An Analysis of Information Literacy Education Worldwide

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This article was prepared for UNESCO, the United States National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic. The author explores some of the factors that facilitate and hinder the drive toward information literacy around the world, as reflected in publications of the International Association of School Librarianship (IASL) between 1998 and 2002. Initiatives taken in the compulsory schooling sector are illustrated with reference to the degree of existing literacy and technological infrastructure in particular countries, together with differing understandings of information literacy. The transition from literacy to information literacy and school library programs, promising practices in addressing students' learning needs, and those of their teachers are explored. Promising government initiatives are outlined, and recommendations for future progress are made.

Introduction

Postman (1990) observed that the information age began with the invention of the printing press. Since then, the relationship between information and action (e.g., learning, decision-making, and problem-solving) has been severed while, "we have directed all of our energies and intelligence to inventing machinery that does nothing but increase the supply of information" (pp. 4-5). Access to virtually unlimited information, however, does not necessarily make the world in which we live any more comprehensible.

The central point of Postman's (1990) address is that advances in technology are accompanied by unforeseen consequences and that, "it is not always clear, at the beginning, who or what will win, and who or what will lose" (p. 2). The fruits of technology cannot of themselves assist in making sense of the world, but advances in information and communication technology (ICT) are forcing a reconsideration of the knowledge, skills, and values needed for education and successful living. As Todd (2001) commented, "The information environment of the 21st century is complex and fluid, connective and interactive, diverse, ambiguous and unpredictable, and one is no longer constrained by physical collections, time, place and national boundaries" (p. 1).

In this environment, educators win in that access to vast amounts of information is possible directly from library facilities and through use of ICT in schools. However they lose in that this puts considerable pressure on their own knowledge of technology and information processes and their ability to develop the information skills of students. For example, there are
challenges in defining and quickly locating relevant and objective material, and the authority of digital information is often more difficult to establish than is that of printed literature. Although adults may have accumulated experiential knowledge to assist them in sifting and evaluating information, children frequently believe that something in print or from the Internet must be true (Markuson, 1996). Furthermore, the information retrieved typically reflects only the language, culture, and lifestyle of its creators. This makes evaluation of worth and applicability to other cultures particularly challenging for adults and children alike. As a consequence, information literacy is gaining a high profile as central to education. This dynamic concept extends basic reading, writing, and calculating skills for application in information- and technology-rich environments (Kuhlthau, 2001) for the purpose of learning or solving problems. However, it is widely recognized that in even the most technologically advanced countries, efforts to prepare students for the information age have been only partly successful, and implementation of recommendations from information skills research has been slow and difficult (Kuhlthau; Rogers, 1994).

This article explores some of the factors that facilitate and hinder the drive toward information literacy, as reflected through activities of the International Association of School Librarianship (IASL) between 1998 and 2002. IASL's mission is to provide an international forum for people interested in promoting effective school library programs as viable instruments in the education process. It has active members in more than 80 countries, and its publications and Web site (www.iasl-slo.org) provide a unique window on research and promising information literacy practices in schools. Reference is also made to literature that provides broader contextual information. The article concludes with some recommendations concerning strategies and practices necessary to increasing information literacy in the compulsory schooling sector.

Information Literacy: The Concept and its Application in Compulsory Education

Although there is general agreement on elements of the definition of information literacy, its practical manifestation is described in a multitude of complementary ways. These include the attributes of information-literate people (Doyle, 1994), predominating elements as conceived by skilled information users (Bruce, 1997), behavioral standards for students (American Association of School Librarians, 1998), and rubrics for the assessment of information literacy (Colorado Department of Education, 1998). The literature examining actual information literacy performance among school students, however, tends to focus on identifying information-skill shortcomings rather than detailing extensions of the curriculum and learning outcomes made possible by information literacy abilities.

Information literacy standards and rubrics provide behavioral descriptors to guide curriculum design and evaluation of students' learning. These
activities are further informed by a variety of models used to describe information problem-solving in inquiry, discovery, and problem-based learning activities. Models usually describe this process in terms of six to 10 steps and have been developed in many countries, among them the United Kingdom, the United States, Canada, Australia, and New Zealand. These models are perhaps the most familiar face of information literacy in schools and provide educators with a framework in which specific information skills can be targeted and their coordination fostered. They form one focus of the school library programs that are typically a major force for promoting information literacy. School library programs usually also address literature appreciation and may include understanding information "as something that is created, organized and shared and ... something that is affected by both creators and consumers" (Oberg, 2001, p. iii).

Information literacy exists in pedagogical terms at the confluence of resource-based learning practice, constructivist and metacognitive theories, and the practice of developing thinking skills through modeling and scaffolding (Moore & Page, 2002). Its central processes draw on critical thinking, problem-solving, and the development of extensive understanding of information functions and systems in the context of the curriculum and beyond. As Henri (1999) put it, "information literacy could fairly be identified as: Mastery of the processes of becoming informed" (p. 4). Indeed, as a pedagogical tool, the concept provides a powerful framework for integrating learning skills and strategies across the curriculum, as well as enabling educators to harness the potential of ICT (Eisenberg & Berkowitz, 1988; Johnson & Eisenberg, 1999).

Information literacy is often seen as the school library media version of constructivism (Loertscher & Woolls, 1997). This points to certain assumptions not only about resource availability (school libraries, ICT, and specialist teachers), but also about system-wide curriculum policy, school reform, pedagogical leadership, and shared understanding of central concepts. Although resource-based learning may not be the only vehicle for promoting information literacy, the bulk of discussion and research in schools has focused on this approach. Naturally, most of the published teaching ideas and tips reflect the curriculum and resources of the region or country of origin. Resource issues aside, these pedagogical practices may not be entirely compatible with those historically applied elsewhere. Information literacy demands a new way of thinking about learning and teaching that may be in conflict with cultural standards and expectations about the roles of students and educators. Consequently, it is apt to consider Luke's (2000) caution against the generalization of any educational approach from one nation or region and its embedded cultures.

Henri (1999) coined the term information literate school communities to describe an admittedly fuzzy constellation of factors, attributes, goals, and practices necessary to an environment where the focus is on learning rather than teaching, and developing mastery of the processes of becoming informed.
The fuzziness is due to the complexity of school communities and the evolving nature of information literacy. As a result, it is likely that schools and individuals at any time are more likely to demonstrate a profile of contextualized strengths and weaknesses, rather than some finite quantum of information literacy. In other words, information literacy cannot be captured completely in a snapshot; it is more like an epic film being made from a script under continual revision. This has implications for development strategies and evaluation at individual student, school, and regional levels.

The notion of information-literate school communities converges with those of school improvement and learning organizations (Henri, 1999). For example, with regard to school improvement, Hopkins (1996) concludes that the more generic, yet focused, a priority for development is, the more effect it will have. Information literacy is a potentially powerful focus for improvement initiatives, as the concept is applicable in all areas of the curriculum at all levels and has implications for school organization, management, and structure. School communities with a combination of attributes highlighted in each of the above strands of research are being established, but the process is slow even when conditions are supportive. For example, research in progress suggests that after an eight-year journey, three schools held to be exemplars of emerging information literate school communities in New Zealand are identifiably different from others, but information literacy is still a peripheral rather than a central concern for some staff (Moore & Trebilcock, 2003).

The task of comparing information literacy progress made within and between nations is challenging because, as shown below, the emphasis in initiatives reflects the perceptions of their originators and the constraints of their information environments. Thus echoing Bruce’s (1997) relational model, for some originators, ICT knowledge and abilities predominate as information literacy program goals, whereas others focus on library skills (organization and control of information), and yet others focus on learning processes (knowledge construction). In other words, what is supported or actively taught as information literacy can vary from the bibliographic to the technological through to addressing cognitive and metacognitive components of the mastery of becoming informed.

Furthermore, Bruce (1997) comments that if an individual sees information literacy as dependent on ICT skills and technical knowledge to which one has no access or is unready to acquire, then it may appear to be beyond one’s reach. Similarly, one might argue that if library skills or basic literacy are seen as foundations of information literacy, but one has no access to libraries or text, it may not only be an unattainable goal, but may be deemed irrelevant at that time. Information environments of the 21st century are far from homogeneous. Governments and educators are still striving to address learning divides founded on mass education and printing technology. The challenge of perceiving information literacy progress where print resources are limited and literacy itself is fragile should not be underestimated.
From Literacy to Information Literacy and School Library Programs

As information environments have evolved, notions of literacy and literacy education have changed. For example, the PISA 2000 (Organization for Economic Cooperation and Development [OECD], 2002) study focused on reading, mathematics, and science to assess literacy in terms of "the knowledge and skills needed for full participation in society," but it does not go as far as assessing information literacy. It reports, "most students have neither very high, nor very low reading skills." On average, only 10% of 15-year-olds in the combined OECD area were able to show detailed understanding of unfamiliar text such that they could infer which information was relevant to a task. In today's information environments, it is important, but no longer sufficient to be able to retrieve information from a text provided by an assessor and known to contain "the answer." One also needs to be able to retrieve resources from complex storage systems, to sift and evaluate the authority and objectivity those resources and their content, and to construct answers from the fragments of the relevant information they may contain. Monitoring and managing these complex thinking and information problem-solving processes is another essential ability underlying information literacy (Moore, 1995).

The PISA (OECD, 2002) findings suggest that most 15-year-olds would struggle to meet a reading demand fundamental to a process of inquiry. However, in assessing what schools can do to make a difference to literacy outcomes, PISA 2002 concludes that where student use of resources such as the school library, computers, and Internet is "relatively high, mean reading scores tend to be higher, even when other factors are discounted" (p. 22).

This finding echoes those of the IEA studies that link reading development with resource provision (Elley, 1992, 1994) and the large quantitative school library studies conducted in Colorado and Texas (Lance, Welborn, & Hamilton-Pennell, 1993; Lance, Rodney, & Hamilton-Pennell, 2000). Williams and Wavell (2002) cite these studies as indicative of the accumulating evidence that school libraries contribute to both formal and informal learning. In particular, the studies by Lance et al. found that a stable, positive relationship exists between school libraries, well-developed school library programs, and student performance regardless of socioeconomic factors. From these studies, it can be inferred that well-developed school library programs are associated with particular levels of physical resources and include specialist staff who:

- spend time explicitly teaching information literacy to students,
- collaboratively plan instructional units with teachers,
- provide in-service training to teachers,
- teach cooperatively with classroom teachers, and
- attend to curriculum integration issues. (Moore, 2001)

However, it is difficult to isolate the effects of teaching for information literacy from resource levels implied by the term well-developed school library...
program. From a review of specific research-based evidence, Todd (2001) identified a number of parameters in the relationship between school libraries and learning that could also be applied to information literacy initiatives. Successful school library programs are usually:

- founded on a shared educational philosophy centering on inquiry learning that provides a climate for collaborative, integrated learning opportunities;
- based on clear expectations and manageable objectives, informed by meaningful and systematic feedback; and
- need to lead to active engagement of the library in the teaching and learning process such that specific effects can be articulated to attract the support of school leaders.

The concept of a coherent information literacy development program is embedded in school library program research findings that:

- improved student performance results from systematic and explicit development of abilities to connect with, interact with, and utilize information to construct personal understanding;
- flexible instruction at the time of need is most effective in developing student competence, and
- active reading programs foster higher levels of reading, comprehension and language skills. (Todd, 2001)

As yet the physical and intellectual resources and activities associated with a school library program are not freely available in all countries. This should not be taken to imply that information literacy is out of reach; rather that those intending to create information-literate school communities may need additional strategies in their journey toward that goal. As Oberg (2001) notes,

There is no one best model or approach to education for media and information literacy. Each school’s approach will be shaped by the school’s curriculum, the needs of the students and the resources available for its implementation. The effective approach is identified in the end by the extent to which students are confident and competent learners, able to understand the world of information and willing to use and create information within and beyond their school environment. (p. iv)

The challenge in educating for information literacy despite the digital divide demands that resources be used to create learning activities that promote critical interaction with and understanding of the information environment—whether or not a school library program can be established at this point. In relation to schooling in Canada, Oberg (2001) observed that “Literacy is often defined in terms of reading and writing; it is less often defined in terms of listening and viewing or speaking and image-making.” One result is that much attention is given to the meaning of printed texts, but little is given to other media that validate young people’s experiences. Herein lies a way forward where students are disaffected, or print and ICT resources and students’ abilities to benefit from them are as yet limited. Through investigation of their own communities, students have access to
local voices and knowledge that can catalyze all aspects of information problem-solving and the thinking underlying information literacy. With guidance, older students may even create text and image resources for younger students that are relevant to their experience and increase interest in learning (Moore, 2000). However, there are other fundamental challenges to information literacy progress.

Students’ Learning Needs: Promising Practices
Even in comparatively resource-rich countries, many teachers agree that information literacy is important while admitting to uncertainty about how to promote it. As tools to assist educators, developmental approaches to teaching information literacy are gaining popularity. For example, Capra and Ryan’s (2000) Information Literacy Planning Overview details skills and resources to be introduced across compulsory education sectors and links these to key learning areas such as science, technology, mathematics, and English. An important characteristic of this tool is that it is designed to be adopted or adapted to the requirements of particular schools. Capra and Ryan point out, “Responsibility for implementation of integrated Information Literacy lies with the entire staff of a school” (p. 6). Although not disagreeing with this view, Eisenberg and Berkowitz’s (1988) approach focuses more tightly on the role of library media specialists or teacher-librarians, specifying learning outcomes for each stage of information problem-solving in terms of Bloom’s Taxonomy rather than a matrix of skills. Both approaches inform educators of the skills, attitudes, knowledge, and thinking processes to be developed, but many teachers still believe that students will acquire these skills by osmosis if they are exposed to resources.

Countering this view, and showing that little has changed since Elliott (1976-1977) demonstrated that providing appropriate curriculum materials is insufficient for inquiry learning, Bishop (1999) found that even able 15-year-olds in the US varied markedly in their ability to find and use information independently. All 10 students in her study were highly dependent on teachers for information, and although some had developed search skills, others were unable to articulate a focus or any questions guiding their work. A related concern emerged from the National Education Monitoring Project (NEMP) in New Zealand. It concluded that about 50% of 8-9-year-old students showed little development of skills in clarifying information needs. Although 12-13-year-olds were more successful in tasks requiring these skills, about half still struggled (Crooks & Flucton, 1998). These are just two examples from the literature (which abounds with studies from around the world) that identify gaps in information skills related to learning tasks using libraries in general, specific print resources and ICT, as well as the Internet (Todd, 1998; Branch 2001; Yitzhaki & Bibi, 2001).

Case study research suggests that applying models such as the Big Six Skills© (Eisenberg & Berkowitz, 1998) in teaching and explicitly drawing
students' attention to thinking while handling information is an excellent vehicle for promoting metacognitive awareness and information literacy simultaneously. For example, Lamb's (2002) doctoral research (in Australia) focused on seven gifted teenage girls who initially resisted information skills instruction as unnecessary. As a result of metacognitive scaffolding to prompt reflection in an information problem-solving framework, all came to acknowledge that consciously monitoring the research process and skill performance resulted in more efficient use of time, more complete assignments, and greater learning. The overt application of an information problem-solving model provided a "cognitive road map" of the process and tools for thinking about progress.

At the other end of the compulsory education continuum is promising, but similarly limited evidence from new-entrant classrooms in New Zealand that modeling information processes through shared reading motivates beginning readers to engage with and seek relevant text (Moore & Page, 2002). In the context of a body awareness activity, three teachers each read nonfiction tables of contents aloud, inviting students to identify chapter headings likely to contain information about the heart. Five-year-olds responded enthusiastically to this modeling of seeking information and were reported to improve significantly in oral and written communication, questioning, and reading confidence. Gains were such that teachers felt challenged to respond rapidly in curriculum planning to take advantage of a learning environment driven by children. Over three weeks, what could be taught changed.

Furthermore, at-risk readers at ages 9 and 10 have been found to move from reluctance to enthusiasm when specialist reading support sessions over a five-week period were focused on information literacy (Pouloupolos, 2000). The critical gains for these children included a sense of purpose for learning to read (other than "to know more words"), confidence in participating in discussion, willingness to seek clarification of meanings, and greater independence in information seeking. The skills they gained were maintained in other classroom settings.

Australian studies also demonstrate that where teachers and teacher-librarians have explicitly taught for information literacy, factors such as self-esteem, self-perception, control of learning, mastery of content, task focus, and reduction of confusion and frustration are influenced positively (Todd, 1995). Similarly, in the UK, Herring, Tarter, and Naylor (2000) reported improvements in learning, writing, and information skills. In an interesting extension of this, Harada (2001) concluded that Hawaiian 10- and 11-year-olds who wrote journals as part of an information literacy initiative demonstrated increased cognitive and metacognitive understanding of the information search process, although it was still a challenge for them to verbalize thinking processes. In line with Kuhlthau's (1993) affective model of information problem-solving, journal writing also assisted these students in verbalizing and sharing personal feelings and emotions cen-
tered on school research tasks. A teacher working with Moore and Page (2002) obtained similar results by using an emotions continuum based on Kuhlthau's model, along which 9-year-olds placed pictures of themselves as inquiry tasks proceeded. She reported that through ensuing discussion, a new, more trusting classroom climate developed to enhance learning.

The benefits of teaching for information literacy extend far beyond constructing knowledge and developing strategies for seeking and using information. Rather, students seem to develop personally and socially on a wide range of fronts that affect their ability to benefit from responsive learning environments. However, unlike literacy, information literacy is yet to be the sole focus of large-scale, longitudinal studies that thoroughly test its effects on learning outcomes. One generalizes from case studies with great caution. A note of concern that supports the call for longitudinal studies arises from a comparison of Canadian and US studies. Streitburger and McGregor (1999) compared three naturalistic studies conducted over three years and found that not only did younger students (8-year-olds) appear to be more process-oriented than older students (16-year-olds), but mental models of the inquiry process among all participants were highly similar. The extent to which older students had experienced information literacy-informed instruction is unclear, but it seems that understanding at the elementary level may not necessarily develop with further schooling. The implication is that information problem-solving needs to be addressed consistently and developed coherently across all levels of compulsory education if students are to meet the demands of an information society that is markedly different at their time of entry into and exit from the education system.

Each of the above examples is based on instructional design founded on a model or approach to information literacy. To be fully effective, these models need to be made apparent to the students. A telling question that emerged from Moore and Page's (2002) examination of teachers' learning and subsequent students' learning was, "What did you do to bring information problem solving and thinking to the attention of students?" This revealed a difference between planning for and actually teaching for information literacy.

Teaching the Teachers

Citing several researchers, Henri (2001) commented that development of information literacy in schools is predicated on the belief that teachers are themselves information literate, that information-processing models or approaches inform their teaching, and that they apply higher-order thinking skills when undertaking complex information tasks. In investigating information literacy among 91 practicing teachers and trainee teacher-librarians in Australia, he found that in reality, "teachers demonstrate much of the impoverished information behaviour shown by senior school students." Participants did not "instinctively employ an information
processing model and had difficulty distinguishing between relevant and irrelevant information.” Further, they rated themselves as more confident of their ability to undertake information tasks using older rather than newer technologies. Preliminary conclusions suggest that “unqualified teacher-librarians are no better equipped to employ an information model than are their classroom colleagues.” Findings of other studies in comparatively resource-rich countries agree, and Hart (1999) gave colorful support to the same conclusion in her case study of information literacy in disadvantaged schools in South Africa.

Established thinking is that to promote information literacy and effective resource-based learning, teacher-librarians should form partnerships with colleagues in developing a school culture that facilitates learning (Haycock, 1998; Henri, Boyd, & Eyre, 2002; Hopkins & Zweizig, 1999; Todd, 2001). The success of this is affected by organizational and management structures in schools, a point perhaps that contributes to survey findings that of 126 school librarians in 18 countries, most spend barely a quarter of their time collaborating with teachers on instructional design (Danley, Forde, Lahmon, & Maddox, 1999). Other contributing factors may include varying understandings of the roles that school and teacher-librarians are permitted to play in various educational systems. But more fundamentally, differences uncovered by Henri (2001) in the information behaviors of teachers may also be operating.

Professional development about information literacy as a concept and as a framework for teaching and personal learning is clearly an issue for tertiary educators. It is addressed in terms of current teacher-librarianship training, but this is undertaken by only a small proportion of teachers in each country. Few indications are yet reflected in IASL conference publications that information literacy has been targeted effectively in preservice and continuing teacher education. For example, the Library Power project in the US began in 1988 and a decade later had resulted in the expenditure of US$45 million to improve teaching and learning through school libraries. Its central goals are clearly supportive of, but do not explicitly include, the term information literacy (Hopkins & Zweizig, 1999). During that time, the project must have touched many established and newly qualified teachers, yet in evaluating the project, Zweizig and Hopkins (1999) reported that the interface between the concept of information literacy and research on learning was poorly understood. It frequently needed explanation to capture the attention of “representatives of the broader education field” (p. 226). This may be an indication that information literacy has not been embedded in mainstream teacher education. Further, although Library Power outcomes are encouraging, an in-depth comparison of inquiry-based learning in two participating schools echoes the findings of Elliott (1976-1977). Although both schools and their students had benefited from improved library resources, only one “demonstrated the transformation in instructional practice that is essential to improved student learning” (Oberg, 2001, p. 148). It
is suggested that the beliefs of educators about the nature of children, learning, and teaching affected attempts to change teaching practice in each school. This conclusion is supported and extended by an international study by Henri, Hay, and Oberg (2002). Qualitative studies in Canada and Australia, followed by quantitative surveys including five other countries, led to the conclusion that:

The development of an information literate school community, in which school librarians play a major role, is much more likely to be a reality when the principal and school librarian form a strong team, united by a common philosophy of information literacy and student learning. (p. 102)

Although education systems could create models to promote information-literate school communities without allocating responsibility to teacher-librarians, they are unlikely to be successful without the common philosophy referred to above. At present, not only are the "information literacy wise" practices described by Henri (2001) not prevalent among Australian practicing teachers who would be teacher-librarians, preservice teachers in the US have been found to hold the view that qualified teacher-librarians have a limited role in teaching and learning (Wolcott, Lawless, & Hobbs, 1999), thus perpetuating existing modes of school library use. Inasmuch as teachers are products of their school experiences and have similar characteristics worldwide, one might conclude that until they perceive a personal need for improving information literacy (like Lamb's, 2000, students), they are unlikely to seek assistance from anyone, qualified or not.

However, apparent lack of information literacy awareness may to some extent simply reflect differences in terminology in that curriculum documents frequently include inquiry process skills and models without labeling them as information literacy (Dalbotten, cited Loertscher & Woolls, 1999). Indeed, the essential skills detailed in New Zealand's Curriculum Framework (Ministry of Education, 1993) provide just one nationally implemented example where all aspects of information literacy are explicitly described in the mandated curriculum, but the unified concept is not (Moore, 2001). Specific attention to information literacy standards and well-developed school library programs led by qualified teacher-librarians appear to add an impetus for a coherent and consistent developmental approach to students' learning and teachers' practice (Todd, 2001). However, the progress toward information literacy where such experts are employed can still be slow and difficult if the potential of their role is poorly understood.

Teacher Education: Promising Practices

A promising approach to reducing the inertia identified by Rogers (1994) and Kuhlthau (2001) is found in a preservice teacher education program studied by Asselin and Naslund (2000). This program included extensive collaboration between preservice teachers and teacher-librarians and a focus on information literacy and resource-based learning. Pre- and post-
experience concept maps and interviews with the student teachers showed significantly increased knowledge of the nature of collaboration, information literacy, and resource-based learning. The project followed a similar study that involved collaborative teams of inservice teachers, teacher-librarians, and preservice teachers together with university researchers and consultants. In this setting, Doiron (1999) reported that authentic learning environments enabled preservice teachers to experience collaborative planning and teaching and to gain a better understanding of the role of teacher-librarians and school libraries. At the same time, they participated in action research into effective teaching strategies and were able to act as information technology mentors to established teachers. This empowered preservice teachers as instructional designers, collaborators, and mentors and highlighted how ICT and school library programs can affect students' information literacy learning. These two programs contain all the factors that would prepare teachers to engage in what Todd (2001) referred to as evidence-based practice, discussed below.

Tertiary educators in New Zealand have taken a different approach to teacher education. School library programs are not well developed, and few schools opt to employ qualified teacher-librarians, particularly at the elementary level. In the context of the part-time teacher-librarianship education program, however, information skills modules have been offered to cohorts of classroom teachers in individual schools for over a decade (Gawith, 1998). These have proven popular, as elementary school principals in particular tend to prefer whole-school staff development. The organization, delivery of curriculum, and emphasis on learning evaluation differ between elementary and secondary schools. Thus school-based information-skills education tends to include smaller groups of staff in secondary schools. Consequently, the development of information literacy-based cultures appears to be easier in elementary schools. In both sectors, however, to retain the critical mass of shared knowledge and dialogue, it has been found essential that new staff members are inducted into teaching for information literacy.

One solution to this challenge is to create professional development resources centered on information literacy and available online to all educators. Moore and Page (2002) compared the professional development gains of those contributing to such a resource through instructional design for information literacy, and of those who adopted or adapted the learning activities for use in their own classrooms. Both groups of teachers reported personal information literacy learning, reflected on teaching practice, and evaluated subsequent learning outcomes of students. The development group had instructional support from researchers in workshops and school visits.

Formally documenting planning, teaching, and evaluation of learning activities, with an explicit focus on information literacy for the benefit of teaching colleagues, was highly rewarding and motivating, if challenging.
Development participants were involved in evidence-based practice (Todd, 2001) and were able to articulate and substantiate claims of immediate changes in students' learning outcomes.

In contrast, teachers previously not experienced in information literacy instruction had extended opportunities for self-directed learning using the curriculum and other resources produced by their colleagues. They similarly evaluated personal learning, teaching practice, and students' learning outcomes, but much less formally. Despite their rather superficial and erratic use of the online resource, they claimed to have gained a better understanding of information problem-solving processes and were impressed by students' learning outcomes that resulted from learning activities designed by their more information-literate colleagues. However, in interviews, a number spontaneously admitted that they did not see themselves as self-directed learners. Although this is of concern, the study proved promising in that it raised teachers' awareness of the need to address information literacy for their students, and their attempts were rewarded by students' responses. We hope this has increased their readiness for more directed professional development. The clear winners were the teachers who developed materials for colleagues. It is, therefore, suggested that establishing an intranet in a school to build and manage information literacy knowledge could be a powerful tool in professional development.

More typically, school librarianship education has a broader focus than is provided to practicing teachers or librarians. Depending on prior training, the emphasis of its content may vary accordingly. For example, in a survey identifying essential competences for teacher-librarians in

Malaysia, Abdullah and Singh (2000) found that practicing teacher-librarians with minimal library training, library educators, and supervisors from departments of education all ranked competences in information literacy below those of traditional librarianship, management, and technology. This may reflect participants’ confidence in their prior educational training and their perception of knowledge gaps. In contrast, in Sri Lanka, a program is currently underway to establish school libraries and teacher-librarianship training simultaneously (Wijetunge, 2002). Participants in this program will initially be qualified librarians for whom the key focus will be on educational issues. Outcomes from professional development in both these countries are likely to be encouraging in their effect on school library use by students and teachers, but in the short term will vary in terms of information literacy.

Overall, programs involving teachers and teacher-librarians in authentic learning situations that require doing information literacy intensively through instructional design and action research appear to achieve the most powerful changes in knowledge and practice. Actively engaging in and reflecting on collaboration and the nature of resource-based learning are essential factors in establishing these wise practices in schools. Although such programs could meet the needs of most of the teaching pop-
ulation, effectiveness will be enhanced by the existence of well-developed, well-managed school libraries. The ability of qualified teacher-librarians to interpret and manage the underlying resource demands and maintain a coherent and consistent overview of developmental needs as information-literate school communities develop should further enhance the professional development and practice of information literacy. The approaches to information literacy development embedded in the teacher-education initiatives described above rely on voluntary engagement in further study. However, in some regions, national programs and projects support this engagement and/or prompt systematic information literacy development from other directions. In particular, ICT initiatives seem to begin with a focus on technological awareness of educators and provision of hardware, but shift to enhancing learning through information literacy.

Government Initiatives: Promising Practices

Singapore was one of the first countries to produce a coherent information policy backed by an action plan and budget commitment (Butterworth, 2000). However, Butterworth's summary indicates that the focus at this stage is on access to information through technological and library resource development. A reference service, Ask TIARA, is available to all users of the library network, but Butterworth suggests that the growth of use has not been as rapid as hoped. Also provided is "access to selected and safe Internet sites for students who need information for homework or project work." Reliance on a mediator is an immediate and practical solution where the move to greater independence in information seeking will take time.

A parallel strand of the information policy is to reform the educational system with the aim of moving "from a content-based curriculum dependent upon rote learning to a system that produces creative thinkers" (Butterworth, 2000, p. 166). However, dual-qualified teacher-librarians with a full-time commitment to the library are scarce, and perhaps as a consequence, the ICT face of information literacy (Bruce, 1997) is more in evidence than other faces. This may change as pilot projects in a few schools have been set up to develop and catalyze integration of ICT in learning and teaching, but the educational wellspring of creative thinking is less apparent. This is similar to the emergence of information literacy in the Malaysian Smart Schools project (Chan, 2002) in which ICT and the concept of resource-based learning have a high profile—but the pedagogical practices necessary to information literacy promotion are less clearly delineated.

In contrast, principles of learner-centered, holistic development, integrated teaching and learning, and an emphasis on learning how to learn are at the core of new outcome-based education policies in South Africa (Zinn, 2000). Zinn comments, however, that implementing teaching for active learning, independent thinking, and learning from the environment is challenging because of the scarcity of materials. This is partly due to the multilingual nature of South African society (resources are required in 11
languages), inadequate funding, and the effects on the publishing industry of frequent changes in mandated curriculum content. Despite this, information literacy is embedded in generic cross-curricular outcomes, particularly in terms of students being able to "collect, analyse, organise and critically evaluate information" (p. 219). Other skills deemed critical to educational outcomes and that contribute to the wider view of information literacy—problem-solving, research, communication, teamwork, technological and environmental literacy, cultural and aesthetic literacy—include those underlying development of a global outlook and personal responsibility. Thus, rather like the New Zealand Curriculum Framework (Ministry of Education, 1993), the elements are present, but the overarching concept of information literacy is more elusive. The Ministry of Education (2002), in collaboration with the National Library of New Zealand, published new school library guidelines with a strong information literacy focus, which may provide a viable model for South Africa and other countries that are endeavoring to strengthen the framework supporting the promotion of information literacy.

As in other countries (developed and developing), perceived barriers to implementation of these South African education policies are identified as arising from the need for teacher education and understanding of both cognitive principles and school librarianship (Zinn 2000; Radebe, 1998). Several steps have been taken to facilitate change, however. To supplement existing diploma courses, a new certificate program has been established to encourage teachers to train as teacher-librarians. An information literacy framework for educator development is being developed; ICT professional development is underway; and for the first time, a National School Library Policy has been created (Zinn). In addition, workshops targeting primary schoolteachers are regularly run by the Western Cape Education Department, focusing on information literacy skills advocacy and supporting project work (Czerniewicz, 1999)—although the value of one-off workshops is challenged by Hart (1999). Examination of past IASL conference proceedings shows that South Africa has an active group of educators who both conduct research and focus attention on improving learning through school librarianship. Indeed, the annual conference of IASL was hosted in Durban in 2003. This focus for action will further catalyze interest and enthusiasm and provide professional development opportunities.

A survey of reports (ranging from official to informal) submitted to the IASL Assembly of Associations (IASL Communiqué, 2002) shows a variety of developments that actively target information literacy or the resources necessary for its development. I include a few here, emphasizing those in developing countries. Advances in Denmark are included, however, to illustrate the implied strength of government support for information literacy.

A separate Danish School Libraries Law has been enacted to emphasize that school libraries are a part of the education system. Thus it is mandated that all independent schools have a library that operates as a
learning resource center where students are encouraged to collect, process, and disseminate information and knowledge from a wide variety of media. A ministerial order and set of guidelines was created for implementation by local authorities. All Danish school librarians are teacher-librarians with classroom teaching obligations; none is located full time in the library; and all have colleagues who share their specialist knowledge and responsibilities. Their basic training is now to be supplemented by extended courses and continuing education, and although information literacy as such is not mentioned, it is strongly implied in descriptions of students' learning outcomes.

In Latvia, it is reported that the Ministry of Education has provided school library automation systems, and the University of Latvia is providing teacher-librarians with free training. According to Latvian law, the school librarian is a pedagogical worker. From 2002, all school librarians will need library or higher pedagogical qualifications; however, the emphasis on information literacy in their education is not apparent from the report.

In Oman, the focus is on provision of resources, and a five-year plan to introduce a new education policy is being implemented. More than 320 new schools, each with a learning resource center including basic equipment but few books, have been established since 1998. Despite lack of print resources, the information skills curriculum for grades 1 to 6 has been developed by an adviser and is being translated into Arabic. Previously, most teaching was based on memorizing the Koran.

Similarly, the Ministry of Education in Chile is implementing a plan to provide educational resources to 500 of the poorest and most vulnerable primary school libraries. However, with 8,500 schools, budgets are overstretched. In a parallel development in the UK, the Ministry of Education is targeting literacy and numeracy based on a national strategy for primary schools. This project includes teacher education as well as support for students from kindergarten to grade 4.

These brief examples illustrate promising practices in the development of infrastructure that will support information literacy development. Several are the result of sharing information and expertise between developed and developing countries. An international framework that further supports these efforts is seen in the IFLA/UNESCO School Library Manifesto, the content of which has major implications for progress in information literacy. This document has been translated into more than 24 languages, which appear on several Web sites. Together with the associated School Library Guidelines, access to all has been centralized by the IASL School Libraries Online Web site (http://www.iasl-slo.org). Dissemination of guidelines and practical examples is essential to assisting educators worldwide. It is an understatement to conclude that developing information literacy across disparities in technological and intellectual resources is challenging. Students' and teachers' learning needs are complex. Following from the above discussion, however, some recommendations can be made.
Recommendations

The concept of information literacy promises economic and social growth in that it enables people to make sense of information-rich environments and to participate in their communities. However, learners exposed to information literacy experiences respond rapidly. This may change what can be learned and when, thus setting them apart from those taught by other methods. As a consequence, information literacy has the potential to expand existing learning divides. The impetus for information literacy in schools tends to come from four quarters: those responsible for library services to schools, educators, economists, and information technologists, as well as their supporting professional associations. To create a balanced vision of information literacy that encompasses the goals of each sector, sound communication between advocates and stakeholders is essential.

Governments need to establish advisory groups to ensure that:

- there is a clear understanding of what is to be achieved and why it is desirable;
- coordinated plans for implementation are developed so that top-down and grassroots strategies from each sector merge in an effective and timely fashion; and
- internationally recognized publications such as the IFLA/UNESCO School Library Manifesto, the information literacy standards (AASL and AECT), and rubrics for assessment (Colorado Department of Education) are critically analyzed for aspects that can be adopted or adapted to local resource conditions and students’ learning needs as the basis for short-, medium-, and long-term planning.

Information literacy has been predicated on the assumption that basic education facilities already exist. Recognizing that the information in information literacy is not restricted to print and digital media makes possible a degree of seeking and thinking with and about information wherever communities exist.

Government departments responsible for education and the provision of library and information resources to schools need:

- to give urgent attention to the availability of print and digital learning resources reflecting the cultures and languages of learners in educationally disadvantaged regions;
- to ensure that information literacy is an identifiable and explicitly addressed aspect of even the most basic curriculum, including speaking, viewing, image-making and learning to read; and
- to ensure that developmental views of information literacy take account of the changing abilities of learners and the evolution of information environments.

At present, information literacy appears more likely to be addressed in the training of teacher-librarians who represent but a small minority of the teaching workforce. Many teachers who espouse the aims of the concept are uncertain when and how to include information literacy in their teaching.
Departments of education, qualification authorities, and tertiary educators need to ensure that:

- preservice teachers experience information literacy as an aid to them as learners, instructional designers, and responsive facilitators of learning;
- newly qualified teachers are competent to develop information literacy experiences for their students within the constraints of available resources;
- professional development for inservice teachers involves personal experience in learning through information literacy and ICT, collaborative instructional design, teaching, and evaluation of student outcomes; and
- education for school and/or teacher-librarianship maintain a focus on consistent, coherent information literacy development, as well as more traditional library management and technological concerns.

Information literacy approaches to education have the potential to affect school organization, management, and culture as well as students’ learning outcomes and relationships between staff and students. They represent a way of teaching that may not always be compatible with current pedagogy and culture.

Policy developers in education and library service provision and local school administrators need to develop transparent action plans that:

- include sufficient time and resources for monitoring and revising the process of establishing information-literate school communities;
- are informed by the findings from school improvement and change management research;
- provide a variety of models to guide the application of information literacy concepts alongside more teacher-directed learning methods; and
- are informed by knowledge of the critical relationship between principals and teacher-librarians in establishing collaborative teaching and the development of information literacy school communities.

At this stage in the development of information literacy practices in schools, it is difficult to isolate the effects of these practices from those of parallel ICT and library program. It is, therefore, challenging to demonstrate the value of information literacy experiences to educators who have restricted access to ICT and libraries.

Research supported by governments, tertiary institutions, library organizations, and the corporate sector is required:

- to identify the long-term academic and social gains of information literacy-based learning programs for students of all ages and abilities;
- to identify promising practices in teaching for information literacy where resources and teacher-librarians are well established;
- to develop educational models for achieving improved information literacy where resources are limited and teacher-librarians are not available;
to identify the parameters of effective information literacy-based professional development and its long-term effects on educators; and

- to focus on evidence-based practice as a fundamental tool in teaching, monitoring, and evaluating local information literacy initiatives.

In addition to research findings, basic practical knowledge needs to be disseminated. Even in technology- and information-rich communities, teachers often turn to colleagues rather than to documents for professional extension. However, the wealth of resources centered on teaching for information literacy reflects the demands of local curricula and students’ learning needs. This makes many inappropriate for application in less educationally advantaged nations. The practitioners who create materials are responsive, skilled instructional designers, collaborators, and educators.

Governments, nongovernment organizations, and professional organizations need to support the dissemination of research findings and practical knowledge through:

- development of initiatives that facilitate collaboration and mentoring across cultural and national boundaries (e.g., professional exchanges and study tours);

- publication programs including basic guides on school library and ICT resource development, information literacy practices, and research findings; and

- open and closed forums catering to the learning needs of a continuum of newcomers through to experts, practitioners, policymakers, administrators, and researchers.

The Final Word

The movement towards more open and democratic societies has created a need for learning that goes beyond the academic curriculum and factual knowledge to emphasize problem solving and open-ended enquiry. No country can expect to function successfully with rigid and closed education systems. In order to be relevant the content of basic education must be geared to exploratory learning including all learners and encouraging them to take an active role in planning decisions. (Johnston, 2000, p. 20)

References


**Author Note**

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