Chapter 7 New directions for information literacy

In the second, third and fourth chapters of this thesis I examined directions in, and influences on, our understanding of information literacy, information literacy education and information literacy research. The framework presented was based on the literature available in early 1994. I also argued that researching information literacy in terms of the varying ways in which it is conceived, or experienced, in the higher education community would lay a foundation for adopting a relational view of information literacy and information literacy education. Such an investigation was also intended to support the establishment of a line of information literacy research devoted to uncovering varying relations between people and relevant aspects of the world. This new relational model for information literacy, as opposed to the existing behavioural one, has been made possible as a result of the implementation of this study. Both the old and new models are presented graphically in Figure 7.1.

Drawn together in these figures are the three elements of information literacy scholarship: descriptions of information literacy, information literacy education, and information literacy research. In the behavioural model descriptions of information literacy are made in terms of attributes of persons; information literacy education is seen as making possible the acquisition of these attributes; and research is conducted into the desirable attributes of information users. In the relational model, however:

- descriptions of information literacy are made in terms of conceptions;
- information literacy education is seen as learning to conceive of effective information use, that is information literacy, in new and increasingly sophisticated ways; and
- research is conducted into conceptions of information literacy and related phenomena.

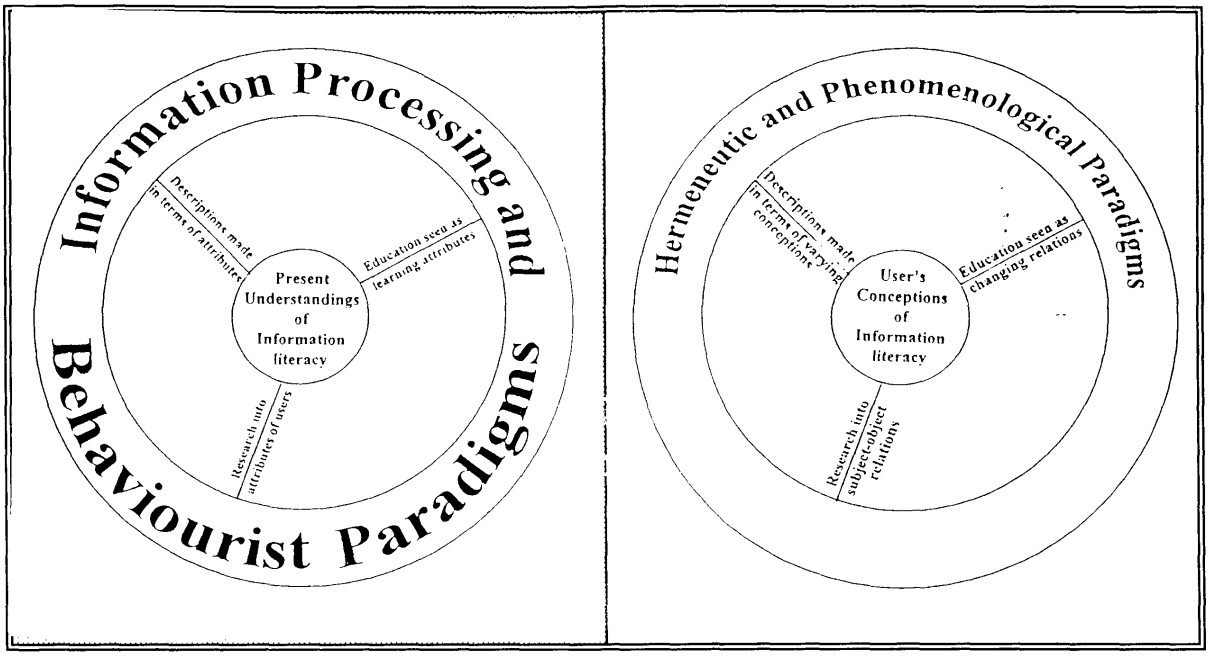

Figure 7.1a Information literacy - a behavioural model

Figure 7.1b Information literacy - a relational model

At the heart of the behavioural model are the many personal attributes required for information literacy which have until now dominated the literature. An initial core for the relational model consists of the outcome space for information literacy.

I will now discuss the outcomes of this study, which lie at the heart of the new relational model, in order to explain their contribution to information literacy theory. I will analyse these findings in the light of the literature available prior to the implementation of my study. I will also analyse how they compare with thinking about information literacy and information literacy education as it has continued to emerge while this study was being undertaken. Then I will examine the implications of the findings for information literacy education and research. The following headings will organise my discussion of the three spokes in the *relational information literacy wheel*:

- How may the outcomes of the study be interpreted?
- How does this study contribute to our understanding of information literacy?
- How does this study contribute to information literacy education?
- How does this study contribute to information literacy research?

How may the outcomes of the study be interpreted?

The results of this study have revealed the varying ways in which information literacy is experienced by higher educators. It is important to restate at this point that the results are not descriptions of people, nor are they descriptions of the object of experience. Instead they are descriptions of the ways in which higher educators relate to aspects of the world in their experience of information literacy, or of effective information use. In other words *we now have a picture of information literacy* as it is seen, experienced, and understood by people who are effective users of information, but who are not themselves scholars of information literacy. We have begun to be able to see information literacy from a second-order perspective. A summary of the picture available can be presented through the category labels. These identify the meaning attributed to information literacy as it is experienced:

- information literacy is seen as using information technology for information retrieval and communication (The information technology conception);
- information literacy is seen as finding information (The information sources conception);
- information literacy is seen as executing a process (The information process conception);
- information literacy is seen as controlling information (The information control conception);
- information literacy is seen as building up a personal knowledge base in a new area of interest (The knowledge construction conception);
- information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained (The knowledge extension conception); and
- information literacy is seen as using information wisely for the benefit of others (The wisdom conception).

This picture of information literacy not only represents the views of one community of information users, it also *identifies significant variation in experience* amongst members of that community. That is not to say that some members of the community experience information literacy one way and others experience it another way. Rather, there exists a set of varying kinds of experiences and we can expect that members of the community would experience any subset of these at different times. The range of experiences of individual members will depend upon what they have learned to focus on when they use information. Marton (1995) describes such a picture as 'a reflection of the collective anatomy of awareness'. This means that the study of information literacy has involved discovering the structure of people's experience in the same way that the study of the anatomy of animals or plants involves seeking an understanding of their structure. Most importantly the structure we now have access to portrays the 'anatomy of information literacy' amongst a group of people rather than amongst a series of individuals. None of the categories represents any one individual; taken together they reveal how information literacy is conceived amongst the whole group.

Variation in experience is not only identified, it is described in a particular way; in terms of *varying subject-object relations which constitute information literacy* in the higher education context. This means that the analysis has revealed that there are varying ways of experiencing information literacy and, more specifically, that these experiences are about the different ways in which an information user (the subject), relates to information (the object). At the commencement of the study it was not possible to predict what the 'object' component of the relation would be. During the course of the analysis, 'information', a complex phenomenon in its own right was discovered to be the object component in each of the categories of description. Although, at a very basic level, information was discovered to appear differently in the various categories, this study sought to identify varying conceptions of information literacy, not information. The analysis, therefore, also uncovered the variations in the subject-object relations which revealed the differences in what it meant to use that information effectively. Thus, we have complex layers of variation, both in how information is used effectively and in how information appears to the person using it. These variations are captured in the three levels of the outcome space, including the meaning structure, the awareness structure and the depiction of the varying ways in which information appears.

Examining people's experiences of information literacy has also revealed that there are changing emphases on information technology and information use in the varying conceptions; and that the emphasis on technology in people's experience is inversely related to the emphasis on how the information is being used. This means that although information technology is

part of people's awareness in all the categories it is of minimal, or peripheral, interest in those categories where information use is thematised. Conversely, information use is not the focus of attention where information technology is thematised. Some participants expressing views involving a focus on information use in fact had a negative view of the influence of technology on information use. These shifts in the structure of awareness between categories suggest that some forms of information use, such as are found in the knowledge extension and wisdom categories, require information technology to recede to the outer edges of awareness. When information users are engaged in meaning construction, or using information in innovative ways, they are not focussing on any information technology they may be using, if indeed they are using it at all.

The picture of the varying ways in which information appears to people in the varying conceptions also deserves comment On the basis of the data gathered in this study, information appears as objective in the first four categories, as subjective in the knowledge construction category, and as transformational in the knowledge extension and wisdom categories. Whereas the 'objective' and 'subjective' appearances are part of the conventional wisdom about information, the interpretation of information as transformational as it appears in this study is novel. It is particularly unusual because it is not the information user, the 'subject' component in the relation, who is transformed. Rather, it is the person with whom the subject is interacting who is transformed in the wisdom conception and information itself that is transformed in the knowledge extension conception.

There is one final aspect of the outcomes that must be discussed, and that is the somewhat vexed question of whether or not some conceptions in the group are 'better' or 'more desirable' than others? The first point to be made is that none of the conceptions is wrong. Each is simply a different way of conceiving of the phenomenon of information literacy and each can be used appropriately in particular contexts. For example, where information scanning is important, the information user may be well advised to attend to information technology that would aid this.

The second point to be made, however, is that some of the categories are indeed more complex and more powerful than the others. On this basis it is possible to claim that the categories do become more sophisticated as we move from the lowest level of the outcome space, the information technology conception, to the topmost pair, the knowledge extension and wisdom conceptions.

What evidence is there to support this claim? As a starting point we can note that the meaning structures reveal differences in the degree of sophistication of the knowledge base, a component of three categories which have 'information use' as a focal element. In the knowledge construction conception the knowledge base is simply a personal synthesis of existing knowledge about a particular discipline or field of interest. In the knowledge extension and wisdom conceptions that knowledge base is enhanced by the presence of life experience related to that discipline or field of interest. As a result, qualitatively different ways of using information become possible. In the knowledge construction conception information use stops short at developing that knowledge base, whereas in the other two conceptions information use involves working with that knowledge base to make social and intellectual contributions.

Further evidence is found in how the idea of information use is interpreted across the categories. In the information technology conception, information use involves becoming aware of existing information or knowledge; in the information sources conceptions information use is centred on location and retrieval; in the information process and control conceptions information use involves recognition and organisation or problem solving. In the remaining categories, information use ultimately involves the transformation of people, circumstances or information itself. It is clear from this that the knowledge extension and wisdom conceptions encompass more powerful forms of information use than do the others. It is not unreasonable, therefore, to claim that the categories do become more complex as the outcome space is traversed from the information technology conception to the topmost pair. This 'hierarchical' view of the outcome space would be particularly important in information literacy education, as it suggests that the conceptions at the lower levels represent inadequate educational outcomes.

What are the strengths and limitations of the picture that has emerged?

The picture of information literacy that has emerged from this study has a number of strengths. Firstly, it is a picture of information literacy as it is understood by information users and not scholars. In this sense the study has opened another window through which to view the experience of information users. These new views of the phenomenon allow us to consider new directions in thinking about information literacy, information literacy education and research. Each of these areas, including the importance of the user-oriented approach, will be explored in the next parts of this chapter.

Secondly, the research outcomes conform to the rigorous requirements of the phenomenographic approach adopted. All the categories identified have each of the characteristics identified by Marton (1988a, p.181); that is, they are relational, experiential, content oriented and qualitative. Also in adherence to the requirements of the research approach, the structural relations between the categories have been successfully identified. The whole structure that has emerged is elegant; relationships between the categories are identifiable in the outcome space.

Thirdly, the categories belong to a specific context, the higher education sector. This makes the categories particularly useful within that context. The categories can be used to enhance communication between stakeholders regarding their intentions in the area of information literacy education. They can also be used as staff development and curriculum development tools. Because the categories have been generated within the higher education sector, stakeholders may be expected to readily identify with them. The value of the outcomes to higher educators will be discussed in detail later in this chapter when I explore their contribution to information literacy education.

Limitations of the outcomes obtained are also identifiable. Although the specific context within which the study was undertaken lends a useful focus to the outcomes, it also reveals the incompleteness of the picture of information literacy which has emerged. This is a picture of information literacy as it is seen in the Australian higher education sector, amongst a group of academics, librarians, staff developers and learning counsellors who are part of the university system in the western world. The existing picture may be deepened through replication or broadened at a number of levels. For example, we must note that studies into other phenomena have been enriched as a result of cross-cultural research (Marton, Watkins and Tang 1995). Further studies of conceptions of information literacy in higher education, undertaken in other cultures, may lead to the establishment of what Marton (1995) refers to as 'a supra-cultural outcome space'.

Also within the higher education sector, we have as yet no picture of information literacy as it is experienced amongst students. This is a significant gap in a picture which is intended to influence information literacy education. Although we can compare classroom observation of students' experience of information literacy against that of their teachers, we do not yet have documented descriptions of the varying experience of neophytes. Each participant in this study, by virtue of their professional contributions, would have to be described as an expert user. 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. Their ways of seeing may differ from those of educators.

Outside the higher education sector the picture of information literacy could be developed to encompass experience in other educational sectors and in the workplace. The former is important to understanding how information literacy education can articulate across sectors; the latter to understanding the post-education experience for which students must be prepared. As the very concept of information literacy was originally tied to the importance of effective decision-making and problem solving in the workplace, the importance of the latter cannot be overestimated. It cannot be assumed that the experiences of higher educators match those of information users in other workplaces. These and other limitations are discussed further in my analysis of possible directions in information literacy research in the final part of this chapter.

How does this study contribute to our understanding of information literacy?

The outcomes of this study influence our understanding of information literacy in a number of ways. Firstly, they establish a way of thinking about information literacy in terms of varying relations between an information user and information. Information literacy has, until now, been considered in terms of attributes of persons, rather than in terms of ways in which people relate to the information.

Secondly, they provide a picture of varying structures of awareness which constitute people's experience of information literacy. We now have an understanding of how people are aware of various aspects of the world around them when they are experiencing information literacy in particular ways.

The third, fourth and fifth outcomes follow from the two just described. Thirdly, the study brings to light elements of information literacy which are not being considered in contemporary discourse about the phenomenon. These elements are:

- ways of thinking about information (that is the view of information having a transformational, subjective or objective character);
- the importance of intuitive aspects of information use evident in the knowledge extension and wisdom categories;
- the very existence of the knowledge extension and wisdom conceptions in the outcome

space, neither of which has a significant place in the current information literacy literature;

- the notion of information literacy incorporating the capacity to transform information (in the sense of extending or generating new knowledge) and to transform people (that is to transform those with whom the information user interacts rather than empowering the information user); and
- the social as opposed to the individual nature of information literacy.

Fourthly, the outcomes improve our understanding of the relationship between information literacy and 'learning to learn', thus endorsing the rhetoric that regularly aligns the two. The categories of description substantiate the close relationship between information literacy and the ability to learn at many levels. For example, the information technology conception highlights the relationship between information literacy and maintaining awareness of ongoing developments. The knowledge construction conception highlights the relationship between information literacy and the ability to learn independently about a field of knowledge. The knowledge extension conception demonstrates that information literacy includes the ability to transform or extend existing knowledge.

Fifthly, they change our view of the role of information technology. The same emphasis is not placed on information technology by effective information users in higher education as it is by some information literacy scholars. According to the conceptions uncovered in this study, there is a need for information technology to recede from the foreground of attention to enable effective information use.

Clearly significant differences have been uncovered in ways of thinking about information literacy, resulting from setting out to describe conceptions or experience. To understand the significance of the change more fully we need to revisit the different ways in which information literacy is described in the literature. Before doing so I will identify recent trends in describing information literacy. I will then examine the differences in the meaning attributed to information literacy between scholarly descriptions available before I implemented the study and the categories of description, before turning to an analysis of more recent contributions.

What have been recent trends in the description of information literacy?

The concept of information literacy continues to generate interest all over the world (Ford 1994; Rader 1995). In the literature that has appeared while this study was being conducted there appears to have been no shift from the view that information literacy is best described in terms of attributes of people, irrespective of whether these attributes are information technology skills or the ability to implement processes of information use.

General directions that have been taken in the literature can be summarised as follows:

- increased emphasis on information technology and its role (Fitsimmons 1995; McClure 1994; Moran 1995; Sutton 1994; Wilson 1994);
- continued interest in the information skills interpretation of the phenomenon, which focuses on the processes of information retrieval and use (Doyle 1994; Cheek and others 1995; Todd 1995);
- interest in technology related literacies, such as 'network literacy' (McClure 1994);
- emerging interest in the importance of information literacy to the world of business management (Kanter 1995; Kiely 1994);
- descriptions of information literacy which continue to add to the lists of attributes previously compiled (Colorado Department of Education 1994);
- a more explicit interest in constructivist learning theory (Colorado Department of Education 1994; Todd 1995, 1996);
- chronological descriptions of information literacy development (Behrens 1994); and
- emerging interest in the creative aspects of information use (Gevers 1995).

How do the categories of description compare with the descriptions available in the literature?

The descriptions of information literacy available in the literature before this study was conducted are compared with the categories of description in Table 7.1. This table shows that there are ways of thinking about information literacy that appeared in the literature that do not form part of the experience of higher educators in this study. There are also ways of thinking amongst higher educators that were not identified in the literature. We can see from Table 7.1 that there are two meanings attributed to information literacy in the literature which have strong parallels with the categories identified. These are the definitions of information literacy

which focus on the ability to use information technology, and the processes of information use often called 'information skills'.

Table 7.1: Comparison between scholarly description of information literacy and higher educators' experience of the phenomenon

Descriptions from the (1990-93) literature	Descriptions of experience-labels
Information literacy as a way of consuming information	
Information literacy as using information technology	**Information literacy is seen as using information technology for information retrieval and communication.**
Information literacy as a combination of information and technology skills Information literacy as including library and computer literacy	
Information literacy as a process (i.e. information skills)	**Information literacy is seen as executing a process**
Information literacy as an amalgam of skills, attitudes and knowledge	Information literacy is seen as controlling information
Information literacy as a the ability to think like a searcher	*Information literacy is seen as finding information.*
Information literacy as the ability to learn	*Information literacy is seen as building up a personal knowledge base in a new area of interest.*
Information literacy as the first component in the continuum of critical thinking skills	Information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained.
Information literacy as part of the literacy continuum	Information literacy is seen as using information wisely for the benefit of others.
Key Normal font indicates no correlation, *Italics* indicate weak similarities, **Bold** indicates strong similarities	

The definitions of information literacy which focus on ways of consuming information, and on the combination of information and information technology skills have no parallels in the categories of description. Neither do those definitions of information literacy which draw together skills, attitudes and knowledge or which place the phenomena on continua of literacy or critical thinking.

The remaining definitions have weak links with some of the categories identified. These are the definitions of information literacy which equate the phenomenon with the abilities to think

like a searcher and to learn. Thinking like a searcher which entails knowledge of the bibliographic universe is similar to the information sources conception; the conception as portrayed in the category is focussed more on knowledge of specific sources than on how those sources are arranged, or mapped, in the world of information. Focus on the ability to learn forms part of the character of the knowledge construction conception. The category of description, however, considers learning in the very specialised sense of building a personal knowledge base in a previously unfamiliar area. The last categories in the information literacy structure, the knowledge extension conception and the wisdom conception, are not reflected at all in the literature of the early 1990s.

Overall, there is also a generalisable difference between most of the categories of description and contemporary thinking about information literacy; many authors tend to treat information literacy as the responsibility of individuals, whereas most of the categories suggest that information literacy is a social responsibility. In the information technology conception, for example, information literacy is achievable when responsibility for information technology skills are shared, or distributed, within a group. In the third subcategory of the information sources conception, information literacy involves a willingness to allow a third-party to contribute to information location.

Similarly, in the triad of categories which thematise information use, other members of the community are appropriated in areas where the information user lacks specific skills. There are only two instances where the idea of shared responsibility is seen as unacceptable. The first is in the information technology conception; here in the second subcategory individuals must be able to use technology themselves. The second is found in the remaining information sources subcategories; the first of these requires individuals to be familiar with information sources and their structure; the second requires people to be able to use these sources themselves rather than via an intermediary. This difference suggests that the adoption of a relational model will require scholars and practitioners to think in terms of communities of information users rather than individuals. It also suggests that for libraries and other information services, programs of information use instruction cannot be seen as reducing the need for programs that offer direct assistance to users.

Recent literature shows that scholars are opting for interpretations which emphasise one way, or a limited number of ways in which people experience the phenomenon, rather than embracing the full range of experience. Many of these papers lean in the direction of the information technology conception. In one, for example, information literacy is defined as:

> ... a convergence of traditional literacy, computer literacy, network literacy and media literacy used in the process of solving information problems. (McClure 1994, p.118)

Here information technology achieves prominence in the form of network literacy, computer literacy and media literacy, while 'the process of solving information problems', or information skills, becomes a domain to which information literacy is applied. Sutton, drawing on McClure (1994) and Kwasnik (1990), also leans towards the information technology approach. He combines information technology skills with information skills, describing information literacy as being able to read and write fluently as well as:

- use the computer effectively as an instrument in the creation, storage and management of information bearing products of the intellect;
- use the powerful post print media's effective tools of expression through their integration into information bearing products; and
- use the emerging National Information Infrastructure as an effective means of accessing, acquiring, managing, and manipulating information regardless of its geographic location or medium. (Sutton 1994 p.14)

Similarly, Kanter (1995) locates information literacy within the information technology domain. He argues that information literacy involves an understanding of information processing, the ways in which an organisation's information systems support the work process and the need for 'an overall information architecture' that supports communication both within the organisation and without. Australian authors are also focussing on information technology. Wilson (1994), for example, equates information literacy with information seeking and retrieval, including the ability to handle technology. Even more markedly, Moran (1995, pp. 18-22), in her report on the role of information technology in higher education teaching and learning, equates information literacy with information technology literacy.

The trend towards a focus on information technology is not universal. Some significant documents which are likely to influence the Australian higher education arena do not highlight information technology at all in their approaches to information literacy. Todd (1995) and Doyle (1996), for example, continue to describe information literacy in terms of information skills, whilst Cheek and others (1995) focus on processes with no special emphasis on technology. That is not to say that information technology is considered irrelevant, rather it is not thematised and is treated as one amongst many elements of the information environment.

Bruce (1995, 1994d, 1994e) includes information technology use amongst a set of characteristics of an information literate person. In this description, use of information technology is present as one of a series of qualities, none of which is more significant than any other. The information literate person:

- engages in independent, self-directed learning;
- uses information processes;
- uses a variety of information technologies and systems;
- has internalised values that promote information use;
- has a sound knowledge of the world of information;
- approaches information critically; and
- has a personal information style that facilitates his or her interaction with the world of information. (Bruce 1994e)

The inclusion of the adoption of a personal information style is an addition in this portrait which differs from the earlier literature. Other major additions to the list of attributes required for information literacy include network literacy (McClure 1994), group skills and a system of ethics for using information and information technology (Colorado Department of Education 1994).

Pettersson (1994) draws together the information technology and information skills models, combining them with an emphasis on 'learning to learn'. His thinking, heavily influenced by Breivik, embraces a broader range of the conceptions identified in this study than is evident in other writing. Despite this, his interpretation of information use does not involve the more complex understandings of information use. Pettersson emphasises the need for people to be able to comprehend and 'repackage' (p.96) information. He also expresses a concern for people to be able to locate 'objective' information (p.92). This reflects the insight, captured in the categories of description, that ways of thinking about information literacy which do not thematise information use are associated with an objective view of information. Alternatively, a focus on information use accompanies a shift in thinking towards subjective and transformational views of information.

Of greater interest are those descriptions which move in the direction of the knowledge construction and knowledge extension conceptions. Kiely (1994), writing in support of the need for business and senior IT executives to be information literate, describes information literacy as 'the ability to distil meaning from data'. This ability is seen as critical to maintaining a competitive edge, ultimately differentiating corporate 'winners' from 'losers'.

Similarly, Candy, Crebert and O'Leary, in their report *Developing Lifelong Learners Through Undergraduate Education*, do not thematise information technology. For them information literacy includes:

- 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, tables; and
- critical evaluation of information. (Candy, Crebert and O'Leary 1994, p. 43)

Although most aspects of this description resemble earlier descriptions, 'the ability to frame researchable questions' reflects the knowledge extension conception. Framing researchable questions would require the knowledge base and creative insight, which characterise that category.

Gevers (1995) argues that people need an existing knowledge base (or an informed mind) to benefit from the world of information that is now upon us. For Gevers, more important than retrieving information, or using new technology, is the way in which information is used. He describes this as the 'ability to see connections where these are not obvious, to be stimulated into insight by distant analogies and to develop unique understandings of particular problems or fields' (1995, p.4). Intriguingly, he comments on the difficulties caused by technology for those who wish to experience information literacy this way. His comments resemble those made by participants in this study who spoke disparagingly about the role of technology in effective information use:

> This creative way of working is better supported by the habit of browsing through conventional journals than by struggling with rapidly repeating printouts of the last 50 abstracts captured by key words, or even by the full articles themselves. It is not easy to browse on the monitor of a PC, and the conversion of edited and refereed journals into packets of information targeted to particular users may destroy some feature of our scientific creativity. (Gevers 1995, p.4)

How does this study contribute to information literacy education?

In chapter three I argued that a picture, or map, of ways of experiencing information literacy was required to enable the development of a relational approach to information literacy education. It is now possible to begin to develop such an approach. Although considerably more research needs to be undertaken in this area, we have the `target conceptions' which teachers and students can use in learning situations. The availability of the relational information literacy model provides a framework within which to:

- develop new outcome statements/objectives for information literacy curriculum;
- devise new teaching approaches;
- evaluate existing curriculum; and
- facilitate staff development for higher educators.

The most important elements of the new model for information literacy education are the categories of description and the view of learning as coming to see effective information use in new and more complex ways. Adopting the relational view will overcome some of the difficulties associated with the skills-based approach to information literacy education, such as the ever growing lists of skills which need to be incorporated into curricula. It is not, however, a panacea which will solve all difficulties. Educators and researchers will need to consider how to implement effectively a relational approach, and study the outcomes of such an implementation. In the following section I first examine recent developments in information literacy education and the relational approach to teaching and learning, then explore the possible influence of the new model on each of the four areas listed above. The need for further research will be discussed in the third and final part of this chapter.

What have been recent trends in information literacy education?

Recent writing about information literacy education demonstrates the following trends:

- limited ongoing interest in distinguishing between library instruction, bibliographic instruction and information literacy programs (Murdock 1995);
- continued variation in curriculum content and processes (Booker 1995);

- continued advocacy for the integration of information literacy education into university curricula (Bruce and Candy 1995; Candy, Crebert and O'Leary 1994; Loomis 1995; McNally and Kuhlthau 1994);
- continued advocacy for emphasis on resource-based learning and information skills (Bruce 1995; Doskatsch and others 1995; Todd 1995);
- continued interest in teaching new technologies, particularly use of internet resources (CAUL 1995; Fjällbrant 1995; McClure 1994);
- increased attention to staff development for information literacy education (Bruce and Candy 1995; Bruce, Weeks and Crebert 1995; Commission on Higher Education 1995);
- early interest in workplace information literacy education (Fisher and Bjorner 1994; Kanter 1995; Kiely 1994);
- using the World Wide Web for delivering instruction (Fjällbrant 1995); and
- emerging interest in the outcomes of phenomenographic research into learning for instructional design (Fjällbrant 1995, p.2).

Policy makers all over the world continue to endorse the need for information literacy education. The Association of Supervision and Curriculum Development in the United States advocates that 'information literacy should be part of every student's educational experience'; and in South Africa a report prepared by the Ford Foundation recommends an 'information literacy pilot project to promote economic development...' (Ford 1995, pp.100-101). In Australia, the Candy report, *Developing Lifelong Learners Through Undergraduate Education,* lists information literacy as one of the key characteristics of lifelong learners and one of the significant elements of undergraduate curriculum (Candy, Crebert and O'Leary 1994). Accrediting agencies are also being encouraged to attend to the issue of information literacy education (Hawes 1995), with the Middle States Commission on Higher Education continuing to provide strong leadership in this area in the United States (ACRL and Middle States Commision on Higher Education 1995).

While policy makers recognise the importance of information literacy, curriculum initiatives still reveal the various ways in which educators interpret the phenomenon. Some developments in this area closely reflect initiatives that were established in the early 1990s and others reveal change. Murdock (1995), for example, advocates removing the emphasis on information location and retrieval from teaching programs altogether, while Pettersson (1994), linking information literacy to the development of learning organisations, calls for an emphasis on meta-learning, or learning to learn, not only in the academic environment, but in the workplace. In high schools and in higher education increased emphasis on 'high technology' has led to calls, not for resource-based learning, but for 'high technology resource-based learning' (Mendrinos 1994; Moran 1995). Ford

raises questions about the bias towards instruction in the use of technology when she writes:

> 'Technology improves physical access to information but does not necessarily improve intellectual access...the time to read, think and write cannot be reduced.' (Ford 1995, p. 100).

Most programs, however, continue to emphasise information technology and use of sources.

In Europe, collaboration between university libraries has enabled the development of an ambitious World Wide Web based program. The objectives for the EDUCATE course in information literacy demonstrate a strong emphasis on information technology and information sources/retrieval, as well as leaning towards information processes and information control. The information use categories, however, are not represented at all, a point which is reinforced by Fjällbrant's description of the course as involving 'instruction in information retrieval':

> The objectives of the EDUCATE course in information literacy are that you should:
> - be able to develop a systematic method of searching for information in connection with your studies - project work, writing a literature survey etc.;
> - be aware of the wide range of sources available for finding information and select sources which best meet your needs;
> - be aware of appropriate indexing and abstracting services and databases and understand the principles of their use;
> - develop your database searching techniques for accessing both online and CD-ROM databases;
> - be able to use current awareness methods to keep up to date with the published literature after your initial search;
> - be able to use citation indexes to find information;
> - be able to use the international academic networks for getting information;
> - be able to compare and evaluate information obtained from various sources;
> - be able to cite bibliographical references in your project reports or theses; and
> - be able to construct a personal bibliographic system. (Fjällbrant 1995, pp. 3-4)

The list above does not appear to include emphasis on constructing a personal knowledge base through critical analysis, knowledge extension or wisdom in using information. The Swedish EDUCATE program is, however, drawing on insights into learning resulting from phenomenographic research, particularly the concepts of deep and surface learning. It is not as yet, at least explicitly, adopting an approach to teaching and learning which focuses on changing conceptions, or students' experience of phenomena.

In Australia, university libraries with strong information literacy initiatives, such as Queensland University of Technology, University of Queensland and Griffith University (CAUL 1995) closely reflect the content of the Swedish program described above, if not the medium through which it is delivered. The Griffith University information literacy modules combine this content with a strong computer literacy component. The Griffith model is of considerable interest because of its vision for fostering information literacy using multiple strategies including staff development, curriculum development, extra-curricular strategies and a core strategy. Its teaching modules however, like the Swedish program, stop short of focussing on information use. In addition, there appears to be a further gap in the lack of emphasis on information processes. Many of the other 'information literacy' initiatives described in the CAUL paper are library instruction programmes presented under a new name, or information technology literacy initiatives. Indeed one university library describes its information literacy program under two headings 1)library skills and 2) computing skills. A different approach is taken by a team from South Australia in preparing an information literacy text for Open Learning students. Their book (Cheek and others 1995), *Finding Out: information literacies for the 21st century*, draws together introductory material on information skills, study skills, library skills and media literacy.

Alongside the curricula which have been developing, is a range of other initiatives targeting the broader university community. The roles of the many stakeholders in information literacy education are being considered (Bruce 1995, Bruce and Candy 1995) and some strategies are being put in place to empower educators to assume responsibility for information literacy education in collaboration with other members of the university community. For example, the Griffith University Information Literacy Blueprint mentioned above identifies academic staff development as an important component. Amongst others, this strategy establishes the following directions:

- to provide opportunities for all staff to regularly update their own knowledge and skills;
- to raise awareness of the nature of information literacy and the need to include information literacy education in academic curriculum;
- to encourage and enable all staff to design and use teaching/learning strategies which target information literacy;
- to implement programs which foster sustained interest in information literacy education; and
- to encourage staff to apply for funding (teaching or research grants) and publish in relation to information literacy education. (Bruce 1994c, p. 18)

Specific staff development practices have been implemented in other universities. In particular, a document entitled 'Developing information literate graduates: prompts for good practice' (Bruce

and Candy 1995), has recently been developed, and teaching staff responsible for Graduate Certificates in Higher Education are attempting to model information literacy education in their programs (Bruce, Weeks and Crebert 1995).

The above review of developments in information literacy education since 1994 reveals accelerated interest all over the world. I shall now briefly review developments in the relational approach to teaching and learning before analysing the possible contributions of this study to information literacy education.

How has the relational view of teaching and learning developed?

Up until the early 1990s advocates of the relational view described learning as a change from one conception, or way of experiencing a phenomenon, to another. This way of thinking about learning is underpinned by the idea that some conceptions are more scientifically acceptable than others, and that these are preferred `outcomes' of learning. Svensson and Hogfors (1988) point out, however, that ideally students should not only learn the 'correct' conception, but that they should also learn why the alternative conceptions are inappropriate. Nevertheless, although they have recommended that the whole framework of conceptions be used in the teaching-learning process, only one of these is to be preferred, and students should understand why this is so. The idea that one conception is somehow better than the others is not always easy to maintain. Booth (1992), in her doctoral thesis examining students' conceptions of programming noted that programmers need to have access to a complete range of conceptions of programming, and need to be able to be able to adopt the conception or set of conceptions most appropriate to a given circumstance. She moved away from describing learning as a change in conception to describing learning as:

> ...gaining access to views of further faces (or conceptions of a phenomenon) and developing an intuitive relationship with the object so that an appropriate face or set of faces is seen in appropriate circumstances. (Booth 1992, p.262)

The first component of this description is consistent with the view that students need to understand the varying ways of experiencing a phenomenon. The second component acknowledges that, in relation to some phenomenon, the varying conceptions are neither right nor wrong, but are used in different circumstances. That some conceptions remain more powerful interpretations of the phenomenon is not inconsistent with this approach.

Recently, this view has been emerging in writing by phenomenographers discussing aspects of teaching and learning. Dall'Alba (1994, p. 86), for example, describes learning as '...a change from one way of understanding to another, qualitatively more complete one'. Her use of the term 'complete' is interesting; it allows the reader to interpret learning as developing a broader repertoire of conceptions. Marton (1995) endorses this view when he writes that learning can '...be characterised as an individual's successive growing within the complex of different understandings'. Such 'growing' would necessarily include awareness of the quality of the different understandings, and awareness of if, and when, it might be appropriate to use each one.

How can the research outcomes contribute to future directions?

On a general level, the categories described in this study strengthen the argument for continued integration of information literacy education into curriculum through:

- illuminating the relationship between information literacy and learning to learn; and
- making concrete the somewhat abstract claim that information literacy is a key characteristic of self-directed life long learners.

More specifically the picture of the phenomenon which has emerged can begin to contribute to curriculum development and staff development for information literacy education.

Developing new outcome statements for information literacy curricula The picture of information literacy derived from this study allows learning information literacy to be redefined in terms of coming to conceive of effective information use in new and increasingly complex ways. From this starting point there are two main ways in which descriptions of higher educators' conceptions of information literacy can influence the content of curriculum. Firstly, they allow curricula to be designed to emphasise conceptions, that is experience or content of thinking, about information literacy. Information literacy is no longer a series of attributes which a learner must acquire. Secondly, they provide a framework within which to ensure that the full range of conceptions is encompassed. While the categories could enhance existing curricula they could also be used to restructure teaching and learning in accordance with the relational approach.

Developing outcome statements in accordance with the relational approach to teaching and learning will, therefore, result in an emphasis on conceptions and experience rather than on skills

and attributes of individuals. Such statements would be constructed recognising that ways of thinking about what it means to use information effectively are more fundamental to information literacy than skills and knowledge. This does not mean that students will not acquire skills and knowledge, but rather that these are secondary to conceptions; students will learn skills and knowledge within a broader framework of learning to conceive of effective use of information in different ways. As a result, the product of information literacy curriculum is no longer `measurable'. Instead the information literate person is one who experiences information literacy in a range of ways, and is able to determine the nature of experience it is necessary to draw upon in new situations.

Following are learning outcomes that may result if the categories of description were to be used as basis for framing outcome statements. The first set is based on a holistic understanding of the phenomenon derived from the outcome space; the second set is based on the individual categories which portray the conceptions:

Outcome statements targeting the need to learn about the phenomenon as a whole. Students will:

- conceive of information literacy in a variety of ways;
- use information effectively in a range of contexts;
- discern the ways of thinking about effective information use which apply to new information problems they encounter;
- conceive of information as subjective and transformational in character; and
- appreciate the socially-distributed nature of information literacy.

Objectives targeting the need to learn about specific faces of the phenomenon. Students will:

- use information technology for information retrieval and communication;
- find information, either independently or via an intermediary;
- use information processes;
- control information;
- build a personal knowledge base in a new area of interest;
- work with knowledge and personal perspectives in such as ways that new insights are gained; and
- use information wisely, for the benefit of others.

The objectives should, of course, be interpreted in the light of the detailed descriptions of the categories describing experiences of information literacy. For example, learning to use information technology does not mean that the student should be able to use all information technology at his or her disposal; he or she should be able to learn to use whatever technology is required with the assistance of peers and available university services. The student should also experience the capacity of information technology for contributing to a personal program of information awareness. This interpretation of the objective is not only consistent with the category describing the information technology conception, it also ensures that students are empowered to take advantage of continual technological change instead of finding themselves armed with a suite of rapidly dating 'skills'.

When compared with other information literacy curricula, this list of outcomes is relatively short, and should remain relatively stable. This is because any changes would be made on the basis of research uncovering further variation in conceptions, rather than on the basis of the emergence of more resources or more new technology. If the outcomes of subsequent research follows the pattern established by ongoing investigations into conceptions of learning, we can expect changes to be minor.

Using conceptions of information literacy as a framework for curricula also allows educators to integrate conceptions of other phenomena, uncovered in previous studies that have a bearing on information use. Investigations into conceptions of learning, reading texts, literature reviews and computers, for example, would contribute to curricula designed along these lines.

Devising new teaching approaches Trigwell, Prosser and Taylor (1994, p.83) confirm that the strategies teachers adopt in their teaching are logically related to their intentions; essentially teachers adopt strategies to suit their intentions. It would not be unreasonable, then, for the outcomes of this study to be used in a lecture situation to transmit information about the varying conceptions, in a small group discussion to encourage students to consider alternative views, or in a socratic event to challenge students' thinking. Although these would all be legitimate ways of using the results, teaching approaches are required that are consistent with the relational information literacy model.

If learning information literacy is to be described as coming to experience effective use of information in new, and increasingly complex ways, then teaching information literacy can now be described as facilitating this change. Teaching, in the relational view, would aim to change the

internal relations through which learners experience aspects of the world. Teachers who choose to work within the relational model would see their role as being to help students conceive of and experience information literacy in the full range of ways captured in the outcome space. Adopting this approach to teaching information literacy would be compatible with the shifting emphasis towards reflective and experiential modes of teaching and learning in information user instruction described in chapter three. It would also enhance learning to be information literate in the context of resource or problem-based curricula.

To help individual teachers who want to adopt a relational approach to teaching information literacy, this study provides a major tool in the form of the categories of description. The categories provide clear pictures of the conceptions they could target in their teaching; they provide a framework which may help with diagnosing existing conceptions; they provide pictures which may help students as well as teachers understand the differences between the various ways of interpreting the phenomenon. The categories enable teachers to pursue the task of ensuring that students can use the full set of conceptions and are able to determine which is most appropriate in a given context.

Teaching strategies consistent with such an approach would revolve around:

- identifying how groups of students are conceiving of, or experiencing, information literacy;
- helping students become aware of their own existing repertoire of conceptions;
- helping students become aware of the range of possible conceptions; and
- helping students conceive of, and experience, information literacy in new ways.

Each of the above directions is derived from the view that learning is about broadening one's existing repertoire of conceptions. They also follow established directions that have been explained in chapter three. In developing more specific strategies higher educators will need to grapple with questions such as the following:

- How may we ensure that students learn to conceive of information literacy in new ways?
- How may we encourage students to focus not on information technology but on information use?
- How should the categories be valued in different contexts?
- How can categories currently less well represented in teaching be better emphasised?
- How can students' ways of thinking about information be influenced?

Booth offers four principles which teachers can adopt to help students understand and change their ways of interpreting important phenomena. Teachers should:

- address the content of learning from the perspective of students' experience rather than from the perspective of the disciplinary framework;
- identify educationally critical aspects of the phenomena to be taught and the teaching context;
- ensure that learners reveal their experience of learning and subject it to reflection;
- ensure that the tasks of learning are integrated into the world that the learners experience. (adapted from Booth 1994, p.4)

Evaluating existing curriculum Information literacy curriculum in higher education needs to embrace the complete range of conceptions if students are to become effective information users to the fullest possible extent. The categories, therefore, can serve as a framework against which to test the content of any curriculum. This would help identify curricula taking an unbalanced approach to information literacy education. There is a danger, for example, that, with increasing emphasis on information technology, other elements of information literacy revealed by the categories will remain of peripheral interest.

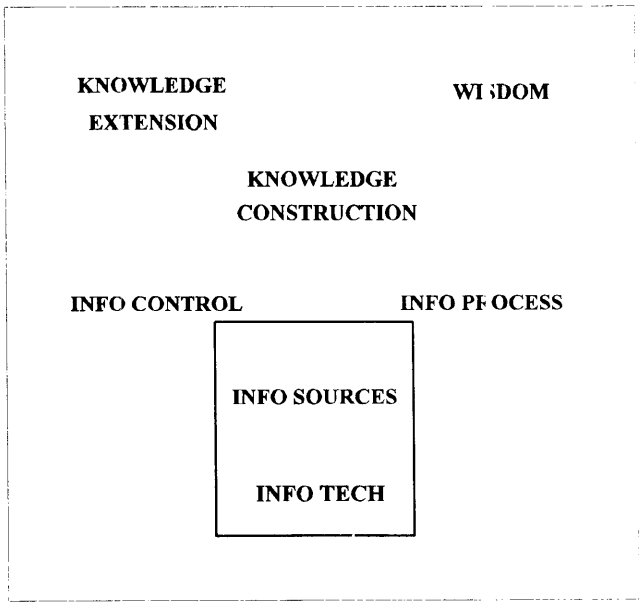

Figure 7.2 Curricula clustering around categories one and two.

The outcome space suggests that it would be possible to detail the various ways of thinking about information literacy, to which any curriculum attends, in a way which reveals the cluster of categories embedded in that curriculum. A curriculum which addressed students' familiarity with information sources and information technology without addressing the processes of recognising information needs, locating, evaluating and using information could be graphically portrayed as in Figure 7.2.

Although further studies would need to be conducted to reveal how curriculum goals fit within this framework, it is relatively easy to group the categories into three clusters:

- the information technology and information sources conceptions;
- the information process and information control conceptions;
- the knowledge construction, knowledge extension and wisdom conceptions.

It is not inconceivable that individuals or programs are likely to favour one subset of these groupings. I have already shown, earlier in this chapter, that contemporary information literacy curriculum does not extend its interest beyond the information control and information process categories. For example, the Mann Library model (Olsen 1992) is largely designed around the information technology and information sources conceptions, with some leaning towards the information control conception. Bjorner's (1991) information literacy meta-course, however, is designed around the information process and, to a lesser extent, the information control conceptions. The resource-based learning model has potential for focussing on the full range of conceptions, but at present appears to be designed around the information process conception, the emphasis being on 'Information Skills'. A *complete* information literacy program, however, needs to operate across the artificial boundaries of these groupings.

The set of categories can also be used to analyse what students are learning in relation to each category. In learning information control, for example, category four suggests that learning to recognise potentially useful information is as important as being able to successfully store it for retrieval. Whether or not both aspects are equally treated would indicate whether or not changes needed to be made to the curriculum. Similarly, any curriculum targeting category six, the knowledge extension conception, should treat all three aspects of the category: the enhanced knowledge base, creative insight and the peripheral role of information technology.

Facilitating staff development for higher educators The results of this study can be used both to enhance higher educators' understandings of information literacy as well as to enhance information literacy education. Higher educators need to be made aware of:

- their own ways of conceiving of information literacy;
- the many ways of conceiving of information literacy that comprise the phenomenon;
- the changing emphases on information technology and information use in the various categories;

- the changing approaches to information (objective, subjective and transformational) in the various categories;
- the socially distributed nature of information literacy; and
- the need for learners to operate within the complete framework, and not a limited subset of the categories.

An enhanced awareness of the above could be accompanied by a challenge to evaluate curriculum and current approaches to information literacy education. Ideally, this would be accomplished within the broader framework of adopting a relational view of information literacy education. The arguments for doing so have already been outlined in chapter three.

For many higher educators adopting a relational approach to information literacy education would require changing their views of teaching and learning. Those educators who have already adopted learner-centred approaches, or those who are interested in reflective approaches to learning and competence, are more likely to develop an interest in the relational view.

In chapter three I referred to four key principles (Ramsden 1988, p.26) in adopting a relational view of information literacy education. These can now be revisited in the light of conceptions of information literacy uncovered. Higher educators would need to consider each of these and reflect on their implications for teaching and learning:

- *Learning is about changes in conception*- that is learning to be information literate is about developing new, more complex, ways of conceiving of, or experiencing, information literacy.
- *Learning always has a content as well as a process*- that is students should be learning about something (discipline content) as they engage in learning to be effective information users.
- *Learning is about relations between the learner and the subject matter*-that is learning to be an effective information user is about the relations between the learner and information.
- *Improving learning is about understanding the learner's perspective*- that is helping students to become better information users is about understanding their ways of conceiving of effective information use.

It is also important that educators be encouraged to reflect on the consequences of promulgating views of information literacy which emphasise individual autonomy. In both the information technology and information sources categories, there are subcategories which emphasise the need

for support from information professionals and peers. Other subcategories convey how users become stressed when autonomy is emphasised. It is especially apparent from the participants in this study, that the view of information literacy as `knowledge of sources' can place the individual concerned under severe pressure. It causes discomfort, stress and embarrassment, when knowledge is found to be lacking:

> ...the Reference librarians do not tell me all the time about new things coming in. So I'm quite embarrassed sometimes - when I don't know- So I'm conscious all the time of trying to keep up, just so that I'm not caught letting a student down. (Int. 10, p.3, Librarian, Female)

Similarly, when independence is construed as an essential element of the information literate person, the need for other people can lead to poor self-image and low self esteem. One interviewee has a negative view of herself as a researcher because she believes that independence is critical to information literacy. An important consequence of this view is that if information is not accessed independently it may not be accessed at all. Members of the academic community may be prepared to sacrifice information rather than subject themselves to the stresses of trying to locate it:

> I'm not really comfortable (trying to do things myself). I'm much happier when someone's holding my hand to help me....My daughter asked me if I could find a book for her. I still haven't done it. I probably won't do it. (Int.14, p. 13, Staff Developer, Female)

Academic librarians who also perceive independence as critical to information literacy do nothing to alleviate this situation:

> If they are information literate, they won't need to bother - not bother ask - the librarian so many questions....so many people come in here and say `Where's such and such?' , and you say `Well go and look in the catalogue'. That person walks straight out of the door because they haven't been taken by the hand and shown where it is. (Int.7, pp. 5-6, Librarian, Female)

Examining and understanding the service and educational implications of differing approaches to information literacy could form an important element of staff development for higher educators.

How does this study contribute to information literacy research?

In chapter four I examined information literacy research as a subset of information needs and uses research. I noted then, that while a few information literacy researchers were adopting qualitative approaches, there was a strong tendency to focus on the views of information literacy expressed by information literacy scholars and opinion leaders rather than the experience of information users and the wider information professional community. In addition, researchers in the broader field of information needs and uses who were focussing on 'information users' in the research endeavour, were mainly adopting a cognitive approach. That is, they were interested in users' mental models of aspects of the world of information.

This study makes a number of contributions of relevance to researchers. It also opens a research agenda for information literacy, and may serve as a trigger for further studies of conceptions of phenomena in other information needs and uses research. I will discuss these areas to highlight the possible influence of this study in future research. As in previous sections of this chapter, I will commence by analysing recent developments in relevant research. The following headings organise the remainder of the chapter

- Recent developments in information literacy and information needs and uses research
- Contributions to the information literacy and wider research base
- Establishing a new research agenda for information literacy and information needs and uses.

Recent developments in information literacy and information needs and uses research

Current research literature reveals that little has changed in research on information literacy and information needs and uses. Important developments in such research are captured in recent papers about researching the phenomenon of relevance, and the role of information in society. These include:

- renewed interest in problems of meaning and the information user's experience as a vehicle for exploring meaning (Froehlich 1994; Park 1994);
- continued emphasis on the importance of adopting naturalistic approaches to explore users' experience (Park 1994);
- questioning of the need for 'definitions that are clear and distinct', and the suggestion that

when meaning is sought on the basis of users' experience concepts are unlikely to be definable in a fixed and precise fashion (Froehlich 1994, p.128);

- focus on the value of hermeneutics for developing frameworks within which to model information systems and their users (Froehlich 1994, p. 130); and
- analysis of the nature of the assumptions underlying different ways of thinking about the relationship between information and democracy (Dervin 1994).

Also of interest is the strengthening emphasis on research approaches which, like phenomenography, have hermeneutic and phenomenological underpinnings (Dervin 1994; Froehlich 1994; Park 1994). There is little evidence, however, of these consolidations of interest in the information needs and uses domain influencing ongoing information literacy research.

While my own research into conceptions of information literacy has been in progress a number of other studies have been completed and published, including:

- a follow-up study of US information literacy scholars' consensus view of information literacy (Doyle 1996);
- a preliminary investigation of information literacy as a continuum in Australian education (SAFIL 1995);
- a study of the impact on academic achievement of integrated information skills instruction (Todd 1995);
- a survey of the place of information literacy education in US institutions of higher education (ACRL and the Middle States Commission on Higher Education 1995);
- an exploration of the role of the community college reference librarian in promoting and teaching information literacy (Herring 1994); and
- an exploration of the role of information technology in facilitating information literacy for distance education students (Wilson 1994).

Most of these fail to fully adopt the approaches being argued for in the literature of information needs and uses research. For example:

- they continue to assume that information literacy is a readily definable concept, generally adopting the information skills model as a benchmark (Herring 1994; Todd 1995; Wilson 1994);
- they demonstrate an interest in the views of opinion leaders and information literacy scholars rather than information users (Doyle 1996);

- only one of these studies has sought to research the experience of information users (Todd 1995); and
- only one of the studies has adopted a naturalistic research design (Doyle 1996). Specific research strategies used include questionnaires (ACRL and the Middle States Commission on Higher Education 1995; Herring 1994; SAFIL 1995), statistical analyses (Herring 1994), experimental design (Todd 1995), and the Delphi Technique (Doyle 1996).

Taken together, all of these studies continue to develop what Todd (1996) refers to as information literacy's fragmentary research base; he also comments that most of the existing research is 'methodologically unsophisticated' and contributes little to theory or practice. The few studies which do display methodological sophistication, for example Doyle's search for meaning using the Delphi technique and Todd's investigation of students' academic performance form a significant, though small, contribution to that research base.

Given the fragmentary research into information literacy, it is surprising that recent literature has contributed in only a limited way to the ongoing development of the information literacy research agenda. Gaps in the research endeavour that have been highlighted, include:

- the lack of academic scrutiny of information and its social role (Cronin 1995, p. 11);
- the need for evidence of benefits to learners of a focus on information literacy education (Todd 1996); and
- the need for the strengthening of the information literacy research base (Todd 1996).

The most comprehensive listing of potential research questions were drawn together by Candy at the Second Australian Information Literacy Conference. A summary of these appears below:

- What is the connection between technology and futures for individuals?
- Does information from different sources have differential acceptance to learners?
- What support is there for the idea of information literacy in official statements by professional bodies and societies?
- To what extent is information literacy a generic accomplishment, and to what extent is it discipline- or domain-specific?
- How do people's needs and skills change over time?
- How persuasive is modelling by teachers, lecturers, librarians, and other adults on influencing the behaviour of students and other learners in relation to information literacy?
- Within the new electronic dispensation...what will be the tests of trustworthiness or credibility of information?

- To what uses do people put information literacy?
- What sort of learning do people undertake which involves access to information, and what skills do they find that they need as they do it?
- How does information literacy intersect with the notion of socially distributed knowledge? (Candy 1996)

Contributions to the information literacy and wider research base

My study has made both substantive and methodological contributions to information literacy research. The substantive contributions have been examined earlier in this chapter and chapters two, three and four of this thesis. The main areas in which contributions have been made are summarised below. This study has:

- developed a relational model of information literacy;
- proposed a focus on conceptions as a framework for information literacy research and scholarship;
- developed a map of information literacy as it is conceived in higher education; and
- challenged conventional thinking about information literacy and information literacy education.

In addition to these, a number of methodological contributions have been made. The study:

- provides an example of phenomenographic research as applied to information literacy;
- demonstrates the value of adopting a phenomenographic approach to information literacy and information needs and uses research;
- allows us to derive implications for information literacy researchers; and
- demonstrates that the research approach, phenomenography, has the potential to continue to advance theoretically as new studies are completed.

The study provides an example of phenomenographic research as applied to information literacy This study has shown how changes are required in how we think about studying information users in order to apply the phenomenographic approach to this area of research. The relational approach to research which was adopted in this investigation of higher educators' conceptions of information literacy, involved two significant shifts from what was the norm when

the study commenced. Firstly, there was a change from studying information users, to studying users' ways of conceiving the world. This meant that in this study conceptions, and not 'information users', were the object of research. That is not to say that information users were not of central importance to the research, but rather that users are seen as interacting with the world rather than being separate from it. Secondly, the study involved a change from seeing knowledge as being constructed by the user, to seeing knowledge as being a product of awareness, jointly constructed by information users and aspects of their world.

The study demonstrates the value of adopting a phenomenographic approach to information literacy and information needs and uses research I have already discussed in this chapter how taking this approach has provided a deeper understanding of information literacy in higher education. Looking at information literacy as a phenomenon, that is the sum of people's conceptions or the subject-object relations through which it is constituted, has challenged the conventional view of information literacy as being a measurable attribute of people demonstrable through their ability to implement information skills processes. According to the outcomes of this study what constitutes information literacy is not fixed, it is fluid and contextually bound. Further, despite differing experiences of information literacy being appropriate in different circumstances, it is also clear that the nature of these experiences as described through the outcome space becomes progressively more sophisticated or complex. Consequently learning to be information literate, within the context of contemporary higher education, may be said to involve coming to conceive of effective information use in increasingly sophisticated ways. It is likely that equally important insights are likely to be gained through applying this approach to other objects of the information literacy and information needs and uses research. In general terms, we can conclude that the phenomenographic approach, that is investigating subject-object relations, is an effective strategy for illuminating information users' experience of the world.

The phenomenographic approach has proven to be a strategy which allows information literacy researchers to:

- accept the variation and fluidity of meaning associated with the concept of information literacy;
- accept the variation and fluidity of meaning which is likely to be attributed to other elements of the world of information; and
- uncover variations in experience which are of use both theoretically and practically.

These advantages will continue to make this approach attractive to information literacy and other researchers who are interested in information needs and uses.

The study allows us to derive implications for information literacy researchers Three important implications may by derived from this study which should be considered by future information literacy researchers. The implications each relate to one of the three areas of concern in this study - the meaning of information literacy, information literacy education and information literacy research. These are that:

- we cannot assume that the prescribed meanings associated with information literacy are shared by information users and information professionals;
- we cannot assume that information literacy is best described as an attribute of persons, or that the information skills model best characterises information use processes; and
- our understanding of information literacy and related concepts will continue to deepen if the experience of information users is given priority in research.

These implications further attest to the value of adopting naturalistic approaches, and specifically the phenomenographic approach in information literacy research. They also, however, stand as contributions to information literacy research in their own right.

The study demonstrates that the research approach, phenomenography, has the potential to continue to advance theoretically as new studies are completed Because phenomenography is a comparatively new research approach it is not unusual for new studies to make some form of contribution to the approach. Three features of this study have the potential to advance the theory of phenomenography. The first is the nature of the outcome space. It is unusual to have a multi-plane outcome space as an outcome of phenomenographic research. Yet the three elements involved in the outcome space, the meaning structure, the awareness structure and the way in which information was seen required this structuring in order to form a communicable map. Concurrent with the progress of this study, but quite separately, Marton, Watkins and Tang (1995) have also developed a different form of outcome space. In their case the outcome space of Hong Kong students' experience of learning was presented in two dimensions. This suggests that some phenomena at least are likely to reveal a complexity in the subject-object relations through which they are constituted which was not suggested by earlier studies.

The second is the separate analysis of the meaning structure and the structure of awareness in each category of description. It would seem, from this study, that for some phenomena the meaning structures and structures of awareness must both be revealed in order to capture a complete picture of the subject-object relation. Previous studies have examined either the one or the other of these elements treating them as equivalent. This study of conceptions of information literacy suggests, however, that the meaning structure and the awareness structure are not necessarily equivalent, and indeed may reveal different aspects of the form of the conception. Not surprisingly the two ways of viewing the subject-object relation are not incompatible, but rather complement each other. Together they reveal the logical relations between the categories allowing the outcome space to be constructed.

Thirdly, there is the clear identification of 'information' and not 'information literacy' as the object in the relation. Although the object in the relation, and the varying ways in which that object is experienced have been identified, it is the mediation of that object, that is the elements that form part of the relation, which constitute the experience of information literacy. Information literacy is experienced as a range of ways of experiencing effective information use. This suggests that, when we are researching conceptions of what appears to be an abstract rather than a concrete phenomenon, we can expect to find underlying the abstraction a more or less concrete subject-object relation. Thus, on the one hand, conceptions of a Geographical Information System (GIS), are about varying relations between the person and the GIS, and conceptions of essay writing are about varying ways of structuring the essay. Conceptions of love, on the other hand, may be found (hardly surprisingly) to be about the relation between a person and some other living being, whilst conceptions of beauty we could speculate to be about the relation between a person and the appearance of some thing.

Establishing a new research agenda for information literacy and information needs and uses

The successful completion of this study makes it possible to speculate about new directions for the research agenda for information literacy, and the wider field of information needs and uses based on a continuing adoption of the relational approach. As this study demonstrates that researching conceptions has both theoretical and practical value, researchers in these areas must give serious consideration to making people's conceptions an object of study. The recommendations for future research which follow are based on developing the present study and adapting the approach to other aspects of information literacy research.

Building on the current study Before conducting the empirical investigation that I am now discussing, I speculated that the outcomes of this study would provide an initial benchmark of descriptions of information literacy which further research could confirm, refine or otherwise build upon. That benchmark is now available and the research agenda tentatively outlined in chapter four of this thesis can be refined. Four main areas of research were proposed:

- people's experience of information literacy;
- people's experience of learning information literacy;
- teachers' experience of information literacy;
- teachers' experience of students learning information literacy.

In each of these areas *people* are information users including information professionals, and teachers are those responsible for information literacy education. The areas were then subdivided to include a focus on one of each of the following pairs:

- conceptions of information literacy, or learning information literacy;
- conceptions of information literacy, or learning information literacy, in specific contexts;
- conceptions of specific phenomena, or learning about specific phenomena, which need to be understood in becoming information literate, for example the information life-cycle, thesaurii and other elements of the information environment; and
- conceptions of vehicles, or learning about vehicles, through which information literacy is expressed, for example problem-solving, decision-making or research..

The above agenda provides a broad framework within which the phenomenon of information literacy can continue to be investigated. More specific recommendations which fit within the framework are as follows:

Research Recommendation One: *That the present study be replicated in other higher education institutions.* This will help determine whether the conceptions uncovered in this study are present in other parts of the higher education sector. Replications of the study will also lead to the affirmation or modification of the outcome space developed here as a graphical representation of the phenomenon.

Research Recommendation Two: *That the present study be replicated amongst higher educators in other cultures.* This will help determine whether the conceptions uncovered in this study are also to be found in other cultural contexts. Such studies will reveal variation in

conceptions of effective use of information across cultures, and will allow the construction of a supra-cultural outcome space for information literacy. This is of particular importance as more nations express an interest in information literacy, and as educational institutions increasingly deal with a multi-national student population.

Research Recommendation Three: *That the present study be replicated amongst single groups of higher educators, for example librarians, staff developers, lecturers and learning counsellors.* Examining the conceptions of individual groups will make it possible to discover whether or not members of such groups are likely to operate within a sub-set of the broader outcome space. It is important for professional educators and staff developers in particular to know whether members of any group may be likely to adopt any of all the conceptions in the outcome space or whether they may be expected to choose from a limited number of these. Such studies will allow us to begin to address questions such as: Do librarians conceive of information literacy in the same way as lecturers?

Research Recommendation Four: *That similar studies be conducted drawing participants from a specific discipline base, for example science, engineering, education or the health professions.* This will help determine variation in conceptions amongst members of a particular discipline. Such studies will add depth to our understanding of information literacy and will reveal how conceptions in particular fields are related to the broader picture presented here.

Research Recommendation Five: *That similar studies be conducted amongst student groups.* This will help determine whether students' conceptions of information literacy coincide with or differ from the conceptions of those guiding their education. Such studies will be of particular importance to educators who are interested in helping their students conceive of effective information use in particular ways.

Research Recommendation Six: *That similar studies be conducted in a range of workplaces, the workplace being a key context within which information literacy is considered important.* Both horizontal studies, that is studies of employees at one level in the organisation, and vertical studies, that is studies of employees at a range of levels, could be implemented. Such studies are important because information literacy is being described as a 'generic skill' which employees may require of new graduates. Educators, as with students' conceptions, need insights into how ways of conceiving of information literacy in the workplace coincides with or differs from their own.

Investigating conceptions of other, related phenomena The above recommendations are about furthering our understanding of the phenomenon of information literacy. The relational approach to research can also be adopted to investigate people's conceptions of other, related phenomena. These studies would be of interest to colleagues working in the broader field of information needs and uses as well as information literacy researchers. Some examples are suggested in the recommendations below:

Research Recommendation Seven: *That studies be implemented to discover people's conceptions of phenomena that are encountered in the process of becoming information literate.* We need, for example, to understand the variation in how people conceive of information problems, information technology, and information use contexts such as decision-making, problem solving and research. Phenomena identified in chapter three as important include the world of information, online databases, indexing structures, telecommunications networks, scholarly communication, the information life-cycle and information search processes. In the specific area of learning to search online electronic databases the need for studies to illuminate how users conceive of aspects of the online search experience has already been noted (Bruce 1994a, p.173). Such studies would inform educators as well as make it possible to devise new models of information users and their environments. When opening this area, however, researchers must be careful embrace the full range of interpretations of information literacy.

Research Recommendation Eight: *That the phenomenographic approach be tested as a device for the study of information and its role in society.* The study of information and its role in society has already been described as 'a domain deserving of serious academic scrutiny' (Cronin 1995, p.11). Cronin also asserts that this scrutiny is not occurring. Researching conceptions of information is likely to be a useful technique for opening up this research domain. Such studies may also establish the importance of research on information literacy to this broader field.

Research Recommendation Nine: *That studies be implemented to discover how information is used in learning and everyday contexts.* Information literacy researchers must begin to examine closely variation in people's experience of information use in all kinds of environments, and to study the experience of learning to use information effectively. A recent study by Gerber, Boulton-Lewis and Bruce (1995) that examines how students interpret data contained in maps and charts provides an example of such a study in the educational arena. Park's (1993) study into how people interpret the value of bibliographic citations, although not phenomenographical, provides a further example of what may be possible. The

phenomenographic approach has a powerful contribution to make in this area with its emphasis on variation in experience, combined with the emphasis on a holistic approach to studying information use.

Information literacy is indeed a phrase with a meaning, it is a phenomenon that is worthy of being experienced, taught and researched. Its elusiveness, resulting from its association with other phenomenon such as Information technology literacy, computer literacy, learning-to-learn, library literacy, and information skills is overcome when it is treated relationally, as a way of experiencing the world. The paradigms that allowed the study to unfold can also be applied to learning situations and further research in this area.

Interpretative research, as has been demonstrated in this study, clearly has the power to transform the way in which we understand information literacy. Each of the recommendations with which I have concluded this thesis reflects the importance given in this study to understanding variation in how people relate to aspects of the world. If we continue to research information literacy in this way, it is likely that the 'information users', citizens, learners and scholars in our information age, will continue to challenge and help us reconstruct our understanding of this phenomenon. It is essential that we, as researchers, should abandon the attempt to artificially construct the phenomenon by creating our own descriptions or encouraging other information literacy scholars to do so. We must instead work at describing the experience faithfully, or as has been done here, the variation in experience of those actively engaged in using information.