of the

region, but found that she ran out of time. She expressed regret that she didn't go ahead with her plans for the interview as she wanted to expose what was happening in the region.

Becky: ...even help raise awareness of what was happening in Monga, just the people reading it or something like that.

Louise criticised mainstream Australian society for not changing in response to a greater understanding of Australia's environmental problems. She was explicit about wanting to learn in order to effect a 'revolution'.

Louise: You have to chuck them out the window and completely reinvent the way that we live our lives. I think that's the answer to many of our problems. The problem is that no one wants to do that. It's like -- I'm not changing. I've got my lifestyle. I've got my comfortable life, and I know what it means. I completely sympathise with those people. But it does need to be, as Alastair was saying, a revolution. It really does. So in order for me to effect one I need to know as much as I can.

Dimensions of variation

Focus on learning

Students saw applying their learning as a primary objective. Learning goes beyond the essay topic into looking at connections between different fields and disciplines. Students were focussed on what they could do with their understanding of the topic and the wider discipline.

Focus on essay task

The essay was seen as a vehicle for developing understanding and communicating. Students wanted to be effective communicators to enable them to get their message across. They praised other writers for effective communication.

Louise: Because I've always believed... it's science and there is a place for academic journals that you need to be able to communicate your ideas and the best language is often the simplest and the most elegant. That's what I'm trying to achieve -- is direct communication to whoever I'm trying to point my essay at. In the most simple way try to expose what the problem is and what needs to be done and talk about it.

Louise goes on to describe the joy of good writing.

Louise: So then I can get to the stage which I loved about my design which was I could design something and then let it sit for about a week and then go ahh, OK and then to the lovely tweaked tweak at the end. I get such a thrill out of writing well. I get a kick out of reading things that are beautifully constructed. It is nice to be able to do that, and have the satisfaction.

Becky found that articles written from a social science perspective rather than a 'hard' science approach were easier to understand and relate to. She modelled her writing on this literature.

So you liked those articles because they were more along your philosophy or the way you think?

Becky: Yeah, and they were more accessible, they were easier to read, they just made more sense. And things ding, ding, ding went off, instead of just reading those facts.

So tell me more about how that was more social science than hard science.

I guess say, Peter especially, recognised that there was a large social component in the management, and that really came through in his articles. Even the language he was using was a lot more fluid, just more socially aware. More socially aware expression than the more dryer articles. Like the journal called the Australian Forester, that is painful! [Laughter]. In contrast his are interesting.

Is that the writing style as well as the ideas?

Absolutely.

So he has actually communicated.

That's it.

Use of information in the course

Students looked beyond the course material to their responsibility in solving environmental problems. They made links with other fields and disciplines. Personal interest is strong.

Louise: Actually being aware of the connections between everything else that I'm reading in my other courses, that's been a big source of information as far as background information goes, deepening my comprehension of the issues... Especially with connections with society and community and how -- expanding my understanding of how western systems have impacted upon other societies around the world... Just sort of broadening my understanding of what needs to be done.

Becky: I find it all a bit overwhelming, all the information that is out there. I read far too much I think, I get carried away with the reading. I find something that I'm interested in, and I go and research it. And I sort of do it to death. But that is often sidetracked from what I'm meant to be doing... Create links with other things I know, and it sparks off an interest. I feel like it is going to stay with me, that whatever I've read it is going to stay with me.

Sam was interested in issues concerning his country and chose a topic that is a problem in his country.

Sam: Mainly the stuff that interests me is stuff that I can relate to easily. Like, I did my essay on water management. That's something that's very close to my heart. Any kind of environmental issue that grabs me I might go and have a look at.

Why is it close to your heart?

Because I grew up in a water deficient area... The whole water management issue, it fascinates me. I like it.

Use of information in the essay

Information is internalised, personal and transformational. Trustworthiness of information was not a focus. Sam described looking for 'personal information' while searching for information in the course and for the essay.

Just clarify for me what you meant by personal information?

Sam: Just stuff that I would find interesting.

OK, for you personally.

Yeah. I use up my Internet quota very quickly! [laughter] because I'm always on the net searching... Issues such as poverty. I've got a few sites like the hunger site. And I found an awesome site one day but I lost it. It talked about -- every 10 minutes these number of kids had died. It's a powerful site. It's a really powerful site. Just stuff like that, I just find it very cool to just sit there looking at it. It may not be relevant to the essay, but it may trigger ideas. Because I'm writing the essay, and if something affects me personally from another website, I might be able to integrate it into the essay somewhere.

Use of contrasting perspectives

Different perspectives were used to contribute to a personal understanding of the topic. Becky described at first rejecting biased sites but later realised the value of them as they made her 'think'.

Becky: Internet was -- first of all I thought it was more valuable because it had more stuff, but when I actually started to look through it and read it, a lot of it was very skewed and one-sided. Either to the industry side, or the environmental side. But that was interesting in itself... So first of all when I was looking at ones like that I would dismiss them, I would go that is too unscientific... flicking through these to try and get to ones which had a balanced view, but then I was thinking you're not going to get a balanced view on an issue like forest management because it is such a contentious area. So I went back to these one-sided things and I actually got a lot out of them because they stop and make you think. I've got quite an environmental slant on life. It's good to listen to what other people have to say. I was reading about it. They made me think a lot more than the journal articles.

Development of argument

Students developed their argument as they searched.

Louise: You sort of ask yourself questions then write yourself answers and then you need to find information about fleshing out the answers... Then from that you can develop an argument I think. It doesn't sort of really happen to me until late in the first stage -- the argument developing -- I don't go in and say well I'm going to say this and then try and find stuff, it sort of happens the other way around.

Summary of Category 3 - Learning as a social responsibility

Students were interested in applying their learning to solving environmental problems. They felt a social responsibility to help the community and to effect social and political

change. They looked beyond the topic to the field and discipline and made connections with other disciplines. They regarded the essay as a way of communicating about the issues. They internalised information in looking for information for their personal interest and developed their essay argument as they searched. Information was experienced as transformational, as it was being used to change people and society.

Conclusion

Undergraduate students in my study experienced information literacy when researching an essay as:

- Seeking evidence - *seeking evidence to backup an existing argument*
- Developing an argument - *using background information to develop an argument*
- Learning as a social responsibility - *applying learning to help solve environmental problems.*

Students experienced information literacy as the interrelationship between the essay, information and learning. The experience of the students was clearly influenced by the context of the course, their choice of topic and their intent. For example, information was used as evidence for the essay, to develop an argument, to learn about the topic and to gain further understanding of the topic, field and discipline. The essay was regarded as an end in itself, and a tool for learning and a vehicle for communication. Information was experienced as: external (outside the person, not affecting the person); internal (given personal meaning); and transformational (used to change people and society).

Students approached their search for information and essay writing as: deciding on an argument, writing the essay or essay plan then searching for information to use as references; and writing an essay plan or outline, searching for information to fill in the gaps and to answer questions generated by the search in order to develop an argument.

The sources of information that students used for their essay were webpages, journal articles, books, magazines, newspapers, television programs, radio programs, lectures, Year 11 Geography research projects, teachers, peers and librarians. They regarded information as sources, definitions, facts, figures, statistics, ideas, opinions and perspectives. Students

used the ANU Library, the National Library of Australia, the public library in their home town during the university break, their own personal collection, and libraries at other universities.

Students used a range of sources for different purposes:

- government documents for reports, policy and legislation
- books for general, broad information and ideas
- journal articles for specific information and scientific information
- websites for biased information and different perspectives
- encyclopaedias and dictionaries for definitions
- television, radio and newspapers for background information
- textbooks for background information
- other subjects to provide connections between disciplines and fields
- lectures for a framework upon which to build a knowledge base and approach.

In the next chapter, I compare the results of my study with the empirical studies in the area of information literacy and essay writing introduced in Chapter 3. I discuss the implications of my results for information literacy education, in relation to theory and practice in higher education. I make conclusions about the contribution my study has made to understanding information literacy from the students' perspective and I make recommendations for further research based on questions raised by my study.

Chapter 7 – Discussion

Introduction

The contribution that my study makes to information literacy education is the mapping of the qualitatively different ways students experienced information literacy when researching an essay. This insight into the students' experience can be used to design curriculum for information literacy education, and to contribute to a more holistic understanding of the phenomenon of information literacy.

In Chapter 1, I present the following questions:

1. How do students' ways of experiencing information literacy relate to existing models, descriptions and definitions?
2. How can curriculum be designed to facilitate the development of information literacy?
3. Is there a link between learning approach and ways of experiencing information literacy?
4. How do students' ways of experiencing information in the course relate to their ways of experiencing information literacy in the essay?

Question 4 is addressed throughout Chapter 6. In this chapter, I explore the remaining questions. I begin by analysing the results of my research with the two phenomenographic studies that have served to frame my study - that of Limberg (1998) and Bruce (1997b). I then compare my results with other research studies and models. Next, I discuss the implications of my results for teaching, learning and analyse these in terms of learning approach. I discuss curriculum design in terms of the course context of the study and offer suggestions for relational curriculum design based on my results. Throughout, I address issues of reliability in comparing the results of my study to other studies. I make recommendations for further research based on my study. Finally, I summarise the contribution of my study to information literacy theory and practice.

Comparison of results

My study was designed to sit between Limberg's study of Year 12 students and Bruce's study of higher educators, in order to provide a holistic picture of the phenomenon of information literacy along a continuum of formal education. It is relevant, therefore, to compare and analyse my results with the studies of Limberg and Bruce. For clarity, throughout this chapter my categories appear in *bold italics*, while those of other studies appear in *regular italics*.

Relationship with Limberg's study of Year 12 students

I will compare Limberg's study with my study by looking at the similarities and differences in results. Limberg's study was of a class of 25 Year 12 students who worked for four months on a research assignment (1998). Limberg found three primary categories:

- Category A – *Fact-finding*
- Category B – *Balancing information in order to choose the right side*
- Category C – *Scrutinising and analysing*

Limberg's first category of *fact-finding* is similar to my first category of *seeking evidence*. Limberg's Year 12 students who experienced information seeking and use as *fact-finding* judged reliability of information by surface signs such as the status or expertise of authors or interviewees. Similarly, the undergraduate students in my study who experienced information literacy as *seeking evidence* evaluated reliability by the presence of statistics, presence of references, the author, date and format (book, journal article, pdf file, website etc).

Both groups used limited resources but for different reasons. The undergraduate students limited resources to those that seemed trustworthy, those that backed up an existing argument and those that contained evidence. Limberg's Year 12 students limited their information by restricting the number of libraries, searches and sources, but did not describe limiting by their own argument or by evidence.

There were similarities between the experience of Year 12 students who were *balancing information in order to choose the right side* and the undergraduate students in my study

who were *seeking evidence* as *seeking different perspectives*. Both groups used biased information purposefully. The undergraduate students articulated clearly that they used different sides in order to construct a good argument. The differences were that undergraduate students who experienced *seeking different perspectives* saw information as external as they were interested in using different perspectives and biased information for the purposes of a good essay, in contrast with Limberg's Year 12 students who experienced *balancing information in order to choose the right side* and were using this information to gain a personal perspective.

The students who experienced *balancing information in order to choose the right side* shared the development of a knowledge base with the undergraduate students in the more complex categories of *developing an argument* and *learning as a social responsibility*. These higher categories in my study both had learning as the core focus.

Limberg's third category is similar to my second category. Both groups read widely and aimed to see the big picture. They drew material from other subjects and disciplines. They searched for and used information to set the topic in a broad context. Their intent was to learn about the topic and to understand the background of the topic. The students who experienced *developing an argument* shared the internalisation of information with the students who experienced *scrutinising and analysing*. This included information being incorporated into the students' knowledge base and a strong personal interest in the topic.

It appears that the category *learning as a social responsibility* identified in my study was not represented in Limberg's study. The intent of these students was to go beyond the topic, beyond the essay, beyond the information and beyond the course. This difference is not surprising, given the different contexts of the studies. Limberg's participants were aged 18-19 and were in Year 12, while the students in my study were aged 17-45. Being university students, the students in my study may have been a more select population in terms of the academic achievement required to gain entry to university, but were also a more diverse population in terms of age and experience.

Limberg's results had similarities with the first two categories in my study. As I demonstrate below, Bruce's results had strong similarities with the third category.

Relationship with Bruce's study of higher educators

Bruce (1997b) found seven 'faces' or ways in which higher educators⁹ experienced information literacy:

1. Using *information technology* for information retrieval and communication;
2. Finding information located in *information sources*;
3. Executing a process (*information process*);
4. Controlling information (*information control*);
5. Building up a personal knowledge base in a new area of interest (*knowledge construction*);
6. Working with knowledge and personal perspectives adopted in such a way that novel insights are gained (*knowledge extension*); and
7. Using information wisely for the benefit of others (*wisdom*).

Bruce's analysis procedure included identifying areas of focus and awareness in each of the above categories. These areas defined and delimited the categories. For example, information use was an area of focus. In the first two categories (*information technology* and *information sources*) it is present on the edge of awareness, whereas in the third and fourth categories (*information process* and *information control*) it is in the background. In the remaining three categories, information use is central to awareness. This method of analysis is similar to my study where there is a shift in focus on the essay, information, learning and applying learning.

Bruce's first category was identified as 'using *information technology* for information retrieval and communication'. In my study, students did not focus on information technology. It was a taken-for-granted aspect of their university study. Bruce's *information*

⁹ Bruce used the term 'educators' to include teachers, lecturers, tutors, librarians, academic skills/study skills advisors/counsellors and staff/academic developers. I continue to use this term to include the same groups throughout this chapter.

sources and *information control* categories do not have any similarities with the experiences of the students in my study. Obviously, the undergraduate students needed to use information technology, information sources and information processes while researching their essay, but these areas were not areas of focus and did not form qualitative differences in experience.

On the surface, Bruce's *information process* category has some similarities to the approaches students in my study took in researching their essay. *Information process* was experienced as action, problem solving or decision-making to address a knowledge gap or new situation. The process was the focus of the experience, with information use in the background of awareness (Bruce, 1997b p. 128-132). In my study, students were actively looking for evidence or to fill in a gap in their knowledge. However, information use was the defining factor in students' approach, and this dictated their decision-making and problem solving. In contrast, the educators in Bruce's study focused on process rather than the use of information.

The closest similarities between Bruce's results and my study come in Bruce's higher categories. In the category of *knowledge construction*, information use is the focus. Here educators analysed information in order to build up a personal knowledge base in a new area of interest (Bruce, 1997b p. 137-143). In my study, students who experienced *developing an argument* and *learning as a social responsibility* were all interested in learning and building up a knowledge base.

Educators' *knowledge extension* experience included gaining and enhancing knowledge through personal experience where the person transforms the information and creates something new, or makes new links (Bruce, 1997b p.143-147). In the experience of *learning as a social responsibility*, students made links between other courses and disciplines.

Bruce's *wisdom* category includes the transformation of people when knowledge is used wisely. The use of values is a distinctive component of *wisdom*. When combining values with an enhanced knowledge base, information is used for the benefit of others (Bruce,

1997b p. 147-151). *Wisdom* has a strong similarity to *learning as a social responsibility*. These students aimed to learn about the topic, field and discipline, not as a course requirement, but as a social responsibility. Students did not necessarily transform information as in *knowledge extension*; however, their intention was the transformation of society.

Comparison of the three studies

The students in my study have similarities with the Year 12 students in Limberg’s study and higher educators in Bruce’s study. The experiences of Limberg’s students are similar to the students in the first two categories of my study. The similarities between my study and Limberg’s study are not surprising, considering both studies investigated students’ experiences of researching an assignment. In contrast, Bruce’s study investigated the experience of educators in their everyday lives. Given this difference, it is of interest that the seventh category of Bruce’s study has a strong similarity with the last category of my study. These similarities are represented in Table 7.1.

Table 7.1 – Comparison of studies

Limberg Year 12 students	Lupton Undergraduate students	Bruce Higher educators
<p>Fact-finding</p> <p>Balancing information</p> <p>Scrutinising and analysing</p>	<p>Seeking evidence</p> <p>Developing an argument</p> <p>Learning as a social responsibility</p>	<p>Information technology</p> <p>Information sources</p> <p>Information process</p> <p>Information control</p> <p>Knowledge construction</p> <p>Knowledge extension</p> <p>Wisdom</p>

Other aspects revealed by the studies are ways of experiencing information as external, internal, objective, subjective and transformational as described by Bruce (1997b pp. 115-116). Bruce links the aspects of objective and external and subjective and internal. Objective-external is where information is experienced as ‘part of the external environment and particular kinds of knowledge are required in order to access it’ (Bruce, 1997b pp. 115-116). A subjective-internal experience is where information is seen as open to interpretation and reflection. The information becomes part of the person. A transformational experience

occurs when information is changed or people are changed through interaction with information (Bruce, 1997b p. 116). The internal and external nature of information is present in the experience of Year 12 students, undergraduates and higher educators. In Limberg's study the last two categories feature an internal dimension. This is evident in *balancing information in order to choose the right side* where students are seeking to form a personal viewpoint and in *scrutinising and analysing* where students' intent is to understand the topic. In Bruce's study, an internal dimension is present in the last three categories where information is personalised through reflecting, integrating into a knowledge base, gaining insights and using values.

In my study, it features in the last two categories where students are learning, understanding and applying learning. The transformational dimension is present in Bruce's six and seventh categories where knowledge and people are transformed and in my last category where the intention is the transformation of society. Table 7.2 illustrates these aspects.

Table 7.2 – Internal and external aspects of information

	Limberg <i>Year 12 students</i>	Lupton <i>Undergraduates</i>	Bruce <i>Higher education</i>
External	Fact-finding	Seeking evidence	Information technology Information sources Information process Information control
Internal	Balancing information Scrutinising and analysing	Developing an argument	Knowledge construction
Transformational		Learning as a social responsibility	Knowledge extension Wisdom

(Adapted from Bruce, 1997b; Limberg, 1998)

The three studies juxtaposed also illuminate a data-information-knowledge-wisdom continuum. Information has been turned into knowledge through internalisation and transformation and knowledge has been transformed into wisdom through the actions or intended actions of benefiting others and helping the community.

The identification of similarities and differences between the three studies demonstrate their contribution to a holistic understanding of information literacy. The three studies offer a broad view of information literacy from the experience of senior secondary school students to undergraduate students to the experience of higher educators. Individually, they provide an understanding and awareness of information literacy and information seeking and use in different educational contexts. Taken in conjunction, however, they transcend the boundaries of the studies and illuminate the phenomenon from a wider perspective.

Relationship with other empirical studies

Do the results of my study have any similarities with other studies of information literacy and essay writing? In this section, I explore similarities with other studies to illustrate a bigger picture of the way in which students experience researching an assignment, and in order to further establish the reliability of my study.

It is of significance that the experience of students who were *seeking evidence* to backup an existing argument has been noticed in other studies. Seamans (2002 p. 116) found that students searched for information that agreed with their viewpoint. She explained that ‘all seemed to approach information gathering with a predetermined viewpoint they were looking to support, as opposed to more broadly exploring a topic’. Kuhlthau (1993 p. xxii) also found that participants in one of her studies went straight from choosing a topic to collecting information without spending time exploring. Prosser and Webb (1994 p. 128) found that ‘isolated facts gained from reading were used to support predetermined opinions’. Hounsell (1997 p. 115) found that in *essay as viewpoint* ‘there may be indications that reading is directed by a preconceived view of the line the essay will take’. The results of these studies demonstrate a direct relationship with the *seeking evidence* category in my study where students searched for and used information to backup an existing argument. The lack of exploration of a topic and restricting the search to an existing argument should be a cause of concern for educators who see exploration as an essential and valuable aspect of learning subject content and concepts.

Seamans found that students verified information on websites by finding other websites that correlated. She stated that ‘there was a sense that two Web sites with the same

information meant, for them, that the information was true' (2002 p. 117). This is the same approach described by the students who experienced *seeking evidence*, who cross-referenced information in order to establish reliability and trustworthiness.

Hounsell's (1984; 1997) research into essay writing has similarities and differences with my study, particularly in relation to the use of data and evidence. Hounsell found that the interaction between the three foci of data, organisation and interpretation was what distinguished each category. He defined data as the 'subject-matter which provides the raw material or bedrock of essays' (1997 p. 112). In the most complex conception of *essay as argument*, Hounsell describes data as 'evidence substantiating or refuting a particular position or point of view' (p. 112). His illustrative quotes from students demonstrate that the students saw data as facts and quotes. The focus on data, evidence and interpretation is illustrated in Table 7.3.

Table 7.3 – Hounsell's categories

Category	Description	Focus
Essay as arrangement	Ordered presentation embracing facts and ideas	Data was focused on as coverage of sources rather than as evidence
Essay as viewpoint	Ordered presentation of a distinctive viewpoint	Students are not focused on data
Essay as argument	Ordered presentation of an argument well-supported by evidence	Interpretation and data are experienced as interrelated

(Adapted from Hounsell, 1997; Marton & Booth, 1997 pp. 27-29)

In my study, the focus on evidence is clear in the *seeking evidence* category, however this is reversed in Hounsell's study, where the focus on evidence is apparent in the highest categories and absent in the lower category. The aspects of viewpoint, argument, data, facts, ideas and evidence are present in both studies.

Hounsell discusses the approaches demonstrated by students in each category. He sees the experience of *essay as argument* and *essay as viewpoint* as engaging in a 'quest for meaning' (p. 122). This is similar to the categories *developing an argument* and *learning as a social responsibility* in my study that were characterised by understanding and learning. Hounsell describes the experience of *essay as arrangement* as 'Learning-as-studying but not learning-as-understanding' (p. 123). This is similar to the experience of

information literacy as *seeking evidence* identified in my study where students were interested in fulfilling the requirements of the course rather than learning.

Analysis of reliability of study

One method of analysing the reliability of a phenomenographic study is to compare it to other studies in the same field. As information literacy is interdisciplinary, it is relevant to compare my studies with those undertaken in library and information studies, and education.

In the previous section, I compared my study with that of Bruce and Limberg. I found that the lower categories in my study have similarities with Limberg's study and the higher categories have similarities with Bruce's study. I have also compared my results with Hounsell and found the same elements of evidence, argument and viewpoint, but constituted differently according to the focus of students and the object of research. Further, I identified similarities in results with Seamans and Prosser and Webb.

A theme in many phenomenographic studies has been one of social responsibility. Åkerlind (2003) investigated academics' awareness of their own growth and development. She found development as *contributing to disciplinary growth or societal change* as the most complex category. Similarly, Bowden et al (2002) found that the most complex category in researchers' conceptions of success in research included a sense of helping people by affecting peoples' lives, finding solutions to problems, increasing awareness and creating new knowledge. In looking at conceptions of information technology research, Bruce et al (2002b; 2002a) found that IT researchers' conceptions of IT research included helping to address and solve real-world problems for society and humankind. These studies looked at ways of learning in higher education, whether they were regarding an academic's development or a researcher's work. My study and Bruce's study have identified *learning as a social responsibility* and as *wisdom* respectively. They all share social responsibility as a complex way of experiencing.

Comparison with the standards models

In this section, I explore the relationship between the standards models and the results of my study. The standards models from Australia (CAUL), the US (ACRL) and the UK (SCONUL) (as described in Chapter 2) have been designed to provide a framework for information literacy education. These models portray the legacy of library-centric user education and bibliographic instruction. They represent an *expert's* view of information literacy. In contrast, the outcome of a phenomenographic study represents the experience of the *information user*.

As discussed in Chapter 2 and 3, the standards models present information literacy as a list of individual skills, attributes, attitudes and knowledge. The standards are generic, and non-discipline specific. In contrast, my study provides a picture of the collective student experience that includes the ways in which students learn about a topic, approach learning, understand what constitutes evidence, and develop their argument. My study frames information literacy as the interrelationship between the essay task, information and learning. When using the standards models to provide a curriculum framework it is easy to overlook the impact of the task, the topic and the discipline, and to assume that information literacy is generic i.e. that a person will experience information literacy in the same way regardless of the task, topic, discipline and intent. It is clear that the nature of the task, topic and discipline affected the students' experiences. For example, Sam was able to choose a topic that directly related to an environmental problem faced by his country. If he had not been given the freedom to choose a topic, he may not have experienced researching the essay as *learning as a social responsibility*.

Furthermore, there is an absence of a clear concept of social responsibility in the higher education standards models. Social responsibility is a distinctive element that was present in Bruce's *wisdom* category and is represented in my study where students experienced information literacy as *learning as a social responsibility*. The CAUL (2001 p. 19) standards allude to social responsibility when describing participative citizenship, however this aspect is not explicitly pursued. For example, an individual applying values to information is seen as important for democracy, but the impact this has on society is not stated. Interestingly, the US primary and secondary school *Information Power* standards

(American Library Association & Association for Educational Communications and Technology, 1989) explicitly state that social responsibility is an attribute of the information literate student. However, the way that social responsibility is portrayed is mainly in recognising the importance of information to a democratic society, behaving ethically with information and participating in groups to generate information. There is less emphasis on using information for the benefit of others or to help the community, which was the aspect of social responsibility present in my study and Bruce's study.

Another feature of my study and Bruce's study was the transformational nature of information literacy. In the standards models, transformation exists where new knowledge is created and new connections are made. However, there is no recognition of the other dimension of transformation – that is, the person being transformed by the information or a community being changed by use of information.

Comparison with process models

How do the experiences of students in my study relate to the information seeking process models, for example those of: Kuhlthau (*Information Search Process*); Eisenberg and Berkowitz (*Big Six*); and Pappas and Tepe (*Pathways to Knowledge*) (as described in Chapter 2)? It is difficult to relate these models to my study directly as my research approach concentrated on differences or variation in experiences, whereas the process models concentrated on similarities or, more accurately, commonalities in experience. However, there are some points that can be made which relate to the presentation of the models as a curriculum framework, and the representation of information literacy they project.

In my study, it was apparent that students experienced an information seeking and use process as an act of learning rather than a series of steps or phases. Students did experience many aspects of the process models but their experience also transcended the models. Furthermore, the Kuhlthau and Eisenberg and Berkowitz models are mainly limited to information seeking rather than information use. For example, Kuhlthau's model ends with the search closure and does not include information use. The 'Synthesis' stage in the *Big Six* involves the 'restructuring or repackaging of information into new or different formats'

(Eisenberg & Berkowitz, 1990 p. 8) which implies a low level conceptual process. Absent from these models is the sense of creating knowledge, internalisation, personalisation and transformation that is present in the information literacy phenomenographic studies. Indeed, the process of ‘construction for meaning’ that Kuhlthau (1993 p. 113) mentions appears to be the dimension that is more appropriate in describing the experience of the students in my study and Limberg’s study.

In contrast, *Pathways to Knowledge* appears to be more holistic and closer to the experiences of the students and educators in the three phenomenographic studies. For example, in the ‘Interpretation’ stage there is a sense of internalisation of information in developing personal meaning, while in ‘Communication’ the application of information results in constructing and presenting new knowledge (Pappas & Tepe, 2002).

As curriculum frameworks, the process models are appealing, as they are easy to use and understand. However, their simplicity may misrepresent the complexity of layers that constitute information literacy as revealed by the phenomenographic studies, particularly in regard to internalisation and transformation. Further, in common with the standards models, the process models portray information literacy as generic and context-free, which is clearly not the way students in my study experienced information literacy.

Comparison with definitions and descriptions of information literacy

The results of my study represent the range of ways that students’ experience information literacy through researching an essay. In this section, I compare these results with accepted definitions of information literacy.

The American Library Association (1989) and the Council of Australian University Librarians’ (1989; 2001) definition states that information literacy is:

an understanding and set of abilities enabling individuals to recognise when information is needed and have a capacity to locate, evaluate, and use effectively the needed information.

The missing element from this definition is that of social responsibility. Further, the use of information is not elaborated. Consequently, the UNESCO et al (2002) definition appears

to be the most comprehensive, as it stresses the ways in which information is used and incorporates responding to social issues:

People are information literate who know when they need information, and are then able to identify, locate, evaluate, organize, and effectively use the information to address and help resolve personal, job-related, or broader social issues to problems.

The ALA definition described earlier is regarded as the official definition in higher education and has been quoted in most of the literature on information literacy in the last decade. It has therefore had the most influence on experts' understandings of information literacy. However, some researchers have expressed a more holistic and qualitative description of information literacy as 'going through an information seeking and use process to acquire new meaning and understanding' (Cheuk, 2000 p. 178), as 'seeking meaning' (Kuhlthau, 1993), and as 'an appreciation of the complex ways of interacting with information. It is a way of thinking and reasoning about aspects of subject matter' (Bruce, 2000 p. 97). It is no surprise that these writers have based their descriptions on their empirical studies. The results of my study contribute to an understanding of information literacy that corresponds with these views.

Application of this study to information literacy theory and practice

Research studies grounded in the experience of students are essential to develop understandings of information literacy from the students' perspective. As a single study, the results of my research contribute to these understandings. However, when taken in conjunction with the studies of Limberg and Bruce the impact is more powerful. Not only can the three studies contribute to definitions, descriptions and models of information literacy, but they can also form a framework for information literacy education. In this section, I again draw on the three studies to discuss information literacy education. In particular, I use the results of my study to suggest teaching, learning and assessment strategies. I also discuss the link between students' experiences of information literacy and the design of the course from which the participants in my study were drawn.

Curriculum design for information literacy education

An understanding of information literacy from both the student and educators' perspective is important for the design of teaching, learning, assessment and evaluation activities. In

order to understand how these different perspectives impact on teaching and learning, it is necessary to analyse the similarities and differences between students' and educators' ways of experiencing.

The first four categories in Bruce's study described educators experiencing information literacy as *information technology*, *information sources*, *information process* and *information control*. These conceptions were not identified in the studies of students' experiences (i.e. Limberg's study and my study). This difference has implications for the design of curriculum and programs. If educators see information literacy as IT, sources, process and control, then it is likely that this is how they will approach their teaching. Indeed, the ACRL/CAUL standards are dominated by these ways of seeing information literacy. Further, within the library and information studies literature there is a plethora of reports of information literacy education based on these aspects (see for example, Bren, Hillemann et al., 1998; Julien, 1998; Bernard & Jacobson, 2001; Caravello, Herschman et al., 2001).

The elements that are present in the studies of students' experiences that are not present in the *IT*, *sources*, *process* and *control* experiences is the intention behind *using* information. In Limberg's study these intentions included finding the right answer, choosing the right side and creating an answer (Limberg, 2000a p. 195-196). In my study they appear as reinforcing existing viewpoints, understanding, filling in the gaps, making connections, learning and applying learning. In Bruce's study they appear as building a knowledge base and use of information through critical analysis, intuition and values. Indeed, Limberg (2000a p. 204) argues that:

The finding that aspects of information *use*, not searching, form the essential differences between the conceptions of information seeking gives us reason to infer that a greater emphasis should be put on use aspects rather than search skills or technology issues in education.

It is obvious that there is a qualitative difference between thinking of information literacy primarily as information seeking, and thinking of information literacy as information use. For librarians who base their information literacy programs on technology, sources, process and control, it is a challenge to think beyond information seeking. It is also possible that thinking outside these aspects may threaten the operational boundaries of responsibility that

exist in higher education between academics, librarians and academic skills advisors (Lupton, 2002a).

There has been a call to rethink information literacy education as some practitioners and researchers have recognised that information literacy has moved beyond information seeking and information behaviour. Graham and Lester (1999) describe collaboration between academic skills staff and librarians in teaching information literacy, contrary to many of their New Zealand colleagues who do not take responsibility for 'non-library' skills such as critical thinking. As Graham and Lester (1999 p. 124) point out,

[these skills] are what separates information literacy from user education or bibliographic instruction. It is of note that as librarians, we are pushing for our students to become information literate yet we are not teaching all the skills involved.

In addition, Cheuk (2000 p. 187) challenges current information literacy education practice and asks:

- How often do you try to inform your students about the 'right' information handling strategies, instead of asking students to reflect on and evaluate their own strategies as exhibited in real-life?
- How often do you encourage students to learn by mechanical behaviour (for example looking up thesauri, using indexes, and searching OPACS), instead of encouraging students to learn by 'deep thinking' (for example, synthesising information, and generating alternative opinions from information gathered)?

The strategies that Cheuk critiques stem from a transmission-based, teacher centred view of information literacy education. This approach is also reflected in assessment practices. My study contributes to an understanding of information literacy as part of learning in contrast to seeing information literacy as separate skills, attributes and steps. Generic assessment practices and instruments that measure IT skills, information sources and information processes as described in Chapter 2, do not reflect the range of ways students in my study experienced information literacy. For these students, information literacy was bound up in the topic and content of the assignment and in the way they approached the course. Therefore, the results of my study challenge some aspects of information literacy education practice in academic libraries.

The common way of understanding information literacy from the librarians' perspective is to separate the process and content of learning. It is not to see the whole information seeking and use process within the context of the learning environment, nor is it to see assessment as contextualised into the learning process. Rather, it is to see it as a discrete process based on information seeking. In some ways it is more comfortable and easier to view information literacy in this way. Issues of power and control over curriculum can be avoided when the curriculum can be segmented and delimited, where different people and operational units have responsibility for different parts of the learning process and where assessment can measure discrete information seeking skills. However, the results of my study indicate that this way of organising and structuring information and learning is contrary to the way in which undergraduate students learn.

The results of the three information literacy phenomenographic studies contribute to a way of rethinking information literacy education to support the design of learning activities that encourage students to experience information literacy in a range of ways. In the next section, I explore curriculum design for information literacy education from a phenomenographic perspective.

Relational curriculum models for information literacy education

A relational approach to curriculum design is based on a phenomenographic perspective that involves making the variation in experience explicit. It is clear that some ways of experiencing information literacy are more complex, complete and inclusive. Learning information literacy as seen from a relational perspective is 'coming to experience effective use of information in new, increasingly complex ways' (Bruce, 1997b p. 171). In other words, it is a qualitative change in the way someone experiences information literacy.

A relational approach provides opportunities for students to experience information literacy in a range of ways. Therefore, one contribution of my study to information literacy education is to demonstrate that teaching, learning and assessment activities can be designed which enable students to experience information literacy through researching an assignment as ***seeking evidence, developing an argument*** and ***learning as a social responsibility***.

Recent relational approaches to curriculum design have utilised variation theory. Variation theory can be used as a framework to design curriculum based on dimensions of variation in ways of experiencing. Variation theory holds that ways of experiencing are comprised of 'critical features that must be discerned and focused on simultaneously' (Pang & Marton, 2002 p. 11). Dimensions of variation are aspects that run through the categories in a phenomenographic outcome space and that are experienced in a qualitatively different way in each of the categories. As Bowden and Marton (1998 p. 12) assert, it is only when variation is discerned, that learning as moving to a more complex way of experiencing can occur. Information literacy curriculum strategies for enabling a discernment of variation in critical features of experience involve varying an aspect of information literacy while other aspects are kept constant (Bowden & Marton, 1998 p. 35).

The dimensions of variation identified in my study were the focus on learning, focus on the essay task, use of information in the course, use of information in the essay, use of contrasting perspectives and development of argument. Further, the expanding awareness structure encompassed the essay, information, learning and applying learning. Therefore, the dimensions of variation identified in my study could be used to structure information literacy education where students:

- learn about the topic, communicate about the topic, apply learning about the topic
- search for information to answer questions, pose questions, make links and connections between the topic, field, discipline and other disciplines
- evaluate trustworthiness of information, use a variety of sources, use different sources for different purposes, discuss sources that communicate effectively
- use contrasting perspectives to enhance an argument, to get the big picture, to understand
- develop an argument as personal viewpoint and as incorporating personal viewpoint.

Examples of utilising dimensions of variation in designing teaching and learning activities based on my study are illustrated in Table 7.4.

Table 7.4 – Examples of dimensions of variation

	Variation
Use of information in the essay	<ul style="list-style-type: none">• trustworthiness of website (author, date, provenance, look and feel)• how the information in the website could be used to provide facts, figures, ideas, opinions, contrasting perspectives• quality of written communication in terms of enjoyment of good writing
Contrasting perspectives	<ul style="list-style-type: none">• exploring the contrasting perspectives on a particular issue and discussing their value in terms of using them to enhance argument, to get the big picture and to understand the issues
Essay task	<ul style="list-style-type: none">• exploring ways the essay task could be used to complete course requirements, learn about the topic and communicate the topic in relation to the field and discipline
Argument	<ul style="list-style-type: none">• exploring students' personal viewpoint and how that relates to the essay argument

Bowden and Marton (1998 p. 154) argue that not only do students need to experience variation in order to learn, but they also must explore variation by comparing and analysing their experiences. Therefore, specific strategies could include designing activities where students discuss and analyse:

- their intention behind seeking and using information for their assignment
- how they use evidence to backup their arguments
- how they develop and rethink arguments
- the ways in which bias and contrasting perspectives can be used
- the way in which their own viewpoint develops
- how they make links between different disciplines
- the development of their knowledge base
- how they can personally use knowledge gained by doing the assignment, course, program and degree to help the community and to effect social and political change.

This can be facilitated by the design of activities and assessment where students are required to:

- present different viewpoints
- pose questions to research throughout the information seeking and use process
- reflect on and demonstrate the development of their own viewpoint
- reflect on and demonstrate the development of their essay argument
- analyse bias and the use of statistics
- set their topic in an historical, social, cultural and political context
- reflect upon how they have learned about the topic through the process of their research
- make links between the topic, the course, other courses and disciplines
- reflect on how learning about the topic may help contribute to social responsibility.

How can students move from one way of experiencing information literacy to a more complex way of experiencing information literacy? As learning from a phenomenographic perspective is seen as moving from a less complex way of experiencing something to a more complex way of experiencing something (Marton, 1992 p. 603), then it follows in the context of this study, learning information literacy entails moving from experiencing it as *seeking evidence* to *developing an argument* and from *developing an argument* to *learning as a social responsibility*. One goal of information literacy education in first year could be to design teaching, learning and assessment activities that explicitly develop students from experiencing information literacy as *seeking evidence* to experiencing it as *developing an argument*. For example, this could be facilitated by the design of the essay assignment to encourage exploring the topic rather than limiting their search to supporting an existing argument. Students could:

- choose a general topic
- search for information, read widely around the topic
- refine the topic
- construct their own analytic essay question based on their exploration of the topic.

A learning portfolio can facilitate reflection where students describe the development of their understanding of the topic and discipline while they are searching for and using

information. Students should be encouraged to document questions they have posed while learning about the topic. This reflection and question asking is exemplified by Louise's experience in working out what questions she needed to explore in order to fill in the gaps, develop her argument and learn more about the topic:

Louise: OK. I do a lot of scan reading and pick out like -- once you read a little bit about the topic you sort of learn the language used to describe the particular problem and so you look for similar words. Like I remember -- I've got a lot of information about the Murray Darling Basin, I've got a lot of information about what salinity is, what causes it, where it happens. I know who causes it, I know about our European heritage of unsustainable agriculture. I don't have any information about farmers, what the future of farmers are -- I'm thinking -- I need something about that. So you see the gaps in your knowledge and you think OK, well I'll type in those keywords so I can fill in those gaps. You then run that same filter over that information and think I need something that tells me about future social landscapes, I need something about intergenerational equity, I need something about housing, farmers having to sell their properties. So you sort of like do a little bit of a dance of what do you need to know. You have to do this broad, sort of general... at the beginning to get the big outline and then it is a gradual process of coming closer and closer and closer and closer down to your target... It is, it is by sort of getting the general that you end up being able to find out what the specifics are that you need and what the gaps are that you need. Because you formulate an argument the more you sort of read, and by doing the plan you think OK -- because what I do -- I write like 20 sentences that are going to be my key for my essay. I started out with a real general sort of -- what are the systemic issues? who are the main players? where does it happen? what does it affect? whose interests are at stake? You sort of ask yourself questions then write yourself answers and then you need to find information about fleshing out the answers. And so there are things that I use for my keywords to actually find information. Then from that you can develop an argument I think. It doesn't sort of really happen to me until late in the first stage -- the argument developing -- I don't go in and say well I'm going to say this and then try and find stuff, it sort of happens the other way around.

Working from a librarian's perspective, Bodi (2002 p. 112) contributes a general list of questions to guide the research process:

Context

- What is the subject content of my topic: sociology, literature, philosophy?
- What are the historical trends or time periods related to this topic?
- Do I need historical or current information?
- Are there geographic limitations?

Details

- What are the parts of my topic?
- What examples and evidence do I need?
- What are the terms that are used, and what do they mean?
- Causes
- What and how has this situation developed?

Results

- What are the results of this situation?

Alternatives

- What are the different or conflicting points of view on my topic?
- What position do I want to take?

Comparisons

- How does my topic compare with other places, times, or groups of people?

Warnings

- Do I see any negative outcomes or effects?

Opportunities

- How can I contribute something meaningful and new?

Bodi suggests that the list of questions should be generated by the librarian in collaboration with academic staff, however, much of the power of the questions posed by students in my study were that they were constructed by the students in the process of building a knowledge base, filling in the gaps and developing an argument. The strength of a pre-formed list of questions is that it exposes students to aspects of thinking about the topic that they may not have considered and gives structure to what for many is a daunting experience. This is especially relevant to providing support for first year students. A weakness of such a list could be that students set out to find the answers to discrete questions and do not integrate the whole. One example of this was in the 'webography' task in the course Resources, Environment and Society (from which the participants of this study were drawn) where students were required to find five websites and critically evaluate them in terms of purpose, currency, viewpoint and the way the information will be used in a tutorial debate. As part of the information literacy workshop, students were supplied with an 'Internet resources checklist' handout (see Appendix J).

To the dismay of the teachers involved, many students addressed the checklist questions individually and discretely. They did not integrate the answers as expected and concentrated on the checklist to the detriment of the requirement that they describe how the information will be used in the tutorial debate. It was evident that there was misalignment (Biggs, 1999) between the goals of the task and the emphasis on the web checklist.

The web checklist used for the ‘webography’ may have also had an impact on students’ experiences in researching the essay. As described in Chapter 6, the students who experienced *seeking evidence* evaluated the trustworthiness of information by checking the date, author, presence of references, presence of statistics, file format (e.g. pdf), author contact details and look and feel of the page. It is evident that they applied the checklist when searching for information for the essay. In contrast, the students who experienced *developing an argument* were not as concerned with trustworthiness of sources, but rather with how the information in the different sources (ideas, opinions, facts, perspectives) could be *used*. The students who experienced *learning as a social responsibility* evaluated information in terms of the communicability of the information. It seems that the concern of Limberg (2000a p. 200) that librarians encourage surface approaches to learning was supported by the students who experienced *seeking evidence*.

Link between results and the course design

Was there a link between the design of the course Resources, Environment and Society and the ways students experienced information literacy? Not surprisingly, many of the teaching, learning and assessment strategies outlined in the last section were present in the course.

The course description states:

The course will examine different ways of conceptualising the nature of resources, the environment and society. The contrasts and connections between scientific and social science theory and methods will be examined. Key factors mediating the inter-relationships between society and environment will be explored including resource use, population and technological change. Other key concepts critically explored will include social justice, equity and sustainability. These issues will [be] explored through case studies of the international dimension of global climatic change, water and land degradation and biodiversity conservation (Baker & Greig, 2002) (see Appendix K for full description).

As described in Chapter 5, the course Resources, Environment and Society was designed as part of the ANU's iLearning Project, and based on an inquiry learning curriculum approach. The course was designed to embed information literacy into the curriculum. There was no textbook and few readings were supplied. Students were required to constantly interact with information through the use of the course website and online lecture notes that contained numbers of web links. There was a strong focus on different ways of seeing environmental resources from social, cultural, scientific, historical and political perspectives. The course featured a weekly panel discussion where representatives from various groups including the indigenous community, government, research and environmental groups presented their views on environmental issues. Tutorial activities included role-plays and case studies.

The link between the course curriculum and the research results was not a research question, however, it has emerged that there is an apparent relationship. For example, in the *seeking evidence* category, students experienced information literacy as searching for statistics, ideas, opinions and perspectives to backup an existing argument or viewpoint. This experience is clearly articulated in a student's learning portfolio reflection on the critical reading tutorial held in week 6 of the semester:

Sally: Before searching for quotes or pre-existing concepts write at least an essay outline, if not a rough draft so that your own opinion dominates rather than that taken from someone else. Then support with fact and pre-existing opinion.

Sally's comment indicates that students were encouraged to search for information in order to backup an existing argument. Students may have interpreted this as limiting their search rather than exploring the topic and learning about the topic as in the case of students who experienced *developing an argument*.

A dimension of variation that was present in different forms in all categories was how students used contrasting perspectives. This was well represented in the course by the value lecturers placed on different views. It was apparent in the interdisciplinary nature of the course and in the prominence of different views being represented in the panel discussions, role-plays and case studies. Students were required to examine their own views and reflect.

An example of this was a case study where students were presented with a number of different views concerning the hunting of whale by the Japanese Makah people. Students were then required to discuss the issue in the tutorial and write their personal position on the issue in their learning portfolio. Throughout the course students were constantly required to challenge their own belief system in relation to different ways of seeing environmental problems.

Experiencing information literacy as *developing an argument* was represented in the course via the subcategory *setting the topic in a context*. This experience was characterised by the framing of the topic within a social, cultural, historical and political perspective, which echoed the approach of the course.

The nature of the environmental studies course was conducive to *learning as a social responsibility*. One of the students who experienced information literacy in this way was an environmental activist. Students interested in solving environmental issues may have been more likely to choose Resources, Environment and Society. They were also more likely to choose an essay topic for which they had some passion. Furthermore, the course orientation was strongly socially critical, where personal and political action was discussed. The theme of social responsibility was reflected in tutorial presentations at the end of semester, where students spoke of wanting to get personally involved in helping solve environmental problems.

Is information literacy experienced as learning?

Is there a link between ways of experiencing information literacy and learning? Definitions, descriptions and models of information literacy implicitly and sometimes explicitly portray information literacy as linked with learning. The association of information literacy with independent learning and lifelong learning is clear as evidenced in the Chapter 2. Cheuk (2000 p. 178) implies a link with learning when she describes information literacy as 'going through an information seeking and use process to acquire new meaning and understanding'. The link is explicit to Kuhlthau when she states that 'information seeking is a complex learning process which involves finding meaning' (1993 p. 57) and 'the person seeks meaning, rather than a right answer, and views information as a way of learning and

finding meaning or as a process of construction'(p. 3). Further, Bruce (1997b) identifies links with learning in her study where higher educators are building a knowledge base and creating new knowledge.

Limberg addressed what students learn through researching an assignment by asking them about the assignment topic. She found a link between learning outcomes and information seeking and use. Students in my study experienced information literacy as not learning (Category 1), learning (Category 2) and applying learning (Category 3). They described building a knowledge base and seeking understanding. It is clear that the results of my study support the view that information literacy is experienced as learning.

Link between ways of experiencing information literacy and deep and surface approaches to learning

Is there a link between learning approach and ways of experiencing information literacy? This question was prompted by Limberg's (1998) finding that there was a link between ways of experiencing information seeking and use and surface and deep approaches to learning, and by Hounsell's (1997) analysis of learning approach in relation to essay writing. It was also inspired by Bruce and Candy (2000 p. 7) in advocating information literacy as a 'way of learning', based on an observation by Kuhlthau (1993 p. 3).

A learning approach encompasses the way in which someone goes about learning.

Dall'Alba (2000 p. 95) draws from Marton, Säljö and Ramsden in describing a learning approach as:

- The student's intention (to understand or reproduce)
- The student's focus (on the task or learning material itself, or on its underlying purpose and meaning); and
- The way in which the student engages in learning (organising and integrating, or simply memorising, the content of what is being learned).

In my study it is apparent that students were researching their essay with different intentions, foci and ways of engaging that were closely related to Dall'Alba's description of learning approach.

Further, the characteristics of deep and surface approaches to learning (as described in Chapter 3) were apparent in the experiences of students in my study. Some students experienced the essay as an end in itself, while others experienced it as learning. Some students looked to collect facts and figures on the topic while others saw how the topic fitted into the field and discipline and how it related to other disciplines. Some students searched for information to answer questions posed by teachers, others posed their own questions. Some students saw information as external, others internalised it in seeking meaning, understanding and relating it to life goals such as helping the community. These differences were intrinsic to the foci that distinguished and delimited the categories. They closely correspond with deep and surface approaches to learning. There are two ways this can be conceptualised, either that the students in my study were engaged in deep and surface learning approaches; or that they were engaged in information literacy as a learning approach. Rather than linking deep and surface learning approaches to information literacy, deep and surface approaches can be seen as intrinsic to different ways of experiencing information literacy. In other words, deep and surface learning approaches can be seen as a component of experiencing information literacy.

How can educators use the results of this study?

The results of this study, and that of the studies of Limberg and Bruce have implications for the professional development and practice of educators such as academics, librarians, academic skills advisors and academic developers in higher education¹⁰. It is also of value to teacher librarians, as it is a departure from the process models prevalent in primary and secondary education.

Educators can use the results of this study to design teaching, learning and assessment strategies based around the experience of variation in information literacy. For example, the strategies outlined in the previous section can be used as tutorial activities, and assessment criteria can be designed that reflects the more complex and inclusive ways of experiencing information literacy. At the very least, it simply offers an awareness of the variation in experience that exists amongst students studying a first year course.

¹⁰ In Australian higher education, academic skills advisors are also known as study skills advisors/learning advisors/counsellors. Academic developers are also known as staff developers.

The development of information literacy education has resulted in the role of academic librarians expanding from a service role to an educative role. Many librarians are directly involved with teaching and working with academics to design curriculum. Librarians can also use these results to have an awareness and understanding of the variation in ways of experiencing information literacy, and to design teaching, learning and assessment activities. The relational model offers a different way of thinking about information literacy, which is an important alternative for librarians who are accustomed to process and standards models. In particular, these results are significant in challenging and critiquing current practice and understandings of the phenomenon of information literacy.

Recommendations for further research

Further research is needed into information literacy in formal educational environments.

Issues raised by my study include:

- the ways in which various groups of students at different year levels experience information literacy
- the ways in which students in different courses and disciplines experience information literacy
- the ways in which students experience information literacy in their everyday lives
- the ways in which students experience learning information literacy
- the link between learning outcomes and ways of experiencing information literacy
- the link between curriculum design and ways of experiencing information literacy
- how educators teach information literacy.

As part of my research program building on this study I will next proceed to transcribe and analyse the data gathered from a second interview with the participants of my study (see Appendix F). I will explore the experience of students doing the essay in the course Resources, Environment and Society with how they approach assignments in their other courses. In addition, I will describe students' experiences of information literacy in their everyday lives which will enable me to directly compare experiences of students with the experiences of educators as identified by Bruce. Further, in building on this study I hope to explore the relationship between the ways in which undergraduate students experience

information literacy in their everyday lives, and the ways in which they experience information literacy through researching an essay.

Conclusion

In this study I have asked 'How do undergraduate students experience information literacy when researching an essay in a first year course?' I have used the results of my study to contribute to an understanding and awareness of information literacy from the students' perspective, and to suggest teaching, learning and assessment strategies for information literacy education.

Is information literacy: A process? A strategy? A set of characteristics? A set of skills, attitudes and attributes? A study skill? A learning approach? A teaching method? A way of learning? A curriculum design? Is it individual? Is it socially constructed? Is it a characteristic of the learner or a characteristic of the context or both? Is it developmental? The different ways of understanding information literacy as suggested by these questions are evident in the literature and are demonstrated by a plethora of models, descriptions and definitions. Information literacy can be all the above, but how is it best conceptualised in order to enhance student learning? The contribution I make in this study is in framing information literacy as a learning approach.

If we see information literacy as a learning approach, then it follows that it is not seen as a characteristic of a learner, but a response to a context. The way students experience information literacy is bound up in the topic, the course and the discipline. The implication for seeing information literacy as a learning approach is that educators need to understand information literacy in a wider context and as an intrinsic part of learning. This is a challenge for breaking down the operational boundaries between lecturer, tutor/demonstrator, librarian and academic skills advisor that exist in higher education and that function as barriers to integration of disciplinary content and process.

The implication for administrators including library management, policy makers and library and information professional bodies is that information literacy cannot be decontextualised

from the learning process. Therefore, the value of generic, standalone, parallel and foundation courses for information literacy education is dubious.

Information literacy as a construct in library and information studies has emerged from investigating and teaching information *seeking*. However, a crucial dimension of information literacy is information *use*. Further, information literacy transcends information seeking and use. Information literacy is less about the specifics of searching for information and more about the intent of searching for information. It is less about the use of information and more about the conceptualisation behind using information. Information literacy is about learning, and is a way of learning. This learning dimension can be seen in the discourse that describes information literacy as a functional literacy of the information age, as crucial to independent learning and as fundamental to lifelong learning. It is apparent in the studies of the ways people experience information literacy, where the people seek meaning and understanding in building a knowledge base, where people create new knowledge, and where knowledge is transformational.

The contribution of my study to information literacy theory and practice

My study has contributed to an understanding of students' ways of experiencing information literacy when researching an essay in a first year course. The outcomes of the study include the:

- mapping of ways of experiencing information literacy into an outcome space, presenting the qualitatively different ways that students experience information literacy
- hierarchical structure of the outcome space where Category 2 subsumes Category 1 and where Category 3 subsumes Categories 1 and 2
- structure of awareness in the outcome space presenting an expanding awareness of the essay, information, learning and applying learning
- framing of information literacy as a learning approach
- framing of information literacy as the interrelationship between the essay task, information, and learning
- support of Bruce and Limberg's results, including seeing information as external, internal and transformational

- support of social responsibility being part of the experience of information literacy
- identification of further affective elements as part of information literacy to add to the outcome of Kuhlthau's study
- support of a relational curriculum design approach.

In framing information literacy as a learning approach, a number of opportunities and challenges for information literacy education are revealed. The opportunities include supporting those educators who view and experience information literacy as intrinsic to learning. It also provides support to embedded, across-the-curriculum information literacy practice. However, it provides challenges for those who regard information literacy as:

- a set of skills
- a series of defined steps, stages and phases
- an individual, stable characteristic
- measurable and observable
- generic
- topic free, discipline free and context free
- information seeking rather than information use.

Further, it provides challenges for existing practice where information literacy education is:

- library-based
- decontextualised
- involves training specific skills.

Finally, my study offers a holistic understanding of information literacy from the students' experience. The use of a phenomenographic approach has resulted in the mapping of the qualitatively different ways that undergraduate students experience information literacy when researching an essay. As such, this study is a valuable educational resource as it provides a framework to assist with designing relational curriculum that offers students opportunities in varying ways of experiencing information literacy and in developing more complex and inclusive ways of experiencing.

Appendix A - University of Canberra Generic Skills and Attributes

University of Canberra, 1995	University of Canberra, 2002
<p>Information Literacy</p> <p>This refers to students' general ability to identify, analyse, evaluate, interpret and present information. It also includes student's ability to identify, use and critically evaluate information technology. Examples of this include:</p> <p>2.1 choosing appropriate technology for a task;</p> <p>2.2 retrieving information using technology;</p> <p>2.3 manipulating data using technology;</p> <p>2.4 using technology to present information; and</p> <p>2.5 adapting to technological changes as appropriate.</p>	<p>Information Literacy and Numeracy</p> <p>Graduates are expected to be able to locate, identify, collate, analyse, manipulate, evaluate, interpret and present information and numerical data.</p> <p>Information and Communication Technology</p> <p>Graduates are expected to be able to select and use appropriate information and communication technology to retrieve, manipulate and present information.</p>

Appendix B - Information Power standards

Information Literacy

The student who is information literate:

1. accesses information efficiently and effectively.
2. evaluates information critically and competently.
3. uses information accurately and creatively.

Independent Learning

The student who is an independent learner is information literate and:

4. pursues information related to personal interests.
5. appreciates literature and other creative expressions of information.
6. strives for excellence in information seeking and knowledge generation.

Social Responsibility

The student who contributes positively to the learning community and to society is information literate and:

7. recognizes the importance of information to a democratic society.
8. practices ethical behavior in regard to information and information technology.
9. participates effectively in groups to pursue and generate information (American Library Association & Association for Educational Communications and Technology, 1989).

Differences with the higher education standards include the explicit hierarchical structure and appreciation of 'literature and other creative forms of expression'. It is of interest that Standard 7 'recognizes the importance of information to a democratic society' which seems to exclude discussion of non-democratic societies where one might imagine the importance of information is just as great, or greater.

Appendix C - Summary of Limberg's categories

Category	Intent	Description
A) Fact-finding	<i>Finding the right answer</i>	<ul style="list-style-type: none"> • fact-finding • finding information that was conveniently located • avoidance of information • restricting information • evaluating information using surface signs rather than content • not using biased information
B) Balancing information in order to choose the right side	<i>Choosing the right side</i>	<ul style="list-style-type: none"> • finding enough information to form a personal standpoint • using biased information to choose the right side • evaluating information using surface signs rather than content • using a variety of sources
C) Scrutinising and analysing	<i>Creating an answer</i>	<ul style="list-style-type: none"> • seeking and using information to understand the topic • critically evaluating and analysing sources • valuing different perspectives • placing topic in a wider context

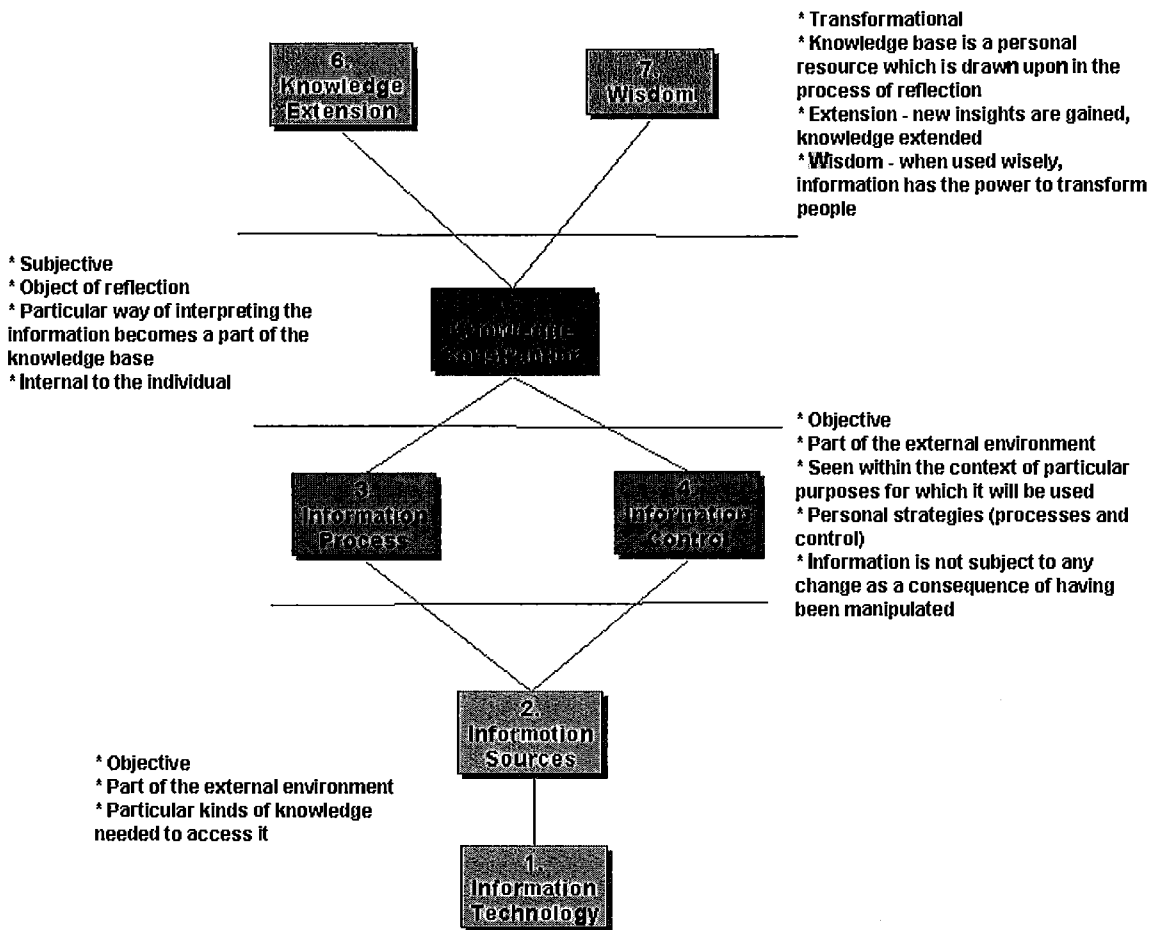
(Adapted from Limberg, 1998; 1999; 2000a)

Appendix D - Summary of Bruce's categories

Category	Description
1) Information Technology <i>Using IT effectively is:</i> a) <i>achievable</i> b) <i>unachievable</i>	<ul style="list-style-type: none"> • Using IT for retrieval and communication • Staying informed • Scanning information in case it is needed • Interacting with people
2) Information Sources <i>Knowing sources and:</i> a) <i>their structure</i> b) <i>using them independently</i> c) <i>using them flexibly</i>	<ul style="list-style-type: none"> • Finding information • Purposeful searching – knowing what you want • Personal knowledge of sources • Being familiar with sources • Fluency with sources
3) Information Process	<ul style="list-style-type: none"> • Identification of knowledge gap • Executing a process and/or strategy • Decision making and problem solving
4) Information Control <i>Controlling information using:</i> a) <i>filing cabinets</i> b) <i>the brain</i> c) <i>databases</i>	<ul style="list-style-type: none"> • Organisation and management • Storing of information for easy retrieval • Selecting information on basis for likely value
5) Knowledge Construction	<ul style="list-style-type: none"> • Critical analysis • Building a personal knowledge base • Adoption of personal perspectives • Learning • Construction and interpretation
6) Knowledge Extension	<ul style="list-style-type: none"> • Knowledge extension • Knowledge gained through personal experience • Creative insight, reflection, intuition • Information is transformed
7) Wisdom	<ul style="list-style-type: none"> • Using information wisely for the benefit of others • Awareness of personal values, attitudes and beliefs • Social responsibility • Enhanced knowledge base • Placing information in an historical, social and cultural context

(Adapted from Bruce, 1997b)

Structural features and additional dimensions of the Seven Faces



Adapted from Bruce (1997b; 1998)

Appendix E - Summary of Hounsell's categories

Category	Description
Essay as arrangement	<p><i>Ordered presentation embracing facts and ideas</i></p> <ul style="list-style-type: none"> • Ideas are viewed disjunctively • Data are used for coverage of sources rather than as evidence supporting a point of view • Interpretation, organisation and data hold equal focus
Essay as viewpoint	<p><i>Ordered presentation of a distinctive viewpoint on a problem or issue</i></p> <ul style="list-style-type: none"> • Interpretation and organisation are in focus
Essay as argument	<p><i>Ordered presentation of an argument well-supported by evidence</i></p> <ul style="list-style-type: none"> • Argument is a distinctive position or point of view • Involves interpretation • Integrated whole • Interpretation is superordinate to organisation and data

(Adapted from Hounsell, 1997; Marton & Booth, 1997 pp. 27-29)

In common with Limberg, Hounsell analysed his results in terms of conceptions of learning and deep and surface approaches. He identified the *essay as argument* category as relating to a deep approach, where there is a 'concern to abstract and construct meaning through an active engagement with the subject-matter'. He related the *essay as viewpoint* to the multistructural level in Biggs and Collis' SOLO Taxonomy (1982), where 'inconsistencies or conflicts encountered in data are ignored or discounted so that a firm conclusion can be reached' (1997 p. 123). He related *essay as arrangement* to a surface approach where learning is factual and reproductive.

Appendix F - Interview based on Bruce's study

The pilot study was conducted with the following questions replicated from Bruce's (1997b p. 99) study:

1. *How do you use information in your everyday life?*
2. *Tell the story of a time when you used information effectively.*
3. *Describe your picture of an effective information user.*
4. *Describe your experience of being (or trying to be) an information literate person.*

The outcome of the pilot study was the reframing of questions as follows:

1. *Tell me about a time when you were satisfied with the way you used information.*
2. *Describe your picture of an ideal information user.*
3. *Describe your experience of being an information literate person.*

While conducting the first interview that formed the basis for this dissertation (as described in Chapter 5), it became apparent that students' interaction with information might be affected by the design of the course. I then included questions in the second interview that explored this aspect. Before the second interview commenced, I explained that the first three questions would relate to the student's study at university, while the second group of questions could relate to university, everyday life, work, school, hobbies and past and present experiences. Fifteen students of the original 20 in the main study returned to do the second interview.

Second interview

The second interview (45-60 minutes) was designed to examine students' experiences of information literacy in other courses and how this differed from their use of information in Resources, Environment and Society. Broad questions based on Bruce's study were also included.

The second set of interview questions were as follows:

1. *How do you use information in your other courses?*
2. *What types of information do you use in your other courses?*
3. *Can you tell me about the way you used information in 'SRES1001 compared to how you used it in your other courses?*
4. *Tell me about a time when you were satisfied with the way you used information.*
5. *Describe your picture of an ideal information user.*
6. *Describe your experience of being an information literate person.*

Appendix G - Consent form

UNIVERSITY OF CANBERRA

Consent Form

Research Project 'Undergraduates' conceptions of information literacy'



This research project is designed so that you can think about and describe the way you seek and use information in everyday life and in your studies at ANU. I will be asking you questions such as how you search for information, how you decide when you have enough information, how you decide on the quality of information and what you do with the information when you have gathered it. You may find that you will benefit by participating in this study as you may become more reflective and critical in the way you seek and use information.

The results of the study will be used in the future by educators such as lecturers, tutors, librarians and academic skills advisors in order to understand the way that undergraduate students search for, and use information.

Demographic data is required because I need to choose a cross-section of students to be involved in the study.

Participation in this research is voluntary, and you can discontinue participation at any stage without penalty or the need to provide an explanation.

Your participation in the research involves the following:

- 30 min taped interview in April
- 60 min taped interview in June/July
- Learning Portfolio submitted for 'Resources, Environment and Society'
- PowerPoint presentation for 'Resources, Environment and Society'

You will be given a \$10 photocopy card as a reward for your participation in the interviews.

Your interview responses will be kept confidential, and in no way will you be able to be identified through them. I am the only person who will have access to them. Your privacy will be protected throughout the study. The interview data will initially be stored off-campus in password-protected files. The tapes will be transcribed and then wiped. They will be stored in locked containers while they are being transcribed. When the tapes are transcribed, you will be able to read your response. At the completion of the project, the data will be stored at the University of Canberra for a period of five years, after which the data will be discarded. At the completion of the project, you may request access to the research findings.

If you agree to participate, please sign the form over the page and answer the questions. Your signature indicates that you have read and understood the information in this letter and have received an Information Sheet, and that you voluntarily give your informed consent to participate in the study.

Researcher: Mandy Lupton

Master of Arts student, University of Canberra

Division of Communication and Education

Supervisor: Professor Belle Alderman Ph: 6201 2062

I understand the contents of the following:

*'Undergraduates' conceptions of information literacy' Research Project Information Sheet
Consent to Participate in Research (this form)*

I agree to participate in the 'Undergraduates' conceptions of information literacy' research project and give my consent freely. I understand that the study will be carried out as described on the Research Project Information Sheet, a copy of which I have kept. I realise that whether or not I decide to participate is my decision and will not affect my studies. I also realise that I can withdraw from the project at any time and that I do not have to give any reason for withdrawing. Any questions I had about this research project and my participation in it have been answered to my satisfaction.

Name: (print) _____

Age: _____

Gender: **Female** ____ **Male** ____

Study pattern: **Full-time student** ____ **Part-time student** ____

Degree: _____ (eg. B Sc/Arts)

Academic major: _____ (eg. Archaeology)

Email: _____

Phone: _____ (h) _____ (mob)

Signature

Date

Thank you for your participation,
Mandy Lupton

UNIVERSITY OF CANBERRA

Research Project Information Sheet

‘Undergraduates’ conceptions of information literacy’



Researcher: Mandy Lupton

This research project is designed so that you can think about and describe the way you seek and use information in everyday life and in your studies at ANU. I will be asking you questions such as how you search for information, how you decide when you have enough information, how you decide on the quality of information and what you do with the information when you have gathered it. You may find that you will benefit by participating in this study as you may become more reflective and critical in the way you seek and use information.

The results of the study will be used in the future by lecturers, tutors, librarians and academic skills advisors in order to understand the way that undergraduate students search for, and use information.

Demographic data is required because I need to choose a cross-section of students to be involved in the study.

Participation in this research is voluntary, and you can discontinue participation at any stage without penalty or the need to provide an explanation. I am conducting this research for a Master of Arts in Information Studies (research), at the University of Canberra. My supervisor is Professor Belle Alderman, who can be contacted on 6201 2062.

Your participation in the research involves the following:

- 30 min taped interview in March/April
- 60 min taped interview in June/July
- your responses in the Learning Portfolio submitted for 'Resources, Environment and Society'
- your responses in the PowerPoint Presentation for 'Resources, Environment and Society'

You will be given a \$10 photocopy card as a reward for your participation in the interviews.

Your responses will be kept confidential, and in no way will you be able to be identified through them. I am the only person who will have access to them. Your privacy will be protected throughout the study. The interview data will initially be stored off-campus in password-protected files. The tapes will be stored in locked containers. At the completion of the project, the data will be stored at the University of Canberra for a period of five years, after which the data will be discarded. At the completion of the project, you may request access to the research findings.

Please don't hesitate to contact me if you have any questions.

Thank you for your participation in the project,

Mandy Lupton

Appendix I - Document for people who are participants in a research project

UNIVERSITY OF CANBERRA

Document for people who are participants in a research project

**CONTACTS FOR INFORMATION ON THE PROJECT AND
INDEPENDENT COMPLAINTS PROCEDURE**



The following study has been reviewed and approved by the Committee for Ethics in Human research:

Project title: Undergraduates' conceptions of information literacy

Project number: 02/03

Principal researcher: Mandy Lupton

As a participant or potential participant in research, you will have received written information about the research project. If you have questions or problems which are not answered in the information you have been given, you should consult the researcher or (if the researcher is a student) the research supervisor. For this project, the appropriate person is:

Professor Belle Alderman

Head, School of Information Management and Tourism

University of Canberra, ACT, 2601

Phone: 6201 2062 Fax: 6201 2649

If you wish to discuss with an independent person a complaint relating to

- Conduct of the project, or
- Your rights as a participant, or
- University policy on research involving human participants,

You should contact:

Secretary of the University Research Committee

Phone: 6201 2466

Room 1D85, Secretariat, University of Canberra, ACT 2610

Providing research participants with this information is a requirement of the National Health and Medical Research Council *National Statement on Ethical Conduct in Research Involving Humans*, which applies to all research with human participants conducted in Australia. Further information on University of Canberra research policy is available in *University of Canberra Guidelines for Responsible Practice in Research and Dealing with Problems of Research Misconduct* and the Committee of ethics in Human Research *Human Ethics Manual*. These documents are available from the Research office at the above address or on the University's web site at
<http://wasp.canberra.edu.au:80/secretariat/respprac.html> (Research Guidelines)
http://wasp.canberra.edu.au:80/secretariat/ethics/human_ethics/manual-1.html (Human Ethics Manual)

Appendix J - Internet resources checklist

Is the author of the source clearly stated? Does the author or publisher list their credentials and affiliations, and can they be verified?	
Is responsibility for the content clear? Is it an individual's opinion or is it endorsed by the organization/university/company?	
Is the information posted on a government, organisational or educational server?	
Is the publisher (eg an organization or company) reputable or a credible source?	
Does the author provide contact details (eg, an email address) that you can use to ask follow-up questions about the information?	
Is there evidence that the information has undergone some peer review or referee process?	
Has the author provided any evidence or other sources to back up their information? Does the resource include sources or references you can check?	
Which resources could you use to verify the information presented?	
Is there any evidence of bias? Are you being presented with fact, or an opinion?	
Is the motivation for presenting the information clear? Is the page or site a marketing or advertising tool?	
Is it important that the information is up-to-date? Is there an indication of the date of publication for a document? Is there an indication of the date the site was last updated?	
How substantive is the information? Is it a page of links, a research article, or something in between?	

Appendix K - Resources, Environment and Society course description

This course critically analyses the relationships between people and their environments. It focuses on the big issue facing the globe - the equitable and sustainable use of this planet's resources. The course is suitable for both Science or Arts students. It is also an introductory course for later year courses in the School of Resources, Environment and Society.

The course will examine different ways of conceptualising the nature of resources, the environment and society. The contrasts and connections between scientific and social science theory and methods will be examined. Key factors mediating the inter-relationships between society and environment will be explored including resource use, population and technological change. Other key concepts critically explored will include social justice, equity and sustainability. These issues will be explored through case studies of the international dimension of global climatic change, water and land degradation and biodiversity conservation.

The course will have a strong skills-based focus with the aim of giving students the research and communication skills required to successfully complete later year courses. Particular attention will be given to critical thinking and writing skills. Staff from the ANU Libraries and the Academic Skills and Learning Centre will be involved in this element of the course. The course will be taught by staff from the Science and Arts Faculties and key researchers from the ANU Research Schools.

SRES1001 is an ANU iLearning project contributing to the development of a distinctive approach to undergraduate education by drawing on the strengths of ANU research. The 'i' stands for inquiry based learning characterised by a process of inquiry rather than transmission of knowledge. The 'i' also stands for an interdisciplinary approach that explores major themes about human relationships and sustainable management of the environment, social justice and equity, and the nature of scientific and social-science methods. Tutorials, expert panel discussions, lectures and field work are an integral part of the course.

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