

An Analysis of Information Literacy Education Worldwide

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1. 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 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 instance, 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. While adults may have accumulated experiential knowledge to assist them in sifting and evaluating information, frequently children consider 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 in 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 technologically rich environments (Kuhlthau, 2001) for the purpose of learning or solving problems. However, it is widely recognised that in even the most technologically advanced countries, efforts to prepare students for the information age have been only partially

successful and implementation of recommendations from information skills research have been slow and difficult to implement (e.g. Kuhlthau, 2001; Rogers, 1994).

This paper will explore some of the factors facilitating and hindering the drive towards 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 those people interested in promoting effective school library programmes as viable instruments in the educational 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 will also be made to literature providing broader contextual information.

The paper will conclude with some recommendations concerning strategies and practices necessary to increasing information literacy in the compulsory school sector.

2. INFORMATION LITERACY—THE CONCEPT AND ITS APPLICATION IN COMPULSORY EDUCATION

While 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), behavioural 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 more than detailing extensions of the curriculum and learning outcomes made possible by information literacy abilities.

Information literacy standards and rubrics provide behavioural descriptors to guide curriculum design and evaluation of student 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 ten steps and have been developed in many countries, among them the UK, USA, Canada, Scotland, Australia, and New Zealand. These models are perhaps the most familiar face of information literacy in schools and provide educators with a framework within which specific information skills can be targeted and their coordination can be fostered. They form one focus of the school library programmes that are typically a major force for information literacy promotion. School library programmes usually also address literature appreciation and may include understanding information “as something that is created, organised 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 modelling and scaffolding (Moore & Page 2002). Its central processes draw on critical thinking, problem solving, and 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 (see for example, Eisenberg and Berkowitz, 1988; Johnson and 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. While 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 traditionally applied elsewhere. Information literacy demands a new way of thinking about learning and teaching which may be in conflict with cultural standards and expectations concerning the roles of students and educators. Consequently, Luke's (2000) caution against the generalisation of any educational approach from one nation or region, and its embedded cultures, is apt for consideration.

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 in which the focus is on learning, rather than teaching, and developing mastery of the processes of becoming informed. That 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 point in time are more likely to demonstrate a profile of contextualised 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 constant 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 organisations (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 impact 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 organisation, 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 central concern for some staff (Moore & Trebilcock, in preparation).

The task of comparing information literacy progress made within and between nations is challenging because, as will be seen, the emphasis within initiatives reflects the perceptions of their originators and the constraints of their information environments. Thus, echoing Bruce's (1994) relational model, for some originators, ICT knowledge and abilities predominate as information literacy programme goals, while others focus on library skills (organisation and control of information) and others again 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.

Further, Bruce makes the comment that if an individual sees information literacy as dependent upon ICT skills and technical knowledge to which one has no access or is unready to acquire, then information literacy may appear to be beyond 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, information literacy may not only be an unattainable goal, it may be deemed irrelevant at this time. Information environments of the 21st century are far from homogenous. 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.

3. FROM LITERACY TO INFORMATION LITERACY AND SCHOOL LIBRARY PROGRAMS

As information environments have evolved, the notions of literacy and literacy education have changed. For example, the PISA 2000 (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 that, “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 findings suggest that the majority of 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” (OECD, 2002, p. 22).

This finding echoes those of the IEA studies, linking reading development with resource provision (Elley, 1992, 1994), and the large quantitative school library studies conducted in Colorado and Texas (Lance et. al, 1993, 2000; Smith, 2001). 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 programmes and student performance, regardless of socio-economic factors. From these studies it can be inferred that “well-developed” school library programmes 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)

It is however, difficult to isolate the effects of teaching for information literacy from resource levels implied by the term “well-developed school library programme.” 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 programmes 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 underpin successful school library programmes, and
- need to lead to active engagement of the library in the teaching and learning process such that specific impacts can be articulated to attract the support of school leaders

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

- improved student performance results from systematic and explicit development of abilities to connect with, interact with and utilise information to construct personal understanding,
- flexible instruction at the time of need is most effective in developing student competence, and
- active reading programmes 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 programme are not freely available in all countries. This should not be taken to imply that information literacy is beyond reach, rather that those intending to create information literate school communities may need additional strategies in their journey towards 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 programme 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 these, are as yet limited. Through investigation of their own communities, students have access to local voices and knowledge that can catalyse 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.

4. STUDENTS LEARNING NEEDS—PROMISING PRACTICES

Even in comparatively resource-rich countries, many teachers agree that information literacy is important while admitting to an uncertainty concerning how to promote it. As tools to assist educators, developmental approaches to information literacy teaching 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, Math, and English. One important characteristic of this tool is that it is designed to be adopted or adapted to the requirements of particular schools. Capra and Ryan make point that, “Responsibility for implementation of integrated Information Literacy lies with the entire staff of a school” (p. 6). While not disagreeing with that 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 step of information problem solving in terms of Bloom’s Taxonomy rather than as a matrix of skills. Both approaches inform educators of the skills, attitudes, knowledge and thinking processes to be developed, but there are still many teachers who believe these skills will arise almost by osmosis if students are exposed to resources.

Countering this view, and showing that little has changed since Elliott (1976-7) demonstrated that provision of appropriate curriculum materials is insufficient to inquiry learning, Bishop (1999) found that even able fifteen year-olds in the USA varied markedly in ability to find and use information independently. All ten students in her study were highly dependent upon 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 percent of 8 to 9 year-old students showed little development of skills in clarifying information needs. Although 12 to 13 year-olds were more successful on tasks requiring these skills, around half of them still struggled (Crooks and Flocton, 1998). These are just two examples from the literature (which abounds with studies from around the world) identifying gaps in information skills related to learning tasks using libraries in general, specific print resources and ICT, as well as the Internet (e.g. Todd, 1998; Branch 2001; Yitzhaki & Bibi, 2001).

Case study research suggests that applying models such as the Big Six Skills[®] (Eisenberg and Berkowitz, 1998) in teaching, and explicitly drawing student attention to thinking while information handling, 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 within 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, there is promising, but similarly limited, evidence from new entrant classrooms in New Zealand that modelling information processes through 'shared reading' motivates beginning readers to engage with and seek out relevant text (Moore & Page, 2002). In the context of a body awareness activity, three teachers each read non-fiction tables of contents aloud, inviting identification of chapter headings likely to contain information about the heart. Five-year olds responded enthusiastically to this modelling of information seeking 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 a period of three weeks, what could be taught changed. Further, 'at-risk' readers at age 9 and 10 have been found to move from reluctance to enthusiasm when specialist reading support sessions over a five-week period were founded on information literacy (Poulopoulos, 2000). The critical gains for these children included a sense of purpose for learning to read (other than "to know more words"), confidence to participate in discussion, willingness to seek clarification of meanings and greater independence in information seeking. Skills 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 & Naylor (2000) report improvements in learning, writing and information skills. In an interesting extension of this, Harada (2001) concluded that Hawaiian 10 and 11 year olds engaged in journal writing as part of an information literacy initiative demonstrated increased cognitive and metacognitive understanding of the information search process, although it was still a challenge to verbalize thinking processes. In line with Kuhlthau's (1993) affective model of information problem solving, journal writing also assisted these students in verbalising and sharing personal feelings and emotions centres on school research tasks. A teacher working with Moore and Page (2002) got 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 information seeking and use. Rather, students seem to develop personally and socially on a wide range of fronts that affect 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 test its effects on learning outcomes thoroughly. One generalises from case studies with great caution.

A note of concern, that supports the call for longitudinal studies, arises from a comparison of Canadian and American studies. Streitenberger and McGregor (1999) compared three naturalistic studies conducted over a three year period and found that not only did younger students (8 year-olds) appear to be more process oriented than older students (16 year-olds),

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 the understanding existing at elementary level might 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 the time of their entry to 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, those 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 student 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.

5. TEACHING THE TEACHERS

Citing several researchers, Henri (2001) comments that development of information literacy in schools is predicated upon 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. He found in investigating information literacy among 91 practicing teachers and trainee teacher-librarians in Australia 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) gives colourful support to the same conclusion in her case study examination 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 (e.g. Haycock, 1998; Hopkins & Zweizig, 1999; Todd, 2001; Henri, Boyd & Eyre, 2002). The success of this is influenced by organisational and management structures in schools, a point perhaps contributing 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 different understandings of the roles school and teacher-librarians are permitted to take in various education systems, but more fundamentally, differences uncovered by Henri (2001) in the information behaviours of teachers may also be operating.

Professional development concerning 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 that is undertaken by only a small proportion of teachers in each country. There are still few indications reflected in IASL conference

publications that information literacy has been targeted effectively in pre-service and continuing teacher education.

For instance, the Library Power project in the USA 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, p. 40). In the course of that period, the project must have touched many established and newly qualified teachers, yet in evaluating the project, Zweizig and Hopkins (1999) report 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, while Library Power outcomes are encouraging, an in-depth comparison of inquiry based learning in two participating schools echoes the findings of Elliott (1976-7). 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 concerning 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, emphasis added)

While 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, pre-service teachers in the US have been found to adhere to the view that qualified teacher-librarians have a very limited role in teaching and learning (Wolcott, Lawless & Hobbs, 1999)—thus perpetuating existing modes of school library use. In as much that teachers are products of their school experiences and across the world have similar characteristics, 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, 2002). What specific attention to information literacy standards and ‘well-developed’ school library programmes led by qualified teacher-librarians appear to add is an impetus for a coherent and consistent developmental approach to student learning and

teachers' practice (Moore and Trebilcock, in preparation, Todd, 2001). However, the progress towards information literacy where such experts are employed can still be slow and difficult if the potential of their role is little understood.

6. TEACHER EDUCATION—PROMISING PRACTICES

A promising approach to reducing the inertia identified by Rogers (1984) and Kuhlthau (2001) is found in a pre-service teacher education programme studied by Asselin & Naslund (2000). This programme included extensive collaboration between pre-service 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 involving collaborative teams of in-service teachers, teacher-librarians and pre-service teachers, together with university researchers and consultants. In this setting, Doiron (1999) reported that authentic learning environments enabled pre-service teachers to experience collaborative planning and teaching and gain a better understanding of the role of teacher-librarians and school libraries. At the same time, they participated in action research concerning effective teaching strategies and were able to act as information technology mentors to established teachers. This empowered pre-service teachers as instructional designers, collaborators and mentors and highlighted how ICT and school library programmes can affect student information literacy learning. These two programmes contain all the factors that would prepare teachers to engage in what Todd (2001) referred to as 'evidence-based practice,' to be discussed in an example that follows.

Tertiary educators in New Zealand have taken a different approach to teacher education. Here school library programmes are not well developed. Few schools opt to employ qualified teacher-librarians, particularly at elementary level. Within the context of the part-time teacher-librarianship education programme, however, information skills modules have been offered to cohorts of classroom teachers in individual schools for over a decade (Gawith, 1998). These have proved to be popular, as elementary school Principals in particular tend to prefer 'whole-school' staff development. The organisation, delivery of the curriculum and the emphasis on learning evaluation differs 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 to be essential that new staff members are inducted into teaching for information literacy (Moore & Trebilcock, in preparation).

One solution to this challenge is the creation of professional development resources centred 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 those adopting or adapting the learning activities for use in their own classrooms. Both groups of teachers reported on personal information literacy learning, reflected on teaching practice and evaluated subsequent student learning outcomes. 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 basically involved in evidence-based

practice (Todd, 2001) and were able to articulate and substantiate claims of immediate changes in student learning outcomes.

In contrast, teachers previously un-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 student 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 student learning outcomes resulting from learning activities designed in by their more information literate colleagues. However, in interviews, a number spontaneously admitted that they did not see themselves as 'self-directed learners'. While this is of concern, the study proved to be 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. This has hopefully increased their readiness for more directed professional development. The clear "winners" were the teachers who developed materials for colleagues. It is therefore suggested that an intranet established to build and manage information literacy knowledge within a school could be a powerful tool in professional development.

More typically, school librarianship education has a broader focus and 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 competencies 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 competencies related to 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 programme is currently underway to simultaneously establish school libraries and teacher-librarianship training (Wijetunge, 2002). Participants in this programme 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 will be, in the short term, different in terms of information literacy.

Overall, programmes involving teachers and teacher-librarians in authentic learning situations that require intensively *doing information literacy*, through instructional design and action research, appear to reap 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. While such programmes could meet the needs of the bulk of the teaching population, effectiveness will be enhanced by 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 information literacy professional development and practice.

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 programmes and projects are supporting that engagement and/or prompting 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 then may shift to a focus on enhancing learning through information literacy.

7. 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, the summary provided by Butterworth indicates that the focus is, at this stage, 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 usage growth 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.” The 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” (p. 166). However, there is a scarcity of dually qualified teach-librarians with a full time commitment to the library, and perhaps as a consequence, the ICT face of information literacy (Bruce, 1997) is more in evidence than others. This may change as pilot projects in a few schools have been set up to develop and catalyse integration of ICT in learning and teaching, but the educational well-spring of ‘creative thinking’ is less apparent (Butterworth, 2002). 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 necessary materials. This is due in part to the multilingual nature of South African society (resources are required in eleven 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 contributing to the wider view of information literacy include—problem solving, research, communication, teamwork, technological and environmental literacy, cultural and aesthetic literacy—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 very strong information literacy focus, which may provide a viable model for South Africa and other countries endeavouring to strengthen the framework supporting information literacy promotion.)

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, and particularly Radebe, 1998). Several steps have been taken to facilitate change however. Supplementing

existing diploma courses, a new certificate programme 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, 2000). In addition, workshops targeting primary school teachers 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 a very active group of educators both conducting research and focusing attention on improving learning through school librarianship. Indeed, the annual conference of IASL is being hosted in Durban in 2003. This focus for action will further catalyse interest and enthusiasm, as well as providing professional development opportunities.

A survey of reports (ranging from official to informal) submitted to the IASL Assembly of Associations (IASL Communique 2002) shows a variety of developments actively targeting information literacy or the resources necessary to its development. Just a few are included here, with an emphasis on those from developing countries. Advances in Denmark are included however as an illustration of the strength of government support, by implication, for information literacy:

A separate Danish School Libraries Law has been enacted to emphasise that school libraries are a part of the education system. Thus, it is mandated that all independent schools will have a library, which operates as a learning resource centre 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 has been created for implementation by local authorities. All Danish school librarians are teacher-librarians with classroom teaching obligations, none are 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 implied strongly in descriptions of student learning outcomes.

In Latvia, it is reported that the Ministry of Education has provided school library automation systems and 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 have to have library or higher pedagogical qualifications, however, the emphasis on information literacy in their education is not apparent from the report received.

The focus is on provision of resources in the Sultanate of Oman where a five-year plan to introduce a new education policy is being implemented. More than 320 new schools, each with a learning resource centre 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, there are 8500 schools and budgets are over-stretched. In a parallel

development the Ministry is targeting literacy and numeracy, based on a National Strategy for primary schools in the UK. 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 infrastructures that will support information literacy development. Several are the fruit 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 information literacy progress. 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 centralised 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. Student learning needs and the learning needs of teachers are complex. From the preceding discussion, however, some recommendations can be made.

8. 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 enlarge existing learning divides.

The impetus for information literacy in schools tends to come from four directions: 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 recognised 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 analysed for those aspects that can be adopted or adapted to local resource conditions and student learning needs as the basis for short, medium and long term planning.

Information literacy has been predicated upon the assumption that basic education facilities already exist. Recognising 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;
- 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
- ensure that developmental views of information literacy take account of changing abilities of learners and evolution in information environments.

At present, information literacy appears to be 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:

- pre-service 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 in-service teachers involves personal experience in learning through information literacy and ICT, collaborative instructional design, teaching and the 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 effect school organisation, management and culture as well as student 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, as well as 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 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 practises in schools, it is very difficult to isolate the effects of those practices from those of parallel ICT and library programme effects. It is therefore challenging to demonstrate the value of information literacy experiences to educators with restricted access to ICT and libraries.

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

- identify the long-term academic and social gains of information literacy-based learning programmes for students of all ages and abilities,
- identify promising practices in teaching for information literacy where resources and teacher-librarians are well-established,
- develop educational models for achieving improved information literacy where resources are limited and teacher-librarians are not available,
- identify the parameters of effective information literacy-based professional development and its long-term effects on educators, and
- focus on evidence-based practice as a fundamental tool in teaching, monitoring and evaluating local information literacy initiatives.

In addition to research findings, there is a need for basic, practical knowledge to be disseminated. Even in technology- and information-rich communities, teachers often turn to colleagues rather than documents for professional extension. However, the wealth of resources centred 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.

Government, non-government organisations and professional organisations need to support 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 programmes 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 new comers through to experts, practitioners, policy makers, administrators and researchers.

9. 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 emphasise 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, p. 20)

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