Chapter 3 Information literacy education

Having examined the various approaches to describing information literacy, I now turn to examining the second spoke in the *information literacy wheel*, information literacy education, in the context of higher education institutions. In this chapter I also review programs which have been part of the move towards information literacy education. Insights into information literacy education demonstrate how educators are fostering the process of becoming information literate, sometimes providing further insights into how information literacy is understood. The educators referred to here are mainly librarians in higher education institutions. As the wider community of tertiary educators develops an interest in the information literacy agenda we may expect changes in approach to information literacy education. Such changes are likely to be the result of the greater variety in experience of information literacy which will influence teaching and the likelihood of closer integration with academic curriculum. It is also possible that the views of information literacy education analysed in this chapter will have influenced higher educators' conceptions of information literacy which will be explored in later chapters.

Towards the close of this chapter I argue for the second of the three shifts in thinking about information literacy which frame my empirical study into higher educators' varying conceptions of the phenomenon. This is the shift from seeing learning to be information literate as the acquisition of attributes, to seeing it as coming to conceive of information literacy in different ways. As a result of this change we would design curricula around changing conceptions rather than around desirable attributes.

Information literacy education is examined under the following headings:

- Precursors to information literacy education
- Contemporary approaches to information literacy education
- Curriculum models for information literacy education
- Towards an alternate approach to information literacy education: from skills, knowledge and attributes to changing conceptions.

Precursors to information literacy education

Although descriptions of information literacy date back to the 1970s, information literacy education is a more recent development. Teaching-learning programs targeted at fostering information literacy have mainly been developed by librarians, although this is a picture which is gradually changing. Before the emphasis on information literacy, university libraries called their teaching programs *library instruction*, *bibliographic instruction* or *user education*. The nature of these programs and their relation to information literacy education is subject to ongoing debate. Practitioners, that is librarians teaching these programs, do not always distinguish between them and so the various terms are often used interchangeably with information literacy education and with each other.

The descriptions provided here of library instruction, bibliographic instruction and user education represent an attempt to demonstrate why the different terms came to be used and some of the distinctions that are made between them at a theoretical level. It will be seen that, although on one hand the changes in terminology, particularly from library to bibliographic instruction were politically engendered, they also represent different ways of thinking about teaching and learning library and information skills. Use of the term *information literacy* to describe a library's teaching program is usually also both a political move, to attract interest in the program, and an acknowledgment of differences in the content and processes used.

Library instruction

Library instruction is the earliest ancestor of information literacy education. The aim of library instruction was, and still is, to ensure that students have the necessary skills to use their

libraries. The key content areas of a library instruction program are outlined by Breivik (1982, p.85) as: 'attitudinal concerns, the logistics of using the library, the logistics of using resource tools, the organisation of information, resources and search strategies'. The focus of attention is the library and the resources it contains, usually leading to emphasis on library tours, instruction in the use of the in-house library catalogue and tools which are commonly used. Another feature of this kind of instruction is awareness raising of the resources contained within the host library collection. In Breivik's content areas listed above, the latter elements such as the organisation of information, resources and search strategies, are also dealt with within the library context.

Library instruction programs may comprise one-to-one instruction or group instruction within, or in addition to, academic curriculum. In the latter case, student participation is usually voluntary. Irrespective of the level of formality, these programs are usually subject to the influence of educational research and theories (Aluri 1981), and evaluation (Beeler 1975; Breivik 1982).

Differences in library instruction reflect the differences in interpretation of library literacy noted in the previous chapter. Thus, library instruction is sometimes described as being confined to library orientation and location skills (Behrens 1990). This is not, however, always the case, and library instruction, like bibliographic instruction, may include an emphasis on broader information processes. Ever during the late nineteenth century some librarians did not favour a narrow approach to library instruction. Perhaps this explains in part why the library instruction of those times is now referred to as bibliographic instruction.

In the late nineteenth and early twentieth centuries, although libraries were not yet transformed and linked by computer technology, their instruction programs were by no means confined to the structures and contents of the host library. Genevieve Walton of the Eastern Michigan University is an example of a librarian who did not confine her teaching programs to locational skills. In the late 1800s she initiated a lecture series which dealt with such diverse topics as 'Ancient writing material and manuscripts, printing and the printing press, libraries, catalogues and classification, reference books and how to use them, and selection and buying of books for private and small school libraries' (cited in Beck 1989, p.442). Walton is described as being:

> .... in the mainstream of the late-nineteenth-century movement to develop libraries as laboratories for independent reading, offering an alternative to textbooks. She was not just encouraging this among college students but was trying to train teachers who would make library use a part of the education of school children. (Beck 1989, p.443)

All the elements of library instruction are also part of bibliographic instruction and user education which are examined below. Some of the elements, however, such as library tours may cease to be recognised as a core part of the program.

Bibliographic Instruction

Bibliographic instruction is the name usually given (particularly in the United States) to teaching programs in academic libraries which acquaint students with the bibliographic structure of their disciplines and enable them to use the necessary bibliographic tools. The term came into use, in the mid 1970s, to differentiate programs focussing on the processes and knowledge required for library-based research from the more parochial library orientation programs, both of which had previously been known under the more general label of library instruction.

Bibliographic instruction involves teaching students all facets of using information which has entered the formal domain, that is information which is accessible through libraries. Grey, unpublished literature is also often dealt with. Guidelines for bibliographic instruction programs are provided in the Model Statement of Objectives for Bibliographic Instruction (Roberts and Blandy 1989, p.181) which has been revised regularly. The Model Statement is examined later in this chapter because it is recognised as an example of information literacy curriculum (Kuhlthau 1990, p.17). Important developments in bibliographic instruction include:

- the identification of conceptual frameworks for bibliographic instruction (Baker 1986; Kobelski and Reichel 1981);
- movement towards course-integrated instruction programs (Kirk 1984; Kohl and Wilson 1986);
- emphasis on the development of critical thinking skills (Bodi 1988; Engeldinger 1988; Plum 1984);
- the adoption of learning theories for program development, such as Kolb's learning

cycle (Svinicki and Schwartz 1988), Bloom's taxonomy (Jakobovits and Nahl-Jakobovits 1990), and Knowles' theories of adult learning (Sheridan 1986); and

- the development of experimental (American Library Association 1983) and qualitative program evaluation strategies (Frick 1990).

The term *bibliographic instruction* is now considered somewhat misleading as programs bearing this name today consider a wider range of processes and tools than the name implies. Since the mid 1980s there has been growing emphasis, for example, on teaching remote online searching of commercial databases, the use of bibliographic reference management software, the evaluation of the content of documents, and navigation of Internet sources.

In November 1993 the Bibliographic Instruction Section of the Association of College and Research Libraries considered a change of name which would more accurately represent contemporary practice. Although it was unlikely that the term information literacy would replace it, there has been support for the idea that bibliographic instruction programs were predecessors of information literacy programs:

> BI is part of an evolution towards information literacy, just as library orientation and library instruction was a step towards the evolution of BI. (Rader 1990a, p.20)

Lenox and Walker (1992, p.14) also describe bibliographic instruction programs as 'early efforts in the evolution towards information literacy'. They claim that the 'concepts and principles of bibliographic instruction, in years past were a sufficient information literacy program' (Lenox and Walker 1992, p.5). The stated differences between bibliographic instruction and information literacy education echo those emphasised between library skills and information skills. Bibliographic instruction is today considered to be an important strand of information literacy programs; the fundamental difference being that in teaching information literacy 'the information can be anywhere in any format or shape' (Rader 1990a, p.20).

User/Reader education

The terms *user education* or *reader education* are commonly used in public and academic libraries outside the United States, particularly in Europe (Fjällbrant 1976), Britain (Fleming 1990) and Australia (Frylink 1992) These terms have been in use since the early 1960s and has embraced the changes denoted by the labels *library instruction*, *bibliographic instruction*

and now *information literacy*. User education may also include any one or all of the curriculum models suggested by these labels. They may encompass library specific orientation programs, instruction in the use of bibliographic tools and other sources, the processes of information searching from problem identification to evaluation, synthesis and communication. The format of such programs is also variable, ranging from voluntary one-to-one or group instruction, to accredited academic units.

A useful distinction which has been made in relation to online user education programs, and one which is relevant to user education programs generally, is that between promotion, orientation, training and education (Fjällbrant 1988, pp.229-30). Promotion captures the public relations elements of programs. On a broad scale this may include awareness raising of the existence of the library and resources accessible through it, or awareness raising about the existence and value of other information systems. Orientation ensures that the 'user' is comfortable with the range of types and systems and services provided. Training ensures the ability to use a specific system. Education captures the need for knowledge of broader principles, concepts and strategies which are necessary for understanding, evaluating and using a wide range of systems both within and beyond library structures.

User education programs may be designed on the basis of constructivist approaches similar to those characterising model bibliographic instruction. Interest in fostering reflective practice and critical thinking for example (Walton and Nettleton 1992), mirrors similar work being undertaken in the United States (Gibson 1989; Reichel 1990).

Contemporary approaches to information literacy education

The change in terminology to *information literacy education* within many library teaching programs reflects both real curriculum changes and a political dimension. The political dimension is asserted by Arp who points out that the term *bibliographic instruction* was familiar to librarians but meaningless to those outside that environment. On the other hand the term *information literacy* communicates well with those outside libraries without having yet been properly defined and understood for instruction purposes (Arp 1990). The need to communicate something of the nature of the programs and gain acceptance for them has led to a wide range of library programs being described in terms of information literacy. This practice, together with the varying approaches to describing information literacy, has led to:

> ...disagreement as to whether information literacy demands a mode of teaching different from that developed over the past ten years by library/media specialists and bibliographic instruction librarians. (Bjorner 1991, p.151)

Information literacy and bibliographic instruction are often not well differentiated, a problem which is recognised by critics of information literacy (White 1992, p.78). The lack of distinction is evident in a number of contributions to recent monographs (see for example, Farmer and Mech 1992; Huston 1991) addressing information literacy. In these monographs authors describe classical bibliographic instruction or library instruction without distinguishing between these and information literacy in terms of either content or processes (see, for example, Gaunt and Nash 1992; Porter 1992; Tierney 1992; Wiggins 1992). For example, the following description of an information literacy program at Brigham Young University fits the description of library instruction programs devised by Breivik (1982):

> ....basic skills instruction was developed in self-instructional packages. These included a taped tour and programmed instruction texts for card catalogs, the library's online catalog, and periodical indexes....English composition instructors and librarians would team teach research strategies... (Wiggins 1992, p.79)

Many attempts to distinguish clearly between information literacy education and its forerunners do not succeed. Breivik's (1992, p.13) suggestion, that the essential difference revolves around library instruction being regarded as an 'add-on' to curricula, disregards the tradition of ensuring that both library and bibliographic instruction are integrated into students' learning experiences through effective curriculum design.

Wright and Larson (1990, p.104) propose that the feature which separates information literacy from bibliographic instruction and library instruction is the establishment of 'a conceptual framework that supports information gathering activity.' Their proposal, and Lukenbill's (1989) suggestion that information literacy is a process approach to bibliographic instruction, disregard the already well-established practice of using a process approach in that context. Research strategy, for example, was identified as a crucial conceptual framework for bibliographic instruction in the early 1980s (Kobelski and Reichel 1981). The suggestion that in information literacy education the information need not come from libraries further ignores the emphasis of the other programs on information sources outside the confines of libraries, such as patents offices, commercial online database hosts and newspaper databases. Differentiating between information literacy education and bibliographic instruction becomes

even more difficult when the Biibliographic Instruction Model Statement of Objectives is described as an information literacy curriculum (Kuhlthau 1990, p.17).

Of some assistance in understanding the fundamental difference between an information literacy and bibliographic instruction program is the idea that information literacy education is based on fostering the skills, knowledge and attitudes which are required for learning from information sources of all kinds; whereas bibliographic instruction focuses on the skills, knowledge and attitudes required for learning from formal, library-based, information systems. To make this distinction clear, an information literacy program would aim to ensure that a student could apply his or her information competence to a context in which interviews, for example, were required, whereas bibliographic instruction would stop short at ensuring that students could distinguish whether any documentary sources could supply the information.

In the higher education environment, the skills, knowledge and attitudes learned in both information literacy education and bibliographic instruction are similar; the same processes of recognising an information problem, identifying sources through to evaluating, managing and using the information would be required. However, the context in which these processes are applied would be broader in an information literacy education setting. Therefore, bibliographic instruction, or similar library-based programs, can claim to further the interests of information literacy in relation to formal information systems; they may or may not emphasise the transferability of the skills to a wider range of information environments. Information literacy programs would emphasise a range of contexts for the application of skills, such as libraries, commercial information systems, workplace settings and various forms of public and private systems, for example government agencies. In this sense bibliographic instruction is best regarded as a subset of information literacy education.

Curriculum models for information literacy education

Despite the differences in approach to describing information literacy and the apparent difficulties in delimiting information literacy programs, contributors to the discussion accept, at least implicitly, that information literacy is something that can be learned. Given this assumption information literacy is seen in two distinctive ways in relation to education programs:

- as a conceptual framework applicable to all education curricula; and
- as a program in its own right.

In the former approach information literacy is considered to be a vehicle through which learning occurs. It is thus described variously as 'a conceptual framework for the development of educational models and new curricular concepts in addressing information skill development' (Lenox and Walker 1992, p.5), a paradigm supporting the design of curriculum, including those of bibliographic instruction programs (Lowry 1990, p.23), or as summarising the 'underlying principles of quality undergraduate education for a new century' (Bunnell Jones 1992, p.32). In the second approach information literacy is regarded as content to be learned, thus programs are designed with their own supporting curriculum. The emphasis in such programs is on teaching people how to find, evaluate, use and manage resources.

Many of the difficulties associated with designing information literacy education come from the range of descriptions previously analysed. In addition, information literacy educators aim to develop skills in using information from a wide range of sources, considering it essential to incorporate all kinds of information systems and resources into learning experiences:

> Therein lies the dilemma of defining the concept so as to confine the program or else to open up both the definition to the point of meaningless generality and expanding a program to impossible goals. Where is the proper boundary for conceptualisation and hence targeting? (McCrank 1992, p.487)

Curricula which have been devised can be seen as representing an attempt to come to terms with this dilemma. The contribution of curriculum designers to our understanding of information literacy is significant because they have made the most systematic and sustained attempts at describing information literacy. These descriptions are embedded in the curriculum goals, objectives and taxonomies which they have designed and show how the problem of setting boundaries has been dealt with in practical situations.

A number of philosophies of curriculum development influence information literacy curricula leading to the possibility of discipline-based, student-based, social-utilitarian or social reconstruction models (Bjorner 1991, p.152). Student-based models are considered to be the most appropriate (Bjorner 1991, p.151) although most of the published curricula are heavily influenced by information theory. Also influential in the development of information literacy programs are the behaviourist learning theories of Skinner and Gagne (Lukenbill 1989, p.171).

The following models, or sets of goals which serve as foundations for information literacy curriculum represent the range being used in higher education. Some of them are regarded as models of excellence. These include the Mann library model, the Jakobovits' taxonomy, the Model Statement of Objectives, Bjorner's information literacy curriculum and the resource-based learning model. The first four of these models feature the skills, knowledge and attitudes which students need to acquire. In this way they are consistent with the descriptions of information literacy examined in the previous chapter. Nevertheless, they spell out the knowledge, skills and attitudes involved in more detail. The level of detail provided in the following descriptions is not as extensive as in the primary sources but is sufficient to portray the style of the curriculum involved. The resource-based learning model which is advocated in schools, but could be used more in higher education, sits well with the 'information literacy as a conceptual framework' approach to curriculum described earlier. Each model discussed here has been explicitly described in the literature as an example of information literacy curriculum.

The Mann Library Model

The Mann library model encompasses five goals each of which is subdivided to specify a set of knowledge, skills and attitudes. Specific sources of information are not mentioned. Instead students are required to be able to deal with information formats, such as online databases, and negotiate the structures, such as indexing files etc. The Mann library curriculum was published as an exemplary model in the American Library Association's (1989) report, where it was slightly modified for application to K-12 curricula. The five goals are reproduced below:

Goal A:	Understand the role and power of information in a democratic society. (Including such concepts as scholarly communication and the power of information)
Goal B:	Understand the variety of the content and format of information. (Including the ability to evaluate information and information sources)
Goal C:	Understand standard systems for the organisation of information. (Including understanding sources of information, available through electronic and other media, and their structure)
Goal D:	Develop the capacity to retrieve information from a variety of systems and formats. (Developing and implementing strategies for the use of print and electronic sources including library systems)
Goal E:	Develop the ability to organise and manipulate information for various access and retrieval purposes. (Including bibliographic file management, word proccessing, electronic spreadsheets) (Olsen 1992, pp.98-9)

The Mann library model has also been largely adopted by Cleveland State University, and two further goals included which focus on information process:

- Students can articulate and focus their information needs.
- Students are able to evaluate their information search processes. (Rader 1991, p.28)

These two goals, however, are arguably subsumed by Goal D of the Mann library model. Developing the capacity to retrieve information from a variety of formats must involve articulating the information need and evaluating the search process afterwards. There are also some apparent gaps in both models. For example, there is no focus on the conceptual aspects of synthesising and communicating new knowledge gained from the information use processes.

The taxonomic approach

An approach to library and information skills curriculum based on Bloom's taxonomy of affective, cognitive and sensorimotor objectives has been developed by Jakobovits and Nahl-Jakobovits (1987 and 1990). These models have been adapted and expanded to develop information literacy curriculum applicable to the bibliographic instruction context (Nahl-Jakobovits and Jakobovits 1993). Within this approach the emphasis is on:

> ...integrated behavioural objectives, linking the affective, cognitive and sensorimotor domains within three levels of information literacy instruction: critical thinking or information evaluation skills; using information knowledge or information use skills; and learning to learn or enjoying the benefits of information success (Nahl-Jakobovits and Jakobovits 1993, p.78).

The resultant taxonomy is comprised of nine-cells, with each of what are labelled affective, cognitive and sensorimotor objectives being divided into three levels. The first level is the orientation or critical thinking level, the second is the interaction level in which information is retrieved and used, and the third is the internalization level in which the process is successfully accomplished. The taxonomy includes nine major objectives, three for each of the affective (A), cognitive (C) and sensorimotor (S) domains:

A1: Becoming sensitive to the need to evaluate information.

A2: Having the perception of an information need and feeling the excitement of being an independent searcher.

A3: Attaining the feeling of personal empowerment.

C1: Evaluating the source of information according to appropriate standards.

C2: Formulating the question and planning a search strategy.

C3: Evaluating the information content and being empowered by it.

S1: Coping in an information society and engaging in learning activities.

S2: Recognising the information provided as suitable to the need and experiencing a sense of well being.

S3: Facilitating one's life through lifelong information and enjoying its rich benefits. (Nahl-Jakobovits and Jakobovits 1993, p.79)

The major discrepancy in this taxonomy is the use of the label 'sensorimotor' for the last set of objectives. They appear to contain further examples of affective and cognitive objectives. This taxonomy is, however, based on the assumption that learning in all three levels (1, 2 and 3 in the above list) is occurring simultaneously (Nahl-Jakobovits and Jakobovits 1993, p.79). The authors also claim that the taxonomy is exhaustive, representing a complete map for all kinds of bibliographic instruction programs, '...the information literate person is skilled in all nine cell areas, although not necessarily to the same extent in each' (p.79). Although described as a taxonomy suitable for the bibliographic instruction context, this taxonomy could be implemented in any learning environment.

Bibliographic Instruction Model Statement of Objectives

The Model Statement of Objectives was created, and continues to be revised by the Association of College and Research Libraries Bibliographic Instruction Task Force. The model statement also emphasises skills and knowledge to be learned. Its behaviourist and information processing orientations are recognised by critics who regard the model statement as a 'significant contribution to the process of task analysis' (Wright and Larson 1990, p.105), the idea being that a comprehensive list of tasks is required to serve as a starting point for an information access curriculum. In task analysis the processes of information processing analysis, task classification, and learning task analysis 'produce a list of tasks and behaviours that collectively represent the beginning of a curriculum' (Wright and Larson 1990, p.105).

Kuhlthau (1990, p.17) identifies the model statement as comprising 'general and terminal objectives of information literacy skills'. These skills, in conjunction with the appropriate attitudes and information search processes, including critical thinking skills, form the basis of information literacy curriculum. The model statement, which has recently been revised to

incorporate different levels of curr culum, requires learners to acquire proficiencies that demonstrate they understand:

- how information is identified and defined by experts;
- how information sources are s ructured;
- how information sources are intellectually accessed by users; and
- how information sources are physically organised and accessed.

The model statement is not universally accepted as an information literacy curriculum model. Bjorner (1991, p.159) points out that the 'model statement as it now stands seems limited to libraries and library-based systems and to only one of the duty areas of the information literacy curriculum working model.' Bjorner's working model is discussed below.

Bjorner's information literacy meta-course

Bjorner's working model of information literacy is described as a meta-course which she suggests may be taught as individual lessons, as concentrated units, or throughout a curriculum spanning several years. The meta-course may span the educational curriculum, from K-12 through to adult and continuing education (Bjorner 1991, p.155). According to Bjorner, individual learning situations in particular courses, subjects or lessons should be seen as contributing to an overall effort spanning many years of education. Details of Bjorner's metacourse are reproduced in chapter four as it represents one of the few outcomes of information literacy research. The eight major competency areas, which are a variation on the information skills theme, are listed below:

A. recognising and accepting an information gap;
B. responding positively to the need for an investigation;
C. constructing alternative strategies to reduce the information gap;
D. evaluating and selecting a strategy;
E. acting on a strategy;
F. assessing the effectiveness of a strategy;
G. using information;
H. storing information for future use. (Bjorner 1991, p.157)

Bjorner's meta-course also has apparent deficiencies. Although it emphasises a broad process,

the first six of the elements are concerned with information retrieval. Using information, the essential abilities to evaluate, synthesise and communicate are collapsed into a single element labelled information use.

Resource-based learning

At the school level there has been a strong emphasis on resource-based learning for developing information literacy (Kuhlthau 1991, pp.9-10). Application of this model to information literacy education in the higher education context has limited presence in the literature (see, for example, McHenry, Stewart and Wu 1992; Porter 1992). Its value, however, has been regularly asserted (Breivik 1991a, 1992; Candy 1993; Lenox and Walker 1992). Interest in resource-based learning for information literacy education is an intrinsic part of the American Library Association report which calls for:

> ...not a new information studies curriculum but, rather a restructuring of the learning process. Textbooks, workbooks, and lectures must yield to a learning process based on the information resources available for learning and problem solving throughout people's lifetimes.... Such a learning process would actively involve students in the process of:
>
> - knowing when they have a need for information;
> - identifying information needed to address a given problem or issue;
> - finding needed information;
> - evaluating the information;
> - organising the information;
> - using the information effectively to address the problem or issue at hand. (American Library Association 1989, p.4).

Authors who have addressed the application of resource-based learning to information literacy education have identified a number of its important features. They include:

- adopting resource-based learning strategies ensures that 'information literacy is not taught as a separate course but is integrated with learning across the curriculum' (Kuhlthau 1991, p.9);
- resource-based learning ensures that information literacy skills are 'learned through application and practice across curriculum areas' (Kuhlthau 1990, p.19);

- knowledge of information processes become an integral part of academic units (Lenox and Walker 1992, p.9);
- in adopting resource-based learning strategies lecturers and librarians become learning facilitators rather than conveyors of knowledge (Breivik 1991b, p.226; Lenox and Walker 1992, p.9);
- students 'learn from the information resources of the real world, such as books, journals, television, and online databases' (Breivik 1991b, p.226);
- students engage in active self-directed learning in an information rich environment where they learn to communicate an understanding of content, pose questions about the content being learned, reflect on, assess and take reponsibility for their own learning (Hancock 1993, p.3).

The emphasis on these features of resource-based learning affirms the importance of the interdisciplinary nature of information literacy, its dependence on access to a wide range of resources, and the freedom of the individual to critically select information from them. Also important to a resource-based learning program targeting the development of information literacy, particularly in the higher education context, is the idea that students should be required to identify their own information sources. Where students are provided with resources for learning by teachers, they do not learn the skills necessary to navigate the world of information.

The value of resource-based learning, and similar curricular strategies such as problem-based learning, for information literacy education is readily established. It would not be difficult to adapt existing resource and/or problem-based curricula, some of which already include library or bibliographic instruction components, to meet the full range of requirements of information literacy education. That is, students should be learning to identify their own resources from a wide range of formal and informal information sources and systems.

The content of teaching and learning in higher education

In this section I move beyond the general goals of information literacy curricula to probe *what* is taught in information literacy programs reported in the literature, and *how*, that is the teaching strategies used in such programs. This develops a more detailed picture of what is considered to constitute information literacy in the academic context. These details are drawn

from a range of articles, appearing, except in one case, since 1990, that report established programs in higher education institutions. As the question of whether bibliographic instruction is a component of information literacy education or one of many teaching areas to which information literacy principles can be applied remains unanswered, only articles explicitly representing information literacy programs were considered.

As my previous examination of varying approaches to information literacy suggests, the idea of teaching the execution of an information-based problem solving process is only one of the possible elements of information literacy teaching programs. Thus, programs may focus on a selection, or on a wide range of the following:

Information retrieval

- independent location of literature (Stanford 1992, p.41);
- searching in the electronic environment (Huston 1990, Oberman 1991);
- ability to effectively use bibliographic databases including live commercial databases (Bruce 1994a; Olsen 1992; Porter 1992, p.47);
- the ability to execute processes such as: 1) constructing plans to organise searches for information, 2) using controlled vocabulary and keywords, 3) using logical operators, and 4) understanding and applying concepts of truncation and field qualification in various electronic environments (Olsen 1992, p.99);
- determining the index structure and access points of print and computerised information sources (Olsen 1992, p.99);
- the ability to successfully navigate libraries (Olsen 1992, p.99);
- using card catalogs, online catalogs and periodical indexes (Wiggins 1992, p.79); and
- ability to accurately interpret bibliographic citations from print and computerised information sources and locate the material they represent (Olsen 1992, p.99).

Knowledge of the information universe

- the structure of the information environment (Rubens 1991);
- the conceptual contexts necessary for situating the context of a question, selecting one or more paths, and shifting the search to different pathways (Huston 1990, pp.693-4);
- national and international networks for scholarly communication (Olsen 1992, p.98);
- the purpose and range of reference tools (Gaunt and Nash 1992, p.87);
- knowledge of paper and computerised periodical indexes (Gaunt and Nash 1992, p.86);
- understanding the nature of periodicals (Gaunt and Nash 1992, p.85);

- awareness of library services (Gaunt and Nash 1992, p.85);
- knowledge of specialised information sources relevant to the discipline being studied (Lowry 1990; Tierney 1992; Bruce 1991);
- understanding the power of information and the classification of knowledge (Mc Henry Stewart and Wu 1992, p.58); and
- awareness about the knowledge explosion and the role of technology in helping people identify, access and obtain information (Trauth 1986).

Information management

- knowledge of databases and their structure (Olsen 1992, p.99);
- ability to use specific systems and software packages, eg. bibliographic file management packages (Bruce 1991, 1992a; Olsen 1992), word processors (Olsen 1992, p.95), spreadsheets (Olsen 1992, p.95); and
- use of the computer for inventing and generating topics and for writing and editing (McHenry Stewart and Wu 1992, p.58).

Thinking skills

- question formulation (Rubens 1991);
- critical thinking, analytical and evaluation skills (Oberman 1991; Walton and Nettleton 1992);
- problem finding and problem solving (Fielder and Huston 1991, p.303);
- reflective practice (Bruce 1992b; Walton and Nettleton 1992);
- ways of focussing on a topic (Gaunt and Nash 1992, p.87);
- development of a research strategy (Gaunt and Nash 1992, p.87, Tierney 1992, p.65);
- the ability to differentiate between types of material typically represented in a library catalog and those that are not (Olsen 1992, p.99); and
- assess alternatives for information acquisition, processing and use (Trauth 1986).

Information use context and information presentation

- writing literature reviews (Bruce 1991, 1992a, 1994b; Walton and Nettleton 1992);
- writing abstracts and annotations (Bruce 1990, p.225; Tierney 1992, p.64);
- developing and implementing current awareness strategies (Bruce 1990, 1991); and
- writing correct bibliographic citations (Olsen 1992).

Information technology

- operate a personal computer (Olsen 1992);
- use computer-based tools appropriate to the information need (Trauth 1986); and
- use CD-ROM (Olsen 1992);
- articulate information needs in terms of technological requirements (Trauth 1986);
- understand and use telecommunications software and systems (Olsen 1992, p.98).

Evaluating information

- distinguishing popular from scholarly treatments of a subject, distinguishing primary from secondary sources, evaluating the quality of information and the usefulness of the content and format of a particular tool based on relevant criteria (Olsen 1992, p.99);
- evaluating the literature search process (Bruce 1991);
- ways of assessing alternative points of view, eg. using tools such as the Alternative Press Index (Gaunt and Nash 1992, p.86); and
- analysing the quality of information sources (McHenry, Stewart and Wu 1992, p.58; Tierney 1992, p.64).

In teaching information literacy, both curriculum-integrated and extracurricular strategies are used, although the emphasis on curriculum integration indicates that this is the preferred approach. As in most discipline areas a wide range of teaching-learning strategies are used in information literacy programs. Those with a relatively high level of teacher control include specially constructed assignments (Porter 1992), hands-on experience, lectures, discussions and written materials (Gaunt and Nash 1992, p.85), taped tours and programmed instruction texts (Wiggins 1992, p.79). Strategies emphasising relatively high levels of student control include a range of adult learning strategies (Sheridan 1986), active and discovery learning strategies (Fielder and Huston 1991, Oberman 1991) and reflective strategies such as the use of diaries (Walton and Nettleton, Bruce 1992), or the 'thinking like a searcher' model (Rubens 1991). These latter strategies intrinsically favour the idea of learning in terms of developing personal heuristics rather than the skills, knowledge and attitudes usually prescribed.

It is clear that the literature of teaching and learning information literacy has been influenced, like the literature of bibliographic instruction before it, by the broader literature of teaching and learning in higher education. However, that part of the literature which focuses on the nature and impact of students' perceptions has not had a discernible impact. The work of Mary Huston presents one of the few examples of attempts to design instruction programs based on

the phenomenological perspective that students experience their world, and indeed their learning contexts in significantly different ways. She rejects the idea that information seeking 'like electronic processing is a set of procedures which can be formalised, followed and taught as step-by-step sequences' (Huston 1990, p.692).

Huston's work, however, does not appear to take the argument for a phenomenological approach to designing teaching-learning strategies to its logical conclusion of specifying learning outcomes in terms of changed ways of experiencing the world. Her goal for teaching and learning is to facilitate the development of appropriate 'mental models' of the information universe:

> ...effective teaching, then, should offer a conceptual model that stimulates the development of enabling mental models which can be applied to making database choices and path decisions. (Huston 1990, p.692)

She also describes the student's learning processes and outcomes from a dualistic cognitivist perspective:

> In other words, external information from library sources is received in terms of individuals' existing constructions of the topic - as it were, within his or her head. In turn, this new information causes individual's representations of a topic to change. From this perspective, users' cognitive structures can be portrayed as systems that create, motivate and direct searches for relevant information, even as they are influenced by external information. (Fielder and Huston 1991, p.313)

Towards an alternate approach to information literacy education: from learning skills, knowledge and attributes to changing conceptions

In this chapter, I have continued to develop the picture of our present understanding of information literacy, through examining information literacy curriculum, programs and teaching-learning strategies. In these approaches, teaching and learning information literacy emphasises acquiring attributes (see Figure 3.1a). I now turn to examining the implications of these views in relation to our understanding of information literacy and argue for adopting a relational view of teaching and learning in information literacy education (see Figure 3.1b).

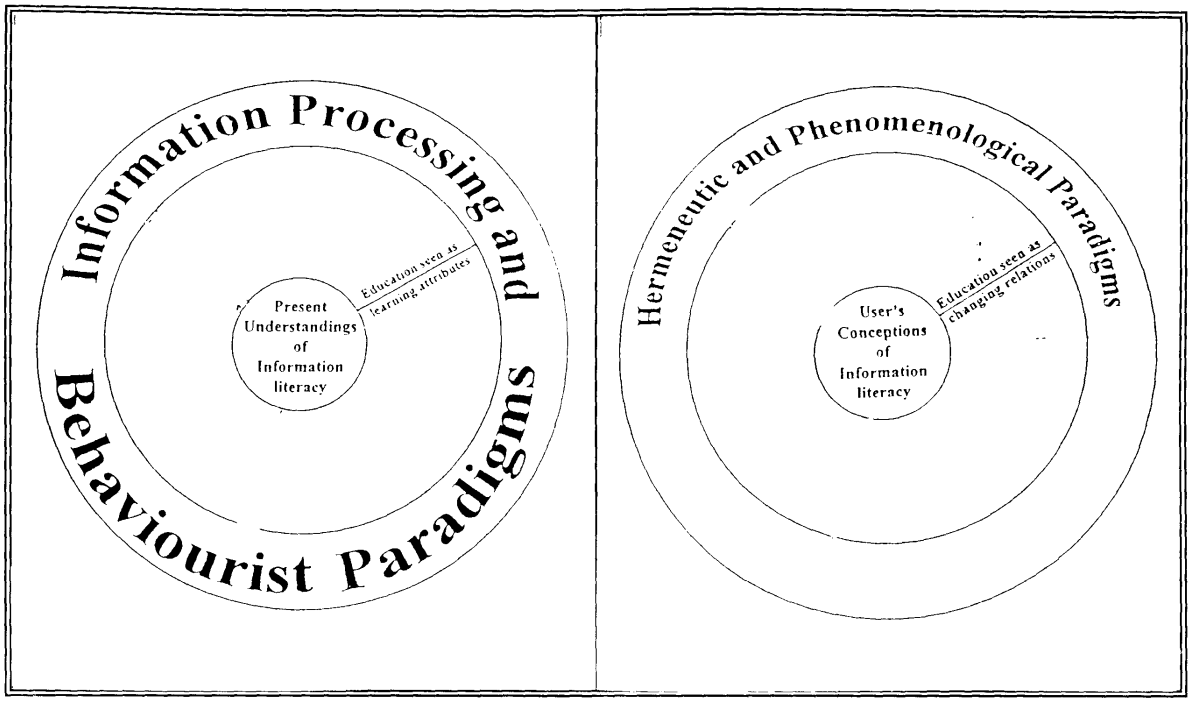

Figure 3.1a Teaching and learning as acquiring attributes of information literacy

Figure 3.1b Teaching and learning as changing conceptions

What are the problems associated with prevailing models of information literacy education?

Although the curricular and teaching strategies demonstrate a move towards student-centred models, the dominant paradigms are similar to those which influence descriptions of information literacy examined in the previous chapter. From these perspectives, learning to be information literate is largely about developing skills, knowledge and values, that is acquiring the characteristics of an information literate individual. Bloom's influence, for example, is explicitly recognised by Nahl-Jakobovits and Jakobovits. This means that most curricula are designed around the skills, knowledge and values which an individual needs to acquire. The views of teaching and learning associated with these approaches are, in Biggs' (1990, pp.12-13) terms, predominantly quantitative and institutional. Learning is about 'coverage of a list of facts, skills, concepts and principles that need to be known' and teaching is about communicating the knowledge and skills. Learning also needs to be demonstrated in such a way that it is testable, competence in skills and knowledge need to be demonstrated in order for academic units to be passed.

Although these views dominate models of information literacy curriculum, the earlier analysis does indicate a shift towards experiential or reflective modes of teaching and learning in bibliographic instruction and some information literacy forums. This appears to be a practitioner-based movement, and is yet to influence theoretical writing about information literacy, although the ideas would fit curriculum models which revolve around resource-based learning. These approaches are based on substantially different models of teaching and learning; but practitioners involved have not yet been provided with detailed descriptions of information literacy which are compatible with this approach. Advocates of resource-based learning may favour interpreting information literacy as learning-to-learn. However, not distinguishing between these phenomena is as unhelpful to information literacy education as it is to our understanding of information literacy.

In all cases of information literacy curriculum, the question of 'what' needs to be taught, and learned, is not adequately addressed If *information skills* are the focus, then this raises the problem of whether an information skills curriculum is a sufficient information literacy curriculum. Similarly a focus on information tools and technologies, or on broader processes of resource-based and problem-based learning seem to skirt around, rather than aim at the target of information literacy. For example, focussing on tools and technologies in relation to information literacy education would not be unlike teaching science students how to use laboratory equipment without any concern for whether or not they understood what it meant to be a scientist. In the case of the more generalised approach, adopting a resource or problem-based learning framework without focussing on what it means to be information literate would not be unlike adopting a problem-based approach to engineering curriculum without helping students to understand what it means to be an engineer.

Current approaches to information literacy, although focussing more sharply on elements of the world of information than the descriptions examined in chapter two, have also failed to define the concept adequately for educational purposes (Arp 1990). As the above analogies indicate, current approaches are either overly specific, or overly generalised. In all cases they fail to engage the students with the question of what it means to be information literate. This problem is clearest in the ongoing discussion which attempts to unravel the distinction between bibliographic instruction and information literacy programs. Current approaches require a better understanding of the concepts and skills involved, the hierarchical arrangement of concepts and skills, and the development of statements and competencies which are testable (Arp 1990, p.49). They are also likely to lead to ever increasing lists of important knowledge

and skills making it difficult for teachers to know what should be the focus of attention in any formal teaching program.

Furthermore, the important knowledge and skills in the world of information are subject to rapid change, paralleling the rate of change in amounts of information and information technology discussed in the first chapter. Content aspects of the curriculum, which are important today, such as the skills required for searching remote online databases may, tomorrow, as a result of technological changes be obsolete. This problem in information literacy education is exactly isomorphic with the educational problems which the concept of information literacy was designed to counteract. The argument here is that the information literate individual should be able to keep up to date in an environment in which relevant professional skills and knowledge are rapidly replaced.

The need to be able to articulate clearly the outcome of information literacy programs is an essential aspect of information literacy curriculum:

> With information literacy we must recognise that we have an expected product - the information literate individual - and that we will be expected to produce this product. (Arp 1990, p.49)

One view is that theorists should seek to describe information literacy in such a way that it is measurable (Arp 1990, p.48). During late 1993 the question of how this should be done was raised regularly via the bibliographic instruction listserv (see, for example, Gawrych 1993; Lau 1993; Megill 1993 and Murrey 1993), and poses a dilemma for those responsible for information literacy education. The continuing proliferation of lists of competencies does not appear to have resolved this difficulty. They also lead into a further dilemma, that of testing specific knowledge and skills which have shelf-lives as short as the discipline-based knowledge which, in part, led to the emergence of the construct of information literacy.

Why adopt a relational approach to information literacy education?

In chapter two I argued for adopting a relational approach to describing information literacy. Adopting such an approach would be of little value if we continued to view information literacy education in terms of ensuring that learners acquired the necessary attributes. Consistent with describing information literacy in terms of people's conceptions would be the adoption of a relational view of teaching and learning within the context of information

literacy education. Moving towards a relational view of teaching and learning for information literacy education is grounded in the idea that information literacy can be usefully described in terms of conceptions of information literacy, a fundamental change in our understanding of what it means to be information literate, which I have already discussed.

The most fundamental principle underlying a relational view of learning is that:

> ...learning should be seen as a qualitative change in a person's way of seeing, experiencing, understanding, conceptualising something in the real world- rather than a change in the amount of knowledge which someone possesses. (Marton and Ramsden 1988, p.271)

Furthermore, such a view implies that 'we do not receive information and then process it internally, but rather we reach out to the world and focus on particular aspects of it' (Prosser 1993, p.21). In relation to information literacy education, this means that how someone conceives of information literacy is of far greater importance to determining what they have learned, than how much knowledge or skill they are able to demonstrate.

A relational view of teaching and learning information literacy would comprise the same features of this approach, outlined by Ramsden (1988, p.26), applied to the information literacy context. I have adapted the first four of Ramsden's features in order to suggest what a relational approach to teaching and learning in information literacy education might involve:

Learning is about changes in conception Applied to information literacy education, this means that learning is about changes in how people conceive of information literacy, or in how they understand, see or experience aspects of their information environment. Of even higher importance to the learner than the knowledge and skills required for using information tools and technology, will be coming to conceive of relevant phenomena in a particular way.

Learning always has a content as well as a process When applied to information literacy education this means that learning to be information literate cannot be achieved in a decontextualised scenario. This means that, like phenomena such as thinking and learning, information literacy does not have a 'life of its own. It is a way of dealing with and reasoning about aspects of subject matter' (Marton and Ramsden 1988, p.274). Information literacy cannot be learned without engaging in discipline specific subject matter.

Improving learning is about relations between the learner and the subject matter, not teaching methods and student characteristics Applied to information literacy education this means that the focus of attention is neither on the student, nor on the teacher, but on the relation between learners and aspects of their information environment. It is these relations which the teacher and learner need to understand and, if appropriate, change.

Improving learning is about understanding the students' perspective This means that it is the role of the teacher, and the learner, to identify how the learner is interacting with elements of his or her information environment. It is the student's conceptions of information literacy and his or her information environment and its elements which need to be explored and revealed. Once this has been achieved it becomes possible for alternative conceptions to be recognised as different, understood and perhaps adopted.

Laurillard's 'prescriptive implications' of viewing learning as a change in conception follow from these four features:

- there must be a continuing dialogue between teacher and student;
- the dialogue must reveal both participants' conceptions; and
- the teacher must analyse the relationships between the student's and the target conceptions to determine the focus for the continuation of the dialogue. (Laurillard 1993)

Other teaching strategies which may assist in changing experiences or conceptions are outlined by Marton and Ramsden (1988).

Adopting a relational view of information literacy education would, therefore, be based on a changed view of what it means to be information literate, and would lead to curricula which emphasise conceptions and experiences rather than attributes of individuals. Adopting such an approach would represent a significant shift from viewing teaching and learning in quantitative (that is, measurable) and institutional terms to viewing them qualitatively (Biggs 1990, p.12). The view of learning which recognises that 'learning not only involves ways of acquiring knowledge, but... of seeing the world in a different way' is recognised by some as a hierarchically sophisticated view which it is desirable for educators to achieve (Biggs 1990, p.12). Similarly, Candy (1991, p. 320) suggests that a focus on conceptions indicates a higher order approach to teaching and learning than thinking in terms of skills and knowledge. This

is a view which is gaining widespread acceptance amongst European and Australian tertiary educators (see, for example, Booth 1990; Laurillard 1993; Prosser 1993; Ramsden 1992). The question needs to be asked, however, of why such a qualitative view, and in particular a relational view of information literacy education is desirable?

One of the most persuasive arguments for adopting a relational approach to information literacy education is the repeated observation arising from studies into learning; namely that the acquisition of knowledge and procedures related to a phenomenon is not necessarily accompanied by a change in understanding about that phenomenon. It cannot be assumed that:

> ...if a student obtains new knowledge and acquires new procedures related to a phenomenon, then his or her understanding of that phenomenon will...change. (Marton and Ramsden 1988, p.272)

In practical terms, based on present thinking about information literacy, this might mean that a student could demonstrate a capacity to perform required tasks, such as formulating an information problem, locating, evaluating and managing information, and yet not recognise the need to adopt these strategies in dealing with information problems in an unfamiliar context.

Secondly, there is ample evidence that students learning about a particular phenomenon do not understand that phenomenon in similar ways. Nor, at the end of a course of study, do they necessarily exhibit the ways of understanding which educators may prefer (Dahlgren 1984a). Essentially, students can have different experiences of the same reality by focussing on different aspects of that reality (Prosser 1993, p.23).

Thirdly, a relational approach to teaching and learning is appropriate if we believe that academic learning is about coming to see the world from the perspective of 'experts'; experts here not being theorists so much as those who have considerable experience of those aspects of the world concerned.

Fourthly, such a view would be consistent with the point already argued, that conceptions of a phenomenon are somehow more fundamental to competence than knowledge and skills.

Finally, such a view may take us some way towards addressing the problem of how to educate people for information literacy without falling into some of the traps evident in the current approach.

In summary, the range of important questions in information literacy education is similar to those which arise in any educational context: Who should teach, in what ways should information literacy be taught, how should students be assessed, how should programs be evaluated, what is the role of libraries in such programs and what is the role of educators, both librarians and other lecturers? Answers to all these questions rest on knowing what should be taught; and at present our programs are largely designed on the basis of librarians' and scholars' views of information literacy rather than the views of information users (Curran 1993, 1990).

If we are to adopt a relational approach to information literacy education, considerable work needs to be done to understand people's varying experience, or conceptions of a range of phenomena: for example the world of information, online databases, indexing structures, telecommunications networks, scholarly communication, the information life-cycle, and information searching processes:

> We have to know what views of a particular phenomenon we would like a learner to develop. (Marton and Ramsden 1988, p.272)

The starting point chosen in this study is to understand the varying ways of conceiving of information literacy itself. The results of this study will provide an initial map of ways in which information literacy is conceived by higher educators, against which students' perspectives can be compared. They will also provide a set of ways of conceiving of information literacy which may act as 'target conceptions' for teachers and students in formal education settings.

Chapter 4 Information literacy research

Information literacy research forms the third spoke in the *information literacy wheel* introduced in the first chapter. In chapters two and three, I examined ways of understanding information literacy from the point of view of descriptions of the phenomenon occurring in opinion papers and the literature of information literacy education. In this chapter, I turn to examining information literacy research. These studies add further to the picture of information literacy presently available to us. I also argue for the third change in thinking about information literacy which frames my study into varying conceptions of the phenomenon. This is the change from researching people and their attributes in order to understand information literacy, to researching the varying relations between people and aspects of their world. It is also a change from drawing on prior assumptions about the nature of information literacy in research to examining the phenomenon in the light of people's experience. Understandings of information literacy derived from research and the proposed alternative research approach are discussed under the following headings:

- Background to information literacy research
- Research into information literacy
- Research directions recommended in the literature
- Towards an alternate research approach: from identifying attributes to describing people's conceptions
- A preliminary research agenda based on the relational approach.

Background to information literacy research

Information literacy research could be seen as belonging to the older, more developed tradition of information needs and uses research. Like the bibliographic instruction research movement which preceded it, however, information literacy research could well draw upon, and contribute to a parallel tradition of educational research. Since little research has yet been conducted into information literacy itself, an overview of developments in the past twenty years is necessary to understand the background to and possible influences on information literacy research.

Trends in information needs and uses research have been analysed and recorded in review articles appearing in the *Annual Review of Information Science and Technology*. Dervin and Nilan (1986), capture paradigmatic changes emerging in the mid to late 1980s. Described, for convenience, as the traditional and alternative paradigms, the former has an emphasis on scientific or 'quantitative' approaches, whereas the latter is roughly equivalent to what are commonly identified as inductive, qualitative approaches (Dervin and Nilan 1986, p.16). Today the inductive, qualitative approaches are seen as continuing to be overshadowed by the dominant paradigm which focuses on issues such as measurement and prediction (Stoan 1991; Park 1993).

The two influential paradigms identified by Dervin and Nilan are important to information literacy researchers as they deal with important issues such as the nature of information, views of users and knowledge interests. Essential differences between the two paradigms are summarised in Table 4.1. It can be seen that the 'alternative' paradigm to which information needs and uses researchers are turning is driven by an intrinsic interest in the information user and the user's perspective. This is paralleled in educational research by an interest in the student, or the learner, and his or her perception of learning contexts and phenomena. Other elements of the alternative paradigm, such as focus on cognitive structures and a constructivist approach to information and knowledge also have parallels in modern educational research.

The views of information underpinning the two paradigms are explored by Morris (1994). She contrasts the traditional and constructivist views of information as follows:

> (the traditional view)...sees information as external, objective, as something that exists outside the individual. It is a message transmitted from sender to receiver through a channel... Information in this traditional sense exists in an ordered world that is discoverable, definable, measurable. When

we seek information through the raditional paradigm, our goal is to find the external 'information reality' that corresponds to our in'ormation need'.

(the constructivist view)...views nformation not as external or objective, but as ... constructed by the user. Information does not exist in the abstract - it needs to be interpreted... We construct cognitive maps of our environment that are constantly being altered and refined as we experience new information. We are changed by new information.... (Morris 1994, p.21)

Table 4.1 Paradigms in Information Needs and Uses Research I
Adapted from Dervin and Nilan (1986)

Traditional Paradigm	Alternative Paradigm
Information is seen as objective. It is commonly defined as: a) a property of matter, b) any message, document or information resource c) any publicly available symbolic material or d) any data.	**Information is constructed by human beings**. It may be defined as: a) that which is capable of transforming image structures or b) any stimulus that alters the cognitive structure of the receiver.
Users are seen as input-output processors of information.	**Users are seen as constantly constructing**; free, within system constraints to create from systems and situations whatever they choose
Researchers search for **trans-situational propositions about the nature and use of information systems.**	Researchers focus on **understanding information use in particular situations** and are concerned with what leads up to and what follows system interaction.
Researchers focus on **externally observable dimensions of behaviour and events**.	Researchers focus on **how people construct sense**, searching for universal dimensions of sense making.
Research questions start with the information system, measure use of systems and seek predictors of use.	**Research questions start with the user.** The system is examined only as it is seen by the user.
Researchers ask 'what' questions, e.g. what people use what systems, what services do people use?	**Researchers ask 'how' questions**, e.g. how do people define needs in different situation, how do they present these needs to the system, and how do they make use of what the system offers them?
Information needs are defined in terms that designate what in the information system is needed, rather than in terms of what users think they need.	**Information needs are defined in terms of the users cognitive structures**, e.g. a) a conceptual incongruity in which the person's cognitive structure is not adequate to the task, b) when the current state of possessed knowledge is less than needed, c) when internal sense runs out.

Despite the apparent move towards constructivist and user-oriented approaches, information needs and uses research continues to be criticised for:

- observing 'users in terms of systems, while only a few studies are finding ways to observe users in terms of users' (Dervin and Nilan 1986, p.9);
- 'concentrating on the means by which people discover information... rather than upon the ends served by their information seeking behaviour (Stoan 1991, p.247, citing Wilson 1981); and
- focussing on systems or intermediaries rather than users (Park 1993).

One unstated, but nevertheless important, characteristic of the 'user-driven', qualitative, paradigm described by Dervin and Nilan (1986), is that it remains, like the traditional paradigm, dualist in approach. Individuals are seen as 'self-contained' and separate from information systems. The knowledge interest in research has simply shifted from the information system to the user without any apparent accompanying change in how the nature of a phenomenon, as a philosophical construct, is understood. As a result the essential relationship between the information user and his or her world is not being investigated. The alternative paradigm is also strongly influenced by cognitivist and information processing approaches. That is, it focuses on how information is constructed by human beings in the form of cognitive structures such as mental maps.

In educational research, a further shift has occurred since the early 1980s towards focussing on the internal relations, which may vary according to context, between people and aspects of their world (Marton 1981). People and their environments are seen as inextricably linked, such that neither one can be described or understood except in relation to the other. This phenomenological perspective of the world, which underpins research which has made significant advances in our understanding of learning during the 1980s, will be examined later in this chapter.

Since the mid 1980s, there has been a growing interest in the perceptual world of the information user. This has occurred in at least two areas of inquiry: the information related experiences of researchers and the experience of information in undergraduate and postgraduate learning contexts. Despite the entrenched interest in the frequency of researchers' use of information systems and sources (Stoan 1991), studies are emerging which report attempts to understand aspects of the researcher's experience. For example, studies based on intensive interviews have examined scientists' information gathering styles (Palmer 1991), and the strategies applied by researchers when determining the relevance of citations retrieved (Park 1993).

These studies have been both innovative and illuminating. Park's (1993) study, for example, an analysis of how researchers assess the value of citations, provides empirical support for the idea that relevance is not a measurable, but rather a contextually dependent and interpretive, concept. She further concludes that 'relevance can be looked at as a relationship between a user and a citation' (Park 1993, p.329). Unfortunately Park does not pursue the idea of relevance as a relation between user and citation, or the implications of that concept for further research. Instead she focuses on developing a model of her findings which presents the 'factors and thought processes ... contributing to selection of a citation' (Park 1993, p.341). Essentially, however, Park adopts a phenomenological stance, describing the essential features of the relation between users and one aspect of their world, without making this explicit.

Qualitative research has also improved our understanding of undergraduate experiences of libraries and information use. Mellon and Kuhlthau used students' journal entries to describe the library research process of new undergraduates (Kuhlthau 1988), and new students' feelings of library anxiety (Mellor 1986). More recently, Andrews (1991) and Sullivan-Windle (1993) used the critical incident technique (CIT) to describe undergraduates' perceptions of academic libraries and their staff and the problems which they, the students, experienced. Huston (1990) investigated undergraduate students' and experienced users' mental models of the information universe. The developing interest in this type of research has resulted in the publication of monographs focussing on the role of naturalistic inquiry for information studies (for example, Glazier and Powell 1992; Kuhlthau 1993; Mellon 1990).

The application of qualitative methods in information needs and uses research to the area of postgraduate study and supervision, however, has been limited. Two studies in this area have been identified (Zaporozhetz 1987 and Bruce 1994). The former explored, through interviews, how supervisors advised doctoral candidates for the literature review aspect of their research. The latter study examined research students' conceptions of a literature review. The study of conceptions of the literature review (Bruce 1994b) was the first qualitative study in information needs and uses to adopt explicitly a relational view of a phenomenon, as will be done in this study of the experience of information literacy.

My study, therefore is situated in the intersection of two research traditions: the phenomenographic branch of research in higher education with a knowledge interest in people's varying conceptions of phenomena, and qualitative studies in information user research, particularly those focussing on the perceptual worlds of information user.

Research into information literacy

For the purposes of this study, research into information literacy is defined as research which explicitly focuses attention on information literacy. There have been many studies into learning and various aspects of information needs and uses, including bibliographic instruction, which shed light on elements of information literacy and the information environment. These studies however, some of which I have discussed in the previous section, do not explicitly seek to illuminate information literacy or its programs; therefore they do not tell us anything about how researchers interpret the idea of information literacy. As I am reopening the question of how information literacy should be interpreted, or understood, I have chosen not to make assumptions about the nature of the phenomenon, a step which would be required if I were to examine research which did not explicitly locate itself within the information literacy domain.

Searches of education and library and information science databases revealed only a small number of journal articles and reports, including dissertations, about information literacy research. Of these studies only three (Bjorner 1991; Doyle 1992; Ochs and others 1991) improve our understanding of how information literacy is interpreted. Other studies, which accept as given contemporary approaches to information literacy, focus on:

- levels of involvement and factors influencing involvement with information and computer literacy in Dutch secondary schools (Plomp & Carleer 1987);
- developing a model of the information intermediary process in facilitating information literacy (Brock 1993);
- the emphasis on information literacy education across selected U.S. teacher education programs (Turner 1992);
- the comparative value of textbooks, computer-based drill and practice and computer-based tutorials in relation to examination performance in a management information systems course (Hoeke 1988); and
- postgraduate students' and supervisors' perceptions of their information needs and personal information competence (Bruce 1990; Hiscock 1993).

Research methods used in these studies included surveys (Bruce 1990; Hiscock 1993; Plomp and Carleer 1987), controlled pre- and post-testing (Hoeke 1988), content analysis (Turner 1992), and the generation of a model through an extensive literature review and the input of a fifteen member expert panel (Brock 1993). These studies draw on existing descriptions of

information literacy in order to pursue their aim. They do not extend our understanding of the phenomenon.

The three studies which deepen our understanding of information literacy in various ways deserve closer attention, both in terms of the strategies used by the researchers and the outcomes achieved. These are:

- the evaluation of Mann Library's information literacy program (Ochs and others 1991);
- the development of a comprehensive definition of information literacy (Doyle 1992); and
- the development of an information literacy meta-course (Bjorner 1991).

Each of these studies assumes that information literacy is a valid concept and draws on opinion leaders' and information professionals' understandings, in delimiting or probing the nature of the phenomenon.

Mann Library's program evaluation

Mann Library's information literacy program evaluation had three goals:

- to assess Mann's information literacy program;
- to ascertain the information skills which employers would like to see in recent college graduates;and
- to ascertain the information skills which recent graduates find necessary in their jobs. (Ochs and others 1991, p.8)

Both graduates and employers were surveyed to meet these goals. Despite the broadly stated aims of Mann's information literacy curriculum, outlined in chapter three, the researchers responsible for this survey interpreted the character of information literacy very narrowly, focussing entirely on the use of computers for information retrieval and management. Because the understanding of information literacy drawn upon here reflects elements of the information technology-based understanding examined in chapter two, information processes, non-computer related knowledge, skills and attitudes, and non-computer-based information sources were not included in the survey. The survey examined the need to use computers in the workplace, and requirements made of graduates, in six skill areas:

- finding information in computerised databases;
- manipulating numeric data with a computer;
- creating and managing databases;
- writing computer programs;
- preparing and producing documents using computers;and
- using telecommunications networks and software. (Ochs and others 1991, p. 12)

Employers, or new graduates who were not involved in using computers were exempt from answering all the questions relating to the defined skills areas. No space was provided in the survey for broader consideration of skills which are not directly computer related. The outcomes of the study were, therefore, confined to statements about computer use. This is reflected in the main conclusions arising from the study:

- Skills in the use of computers are considered in the hiring process....these skills are valuable to the effective performance of our students' jobs once they have them.
- Computers are used in many companies currently and their use is increasing.
- Most employers are willing to train good people if they don't have the computer skills needed.
- Few employers expect intermediate or advanced skills except when hiring for very specific positions.
- Use of computers does not seem to vary by industry or the size of the organisation a person works for.
- Students require less training in mainframe computer programming languages and more training in the use of applications software, including programming with those packages. (Ochs and others 1991, p.17)

This study develops, as a result of its assumptions, a picture of information literacy that revolves entirely around the use of computers. The survey design tells us much about the perceived nature of information literacy which is not apparent in the Mann curriculum model: at its core, information literacy is seen to be about the ability to use computers for various applications. Because of the nature of the survey the picture it provides of information literacy needs in the workplace is limited to details of required computer competence. Questions about whether, for example, new employees are required to formulate information problems, develop strategies for identifying information, evaluating, synthesising and communicating information remain unanswered because they were not asked. The survey does, however, develop in considerable detail the computer skills which, in the Mann Library at least, are considered essential to information literacy.

A comprehensive definition of information literacy

The second of these studies aimed to create a comprehensive definition of information literacy and to develop outcome measures for this concept (Doyle 1992). Implemented for the U.S. National Forum on Information Literacy, the study was not confined to defining information literacy for a particular educational sector or group of people. In order to develop the definition Doyle used the Delphi technique, comprising three rounds, with a panel of fifty-eight participants. The participants were recognised authorities and opinion leaders from the U.S., Canada, and Puerto Rico.

Doyle (1992, p.5) claims that the first outcome of the study is a 'comprehensive definition and a list of specific outcomes for the process of information literacy':

- Definition: Information literacy is the ability to access, evaluate and use information from a variety of sources.
- Attributes: An information literate individual is one who:
  - recognises the need for information;
  - recognises that accurate and complete information is the basis for intelligent decision making
  - formulates questions based on information needs;
  - identifies potential sources of information;
  - develops successful search strategies;
  - accesses sources of information, including computer-based and other technologies;
  - evaluates information;
  - organises information for practical application;
  - integrates new information into an existing body of knowledge; and
  - uses information in critical thinking and problem solving. (Doyle 1992, p.2)

Of the outcome measures agreed upon by the expert panel, the outcomes for students amplify the attributes, further illuminating the perceived nature of information literacy. The following list reproduces those outcome measures which do not duplicate items in the attribute statement. Most of the remaining items deal with problem solving and critical thinking.

Students will:

- read with understanding at grade level;
- have the ability to access computers and other technologies;

- compare and contrast the formats, strengths and weaknesses of various sources such as primary sources, textbooks, databases, indexes, video productions, and human resources;
- know how to learn;
- be able to judge information based on internal and external criteria;
- automatically question assumptions and have the skills to research alternative answers;
- have a willingness to look at and understand various points of view;
- be able to make informed decisions;
- make connections between existing knowledge and new information;
- apply problem solving skills regularly...;
- use critical thinking skills regularly...;
- be able to work individually and in groups;
- demonstrate flexibility in ideas and attitudes;
- develop and refine oral and written communication skills; and
- choose appropriate resources to support a proposal, debate, argument. (Doyle 1992, p.14)

The above definitions, attributes and 'outcome measures' represent the consensus view, of opinion leaders and other experts, about the phenomenon of information literacy. Although the availability of a consensus view and the focus which it provides are important, the view represented does not differ substantially from those approaches discussed earlier. Many of the limitations of descriptions of information literacy identified in chapter two apply to this description also. Further, in relation to the need for educational outcome measures discussed in chapter three, many of these statements are not easily assessed.

An information meta-course

The third of these studies into information literacy involved the construction of a working model for information literacy curriculum (Bjorner 1991). Although designed to conform with the curriculum requirements of the U.S. Vocational-Technical Education Consortium of States, Bjorner points out that her meta-course 'which identifies key characteristics of information-literate behaviour ... could be the basis for the development of lessons in all disciplines at all levels..' (Bjorner 1991, p.155). Her assumptions about the nature of information literacy differ from those of Ochs and others (1991). Whereas Ochs and others adopted a strong computer skills orientation, Bjorner adopts a process orientation. The outcome of her research was a 'behavioural model which is competency based' (p.156). The model is a 'duty and task listing describing actions taken in specific parts or categories of the total information management process' (p.156). In compiling this list Bjorner has detailed extensively a process

approach to information literacy, identifying thirty-four competencies in eight categories:

A. Recognising and accepting an information gap
   1. Identify a question to be answered.
   2. Place the question in a context.
   3. Determine the information needed to answer the question.

B. Responding positively to the need for an investigation
   1. Identify the consequences of not answering the question.
   2. Determine the costs of investigating the question.
   3. Decide on a range of effort to be used to answer the question.

C. Constructing alternative strategies to reduce the information gap
   1. Identify appropriate information sources.
   2. Determine physical location of sources.
   3. Evaluate skills required to access sources.
   4. Develop action plan(s) for utilising resources.

D. Evaluating and selecting a strategy
   1. Estimate effectiveness of a strategy in relation to cost, time and effort required for use.
   2. Compare various strategies in terms of estimated effectiveness, cost, time and effort.
   3. Identify the best strategy in terms of estimated effectiveness, cost, time and effort.
   4. Revise a strategy or select another as necessary.

E. Acting on a strategy
   1. Determine a workplan for implementing the strategy.
   2. Consult the sources required by the strategy.
   3. Note/record the information derived from the sources.
   4. Structure/restructure the information derived from the sources.

F. Assessing the effectiveness of a strategy
   1. Formulate the answer(s) found by using the strategy.
   2. Compare the answer(s) found with the statement of the question to be answered.
   3. Evaluate the success of the strategy selected in relation to the effectiveness of the answer found, time, cost and effort used.
   4. Determine whether the original question has been answered.

G. Using information

1. Identify the audience for the information.
2. Determine the physical format of presentation.
3. Select and arrange the intellectual content of the presentation.
4. Prepare the presentation.

H. Storing information for future use

1. Consider storage requirements of discrete information items.
2. Determine retention value of each item.
3. Discard items of no continuing value.
4. Determine physical storage mechanism(s) for items to be retained.
5. Determine intellectual access points for items to be retained.
6. Prepare items to be retained according to physical and intellectual access requirements.
7. File items in personal files. (Bjorner 1991, p.157)

Bjorner's meta-course was designed using the following process. Firstly, she listed the major categories of action taken by individuals working with information retrieval and management. Secondly, for each of the major categories identified she specified tasks which needed to be undertaken (p.156). Thirdly, she asked library and information professionals to provide anecdotal descriptions of recently encountered information problems according to the model designed, which led to some revision of the behaviours listed. Bjorner's portrayal of information literacy was based on and validated by 'expert' views about the nature of information literacy. It is very much a prescriptive model. The information professionals' anecdotes used were analysed for their fit to the model rather than being the basis for the models' development. In addition, the model was based on information professionals', as opposed to information users', ways of dealing with information problems.

As an information literacy process model, this meta-course could be strengthened by additional attention to the processes of evaluating information and recognition of the need for a feedback loop. Its present linear form does not reflect the cyclical nature of information use.

Research directions recommended in the literature

Research into information literacy has been accompanied by suggestions for the future directions of research into this area. The following recommendations draw on research directions suggested in papers which have contributed to chapters two, three and four. It has been recommended that attention be given to:

Setting social direction

- formulation of national policy recommendations (Doyle 1992, p.5).

Knowledge synthesis

- 'a continuing review of the literature' (Eisenberg and Small 1993, p.264).

Teaching and learning

- further work on 'how to teach individuals to become information literate' (Bjorner 1991, p.159);
- 'empirical research to validate attributes of information based education..., and to identify others' (Eisenberg and Small 1993, p.264);
- '... the evolution of a comprehensive theoretical classification scheme and to test that scheme...to identify the relationships among individual research attributes, the information bases of educational situations and other elements of learning events (particularly the attainment of learning objectives)' (Eisenberg and Small 1993, p.274);
- developing: 'a) a list of information attributes and associated character states, b) a tested data-collection instrument for gathering data on the information base of learning events, c) a validated classification scheme for categorising the information bases of learning events' (Eisenberg and Small 1993, p.275); and
- 'research...into ways that information literacy education can be integrated into all levels of education, including teacher education' (Recommendation 14 of the Jones' Report Australia as an information society).

Evaluation of teaching and learning programs

- research on the impact of information literacy and its programs (Kirk, in Booker 1992, p.168); and
- research into the impact of resource-based learning on information literacy (Breivik 1993, p.16).

The contribution of information literacy and information technology

- testing the assertions that information literacy contributes to lifelong learning and the development of an informed society (Kirk and Todd 1993, p.129); and
- research into the impact on the individual of new information technologies (Palmquist 1992, p.32).

Developing understanding of important concepts and people's experience

- probing into serious questions about the nature, role and impact of specific attributes of information (eg information systems, resources, skills, and processes) in education (Eisenberg and Small 1993);
- researching 'information seeking behaviours and communication patterns of experts within different disciplines' (Arp 1990, p.48);
- 'extensive research on successful information seeking concepts and skills in different disciplines' (Arp 1990, p.49); and
- studies into students' experience in the online information environment (Oberman 1991, p.194).

My study into tertiary educators' conceptions of information literacy is not one of the lines of research which has been recommended in the literature. Nevertheles, it does fall into the same domain as those recommended directions which suggest exploring the nature of concepts and people's experience, and it will contribute to thinking about how to teach information literacy. Although few researchers are questioning our present descriptions and understandings of information literacy, Dervin and Nilan (1986) call for research to improve our understanding of basic concepts in the information needs and uses arena. Information literacy is one of the concepts which needs to be understood, both more clearly and from different perspectives. It is necessary to understand more about people's experience of information literacy, and therefore something more about the nature of this phenomenon in order to address broader issues of, for example, how to teach information literacy or evaluating its impact.

My research does, however, address the existing agenda in the following ways:

- Seeking to understand people's varying experience of information literacy contributes to a better understanding of information related concepts (Dervin and Nilan 1986).

- A review of the literature of information literacy has been undertaken to substantiate the need for the study (Eisenberg and Small 1993).
- The study is likely to provide a useful alternative framework for information literacy education (Bjorner 1991).

Towards an alternate research approach: from describing attributes to describing people's conceptions

In this chapter I have portrayed the understandings of information literacy which have arisen from the work of researchers, and the research directions which have been established. These are researchers' contributions to our understanding of information literacy (Figure 4.1a), as seen through the outcomes of their studies and the assumptions about the nature of information literacy which they have adopted. In this section I will examine the implications of the approaches being adopted and argue for an alternative approach to information literacy research; namely, exploring people's conceptions (Figure 4.1b).

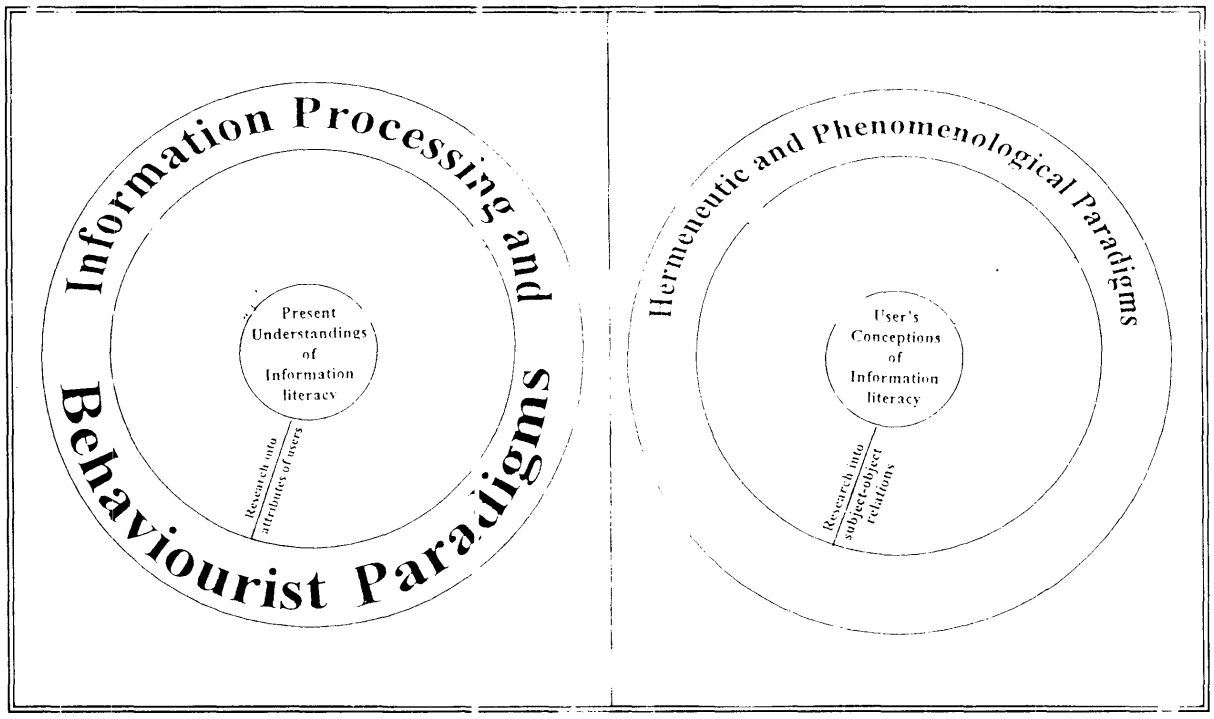

Figure 4.1a Researching information literacy as attributes of people

Figure 4.1b Researching information literacy in terms of people's conceptions

What are the problems associated with established approaches to information literacy research?

The few studies which have been conducted into information literacy have served to deepen and consolidate the views developed by opinion leaders and advocates since the mid 1980s. We now have a better understanding of the computer competence which, in a technology focussed view, is seen as integral to information literacy; we have a detailed picture of information processes and competencies; and a consensus view of a definition of information literacy and the attributes it involves. As these studies are either grounded in existing views of information literacy, or draw further on the views of opinion leaders or other experts, the results are largely compatible with the dominant behaviourist and information processing based ways of thinking about information literacy noted in previous chapters. Until now, information literacy research has either continued to explore the views of opinion leaders and other experts, or has been based on assumptions about the phenomenon made whilst our understanding of it is still limited and subject to change. Such assumptions are not unquestioned in the literature:

> Typically, a list of attributes is postulated *a priori* by researchers and then used to describe particular situations or methods. The scheme has questionable validity and generalisability. (Eisenberg and Small 1993, p. 267)

Other notable features of the body of information literacy research are:

- the number of studies in this area is extremely limited, despite its perceived importance;
- available research outcomes have not led to any significant change in our understanding of information literacy;
- no studies have been located which focus on the views of people other than information literacy researchers and scholars or information professionals;
- researchers do not appear to be questioning existing understandings of information literacy despite confusion about the nature of information literacy and the questions raised by some scholars;
- researchers assume that information literacy is a transferable skill across discipline contexts and information problems; and
- research studies have not been context specific, assuming instead the generic nature of information literacy before examining the phenomenon in specific contexts.

Finally, Kirk and Todd point to the fragmentary nature of these studies and its consequences:

> Available research is fragmented and piecemeal, without connection to prior research or sufficient concentration in one area to build a useful body of knowledge that can inform practice. (Kirk and Todd 1993, p. 129)

Although there is a discernible trend towards studying the users of information systems, this is not yet the dominant approach in information science/retrieval research generally. Much information retrieval research has been conducted focussing either on 'components of information systems or on the intermediary, disregarding the complex behaviour of the end users' (Park 1993, p.347). The shift towards user based research oriented towards a 'second-order perspective', that is user's views, rather that researchers' views, continues to be dualistic and cognitivist in approach. In other words, information users continue to be seen as separate from information systems, and continue to be described separately. Users are also described in terms of what may be 'in their heads'; the emphasis being on cognitive structures rather than on relations between people and aspects of the world around them. Information literacy research, perhaps the newest sub-set of information needs and uses research has not yet begun to adopt a user oriented approach.

Maintaining existing directions in information literacy research will have a number of consequences. Firstly, it will lead to a continued recycling of the views of opinion leaders, probably in the form of more detailed processes or alternative process models, competency statements and attributes. Secondly, these directions do not accommodate the possibility of examining the views of information users in furthering our understanding of information literacy. Thirdly, research into the teaching and learning of information literacy will suffer from a gap in knowledge about information literacy if people's experiences of the phenomenon are not explored; that is such research will be based on assumptions which do not take people's experience of the phenomenon into account.

Moving towards a user-oriented research approach for information literacy would be following the lead of researchers in the information needs and uses (Dervin and Nilan 1986), and more specifically in the bibliographic instruction domains (Kuhlthau 1988; Mellon 1986). Those studies from the more general field of information needs and uses which have researched users, however, have focussed on barriers to information use, rather than examined reasons for successful endeavours; they have also focussed on people as separate from their information environments, accounting for behaviour in terms of 'mental models':

> While many studies have documented the cause of search difficulties, fewer have identified the sources of search success. The most enabling endeavours have concerned user's mental models. (Huston 1990, p.693)

The move towards 'user' focussed research continues to separate people from other elements of the information environment. This is most clearly evident in studies seeking to develop user models; the need for such studies are regularly raised in the literature (Kemp 1990). User models are usually interpreted as 'mental models', such as those derived from studies into mental models associated with the use of online catalogues (Baker 1986; Borgman 1986) and Ruben's (1991) division of the world of information into the bibliographic and non-bibliographic domains. Kuhlthau's model of the search process, although not a 'mental model', is intended as a description of students as they move through the process, rather than as a description of the ways in which they relate to aspects of the world.

What changes are required in adopting a relational approach to information literacy research?

Describing higher educators' conceptions of information literacy, therefore, requires a third shift in the framework within which we attempt to understand the phenomenon. This is a shift from researching the views of information literacy advocates and other experts, to researching people's experiences or conceptions. Such a shift in knowledge interest requires a change in research approach. Important differences between a relational approach and the 'alternative paradigm' as it was described by Dervin and Nilan (1986) are presented in Table 4.2.

The change of knowledge interest goes beyond the impetus to study users to studying their conceptions of the world. This change will enable us to examine the varying conceptions of the phenomenon from the perspective of those who experience it. These ways of thinking revolve around the acceptance of the importance of understanding people's perceptions, views or experiences of a phenomenon.

Essentially, one of the most influential views underpinning current information needs and uses research is that the 'user' and the 'information system' are separate entities. According to such a model, the system has properties which users need to learn, and solving information problems involves bridging the gap between the user and the information system in problem solving (Rubens 1991, p.273-274). Taking a relational view of information literacy requires a

reconceptualisation of this model to see whole phenomena, that is the user together with aspects of his or her information universe, in terms of the varying relations between them. In this alternative view we do not presuppose that users are physically or conceptually separable from their information universes, although indeed they may see themselves that way.

Adopting a relational approach to research also involves a shift in thinking about the nature of 'information'. A relational view of information is consistent with neither the traditional nor the alternative paradigm. The view of information in the alternative paradigm has been labelled 'constructivist', in that the user is the focus of attention. The user is regarded '...not as a passive receiver but as the centre of an active ongoing process of change' (Morris 1994, p.22). In further describing a constructivist approach to information, however, Morris establishes a model which lends itself to a relational interpretation:

> ..information triggers perceptual changes in the user, and changes in the user alter how the information is perceived.' (Morris 1994, p.22)

Table 4.2 Paradigms in Information Needs and Uses Research II

Relational Paradigm	Alternative Paradigm (Dervin and Nilan 1986)
Information is seen as experienced by human beings. It is an element of the information environment which may be conceived in varying ways. Both 'information' and the person engaged with it contribute to how it is interpreted.	**Information is constructed by human beings**. It may be defined as: a) that which is capable of transforming image structures or b) any stimulus that alters the cognitive structure of the receiver.
Users are seen as engaged with aspects of the world - reaching out to and focussing on it in particular ways. There is a limited number of ways in which any phenomenon is conceived.	**Users are seen as constantly constructing**; free, within system constraints to create from systems and situations whatever they choose
Researchers focus on describing and understanding conceptions, the subject-object relations that constitute phenomena in the information environment.	Researchers focus on **understanding information use in particular situations** and are concerned with what leads up to and what follows system interaction.
Researchers focus on how the conceptions are delimited, searching for significant variations between them which illuminate how the conceptions differ in terms of *structure* and *reference*.	Researchers focus on **how people construct sense**, searching for universal dimensions of sense making.
Research questions start with people's ways of conceiving aspects of the world. Neither the information user nor the elements of the environment are of interest *per se*; the relations between them are investigated.	**Research questions start with the user.** The system is examined only as it is seen by the user.

Researchers ask 'what' and 'how' questions, e.g. *what* meanings are being attributed to the phenomenon, and *how* is that meaning being constituted?	**Researchers ask 'how' questions**, e.g. how do people define needs in different situation, how do they present these needs to the system, and how do they make use of what the system offers them?
Information needs are defined in terms of a particular kind of relation between the user and a task, for example a problem to solve, a decision to be made, a question to answer.	**Information needs are defined in terms of the users cognitive structures**, e.g. a) a conceptual incongruity in which the person's cognitive structure is not adequate to the task, b) when the current state of possessed knowledge is less than needed, and c) when internal sense runs out.

The idea that information and people both participate in the construction of meaning fits well with the relational view. In this view the user would not be seen as the centre of focus. Rather both the user and 'information' are seen as constituting meaning.

When interpreted this way, Dervin's early definition of information as 'whatever an individual finds informing' (Dervin 1977, p.22) could be considered an early move towards a relational view; it establishes the need for a qualitative relation between a person and 'information'.

Dervin herself, however, does not move in this direction, but rather favours what she labels a 'communitarian' perspective (Dervin 1994).

The change towards researching conceptions, or the relations between people and their information worlds, remains within the qualitative tradition which has been increasingly adopted by information needs and uses researchers. It involves applying to information literacy research ways of thinking which have been extensively applied in educational research. The major reasons for adopting a relational view of information literacy have been discussed in chapters two and three. If phenomena can be understood usefully in terms of differing relations, or conceptions, between people and aspects of the world, and if teaching and learning can be understood usefully as being about changing those conceptions/ relations, then those very conceptions need to become the object of research. Beyond this, a relational approach to information literacy research is required to ensure internally consistent strategies for discovering the conceptions that will begin to form the hub of the information literacy wheel.

A preliminary research agenda based on the relational approach

Researching higher educators' conceptions or ways of experiencing information literacy, opens up a new and uncharted domain for information literacy research. As studies in the educational arena have examined conceptions of learning, conceptions of phenomena being studied, and conceptions of vehicles of learning such as lectures and essay writing and literature reviews, so in the information literacy forum we need to understand people's varying conceptions of information literacy, conceptions of phenomena which need to be understood in becoming information literate and conceptions of vehicles through which information literacy is expressed. Examples of phenomena which need to be understood may include, for example, the information life cycle, information problems, freedom of information, as well as specific elements of the information environment. Examples of vehicles through which information literacy is expressed could involve problem solving, and decision-making.

A tentative field for future information literacy research could be mapped as follows. Research into:

A ***People's experience of information literacy, where people includes students, information professionals, researchers or any other possible group.***

1. People's varying conceptions of information literacy.
2. People's varying conceptions of information literacy in specific contexts.
3. People's varying conceptions of specific phenomena which need to be understood in becoming information literate.
4. People's varying conceptions of vehicles through which information literacy is expressed, e.g. problem solving or decision making.

B ***People's experience of learning information literacy, where people includes students, information professionals, researchers or any other possible group.***

1. People's varying conceptions of learning information literacy.
2. People's varying conceptions of learning information literacy in specific contexts.
3. People's varying conceptions of learning about specific phenomena which need to be understood in becoming information literate.

4. People's varying conceptions of learning about vehicles through which information literacy is expressed, e.g. problem solving or decision making.

C ***Teachers' experience of information literacy, where teachers include, but are not limited to, those responsible for information literacy education.***

1. Teachers' varying conceptions of information literacy.
2. Teachers' varying conceptions of information literacy in specific contexts.
3. Teachers' varying conceptions of specific phenomena which need to be understood in becoming information literate.
4. Teachers' varying conceptions of vehicles through which information literacy is expressed, e.g. problem solving or decision making.

D ***Teachers' experience of students learning information literacy, where teachers include, but are not limited to, those responsible for information literacy education.***

1. Teachers' varying conceptions of learning information literacy.
2. Teachers' varying conceptions of learning information literacy in specific contexts.
3. Teachers' varying conceptions of learning about specific phenomena which need to be understood in becoming information literate.
4. Teachers' varying conceptions of learning about vehicles through which information literacy is expressed, e.g. problem solving or decision making.

If successful in terms of continuing to advance knowledge and contributing to professional practice the relational approach to researching information literacy could be applied to the broader field of information needs and uses research.

Towards higher educators' conceptions of information literacy

In making differing relations or conceptions the object of research, I am following the path of phenomenography, which has been developed as a branch of educational research since the mid 1970s, and continuing the tradition of conducting educational research in the information domain. The studies into the phenomenon of learning, from which phenomenography grew,

were devised in response to a perceived lack of understanding of how learning appeared to people, in particular to students in higher education (Dahlgren 1984b, Marton and Saljo 1984, Saljo 1979). That problem is very similar to the problem of how information literacy is experienced by people, which I have chosen to investigate. Phenomenography's specialised interest in the variation in subject-world relations, the success with which the approach has been applied to problems within the educational domain, and the continuing international interest in and refinement of the research approach make it an ideal method to use in this study into varying experiences of information literacy.

To summarise, information literacy needs to be understood in terms of people's experience of this phenomenon rather as well as in terms of scholars' views. Such an investigation will contribute not only to our understanding of the phenomenon, but also to the teaching and learning of information literacy and to future information literacy research. For the reasons outlined above and in previous chapters, I have explored conceptions of information literacy amongst a group of information users who can be expected to influence the learning experiences of higher education students. The investigation of higher educators' conceptions of information literacy described in subsequent chapters also launches the research agenda described above. Its completion has provided an initial bench mark of understandings of information literacy which further research can confirm, refine and build upon.

The next chapter describes in detail the knowledge interest of phenomenography and the research methods it employs, in relation to my empirical investigation of the varying experience of information literacy amongst higher educators.