



COVER SHEET

Bruce, Christine (2004) Information Literacy as a Catalyst for Educational Change. A Background Paper . In Danaher, Patrick Alan, Eds. *Proceedings "Lifelong Learning: Whose responsibility and what is your contribution?"*, the 3rd International Lifelong Learning Conference, pages pp. 8-19, Yeppoon, Queensland.

Copyright 2004 (please consult author)

Accessed from <http://eprints.qut.edu.au>

Information Literacy as a Catalyst for Educational Change A Background Paper

Christine Susan Bruce, Queensland University of Technology

*Keynote address, for “Lifelong Learning: Whose responsibility and what is your contribution?”,
the 3rd International Lifelong Learning Conference, Yeppoon, 13-16 June, 2004.*

*Paper in proceedings reprinted from UNESCO Information Literacy Meeting of Experts paper
with permission.*

© Christine Bruce

The idea of information literacy, emerging with the advent of information technologies in the early 1970s, has grown, taken shape and strengthened to become recognized as the critical literacy for the twenty-first century. Sometimes interpreted as one of a number of literacies, information literacy (IL) is also described as the overarching literacy essential for twenty-first century living. Today, IL is inextricably associated with information practices and critical thinking in the information and communication technology (ICT) environment.

Information literacy is conceivably the foundation for learning in our contemporary environment of continuous technological change. As information and communication technologies develop rapidly, and the information environment becomes increasingly complex, educators are recognizing the needs for learners to engage with the information environment as part of their formal learning processes. IL is generally seen as pivotal to the pursuit of lifelong learning, and central to achieving both personal empowerment and economic development.

Information literacy is a natural extension of the concept of literacy in our information society, and information literacy education is the catalyst required to transform the information society of today into the learning society of tomorrow.

Across the world, educators in primary, secondary, tertiary and professional education contexts have been developing strategies and policies for designing learning opportunities that will enable learners to take advantage of the information and communication infrastructures available to them. Learning opportunities that enhance information literacy not only make use of information and communication infrastructures, but are designed to bring the information practices, that are effective in professional, civic and personal life into curriculum. Such opportunities make it possible for learners of all ages to experience the power of effective information practices. When reflection on learning to be information literate is added to the experience of information literacy, students are helped to recognize the transferability of the processes involved to every day life, community and workplace contexts.

In New Zealand a teacher reads non-fiction to children as narrative. As the children pose the questions that they anticipate may be answered in the text, and then reflect on whether their expectations are met, they learn to seek and evaluate information. (Moore and Page, 2002)

In Australia, undergraduate students keep diaries to reflect on their experience of learning to search the internet. They create web sites that organize information resources of use to a business of their choice; requiring access, evaluation and synthesis. (Edwards, 2000)

In Ghana, postgraduate research students learn, in the library, to critically evaluate and make effective use of information sources, including electronic databases and internet facilities. (Entsua-Mensah, 2001)

The above examples reveal the range of different approaches to teaching for information literacy that may occur at different stages in the educational process and in different nations. They also reveal something of the distinction between information literacy (IL) and information technology (IT) literacy. The concepts of IL and IT literacy are usually distinguished to demonstrate the difference between the intellectual capabilities involved in using information, and the capabilities required for using technologies that deliver or contain 'information'. This distinction is also made to convey the idea that provision of ICTs and associated training in the use of hardware and software, the focus of many government, corporate and educational programs, is only a starting point in achieving desired reforms. In practice, the information literacy agenda may be advanced as a consequence of new information technologies, or in the absence of an appropriate IT infrastructure. In the latter case, promoting the information literacy agenda may point towards the need for planned technological advancement in learning communities.

This paper will review key models and standards associated with information literacy in the educational sectors, and elaborate the role of information literacy education in transforming our information society into a learning society. The directions required in systems of education to achieve this will be discussed, and examples of current practice will be provided. Some key issues will also be highlighted.

Information literacy - the foundation for learning in our contemporary environment of continuous technological change

Before embarking on any discussion of information literacy education it is essential to briefly review the character of information literacy as it is presently being interpreted in educational settings. These models take the working definition of information literacy and tease out aspects of its meaning in a way that has proven to be useful to educators across the world.

As we enter the twenty first century, three models of information literacy, and two sets of standards have assumed particular importance in the educational sector. These are:

- Eisenberg and Berkowitz' Big6 information skills (Eisenberg and Berkowitz, 1990)
- Doyles' attributes of an information literate person (Doyle, 1992)
- Bruce's seven faces of information literacy (Bruce 1997)
- The information literacy standards for student learning (ALA and AECT, 1998)
- The ALA information literacy competency standards for higher education (ALA, 2000)

The information skills models developed in the 1980s provide a series of processes, or steps that students need to negotiate when information problem solving. Eisenberg and Berkowitz' (1990) Big6 steps are task definition, creating information seeking strategies, locating and accessing information, using information, synthesizing information and evaluating information. Information literacy in this model may be described as systematic information behaviour.

Learning to be information literate involves practicing the use of the system, or the steps, when engaged in learning tasks.

Doyles' (1992) attributes of the information literate person are the outcome of a Delphi study, in which a group of experts discussed and agreed upon characteristics associated with information literacy. In this model, the information literate person is one who recognises that accurate and complete information is the basis for intelligent decision making, recognises the need for information, formulates questions based on information needs, identifies potential sources of information, develops successful search strategies, accesses sources of information, evaluates information, organizes information, integrates new information into an existing body of knowledge, and uses information in critical thinking and problem solving (p.2). Learning to be information literate involves acquiring and demonstrating these attributes.

The relational model of information literacy (Bruce, 1997) was developed through researching the information experiences of professionals representing a range of disciplines. This model frames information literacy in terms of seven different ways of seeing and experiencing information use. Each of these reveals one of seven facets of the information literacy experience: information technology for retrieval and communication, information sources, information process, information control, knowledge construction, knowledge extension and wisdom. Many of these ways of seeing information literacy involve recognizing interdependency between groups and individuals in the information literacy experience. Learning to be information literate, in this model, involves becoming aware of different ways of experiencing information use through engaging in relevant information practices and reflection.

The ALA information literacy standards for schools (ALA and AECT, 1998) and higher education (ALA, 2000) were devised through extensive consultation between educators and information professionals. These standards comprise grouped lists of desirable learning outcomes and processes for individuals. The standards for schools are divided into three categories: information literacy, independent learning and social responsibility, with the standards reflecting the importance of information literacy to independent learning and social responsibility.

Models and standards such as these are used for communicating the character of information literacy, for curriculum design and evaluation, for staff development, and for assessing students. Taken together, they reveal the richness of the information literacy experience as it is understood by educators that have been working with the concept. Information literacy, from these descriptions is clearly part of the fabric of learning, and, if students are to learn to learn from the resources available in information rich environments, must be woven into the learning experience. In recognition of this imperative, localized models of information literacy are created to meet the needs of specific educational contexts around the world.

In the UK, SCONUL (1999) developed an information skills model depicting library and IT skills as fundamental building blocks. Together with seven 'headline' information skills these assist the development of information literacy.

In Singapore, the Ministry of Education (1997) published Information Literacy Guidelines, which are described as the framework for a course on learning how to learn. The guidelines include an instruction program, assessment and evaluation, and pupil performance standards.

The New Zealand school curriculum framework includes information skills as one of the eight groupings of essential skills that must be developed by all students. (New Zealand, 1993)

Key issue 1: are the models and standards presently available suitable for promotion globally. How might different cultural and national interests be reflected?

Key issue 2: While many aspects of an information literacy curriculum may be taught without state of the art information technology, how can we determine what levels of IT infrastructure are appropriate for the most effective implementation of information literacy education?

Information literacy education - the catalyst required to transform the information society of today into the learning society of tomorrow.

While many of today's educators are concerned about creating learning activities that require engagement with today's ICT environment, it is attention to information practices that are fundamental to effective information use. It is bringing these information practices into the curriculum, and ensuring that students have the capabilities to engage in, and reflect upon such practices, that constitutes information literacy education. Information practices may vary somewhat across disciplines, but they clearly underpin academic and professional practices in, for example, the humanities, science, social science, health sciences and technology based disciplines, as well as underpinning informed civic responsibility.

Advocates for information literacy are often concerned about the need to promote the impact of information literacy on academic achievement.

Ross Todd (1995) identified that, in Australian schools, students with information literacy capability scored better on assessment criteria and in exams.

Louise Limberg (1998) discovered that, in Swedish schools, students who approached information seeking and use in more sophisticated ways, also achieved more sophisticated learning outcomes; these were associated with understanding and interpretation, not reproduction.

The significance of information literacy education lies in its potential to encourage deep, rather than surface learning, and in its potential to transform dependent learners into independent, self-directed, lifelong learners. Without information literacy people are condemned to lack of information, dependence upon others for access to knowledge and information, and even to acute levels of information anxiety (Wurman, 2001). Making information and information technologies available to the world is not enough. Our education systems need to ensure that today's learners are empowered to learn and to take their place in the learning society.

South Africa's legacy of authoritarianism and rote learning has severely undermined and depressed our citizenry, so the challenge to provide quality education within a framework of lifelong learning looms large. In keeping with this challenge, information literacy has come to feature prominently on the agendas of those concerned with educational transformation. (Cathy-Mae Karelse, 2000)

In Singapore, the Government realizes that these (information) skills are important for the longevity of the ...economy. However, to move from a traditional ... learning environment to one where school children work in project-based collaborative environments, supported by appropriate technological platforms, as well as electronic and paper-based sources of information is a major challenge for any educational system, including Singapore's. (Hewworth, 2000)

Patricia Breivik (1998) captured the essence of the changes required to educational systems in order to realize the potential of information literacy education for lifelong learning. Her argument centers around the need to move away from the dominant paradigm of prepackaging information for students in the form of textbooks, lectures and even artificially constrained multimedia resources, to facilitating active learning using real world information resources. Such learning processes, she concludes, would necessarily involve the information processes, practices and experiences described as information literacy:

The effects of prepackaging of information are most obvious in the school and academic settings. Students, for example, receive predigested information from lectures and textbooks, and little in their environment fosters active thinking or problem solving. What problem solving does occur is (often) within artificially constructed and limited information environments... Such exercises bear little resemblance to problem solving in the real world where multiple solutions of varying degrees of usefulness must be pieced together – often from many disciplines and from multiple information sources such as online databases, videotapes, government documents, and journals. Education needs a new model of learning – learning that is based on the information resources of the real world and learning that is active and integrated, not passive and fragmented. ...What is called for is not a new information studies curriculum, but a restructuring of the learning process. Textbooks, workbooks and lectures must yield to a learning process based on information resources available for learning and problem solving throughout people's lifetimes. (Breivik, 1998, pp.127, 128)

While curriculum practices involving active, collaborative, resource-based learning are often pointed to as the ideal, they are still innovative practices. Furthermore, while effective information use arguably underpins enquiry learning, problem based learning, action learning and various other student centred modes, an effective information literacy education requires explicit attention to information processes; as well as the careful crafting of real world information practices, and meaningful reflection, into curricula.

Such an information literacy education supports all of Delors' (1996) four pillars, the proposed foundations for education in the twenty-first century. The use of real world learning resources supports *learning to live together*, effectively bringing the world into the classroom, or perhaps taking the classroom out into the world; and the use of ICTs has the potential to link students to the rich histories, cultures and traditions of the world in a way previously out of reach. Using information to learn is also essential to *learning to know*, as learners seek out knowledge from the exploding range of resources available to them and develop a critical appreciation of the relative value of those resources. Bringing the information practices of the real world into the curriculum supports *learning to do*, as learning experiences are designed to introduce learners to the kinds of information practices that will support professional and civic and personal life. And, finally, the emphasis on critical and creative thinking, communication, team-work and wisdom that are integral to an information literacy education support the fourth pillar: *learning to be*.

Schools, colleges, universities and community information places all over the world need to pursue the pathways of information literacy education, in order to support, and bring to maturity, the embryonic educational systems that are emerging in response to the lifelong learning vision.

Key issue 3: What is required to bring about a transformation of learning processes?

Key issue 4: What is the role of different educational sectors and different groups within the sectors?

Information literacy education –constructing best practice

The idea of information literacy education and its transformational potential is not new. Information literacy education and associated issues have been discussed extensively since the late 1980s, and many programs have emerged at all educational levels. (Breivik, 1998; Bruce and Candy, 2000; Farmer and Mech, 1992; Henri and Bonnano, 1999; Spitzer, Eisenberg, and Lowe, 1998). There is a widespread base of research and practice on which to base an informed approach to furthering the agenda.

In this section selected experiences are captured to reveal important elements of forwarding the information literacy agenda. Best practice is interpreted as those approaches which 1) interpret information literacy as integral to the learning process (Case 1), 2) bring learner centred, experiential and reflective approaches to the information literacy education process (Cases 2&3), 3) bring collaborative approaches to program implementation (Case 4) and 4) establish partnerships within and between organizations (Case 4&5).

Case 1: The impact of the information seeking and use process on learning outcomes (Limberg, 1998)

The inextricable link between information literacy and learning is clearly revealed in Louise Limberg's analysis, in Sweden, of school students seeking to understand the possible impact, for Sweden, of becoming a member of the European Union (EU). Louise's study shows that different ways of experiencing the information seeking and use process may have a significant impact on the outcomes of learning. The investigation also reveals the importance of taking a holistic approach to teaching and learning information literacy.

Within the group of students participating in the investigation, three different ways of experiencing information seeking and use were identified. For some, information seeking was experienced as fact-finding, or finding the right answer. These students wanted information that was easy to access, and disregarded what they considered to be biased information because of lack of facts. This approach to information seeking and use was associated with impoverished learning outcomes. The students acquired a fragmentary knowledge of the European Union and were unable to assess consequences of EU membership due, from their perspective, to lack of facts.

Others experienced information seeking and use as balancing information in order to choose. These learners interpreted the information process as involving finding sufficient information to allow them to form a personal standpoint on a controversial issue, that of Swedish membership

of the EU. Students experiencing information use this way still sought answers to questions and found it difficult to manage subjective views on the issue. They did, however, achieve an understanding of the character of the EU and were able to put forward advantages and disadvantages associated with membership, primarily associated with economic cooperation

Students adopting a third approach to information seeking and use, experienced the process as scrutinizing and analyzing. These students sought to understand through critically analysing and evaluating information sources; they sought to identify the underlying values and motives in the discourse they were interpreting. These students were able to critically assess the issues associated with membership of the EU and considered political and moral, as well as economic issues.

Case 2: Helping Learners Navigate the Digital Environment (Fitzgerald and Galloway, 2001).

Fitzgerald and Galloway (2001) provide important insights into learners' conceptual maps of the digital information terrain. They observed ten high school students using the online environment as they pursued a teachers' assigned task, and ten university students working on a research project. Their findings reveal the need for teachers and learners to work together to understand each others' ways of seeing the information landscape, both digital and non-digital, formal and informal, as well as other elements of information use.

It is clear from investigations like this, that as students engage with information use, they acquire particular ways of seeing, some of which may be more powerful, or more appropriate, than others. Teachers can design learning strategies which reveal these ways of seeing, and facilitate the acquisition of those which are more helpful to the context.

The students participating in this project were using the internet, and, in particular a virtual library named GALILEO which serves academic, public and K-12 clients. Many of these students had not conceptualised the boundary separating GALILEO from the internet, and had difficulty differentiating GALILEO from other internet services. They also did not always distinguish clearly between GALILEO and the local public access catalogue. When the availability of online and CD-ROM databases are added to this picture it is easy to see how conceptual confusion might hinder the information use experience. While we might infer that a seamless internet experience is what users seek and expect, the online environment is structured in ways that need to be understood.

Students also had difficulty with creating conceptual maps of the disciplines available to them. Many information sources, including print and online tools, belong to a discipline domain. Students observed in this project were often unable to determine what discipline an area of study would fall into and therefore were unable to select, for example, appropriate online databases. While some models of the terrain suitable for more sophisticated users are emerging (see for eg Chau, 1997), there remains the need for simple models suitable for neophyte and younger users.

Case 3: A reflective model for learning to search the internet (Edwards and Bruce, 2000)

The reflective model for learning to search the internet (see Figure One) was developed by bringing together the needs of two groups of learners: first year undergraduate students and South African female academics with limited access to technology and associated expertise.

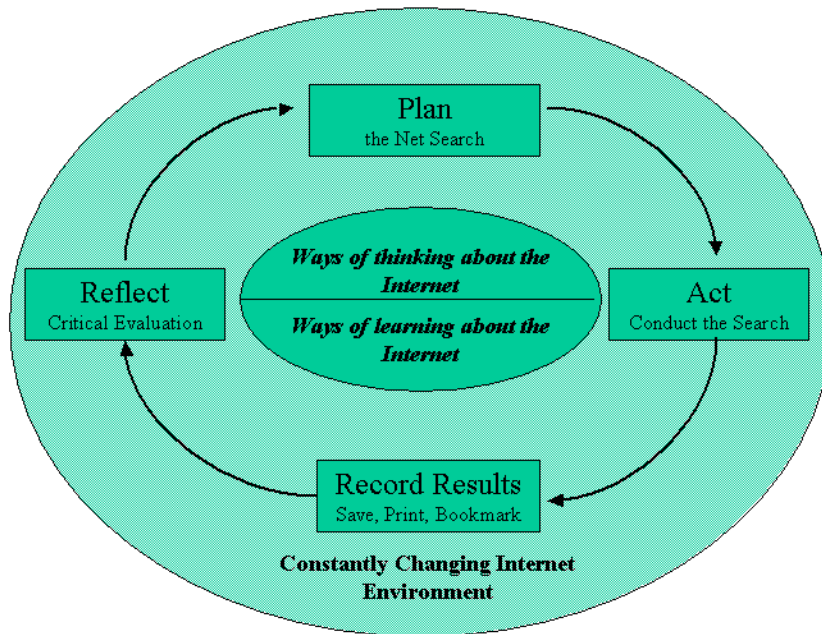


Figure One: Reflective Model for Learning to Search the Internet
(Edwards and Bruce, 2000)

While focusing on a single aspect of the information literacy experience, this model reflects the view that it is not technical skills that make effective Internet users, but rather the reflective and conceptual capabilities that are part of the character of the information literate. It steps away from the skills-based approach to teaching and learning the Internet which, the authors argue, lacks power because of the changing nature of both the technology and Internet content. It emphasises reflective competence, and the ability to continue to learn in the face of change, establishing capabilities that are intended to empower learners to move forward into an unknown future.

The model appears suitable for use with neophytes of all age groups as well as with more experienced information and technology users. It appropriates and structures processes that are relatively timeless, and reflect closely people's natural ways of working.

Case 4: The Australian Catholic University's Information Literacy Academic Development Program (Bruce, Chesterton and Grimison, 2002)

In 1999, Australian Catholic University (ACU) embarked upon a long term program, targeting the incorporation of information literacy education across its' curriculum. The program was developed at a time when major online learning initiatives and associated technological

infrastructures were also being established. The ACU program is founded on principles that apply equally to schools as to universities. First, that teachers need to own curriculum innovations and to be involved in developing strategies relevant to their contexts, and second that leaders and managers are key stakeholders, who themselves need development opportunities in order to assist in leading desired reforms.

The ACU initiative, which is ongoing, developed policy and implemented a staff development program targeting senior management, as well as other academics, information specialists and learning support staff. This program differed from previous Australian information literacy initiatives in that the project team worked over a period of two years, both horizontally and vertically across the university structure. The staff development program targeted senior staff meetings, initiated one-to-one discussions with deans and pro-vice chancellors, and implemented a workshop program that strengthened existing curriculum strategies and facilitated the development of new ideas across all campuses and disciplines. The program was jointly managed by the Chair of the Information Literacy Working Party and the Academic Staff Development Coordinator, on behalf of the Academic Board.

The workshop component of the program aimed to introduce, strengthen and enhance information literacy as a focus for academics and learning support staff, by initiating a process of reflection and action on the nature of information literacy and implications for curriculum design. Its intention was to facilitate a transfer of the awareness raising experienced by staff into students' learning experiences. Day long workshops were facilitated on all campuses of the university where staff engaged in the following processes:

- making explicit their own views of information literacy and information literacy education;
- exploring and becoming familiar with three models of information literacy;
- adapting existing models to their discipline contexts;
- considering the impact of existing practice and future possibilities;
- examining examples of how learning tasks/assignments can be shaped to foster information literate practice;
- suggesting barriers to, and support necessary for implementing information literacy education;
- Developing specific learning strategies to include information literacy processes and outcomes.

An important intention of the workshops was to help staff see aspects of what they were already doing in terms of information literacy, and to make that explicit in learning objectives, assignments, and assessment criteria. Overall, the workshops sought to bring information practices into focus for participants. They were encouraged to reflect on their own information experiences, their own understandings of information literacy and those of students. They also were offered the opportunity of working with information specialists to construct models of information literacy useful to their own context, and to modify or design new learning experiences that would require students to focus and reflect on their own information practices.

Case 5: INFOLIT – a regional approach to promoting information literacy education (Karelse, 2000; Sayed, 1998)

The INFOLIT program was developed and implemented in 1995, for an initial period of five years, by a consortium of five higher education institutions in the Western Cape Region of South Africa. The program had a wide brief, aiming to promote information literacy in primary and secondary schools, universities and the wider community using techniques based on pilot studies and needs assessments. It targeted the development of learning communities in the region through the promotion of cross-institutional and trans-disciplinary collaboration.

The INFOLIT program, in its early stages concerned itself with the development of partnerships between information specialists and educators, professional development opportunities for information specialists, the integration or embedding of information literacy in curriculum and the possibilities of inter and intra institutional collaboration. A key part of this program was an investigation of capacities contributing to information literacy across students in the region. Sayed (1998) measured six indicators of students' capabilities: confidence, reading and writing ability, computer confidence, library usage, information needs and independent learning.

Karelse's (2000) conclusions from several years involvement with INFOLIT capture some of the significant challenges for promoting the information literacy agenda:

In order for the new information infrastructure to aid development by the people, for the people and of the people, it seems imperative that people's capacities are developed to ensure that they can participate in shaping the development of the global information society. The ways in which curricula are developed in response to this need, and the ways in which educational systems are designed to address the problems of access, equity and redress are central to this challenge. Most importantly, the extent to which academics who wield tremendous power within the system are able to shift their mindset from a notion of 'having to teach their students everything' will determine how productively the opportunities presented by the formulation of a lifelong learning framework are created. The extent to which academics are prepared to become more reflective and self-conscious of their own ongoing learning will influence their ability to engage with students more interactively to create open spaces into which students can bring their own experiences to create quality learning.

Keys to implementing information literacy education

Thus far we have reviewed the role of information literacy as a catalyst for educational change. This paper has argued that information literacy education has the power to transform the learning process into one that will empower learners, and give them the capacity to engage in self-directed lifelong learning outside the walls of the formal educational process. Information literacy education involves bringing real life experiences of information use into the classroom, and creating opportunities for critical reflection on the learning process, to foster an awareness in learners of what they have learned.

What is required to make information literacy education a key feature of curriculum in all sectors? While global interest in self-directed lifelong learning has already emerged as a strong trend and information literacy programs have developed in many places, these are still considered innovations. Experience of those leading these developments suggests that there are a number of keys to facilitating the adoption of information literacy education.

Cultural change, change in educational values

The adoption of information literacy education as we have discussed it in this paper is most likely to take root in contexts where there is simultaneous emphasis on what we know to be educational best practice. Broad shifts that are commonly advocated involve movement from a content orientation to a process orientation to teaching, shifts from a teacher-centred to a learner-centred view of learning, and an increased emphasis on understanding the perceptual worlds of students and their pedagogical implications. Such shifts both aid, and can be aided by, guided movement towards information literacy education. It is generally the case that teachers who value the new paradigms find it much easier to embrace information literacy education. Clearly changes in educational cultures cannot be mandated; a valuing of information literacy and student-centred approaches to teaching and learning can be facilitated by changes to policy, staff development and curriculum as discussed below.

Establishing policy and guidelines

International, national and institutional guidelines and policies can direct and support the adoption of information literacy education. Internationally and nationally, of fundamental importance are policies and guidelines regarding basic levels of information technology infrastructure, and the need for an information literacy education program in schools. Guidelines and policies for teacher education, and the establishment of information literacy programs, also should be dealt with at this level. National policies and guidelines targeting information literacy education and associated infrastructure in the wider community can only support such an emphasis on the educational system. Finally, and of considerable significance, are policy and guidelines regarding the role of the information specialist in the learning environment. In schools in particular, the role of the teacher-librarian has been shown to be very important for building information literacy into curriculum; and the education and placement of such personnel must be endorsed in both developed and underdeveloped regions.

A society's ability to develop is determined by its ability to access information, so that information and information technologies are no longer a luxury...but a basic human right (African Women, 1998).

At all levels the IL initiative can only be strengthened, by promoting it as a vehicle for enhancing critical enquiry and self directed learning, and as a foundational element of a broader focus on lifelong learning. Attention to information literacy should clearly be rewarded through funding and grant schemes.

At the institutional level, policies need to support information literacy education in order to support or facilitate a flow into staff development and curriculum initiatives. Once the connection with the idea of information literacy has been made, many institutions have developed their own statements about information literacy and its' purposes in order to reflect the institutional context. It is critical that institutions promote an integration of information literacy with the underlying values and philosophies of the educational institution. This may relate to association with industry and the economy, to the individual in seeking professional currency and renewal, to the empowering features of information literacy in community and personal contexts, to social justice issues, or to the spiritual and ethical dimensions of information literacy.

Teacher Education- Staff Development

Professional education and staff development programs for teachers and information specialists need to model and invite scholarly engagement with the idea of information literacy education. To help bridge the gap between policy and practice they need to reflect the changes to educational culture associated with promoting lifelong learning. It is important that such programs communicate with teachers, information specialists and managers about the character of information literacy, and draw upon their own life experiences to help them understand the importance of information literacy to learner development. Some of the most important hurdles in such programs are 1) the hurdle of understanding that information literacy is not a pre-requisite to learning, we are not talking about a program of remediation, but rather about actualizing a way of learning; 2) the hurdle of modifying, changing or constructing new designs for learning experiences; 3) the hurdle of changing how much we expect students to learn; in a process approach content is no longer paramount, but rather the ability to learn; 4) the hurdle of technology; learning to use technology and learning to use technology to support learning. The role of education for teachers, information specialists and managers, not only in schools but also in the tertiary sector, is critical to global information literacy education initiatives.

National and international collaboration in the development of model programs will clearly lead development in this area. Aspects of learning may be electronically showcased, making readily available portfolios of strategies.

Partnerships between key personnel

Information literacy education is not possible without partnerships. Students, information specialists, curriculum designers, community organizations, teachers, amongst others, all need an awareness of the value of information literacy, and all need to collaborate to make possible learning experiences that facilitate information literacy. We should also note that no single group, in a broad context, nor individuals in a local context, neither governments, nor schools, nor universities, nor teachers, can carry responsibility for information literacy amongst students. This responsibility must be shared within strategic partnerships operating at various levels, including curriculum design, policy development, staff development, research and classroom teaching; and be supported by educational leaders such as principals and deans.

Mexican companies... are in search of graduates with appropriate skills to survive in the more competitive local markets that are now part of the local economy...At the University of Juarez, Mexico, the partnership between faculties and libraries sets the basis for the education of future graduates who will have the information skills required for lifelong learning and for a productive professional career. (Lau, 2001)

The most fundamental of these partnerships at all levels of education, from primary schools to doctoral studies, is the collaborative relationship between the teachers, information specialists and students. The partnerships that are slowly transforming student learning in evolving information literacy programs all over the world seem to be based on changing views of the world from both librarian and teacher perspectives. Librarians are beginning to recognise the need to move away from a library and information retrieval centred view of information literacy towards a broader understanding of the role of information literacy and the information

professional in fostering student learning. From a teacher perspective, there is a developing recognition of the importance of the world of information and information literacy to student learning. The critical role of the teacher-librarian and media specialist as established through Information Power, US based guidelines for information literacy education in schools has proven to be an important element of successful programs. It is also clear that educational teams need access to IT expertise as well as familiarity with learning theory and broader curriculum issues.

All five of the areas of partnership: curriculum design, policy development, staff development, research and classroom teaching are required to bring about change. The opportunity is available to systemically capture these elements, and to develop the synergies between them, as one of the fundamental keys to creating teaching-learning experiences that promote self-directed and critical lifelong learning (Bruce, 2001).

Critical components of an information literacy program

In any educational sector, there are four critical components of an information literacy program:

1. Resources to facilitate the learning of specific skills, eg web based information skills enhancement packages and other point of need, or self paced instruction.
2. Curriculum that provides the opportunity to learn specific skills, either early in a course or at point of need, (from self-paced packages, peers, lecturers, librarians) [integrated].
3. Curriculum that requires engagement in learning activities that require ongoing interaction with the information environment [embedded].
4. Curriculum that provides opportunities for reflection and documentation of learning about effective information practices [embedded].

The first of these represents the resource base that supports learning skills undepinning information literacy, the second represents curriculum integration, and the latter two represent what is better described as 'embedded' information literacy education. In all sectors, curriculum development, including course approval and review processes, maybe used to monitor the inclusion of information literacy in curriculum.

Operating alongside this model of information literacy education, are three critical elements of learning to be information literate:

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

Successful information literacy programs do not only focus on teaching information skills, they focus on designing learning experiences that require the use of information skills.

Dr Sigrun Hannesdottir, (1999) Director of the Nordic Council for Scientific Information writes: It can be argued that the training of future citizens to handle information should start in primary schools. There is no other institution that is in a better position to provide citizens with the information skills and literacy that they need than the library of a school which forms a part of compulsory education.

The vision of the information literate school community is that skills for searching for information and handling of data will be integrated with the subject teaching. Children of the future should learn how to deal with information at the same time as they learn their subjects. That is the only way we can prepare them for an uncertain future."

References

- African Women and Economic Development Conference (1998). *ICT's as a tool of democratization*. (Online) <http://www.un.org/Depts/eca/eca40th/ict1.html>
- American Library Association and AECT (1998). *Information Power: Guidelines for School library media programs*. Chicago: ALA and AECT.
- American Library Association (2000). (online) *Information Literacy Competency Standards for Higher Education*. <http://www.ala.org/acrl/ilstandardlo.html>
- Breivik, P.S. (1998). *Student Learning in the Information Age*. American Council on Education. Series on Higher Education. Phoenix, Arizona: ORYX Press.
- Bruce, C. S. (1997). *Seven Faces of Information Literacy*, AULSIB Press, Adelaide.
- Bruce, C.S. (2001). Faculty librarian partnerships in Australian higher education: critical dimensions, *Reference Services Review*, 29(2): 2001.
- Bruce, C. and Candy, P. (Eds.) (2000). *Information Literacy Around the World*. Wagga Wagga, Australia: Centre for Information Studies Charles Sturt University.
- Bruce, C, Chesterton, P. and Grimison, C. (2002) .Manuscript. Constituting Collective Consciousness: Information Literacy in the University Curriculum. *International Journal of Academic Development*
- Chau, M. (1997). Finding order in a chaotic world: A model for organised research using the world wide-web, in L. Martin (Ed.) *The Challenge of Internet Literacy*. Haworth Press, New York.
- Delors, J. (Chair) (1996). *Learning: the Treasure Within*. Report to UNESCO of the International Commission on Education for the Twenty-first Century. Paris:Unesco.
- Doyle, C. (1992). *Outcome measure for information literacy within the National Educational Goals of 1990. Final report to the National Forum on Information Literacy*. Flagstaff:AZ, NFIL.
- Edwards, Sylvia and Bruce C. (2000). Reflective internet searching: an action research model, in Ortrun Zuber-Skerrit (Ed) *Action Learning, Action Research and Process Management: Theory, Practice, Praxis*, Action Research Unit: Griffith University, 5th World Congress of Action Learning, Action Research and Process Management, University of Ballarat, Victoria, September, pp. 141-152.
- Edwards, S. L. (2000). You Have Provided Me With A New Set Of Tools And Taught Me How To Use Them: Embedding Generic Skills within the IT Curriculum. In K. Appleton, C. Macpherson, & D. Orr (Eds) *Lifelong Learning Conference: Selected Papers from the Inaugural International Lifelong Learning Conference, 17-19 July 2000*. Lifelong Learning Conference Committee, Central Qld University, Rockhampton, Australia, pp. 95-101.
- Eisenberg, M. B and Berkowitz, R. E. (1990). *Information Problem Solving: the Big Six Approach to Library and Information Skills Instruction*. Norwood, NJ, Ablex.
- Entsua-Mensah, C.(2001). User education and information literacy for lifelong education in Ghana: reaching through to the people, *Education Libraries Journal*, 44(2): 19-24.

- Farmer, D.W. and Mech, T.F. (Eds.)(1992). *Information literacy: Developing Students as Independent Learners*. New Directions for Higher Education No. 78. San Francisco: Jossey Bass.
- Fitzgerald, M. and Galloway, C. (2001). Helping students use digital libraries effectively, *Teacher Librarian*, 29(1): 8-14
- Hannesdottir, S. K. (1999) School libraries: Visions and possibilities, in J. Henri and K. Bonnano, *The Information Literate School Community: Best Practice*, Centre for Information Studies, Charles Sturt University, Wagga Wagga.
- Henri, J. and Bonnano, K. (Eds)(1999). *The Information Literate School Community: Best Practice*, Centre for Information Studies, Charles Sturt University, Wagga Wagga.
- Hepworth, M. (2000). Developing information literacy programs in Singapore, in C. Bruce and P.Candy (Eds). *Information Literacy Around the World*, Wagga Wagga, Australia: Centre for Information Studies Charles Sturt University.
- Lau, J. (2001). Faculty-librarian collaboration: a Mexican experience, *Reference Services Review*, 29(2) 95-105.
- Limberg, L. (1998). *Att Söka information för att lära*, Valfrid, Borås
- Ministry of Education. Singapore (1997). *Information Literacy Guidelines*. Curriculum Planning and Development Division. The Ministry.
- New Zealand National Curriculum Framework: Te anga marautanga o Aotearoa*. (1993). Wellington, Ministry of Education.
- Moore, P. A. & Page, N. (2002). Cognitive apprenticeships in education for information literacy. Paper to be presented at the IFLA 5th World Conference on Continuing Professional Education for the Library and Information Professions. 14-16 August, The Robert Gordon University, Aberdeen, Scotland.
- Sayed, Y. (1998). *The Segregated Information Highway: Information literacy in higher education*. University of Capetown Press and Admanstor Trust: Cape Town.
- SCONUL (Standing Conference of National and University Libraries)(1999). SCONUL Briefing paper. Information Skills in Higher Education. SCONUL.
- Spitzer, K., Eisenberg, M., and Lowe, C. (1998). *Information Literacy. Essential skills for the information age*. Syracuse University, New York: ERIC Clearinghouse on information and technology.
- Todd, R. (1995). Integrated information skills instruction; does it make a difference? *School Library Media Quarterly*, 23(2): 133-139.
- Wurman, R.S. et al (2001). *Information Anxiety 2*. Indianapolis, Ind:Que.

Acknowledgements Many thanks are due to Patricia Breivik and Woody Horton for the opportunity to write this paper. I am also indebted to colleagues for their reactions and insightful comments offered – Sylvia Edwards, Mandy Lupton, Mark Hepworth, Bill Johnston and Sheila Weber, Penny Moore, Judy Peacock, Helmut Klaus; and to many others for their ongoing conversation over the years, in particular Philip Candy, Ross Todd, Ference Marton, and Ortrun Zuber Skerritt.