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Literature review

Information Literacy for the Information Age

CONTENTS

Synopsis

In this literature review we explore the theories of information literacy and the contemporary international developments in information literacy research and practice. We analyse information literacy definition and its key concepts. We consider the changes of the information literate society and the new roles for teachers, learners and for librarians that become teachers-librarians. The learning theory, the learning styles and the theory of multiple intelligences are the framework to understand the needs of the learners.

Context

The Information Age

"No other change in our society has offered greater challenges than the emergence of the Information Age. Information is expanding at an unprecedented rate, and enormously rapid strides are being made in the technology for storing, organizing, and accessing the ever growing tidal wave of information." (ALA, 1989)

The combined effect of these factors is an increasingly fragmented information base-large components of which are only available to people with money and/or acceptable institutional affiliations. Yet in an information society all people should have the right to information which can enhance their lives. Out of the super-abundance of available information, people need to be able to obtain specific information to meet a wide range of personal and business needs. These needs are largely driven either by the desire for personal growth and advancement or by the rapidly changing social, political, and economic environments of our society. What is true today is often outdated tomorrow. A good job today may be obsolete next year. To promote economic independence and quality of existence, there is a lifelong need for being informed and up-to-date.

Lifelong learning

"...the deliberate and intentional efforts of learners themselves, consciously planned, self-managed, and generally in proportion to their motivation, their ability and the opportunities available to them ... [that is] deliberate self-directed learning" - Candy, P.C. et al. 1994. *Developing Lifelong Learners Through Undergraduate Education*

Beyond the basic skills of reading, writing, and arithmetic, the citizen/worker of the twenty-first century needs complex analytical skills. The technological tools of the Information Age, computer networks, telecommunications systems, and databases, have put an unprecedented volume of information at our fingertips. Yet how aware are we of what is available, when to use it, and how to find out about it? The need to handle and use information is present in all stages of life and the acquisition of the competencies of information literacy must be intertwined with the acquisition of the other literacies. (Darch et al. 1997).

Education system

Education systems and institutions must take seriously the challenges of the Information Age. This includes restructuring the learning process to reflect the use of information in the real world, changing the role of the teacher from presenter of prefabricated facts to facilitator of active learning, and including the library specialist as a collaborator in curriculum planning for effective use of information resources.

Information Literacy

Definitions

The emphasis on literacy and on strategies necessary for creating literate communities permeates the research literature related to all types of libraries (Lingren, 1981). In fact, "information literacy" has become the buzzword for the '90s; and it is the library's acceptance of this "fundamental responsibility" to provide "the largest possible number of individuals access to and delivery of the largest possible amount of information" (Ghikas, 1989) that drives user education initiatives in public, academic, and school libraries. In a very real sense, these initiatives represent an instructional continuum that, ideally, begins before children enter school, is reinforced through their years of formal education, and continues throughout their adult lives. Liesener (1985) underscores the importance of providing instruction in critical thinking and problem solving "throughout the learner's school experience", because "the cumulative effect of many of these kinds of experiences is what leads to the development of a self-direct learner able and motivated for life-long learning". Of interest in this regard is a study by Nofsinger (1989), which found that one-third of the academic libraries that participated in her survey provided "user education" for high school juniors and seniors.

In the literature of librarianship and education, information literacy has been variously defined. Zurkowski (1974), for example, defined information literacy as:

"the ability to use techniques and skills for the wide range of information tools as well as primary sources in molding information-solution to … problems" (quoted in Eisenberg and Spitzer, 1991).

According to the American Library Association's (ALA) Presidential Committee on Information Literacy, a literate person is one who can:

"recognize when information is needed", has "the ability to locate, evaluate, and use [it] effectively", and has "learned how to learn" (Breivik and Senn, 1994).

The National Commission on Excellence in Education (NCEE) explains literacy as "the skills required for new careers and citizenship", and "life-long learning" (Baumbach, 1986). Drawing on a model created by Christina Doyle (1994), the California Media and Library Educator's Association (CMLEA) recently characterized information literacy as

"the ability to access, evaluate, and use information from a variety of sources",

while Breivik and Senn (1994) discuss information literacy as the **"ability to acquire and evaluate whatever information is needed at any given moment**".

Kirk, Poston-Anderson, and Yerbury (1990, cited in Todd, 1995) have described information literacy holistically, in terms of seven skill areas:
- defining the tasks for which information is needed
- locating appropriate sources of information to meet needs
- selecting and recording relevant information from sources
- understanding and appreciating information from several sources
- combining and organizing the information effectively for best application

- presenting the information learned in an appropriate way
- evaluating the outcomes in terms of tasks requirements and increases in knowledge.

Together these definitions suggest that information-literate individuals are capable of finding and accessing relevant information in appropriate formats and quantities, of reviewing alternatives critically, and of using the information selectively to meet the challenges of contemporary life.

What changes in an information literate society

Teacher new role

Because becoming information literate is an active process, requiring the seeking out of knowledge from multiple sources rather than passively receiving and repeating back facts, the teacher's role must evolve from the giver of knowledge into being more of a coach or guide (Wisconsin Educational Media Association 1993). Teachers, professors, teaching assistants, librarians, administrators, and the community must collaborate to develop ways to involve the students not only in using classroom materials but also in using resources from the broader community and the mass media.

Teachers must be prepared to **"teach students to become critical thinkers, intellectually curious observers, creators, and users of information"** (Lenox 1993). The goal is to prepare students early on to "learn how to learn" and carry these skills into other areas of their lives so that they can be independent seekers and consumers of information throughout their lives. Teachers of all subjects must blend their traditional fact-based approach with an emphasis on learner-based inquiry and the scientific inquiry process (Lenox 1993).

This means shifting some of the responsibility of gaining knowledge from the teacher to the student and allowing students to develop questions, strategies to search for answers, and formulate conclusions. It also means having fewer lectures and replacing them with applied strategies for information literacy (Commission on Higher Education, 1995).

Concurrently, educators and researchers must grapple with defining the standards and competencies associated with information literacy, develop effective new ways to engage learners and measure the outcome and impact of such learning.

Learners new role

Some of our learning occurs in formal settings where what we learn is packaged and prepared for us. But much learning also occurs in non formal settings, and, informally as well. Information literacy is crucial in all three types of learning situations.

Becoming information literate will involve a drastic change from the way many students are accustomed to learning. First of all, it requires students to be more self-directed in their learning. This kind of independent, active learning prepares students for real-life problem solving (Breivik and Gee 1989). Also, in becoming information literate, students will assume more responsibility for their own learning either individually or in work groups. As students become more competent with their use of information resource options, they become aware of their individual styles of learning and preferred ways of assimilating knowledge (Bleakley and Carrigan 1994).

One successful method for developing information literacy skills is through resource-based learning which involves having students assume more responsibility for locating the very materials from which to learn. This approach develops lifelong learning skills because students are learning from the same sources which they will come to use in their daily lives such as books, newspapers,

televisions, databases, government documents, subject matter experts, and others (ALA 1989). Moreover, resource-based learning provides an added advantage (i.e., it allows students to choose materials that match their academic levels and preferred learning styles thus individualizing the learning process for the individual student).

Curriculum integration

In order to produce learners who are information literate, schools will need to integrate information literacy skills across the curriculum in all subject areas beginning in the earliest grades. Educational institutions that wish to produce lifelong learners should be engaged in some fairly basic rethinking of how teaching faculty and information specialists such as librarians and media specialists can work together toward this end (Brittingham 1994). For example, the principal, as instructional leader, fosters resource-based learning by providing adequate planning time and budget support. As instructional partners, the classroom teacher and library media specialist will be actively involved in identifying the learning needs of the students, developing teaching units that facilitate activities which offer meaningful practice in using a variety of information resources, and guiding student progress (Wisconsin Educational Media Association 1993).

Based on a recent study, the following factors seemed to result in successful integration of information skills into the academic curriculum:

the institution has a strong commitment to excellent educational outcomes for the students in the areas of critical thinking, problem solving, and information skills; library administrators have long-term commitments to integrate library instruction into the curriculum; and faculty and librarians work together in curriculum development (Rader 1995).

Replacing discrete curricular areas with problem-based learning inevitably involves reordering instructional roles and relationships as well as restructuring assessment strategies (Bleakley and Carrigan 1994).

Citizenship

Individuals' quality of life to a large extent depends upon the ability of citizens to be what Breivik and Gee (1989) call **"discerning information consumers."**

Indeed, information technology appears to be broadening the gap between the haves and the have not. For example, minority and at-risk students, illiterate adults, and the economically disadvantaged are least likely to be able to access the kind of information that might lead to improvements in their lives (ALA 1987). Breivik and Gee caution that commercialisation of information, control of information resources and new information technology could widen the gap between the haves and the have not. This impending disparity can be headed off if access to information technology is provided and if competency with the information it provides is taught early in life.

The role of the Library

Libraries have centrally positioned themselves in defining and implementing information literacy programs. There are very good reasons for this: for one thing, libraries are intimately concerned with information, however that may be defined. They acquire, describe and make available information in a variety of formats, including print, video, audio, and electronic. Libraries have also

traditionally provided a place for quiet contemplation and scholarly pursuits as well as instruction in research methods. Generally, the library is a university's primary access point to information. Librarians led the way in the early 1970s in conceptualising the idea of information literacy and its relationship to lifelong learning. Early development of the concept of information literacy frequently focused on the future role of libraries and librarians in helping with the use and application of information (Beherens 1994).

The library's changing role from repository to gateway came with the advent of computers in the late 1970's and early 1980's. Computers liberated libraries and librarians. Repetitive tasks were assigned to computers, enabling librarians to pursue other improvements, such as the automated library catalogue and the creation of information databases. By the late 1980's, it was apparent that information technology would become an integral part of all libraries, providing greater efficiencies for both librarians and users. The university curriculum was also affected by computer technology in the 1970's and 1980's. Arthur Luehrmann coined the term "computer literacy" in the 1960's, which as he defined it simply meant knowing how to use a computer.

By the late 1980's, however, it was obvious that the concept of computer literacy was not enough. As computers began to assume a more central role in academic life it was natural that the library would play an integral role in shaping this new model, since libraries had been grappling with these far-reaching changes for some time. One of the earliest and fullest treatments of the information literacy model is Information Literacy: Revolution in the Library, published in 1989. The authors, Breivik and Gee, recognized that the computer literacy model espoused by various educational reform reports was not enough. Instead, they argued that "information management skills are essential to literacy":

> **"In the midst of the information explosion, the ability to access, retrieve, and evaluate information should constitute a significant part of today's definition of literacy. In an era when today's 'truths' become tomorrow's outdated concepts, individuals who are unable to gather pertinent information are almost as helpless as those who are unable to read or write. The college-educated person can no longer rely on previous knowledge, textbooks, and faculty to provide the information necessary to make informed judgements; no single person or group of individuals is capable of assimilating all the available information or of keeping abreast of new information as it is generated. The ability to independently and appropriately gather information-not the ability to program a computer-will be a key element in an updated concept of literacy."**

Where Breivik and Gee say that one "can no longer rely on previous knowledge, etc.," we would argue that one never could and be called truly educated. That is why it is important to reiterate that information literacy does not so much describe something new as it does emphasize certain elements in our traditional concept of education. The necessity of evaluating information has always been with us; it is because of the changes associated with computer databases and the Internet that this seems an even more important goal now.

The information literacy model necessitates positive change in the instructional mission of the library. Rather than just providing traditional library orientations and tours, often taught out-of-context of an assignment, the library's expanded instructional role emphasizes information-seeking behavior within the context of an information need. The emphasis is on enabling students to become independent researchers and thereby encouraging lifelong learning.

Yet as Breivik and Gee state:

> **"The problem with such library initiatives is their impermanence. Individual librarians working with individual classroom faculty or with a particular program may successfully integrate the library into particular courses only to have a change in personnel undo years of effort. Only when academic leaders**

institutionalise these efforts and provide the necessary leadership and faculty development opportunities will these advances become permanent."

Although libraries and librarians are uniquely qualified to support and teach information literacy skills, information literacy is not just a library issue. Because it enables students to be lifelong learners and critical thinkers, it is a fundamental principal of higher education. This concept is clearly articulated by the Association of College and Research Libraries (ACRL):

"By ensuring that individuals have the intellectual abilities of reasoning and critical thinking, and by helping them construct a framework for learning how to learn, colleges and universities provide the foundation for continued growth throughout their careers, as well as in their roles as informed citizens and members of communities. Information literacy is a key component of, and contributor to, lifelong learning."

The work world

Many changes are occurring in the workplace today. Employees are expected to keep up with rapid technological advances, to streamline operations and to possess the ability to be proactive problem solvers (Hancock 1993). Information literacy skills, which carry over from educational to occupational settings, are the keys to helping employees keep up with change in their jobs and careers, and in self-improvement and upgrading of skills.

Awareness of market trends, the business climate, and policies affecting business involves the active pursuit of information upon which decisions will be made. Such information has to be considered for its recency, bias, source, and accuracy. Failure to understand this on the part of schools and business will result in students who are unprepared for the real world of work; the costliness of information illiteracy is ill-afforded nationally and individually (Breivik 1992).

The learning theory

We want to introduce some theoretical frameworks designed to make clear what takes place when effective learning and teaching occur. The emphasis is on the usefulness of the models, rather than on detailed appraisal of the theories.

What is learning?

When we learn, we are said to acquire "knowledge". Often, different sub-types of "knowledge" are distinguished. Bloom (1956), for example, distinguishes between "knowledge", "skills" and "values". Bloom's taxonomy includes analysis and synthesis skills.
Bruner describes "problem finding," and Gagné distinguishes problem-solving and cognitive strategies as categories of learned capability, while constructivist thinking includes authentic, situated problem solving.
Gagnè et al (1992) distinguish motor skills, discriminations, intellectual skills, defined concepts, concrete concepts, cognitive strategies, attitudes, problem solving, verbal information (names or labels, facts, knowledge), rules and higher-order rules.
Romiszowski's (1984) classification is even more complex. He distinguishes four main kinds of "knowledge" (facts, procedures, concepts, principles) and four main kinds of "skill" (cognitive, psychomotor, reactive, interactive) with further subdivisions. We do not use these more elaborate schemes for describing "what is learnt", but it is important one particular distinction: between

"knowing why" (theoretical, conceptual knowledge) and "knowing how" (practical, performance knowledge).

Learning as a process of cognitive construction

"Learning" implies that new cognitive structures are acquired, if only as a consequence of adaptation. *Constructivist* theories of learning emphasize that some cognitive structures and processes actively guide these constructive activities. Learners have intentions, they form plans and adopt particular strategies. Learners can learn to learn; cognition can pull itself up by its own boot straps.

Kolb (1984), using ideas from Lewin and Piaget, provides a simple but useful (and frequently cited) model of the processes involved in constructivist learning. Kolb proposes that learning is a cyclic activity with four stages. There are: *concrete experience*, followed by *reflection* on that experience, followed by *abstract conceptualisation* (the derivation of general rules or theory construction, the construction of models and methods) and finally, *active experimentation* (testing out rules and theories, models and methods). The important point is that the learner is not conceived as a passive recipient of "knowledge" but rather as an active participant in the process of learning. Rescher (1973; 1977), also building on Piaget's ideas, has constructed a more detailed model than that of Kolb. Two cycles of activity are distinguished: one corresponding to the acquisition and justification of "why" knowledge, the other corresponding to the acquisition and consolidation of "how" knowledge. In the "why" cycle, new conceptual knowledge is integrated with existing conceptual knowledge to form a coherent whole. Achieving coherence may necessitate revision or modification of existing knowledge (Piaget's classic terms for these processes are "assimilation" and "accommodation"). In the "how" cycle, new "methods" (procedures, operation) are constructed and tried out and are subject to pragmatic correction.

The teacher-librarian

The role for the teacher-librarian within a constructivist approach is to provide structures and opportunities for learning and support and guidance for learners. Although not denying the necessity or appropriateness of direct instruction, constructivism emphasizes the coaching role of the instructor in planning appropriate activities and structures based on the level of the learner; creating supportive environments; demonstrating important skills; modelling successful performance behaviour; providing opportunities for students performances and reflections; motivating students; and providing feedback for students as they attempt to perform their learning tasks (Kuhlthau, 1997; Means and Olson, 1994).

Specifically, Kuhlthau suggests five levels of assistance or mediation, any one of which may be appropriate at any given time, depending on the student, the context, and the task. These levels are organizer, lecturer, instructor, tutor, and counsellor.

Individual differences related to learning styles and multiple intelligences

The theory of learning would not be complete without some reference to individual difference: learning styles and multiple intelligence. Two theories that provide insights into cognitive diversity are Kolb's (1984) theory of learning styles and Gardner's (1983) theory of multiple intelligences. Kolb (1984) has labelled the four different ways of learning or "modes" as concrete experience; reflective observation; abstract conceptualisation; and active experimentation. Although everyone has the capacity for functioning in all four ways, individuals have preferences for one mode over the others and find operating in that mode entirely natural. For this reason, Kolb believes that when individuals are asked to think "outside" their preferred style, they must work harder to make sense

of the learning task at hand. Dunn, Beasley and Buchanan (1994) have reviewed the educational literature on learning styles and achievement and assert that "**most students can learn anything when … they are interested in the topic; begin learning with their preferred processing style**"; receive reinforcement through their "**secondary or tertiary modality**"; and "**apply new information**" to the development of "**a new instructional service**".

One of the most influential of the cognitive theories in contemporary psychology and education is the theory of multiple intelligence, which Gardner explored in *Frames of Mind* (1983). Gardner defined intelligence as the ability to solve problems in a variety of different "frames" and to create intellectual products that closely reflect those skills valued by families, by communities, and by cultures as they have developed over time. Thus, for Gardner (1996), frames of intelligence represented "**biological and psychological potentialities**" or "**relatively autonomous intellectual capacities**" which can be "**realized to a greater or lesser extent as a consequence of the experimental, cultural and motivational factors that affect a person**".
Gardner originally identified seven types of intelligences (Lazear, 1991); recently, he has added an eighth, "naturalist", as a separate category. The others seven types of intelligence are:
- Linguistic Intelligence
- Musical Intelligence
- Logical-mathematical Intelligence
- Visual Spatial Intelligence
- Bodily-Kinaesthetic Intelligence
- Interpersonal Intelligence
- Interpersonal Intelligence

Although individuals vary to the extent that they exhibit one or several of the intelligences to a high degree, Gardner (1996) asserts that everyone possesses some ability in all "intelligence" areas.
The central task for teachers, as Gardner sees it, is to provide support for learners so that they can use their own unique sets of capacities in mastering the tasks and skills that allow them to succeed as learners in contemporary society.

Process models for Information Skills Instruction

To be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information people have to develop information skills and these need to be learned and practised. But how? Many models since the mid-1980s have been developed. Kuhlthau's (1993) information search process (ISP) model is a seminar work and the only model that has been tested empirically. However, the ISP model describes only the search process itself, that is, that portion of research activity that begins at the initiation of the assignment and ends at the point when students are ready to organize their information and begin writing. A number of other process models have been created to provide more comprehensive guidance. Among the best known of these are the REACTS model, created by Stripling and Pitts (1988); the I-Search model, developed by Joyce and Tallman (1997); and the Pathways to Knowledge model, created by Pappas and Tepe (Pappas, 1997). All three of these models provide a framework for the research process in its entirety, covering the writing of the paper as well as the information-seeking processes that precede it. Although the process approaches proposed by Irving (1985) and Eisenberg and Berkowitz (1990) can also be applied to research paper projects, these authors believe that their model applications beyond the creation of term papers. For example, Irving suggest that her model can be successfully used by students in conducting a wide variety of tasks related to their schoolwork. In her view, information skills are, in fact, "life skills" (Irving, 1985).
Eisenberg and Berkowitz, creators of the Big Six Skills approach to information problem solving, regard the Big Six as flexible enough to use in all kinds of everyday decision making.

All of these process models are instructional in nature (Bates, 1979); they suggest a "best practice" for students as they engage in information seeking and research projects, and they emphasize the development of cognitive higher order or critical thinking skills.

Information Technology

Information literacy is related to information technology skills, but has broader implications for the individual, the educational system, and for society.
"Information technology skills enable an individual to use computers, software applications, databases, and other technologies to achieve a wide variety of academic, work-related, and personal goals. Information literate individuals necessarily develop some technology skills." (ALA, 2000).
Research interest related to technological issues in library and information studies (LIS) has been high, for there is still much to be learned that will help designers create more user-friendly retrieval systems for the "new society". Basic to research in the area of technology and information skills instruction is the assumption that a contemporary definition of information literacy must include the ability to locate, retrieve, and use *electronic* as well as print-based resources. Because, as McDonald (1988) has noted, the inaccessibility of information is compounded in electronic environments, the role of the school library in providing access, instruction, and guidance in information use is crucial. Indeed, **"there is no longer any question that knowing how to seek information electronically will be an essential skill for all individuals"** (Aversa and Mancall, 1989, quoted in Chen, 1993). **"Many of the search and retrieval skills are equally applicable to electronic, printed, and audiovisual resources"** (Irving, 1990).

The benefits of technology and electronic resources for student learning

Although Bialo and Sivin-Kachala (1996) found that the **"use of on-line telecommunications for collaboration across classrooms in different geographic locations has also been shown to improve academic skills"** in general, Morton (1996) has argued that **"the value of a computer environment is not so much the improvement of students' achievement through computer use as it the improvement of students' ability to achieve"**. These and many other studies conducted in the 1980s and 1990s have led educators to conclude that the use of technology offers many benefits to students, including the development of language skills, the promotion of critical thinking skills, an increase in student motivation and interests, improved opportunities for individualization of instruction and independent inquiry, and the promotion of inter-student collaboration.
Research studies aimed at showing the relationship between the use of computers and cognitive development point to the possibilities for critical thinking and problem solving that access to technology provides (means and Olson, 1994). Mancall and her colleagues (1992) believe that online resources create authentic contexts for learning because their use replicates real-world complexities and provides access to perspectives and viewpoints that stretch students' minds and encourage them to think critically.

Problems for students in using electronic resources

According to Sullivan and Seiden (1985, cited in Chen, 1993), problems that beset student searchers in online environments appear to involve three important information needs:
- Knowledge of the library and its role as an online information centre;
- Knowledge of information systems, databases, and their organization;
- Background knowledge of their research topics.

However, Irving (1990), Neuman (1995), Solomon (1992, 1993, 1994) and others have also suggested lack of information-seeking skills, lack of basic language and literacy skills, and lack of time for searching as potential stumbling blocks for students in online search environments. Finally, Studies by Oberman (1995), Irving (1990), and Neuman (1995) suggest that there is frequently a mismatch between the cognitive demands of information available online and the developmental levels of many student searchers.

Current trends for librarians

Eadie (1990) has voiced his concern over the move by librarians to take on the responsibility for creating programs to teach *"bibliographic instruction"* in academic libraries. **"I'm not sure"**, he has written, that **"we should be *'educating'* students but I am sure we should answer their questions. I think (to echo Radford) that we should dismantle barriers rather than train people to climb over them"** (quoted in Sauer, 1995). Although few would argue with the goal of simplifying systems to enhance the ability of students of all ages to use the library as independently as possible, most librarians would assert that today's students encounter far more difficulties in searching for information than those posed exclusively by the idiosyncrasies of information systems. In fact, research indicates that because students frequently lack an understanding of the research process (Kuhlthau, 1993; Pitts, 1995) as a whole, they both need and desire assistance in understanding the process in carrying out their projects. Moreover, Eadies's comments appear to reflect a view that considers information as an objective entity and research as fact finding, rather than as a set of learning activities that require the student to seek evidence to support a personal perspective, as it is understood within a constructivist framework. Where the barriers to system access have been removed, the student can concentrate on the attainment of content and process skills and learn to ask the right questions rather than to *"find"* the right answers (Keefer, 1993, cited in Sauer, 1995).

When constructivist environments are well established, libraries can become arenas where posing questions, discussing ideas, and pursuing understanding become the central activities, and where these activities are seen as the appropriate goals for instructional intervention. The realization that information skills are *"survival skills"* (Irving, 1985) and essential for the development of lifelong learners (Irving, 1985) has created a new sense of urgency among librarians responsible for planning programs of instruction.

Perhaps, for this reason, LIS theorists have sought to change the terms we use to describe the skills students need to develop. Breivik (1989), for example, insists that using the terms *bibliographic instruction or library instruction* only perpetuates the notion that what goes in the library is separate from what goes on in the classroom and in life, and that whatever contributions the library can make to students learning are peripheral or superfluous . For this reason, we might be well served, and we might better serve the students who are our primary constituency, if we settle on *information skills* or some other broader term that more accurately describes what we actually want students to learn as a result of our intervention. (Irving, 1985).

Finally, contemporary understanding of teaching and learning rely on theories that recognize "the inescapably social nature of cognitive development and of cognition itself" (Belmont, 1989). For this reason, librarians need to rethink the ways in which instruction has traditionally been delivered and adopt a coaching role whenever possible.

Staff development models

The need to provide continuing education for librarians in particular has produced a range of staff development models. In the United States, the Information Literacy Institute (www.ala.org/acrl/nili/nilihp.html) has commenced teaching intensive programs for librarians involved in information literacy education. These programs are designed at the introductory and

advanced levels and have attracted interest, and participants, from all over the world. While the Information Literacy Institute operates under the banner of the ALA, EDULIB, in the UK is associated more closely with higher education staff development programs, having gained SEDA accreditation. Online staff development for information literacy is offered in Europe through a programme named DEDICATE (Fjallbrant, ILAW), and a series of workshops have been successfully experimented for school teachers in New Zealand (Moore, ILAW). In Australia, academic librarians are beginning to take advantage of the many Graduate Certificate's in higher education, some of which include opportunities to explore information literacy strategies and issues (Bruce, Weeks, and Crebert, 1995).

Hi-tech solutions

New technologies are the base for solutions to problems of access and communication. In Canada, John Parboosingh (ILAW) has developed a product called PC-Diary for use with continuing education of physicians. PC Diary allows the recording, sharing and monitoring of learning in staff development programs. In Sweden, the Into Info project (previously EDUCATE), has developed a range of electronic, subject specific, learning materials for information access and use by researchers and students (Fjallbrant, ILAW). In Australia considerable work has been done exploring the use of technology for information education in distance learning programs (Appleton, ILAW).

Use of the Standards

The standards provide a framework for embedding information literacy in the design and teaching of educational programs, and for assessing the information literate individual. They extend the information literacy progress of educators, teacher librarians and librarians, in the school and Technological and Further Education sectors.. The standards outline the process by which academics, librarians, and others, pinpoint specific indicators which identify a student as information literate.
The standards are not intended to represent a linear approach to information literacy.
To implement them fully, an institution should first review its mission and educational goals to determine how information literacy would improve learning and enhance the institution's effectiveness. To foster acceptance of the concept, staff development is important for academics and librarians in particular.
Standards have been developed by many universities and institutions in the world. An analysis of national content standards documents reveals that they all focus on lifelong learning, the ability to think critically, and on the use of new and existing information for problem solving. National content standards, state standards, and information literacy skills terminology may vary, but all have common components relating to information literacy.

 "The information literacy standards for higher education" approved by the Association of College and Research Libraries (ACRL) were reviewed by the ACRL Standards Committee and approved by the Board of Directors of the Association of College and Research Libraries (ACRL) on January 18, 2000, at the Midwinter Meeting of the American Library Association in San Antonio, Texas.

The US standards were reviewed at a national workshop initiated and conducted 22-23 September 2000 by the University of South Australia for the Council of Australian University Librarians (CAUL). In reviewing the standards, consideration was given to the implications of Australian research, theory elaboration and practice which may not have been available or accessed when the US standards were developed. The relational model of information literacy was considered in this context.

The intended primary application is to higher education, but they may be applied to other educational sectors.

Conclusion

Information literacy is a survival skill for the Information Age. This greater attention to information literacy comes at a time when many other learning deficiencies are being expressed by educators, business leaders, and parents. To respond effectively to the rapid changing requirements for a satisfying life, people need more than just a basic knowledge, they need to know how to find, evaluate and use information in order to solve a particular problem or make a decision.
Libraries, which provide a significant public access point to such information and usually at no cost, must play a key role in preparing people for the demands of today's information society. They remain one of the few safeguards against information control by a minority. Education needs a new model of learning that is based on the information resources of the real world and learning that is active and integrated, not passive and fragmented.

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Critical Account

I chose as subject of my Literature Review the Information Literacy in the Information Age after having closely examined the concepts of Information Age and of Lifelong learning from the materials used for the tasks before.

I'm interested to investigating the information needs of the learners and the type of teaching, beside the new role for the librarians in this information society.

The first steps of my search had been directed to obtain information that was both timely and appropriate. This process involved:

1. DEFINING THE NEED FOR INFORMATION
2. INITIATING THE SEARCH STRATEGY
3. LOCATING THE RESOURCES
4. ASSESSING AND COMPREHENDING THE INFORMATION
5. EVALUATING THE PRODUCT AND PROCESS

1. DEFINING THE NEED FOR INFORMATION

The first step in the information problem solving process is to recognize that an information need exists and to define that need. I formulated the information problem using a variety of questioning skills. The questions were:

What are the needs for workers and citizens in the Information Age?
Are there any links between Information Literacy and economic vitality?
What changes for learners, teachers and for librarians?
What are the base theories for Information literacy?
Are there any model programs I can examine?

2. INITIATING THE SEARCH STRATEGY

Once the information problem had been formulated, I developed a plan for searching.
I determined what information was needed, through a series of sub-questions and I defined the parameters of my search:

Parameter	Narrow	Broader
Language	UK	UK and USA
Subject area	Information literacy	Information age
	Information technology	Resource-based learning
	Bibliographic instruction	Information skills
	Students	Lifelong learners
Sector	Library	School
Publication period	Last 10 years	Last 20 years
Literature type	Professional journals and books	Journals and books

I brainstormed ideas and recognized a variety of visual ways of organizing ideas to visualize relationships among them.

So I began to look for the list key words, concepts, subject headings and descriptors in the database ERIC. I began with the concepts of Information Age and Lifelong learning and then I found the correlate concepts with Information Literacy: Information technology and Information literacy skills. From these I went on to the base theories of learning, that is the learning styles and models. After having funded the fundamental concepts for my search, helped by the "Directory of online resources for Information Literacy", I divided the keywords according to subject. I also identified the authors' surnames in the examination of my lecture notes (i.e. Eisenberg, Kolb, Irving). The concepts of Information Age and Lifelong learning aided me to clarify the social context. Then I identified the criteria for evaluating possible sources (i.e. timeliness, format, appropriateness). I discussed with my librarian colleagues to obtain new ideas for the keywords. After the discussion and the first searching in the ERIC database the following keywords list has turned out:

Information literacy
Information literacy skills
Information technology
Lifelong learning
Information age
Learning theories
Learning styles
Resource-based learning
Computer literacy
Problem-solving
Education
Bibliographic instruction

3. LOCATING THE RESOURCES

At the beginning of the search I recognized the importance of locating information from a variety of sources and accessing specific information found within an individual resource. I located print resources in the academic library of the Polytechnic using catalogues and other bibliographic tools. In particular I borrowed the books: "The virtual university" (Ryann, 2000) and "Information literacy and information skills instruction" (Pickering, 1999). I had some difficulties to find print materials about the information literacy in Italy and so I searched electronic journals and online reports. From the books I found many references and I used the ERIC databases to obtain many articles and the document delivery of the British Library for the not online materials. A subscription for electronic journals with the main international editors at the Polytechnic, aided me to look for full-text articles and abstracts. Besides with a search engine I located the most current and up-to-date items. Once I had found a useful Internet site, I noted its address in my bookmarks.
The Italian journal "Biblioteche oggi" helped me to identify additional resources and website about information literacy. The bibliographies found in this professional journal were very useful for searching other authoritative sources. In this step I divided specific information within resources by using internal organizers (tables of contents, cross references).

4. ASSESSING AND COMPREHENDING THE INFORMATION

I used a screening process to determine the usefulness of the information.
I skimmed and scanned for major ideas and keywords to identify relevant information and I differentiated between primary and secondary sources determining the authoritativeness, and

reliability of the information. In the primary sources I put in reports and conference proceedings (i.e. the reports of the American Library Association). My secondary sources were the books that I borrowed and many printed journals and electronic journals. The books were useful as introductory sources to clarify my questions and the objectives of my literature review. I found on the Internet many of the used articles, in particular with the database ERIC. These articles contained detailed reports of relevant earlier researches. In the tertiary sources I set bibliographies, abstracts and indexes.

I divided in a table the literature sources in frequency of publication, format, coverage by abstracts and indexes, availability. I made a brief summary of the content of each item, too.

I recognized interrelationships among concepts (i.e. computer literacy and information literacy, knowledge and skills) and I identified points of agreement and disagreement among sources. In these steps I understood that information literacy for example is not the same as computer literacy or library literacy (which requires the ability to use a library's collection and its services), although there is a strong relationship among all these concepts. Compared with computer literacy, information literacy goes beyond because technology alone does not guarantee quality learning experiences. And compared with library literacy, information literacy is more than searching through an online catalogue or other reference materials because information literacy is not a technique, but a goal for learners. For the relationship between information literacy and these other terms, I carried out a search to investigate the benefits of technology and electronic resources for student learning and the problems in using these resources.

The theoretical basis of the learning styles and of the learning theories come from the books and from the materials studied for the tasks before. For the definitions of information literacy I reported definitions found in electronic journal or in reports and that came from consolidated associations (i.e. ALA) or from authors internationally well-known.

I chose as underpinning theories to be considered the "constructivism" as base of the information literacy. Besides, the new role of the teacher/librarian has been evaluated within a constructivist approach. In particular the theories of Kuhlthau have been considered for my literature review because very often cited and reliable.

I read the chapters about the learning process in the book "Information literacy and information skills instruction" (Pickering, 1999) and then I carried out a deeper online search to verify how and what of these models have been applied.

The Big Six Skills of Eisenberg and Berkowitz is the model used in many American universities and the most cited in the literature now. In effect United States and Australia are the states that have put these models into practice and have arranged educational plans including information literacy. For this reason I decided to mention the American information literacy standards for higher education that have been modified and adapted for Australia by their librarian associations. I chose these standards also because my intention in the future is to examine closely the programs for information literacy in the University. I began to consider the new programs for staff development in higher education and the new projects in this area.

For the new projects born in these years the reading of the Bruce report has been enlightening.

I found many articles to deepen the teacher/librarian new role, subject faced by librarian and educational associations. In particular I chose as reference for the changing role of the library and also for the new needs of citizens, the article of Breivik and Gee "Information Literacy: revolution in the library" (1989) because many of the articles written by librarians in these years cited these authors.

I have discarded in the literature review the reports of workplace information literacy initiatives because not relevant in this moment for my objectives. Also reports too linked to a particular reality have been discarded.

5. EVALUATING THE PRODUCT AND PROCESS

At the end of my search I evaluated how well the final product resolved the information problem and if the steps taken to reach the desired outcome were appropriate and efficient.
I have had some problems to find the material about information literacy and for this reason sometimes the contents are not so deep.
I considered that the research question/problem could be expanded, or otherwise modified with the reference to other new projects in the area of the information literacy in the future.