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As we may think: Information literacy as a discipline for the information age

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Abstract

The aim of this paper is to propose information literacy as a soft applied discipline, of key importance in the information society. This is contrasted with the characterization of information literacy as a personal attribute in the U.S. and Australian Information Literacy standards. Vannevar Bush's vision of the technologically connected and enabled scientist is used to introduce a discussion of citizen's information needs and responsibilities in an age of "cheap complex devices." The authors emphasize the key role of information literacy in this information society. Information literacy is identified as a soft applied discipline, with reference to disciplinary indicators that have been identified in the literature. Building on this concept of an information literacy discipline, the authors propose a mission for information literacy education focused around three elements: information literacy for citizenship, information literacy for economic growth, and information literacy for employability. The paper concludes by identifying that in terms of preparing citizens for managing and taking action in society, information literacy has much to contribute, and that it is vital to nurture this emergent discipline.

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1. Introduction

"The world has arrived at an age of cheap complex devices; and something is bound to come of it." (Bush, 1945).

The aim of this paper is to propose and justify information literacy as a discipline; specifically a soft applied discipline rather than (as it has been portrayed in key documents) as a set of personal attributes. As part of our argument, we will outline the broad social relevance of information literacy beyond library and educational concerns.

We begin by using the seminal paper by Vannevar Bush (1945) *As We May Think* as a touchstone for reflection on the current situation. This is to seek a historical perspective which, by emphasizing similarities and differences between Bush's time and our own, may illuminate information literacy as a social phenomenon.

Bush's paper might be regarded as describing a microcosm of the information society, with the boundaries tightly drawn by the interests and experiences of a major scientist of the time, rather than the more open knowledge spaces of the 21st century . He was looking forward speculatively to where we now are and we will look back through his speculations, as we reflect on the current situation.

Bush provides a core vision of the importance of information to industrial/scientific society, using the image of an "information explosion" arising from the unprecedented demands on scientific production and technological application of World War II. He outlines a version of information science as a key discipline within the practice of scientific and technical knowledge domains. His view encompasses the problems of information overload and the need to devise efficient mechanisms to control and channel information for use.

In essence, Bush articulated a recognizable picture of modern information-based society, albeit framed narrowly in the domain of scientific work, and the pressure of documents generated by that work. He clearly envisaged a technological solution to the information problems he identified: Memex. "A Memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility" (Bush, 1945). Even more important is Memex's "associative indexing" (Bush, 1945), which enables its user to access links and trails of associated material and ideas.

Bush's vision may be viewed as a manifesto for technologically enhanced improvements in information handling skills. However, he underlined the limitations of technology, particularly in terms of aspects of human thinking, and he acknowledged "creative thought" (Bush, 1945) as fundamental to his vision of an advanced scientific society. In this respect, he adopted a holistic approach to information behavior: acknowledging its relationship to the human nature of knowledge creation as much as its relevance to techniques for recording and retrieving specific documents.

It is arguable that Bush's vision of cheap, efficient, and readily available information technologies has come to pass. Indeed it is evident that contemporary Computing and Information Technologies (C&ITs) are now widely distributed in the general population, and at

all levels of organizational life in the Organization of Economic Cooperation and Development (OECD) nations. The information interconnectedness that Bush envisioned has spread well beyond the communities of scientific expertise that he envisaged as the prime beneficiaries of "Memex." We will extend Bush's vision by exploring some of the consequences of a wider social experience of "information explosion".

In the next section, we will contrast what we characterize as a "personal attribute" approach to information literacy with our own view of the information literate person in a changing information society. We will go on to propose information literacy as an emerging discipline and reflect on an appropriate curriculum for this discipline. As a starting point, we will use two contemporary "standards" for information literacy, one American, the other from Australia and New Zealand, both of which foreground information literacy as a personal attribute.

2. Information literacy: from personal attribute to information literate person

Two influential documents are the Association of College and Research Libraries (2000) *Information Literacy Competency Standards for Higher Education* and the Australian and New Zealand (Bundy, 2004) Information Literacy framework. The first edition of the latter document (Council of Australian University Libraries, 2001) was based on the former one, and even in the 2nd edition some material remains the same.

The American standards are explicitly focused on identifying desirable outcomes for the information literate student; they provide "a framework for assessing the information literate individual" (p. 5). Information literacy is conceived as a "set of abilities" (p. 2) or "cluster of abilities" (pp. 3 and 5). The Australian framework, focusing on the information literate person, "provides the principles, standards and practice that can support information literacy education in all education sectors" (Bundy, 2004, p. 3); it "incorporates standards and learning outcomes that consist of characteristics, attributes, processes, knowledge, skills, attitudes, beliefs and aspirations associated with the information literate person. the standards are grounded in generic skills, information skills and values and beliefs" (p. 7).

The approach in both documents is characterized by enumeration of knowledge and skills in a series of sections, each relating to a particular standard. We would also contend that there is a discernable bias towards library skill sets and educational settings, for example in Standard 2, which concerns finding "needed information effectively and efficiently." In particular, the American standards give detailed examples of library-based or education-related strategies. The Australian and New Zealand document explicitly links information literacy with graduate attributes "sets of generic capabilities that have been identified by universities as those which are desirable for all graduates to possess by the end of their course, irrespective of their field of study" (DEST, 2003, p. 20). In its preface, Catts (in Bundy, 2004, p. 1) notes that one key aim in this 2nd edition is to seek to "place the standards in the broader context of generic skills, of which information literacy is the core component." In a substantial portion of the preface, Catts discusses the history and nature of information literacy as a graduate attribute, including its boundaries with other graduate attributes.

The linkage to generic skills in the Australian framework is understandable given that Australian Higher Education Institutions (HEIs) have a mandate from government to include statements of graduate attributes in their teaching and learning programs (DEST, 2003). In the United Kingdom (UK) context, there is a resonance given the importance that state, graduate employer and higher education (HE) sector leaders place on the development of "key skills" for employability within undergraduate programs (National Committee of Enquiry into Higher Education, 1997). Although information literacy is perhaps less clearly delineated in the UK skills debate than in Australia, nonetheless there are opportunities for librarians and others to advance information literacy under this heading.

There is therefore a strong link between the standards and tangible aspects of HE policy and practice in relation to the notion of graduate skills and attributes. However, there is also a focus on employability and information skill sets needed for study. It is disappointing that one of the most interesting changes to the U.S. original in the 1st edition of the Australian standards (the addition of a standard concerned with citizenship) was dropped in the 2nd edition in favor of introducing "overarching principles." These principles, including the statement that information literate people "demonstrate social responsibility through a commitment to lifelong learning and community participation" (Bundy, 2004, p. 11), still demonstrate more awareness of the social context of information literacy than do the U.S. standards. However, there is more emphasis in Australian educational institutions on integrating the standards (rather than these overarching principles) and the preface and introduction to Bundy (2004) discuss educational, rather more than lifelong learning, settings.

We, in contrast, have shifted the emphasis more firmly from personal attributes developed mainly in educational contexts to the information literate person, situated in a range of dynamic, social, and personal contexts (see Fig. 1).

Here we make a critical move from approaching information literacy as an enumeration of personal attributes to a concern for the person situated in the information society. It is consistent with a portrait of lifelong education as "a continuous process of forming whole

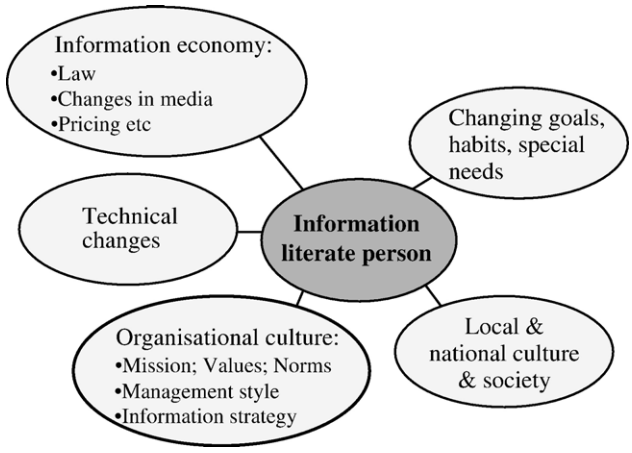

Fig. 1. The information literate person situated in a changing information society.

human beings," which "should enable people to develop awareness of themselves and their environment and encourage them to play their social role at work and in the community" (Delors et al., 1996, p. 19).

This means that our interest shifts to the full range of experiences and is not restricted to the performance of specific information handling activities in a limited range of contexts. Perhaps this shift is best explained by returning to Vannevar Bush's vision. His scientist, operating under conditions of "information explosion" and requiring respite from the tide of scientific documents could be construed as a nascent image of the "Information Literate Person" in an information saturated society. "There is a growing mountain of research. But there is increased evidence that we are being bogged down today as specialization extends. The investigator is staggered by the findings and conclusions of thousands of other workers…" (Bush, 1945).

In our time, however, due to changes in media, technologies, communications, and travel opportunities, many more of us experience "information explosions" and equally we have access to handy devices like computers, mobile phones, and the Internet to channel our experiences. The information society, at least in the OECD nations, now spans a variety of settings, some formal like laboratories, offices, etc., and others more fluid and malleable, such as our homes, coffee shops, airports, and indeed the street. All of us are potentially connected in a chain of varied information relations and transactions, which span the professional, personal, social, and cultural realms of each person's life. All of us are potentially mired in a flux of emails, mobile calls, TV images, and Internet news feeds.

In terms of Fig. 1, there has been a massive development in technology since Bush's time, as the technologies which constellate around mobile computing have come to signify the information society. There has been a sharp change even since Shapiro and Hughes (1996) proposed information literacy as a "liberal art," "knowledge that is part of what it means to be a free person in the present historical context of the dawn of the information age"? We would judge that the dawn has now passed.

This is reflected in the economic sphere, not only by mass production and distribution of cheap devices, or the proliferation of business information, but also by the need for legal regulatory frameworks to control economic activity in digital forms and across national frontiers. This idea of the "Memex" has moved out of the scientist's laboratory and into the full range of organizations that constitute society. Schools, colleges, health care, government, etc., are all implicated in the distribution and use of information, under similar conditions of "information explosion" as Bush's post-war scientists. All these people arguably need some sort of personal "information control" in order to function, and in our terms satisfying this need goes beyond the provision of technologies, to include aspects of thinking and ways of being.

In terms of local and national culture, the information literate person is a self- and socially conscious being, rather than a simple repository of skills and knowledge. This is underlined by cross-cultural difference, where issues of behavior and acceptability of kinds of information become sensitive. Even someone who remains in one country may experience changes in what is perceived as acceptable. For example, laws about what can and cannot be published may change, or developments in the ethnic composition of a country may mean that certain kinds of information are now seen as ethically inappropriate. It is even more obvious that sensitivity is needed if a person starts working in a multinational company or moves to another country.

Attitudes towards information sharing, assumptions about appropriate use of C&ITs, or approaches to evaluating information sources may be different.

A notable change in recent years has been the extent to which "ordinary people" have visibly become creators as well as consumers of information. This encompasses the visual as well as the textual. While photographic clubs have existed, for example, in the UK since the mid 19th century, the combination of mobile phones, digital cameras, social software, and the Internet have put citizen photographers into a new potentially powerful position. Holliday (2005) highlights the way in which photographs taken with mobile phones provide a compelling and unique component of 21st century news coverage. A striking example is a picture taken by a man while trapped underground after the 7 July 2005 bombings in London and blogged within 15 minutes.

Media commentator Jarvis (2005) notes that today "we live in a world where every witness can be a reporter." The increased possibilities for instant creation and publication bring with them the need for citizen photographers and citizen journalists to be aware of both legal and moral implications (Greenslade, 2005), whether they are using C&ITs as the tools of scientific enquiry, to record suffering or to spread opinion and gossip.

3. Information literacy: the discipline

Building on the commentary in the preceding section, we put forward a definition of information literacy as an emergent discipline, which is key to the information society.

> "Information literacy is the adoption of appropriate information behaviour to identify, through whatever channel or medium, information well fitted to information needs, leading to wise and ethical use of information in society." (Johnston & Webber, 2003).

Key aspects of this definition are that

- In line with our argument in the previous section, information literacy is seen not only as a personal experience of need and fulfillment, but also a socialized activity.
- The definition flags up the primary areas of knowledge and research comprising the discipline of information literacy, which we will discuss further in this section.

As to the nature of the emerging discipline, Becher and Trowler (2001) identify indicators of a discipline. We will discuss these in turn in relation to information literacy.

3.1. The existence of professional associations and journals

National associations include the National Forum for Information Literacy (USA) and the Society of College, National and University Libraries' (SCONUL) Working Group on Information Literacy. Geographically close countries have allied to form associations, most notably the Australian and New Zealand Institute for Information Literacy and NordINFOLIT

(Nordic countries). A number of refereed journals now focus predominantly on information literacy, notably reference services review and research strategies.

3.2. The degree to which an international community has emerged

In addition to the examples of national associations mentioned above, the IFLA section on information literacy brings together people from all parts of the world, and the annual World Library and Information Congress has provided a forum for presentation and discussion of international examples of information literacy practice and research. The Meeting of Information Literacy Experts coordinated by UNESCO and the U.S. National Commission on Libraries and Information Science in September 2003 produced the Prague Declaration on Information Literacy, as well as reports highlighting implications and actions in different areas of work, society, and culture (Information Literacy Meeting of Experts, 2003). This has been followed up by further UNESCO-sponsored meetings, for example in Paris in April 2005 and in Alexandria in November 2005, where a second team drawn from different countries and sectors worked on a statement on information literacy to contribute to the World Summit on the Information Society taking place later in the same month (http://www.infolit.org/International_Colloquium/). The international community meets physically at annual conferences such as the Canadian WILU conference, Les Rencontres FORMIST (France), eLit (UK), or the International Lifelong Learning conference (Australia). Virtually, there are discussion lists, blogs, and virtual communities (such as the one set up by Chris Powys, resourced by his UK National Teaching Fellowship; http://www.infoteach.org).

3.3. The existence of academic departments

Here there has been less progress. However, the increasing interest in information literacy as a subject of the curriculum in library and information departments is, for example, evidenced by its inclusion as one of 13 key curriculum areas being discussed and mapped as part of a European Commission project looking at the Library and Information Science (LIS) curriculum in the light of the Bologna Process that harmonizes HE in the European Union (http://www.db.dk/LIS-EU/). Given the mutable nature of LIS departmental titles (see Webber, 2003, for the UK situation), it is not impossible that "information literacy" might become an attractive option.

3.4. Graduate students

Information literacy has become a more popular topic for research students, with Masters and PhD candidates opting to investigate its research problems.

3.5. Identification with the discipline

Some practitioners now have job titles, which identify information literacy as their main area of work. As the number of associations, conferences, and training events increases, so

more information people become professionally involved with information literacy outside as well as within their organization. Researchers are also identifying themselves with information literacy, and starting to form an international research community, which is explicitly focused on information literacy.

3.6. Distinctive language

We would contend that, through discourses written and spoken, on- and offline, a language of information literacy is emerging, drawing on the jargon of LIS and education in particular, and with its own distinctive set of acronyms, and reference to key documents, events, and people.

3.7. Knowledge and research base

Saracevic (1999), discussing information science, notes the need for a discipline to have a knowledge base, identified research problems, and agreement on the preferred range of methodologies. Research questions have, for example, been identified in the U.S. HE context in Association of College and Research Libraries IS Research and Scholarship Committee (2003), and internationally by the Prague Meeting of Information Literacy Experts (Thompson, 2003, pp. 26–27). The nature of the knowledge base and methodologies will be hereinafter discussed further.

We identify this emergent discipline as primarily "soft applied," with some elements of "hard applied," using the typology of disciplines described by Biglan and amended by Becher (1989). Disciplines are identified as hard or soft, depending on the extent to which a paradigm (a consensus on theories and values) exists, and as pure or applied, depending on the extent to which there is a concern about application. Examples are Mathematics (hard pure); Engineering (hard applied); English (soft pure); and Education (soft applied). Characteristics of a soft applied discipline are as follows (Becher, 1989; Becher & Trowler, 2001):

- The nature of the domain is that it draws on clusters of ideas in the soft knowledge domains (as opposed to the objective "value free" hard domains) to interpret and understand situations. Information literacy draws on theory from, for example, information science (the field of information behavior), education, communication studies, and sociology.
- The aim of new knowledge is perceived as enhancement of personal and social life. The focus is on "interpretation" rather than "discoveries." The outcomes of new knowledge are often protocols and procedures, which may be judged in pragmatic terms.
- The growth of the discipline is not steady and linear, but cumulating through case law, with possible reiterations and recursions.
- There is no strong predictability about which research problems should be solved next: there may indeed be debate and disagreement about which are the important "next questions."

This is in contrast to hard pure disciplines in which it is often clear that Problem A has to be solved before Problem B can be tackled.

- The research approach is one of synthesis, with complexity recognized and appreciated. Qualitative methods dominate. The focus is on particular (rather than generalizable) situations, with causality more difficult to establish than in hard pure disciplines. As this is an applied discipline, the choice of research approach may, however, be influenced by the desire for tangible outcomes to the research.

Webber (2003) attributes some of the criticism of information science to inappropriate application of criteria for a hard pure discipline to this applied discipline. For example, information science is criticized for not having its own strong theoretical base and for lacking consensus over the research agenda. She identifies a hard/soft quantitative/qualitative tension within the information science discipline, which can be a source of infighting and acrimony, but is also seen by some authors as potentially fruitful (e.g., Ford, 1999). This soft/hard tension may also be observed within information literacy, in, for example, debates about whether the impact of information literacy needs to be "proved" and what kinds of research might contribute to an evidence base. For example, the information literacy research agenda sketched briefly in Thompson (2003) is focused on investigating and illuminating experiences of information literacy in different communities. In contrast, the Association of College and Research Libraries IS Research and Scholarship Committee (2003) research agenda circles around issues of effectiveness and impact.

In starting to map the discipline, it is useful to identify ways in which it differs from cognate fields: most obviously librarianship and information science. Information literacy differs from librarianship in that librarianship concerns itself with "creation, selection, organization, management, preservation, dissemination, and utilization of *collections* of information" (our italics; Reitz, 2005) for use by third parties. We distinguish information literacy from information science with reference to Ingwersen's (1992) definition of the information science field. Whereas information science is concerned with both the information-using person (centrally, the research field of information behavior) and with developing new information tools (centrally, the research field of information retrieval, with its strong ties to computer science), information literacy is not concerned with the actual development of new tools from scratch, but rather how these tools might be applied by and enhanced for information-using people. Additionally, there is a focus on the context (personal, organizational, and societal) in which information is to be used.

Therefore, information literacy draws on theory, and research approaches, from sociology, psychology, management studies, and media/communication studies to illuminate needs, situations, and behavior. In particular, information literacy is distinguished from librarianship and information science in its close relationship with educational theory and research approaches. In essence, we suggest there is a critical mass of supporting evidence to justify presenting information literacy as a discipline which subsumes the particular knowledge, skills and practices entailed by the information literacy standards.

4. Curriculum for the information society

A key characteristic of the OECD nations is their possession of developed information industries, comprehensive educational provision, and powerful political agendas for social and economic modernization. In the UK, the information society has been defined as

> "…a society in which the creation, distribution and manipulation of information has become the most significant economic and cultural activity." (UK National Inventory Project, 2000).

These factors imply a clear need to educate the population at all levels in order to gain inclusion and achieve success in the information society. An effective educational response is likely to encompass all age groups and to occupy a distinct place in formal teaching, learning, and assessment. The Information Literacy Meeting of Experts (2003) has indeed positioned information literacy as "a prerequisite for participating effectively in the information society, and [is] part of the basic human right of life long learning." It is outside the scope of this paper to address all of these issues, so we will concentrate on outlining some key aspects that we will relate to the HE sector in order to set our thinking in a context which already recognizes information literacy to a certain extent, but which has yet to achieve a coherent curricular formation for information literacy, or indeed for all the implications of the information society.

To begin with, we want to focus on the broad elements of a curriculum for information literacy. We have outlined our view of information literacy as a discipline, above. The next task is to consider how the emerging discipline of information literacy might find curricular form in HE. We regard this as an open question at this point in time, which deserves consideration, and which should not be forestalled by a desire to achieve "quick fixes," or to identify the "one best way" to address information literacy (Johnston & Webber, 2003) however well intentioned that approach might be.

In this respect, we use curriculum as a term that encompasses and lends overall coherence to aspects of education such as subjects; course design; teaching, learning and assessment; and student experience. A curriculum for a particular discipline would involve both a "plan" of the education, which learners are to experience, and pedagogy to realize the plan, and its particular objectives. At the higher level of curricular "plan," we identify three major requirements for information literacy in an information society:

- Information literacy for citizenship: active engagement in community, polity, and global development by freedom of access to, and critical use of, data and information.
- Information literacy for economic growth: stimulating the development of new and existing enterprises by intensive and creative use of knowledge, and by combining information services more efficiently.
- Information literacy for employability: education, training, and continuing development of all of the knowledge, skills, and ways of being information literate required for access to and success in the economy.

Cutting across and contributing to all of these is information literacy for personal growth and creativity to allow people to take full advantage of all the opportunities of the information

society. These elements represent a mission for curriculum and draw out the contrast between our vision of a discipline meeting social requirements, and the library-centric and personal attribute approaches. It should be clear from our previous discussion that all three requirements are consistent with our view of the changing nature of social experience.

Turning to the matter of implementing a curriculum in HE, it should be noted that information literacy is evolving against a backdrop of a rapidly changing society (Webber & Johnston, 2002), and the massification of HE as a deliberate policy for social and economic development. The HE system is under great pressure of change to produce more graduates, increase economic relevance, maintain standards, and apply the most advanced technologies to pedagogy. Hence, our emphasis is on information literacy as an emerging discipline, which has yet to find full curricular form, because the nature of the HE curriculum is itself subject to major change at this time. At present, the traditional provision of single subject degrees for an academic elite is challenged by demands for more generic accomplishments that cut across the curriculum, transcend the different disciplines, and juxtapose the predilections of the academic community with the priorities of the state. This situation of flux in the nature, content, and experience of HE does not undermine claims to disciplinarity for information literacy. If anything, it emphasizes the importance of developing a robust and enterprising approach based in a sense of disciplinarity, with a view to establishing the most effective curricular formation of the discipline in the academy, as HE evolves new relationships with the information society.

These factors have several major implications. Firstly, we are not in a situation where an established discipline simply has to be taught to more students or renovated to meet changing ideas of teaching. Although information literacy educators also have to face these pressures, they have the added challenge of finding an appropriate location for information literacy in the academic firmament. Although the chemists, historians, economists, and teacher educators also have major pedagogical challenges, they at least start from a baseline in disciplinary identity, which clarifies the nature of teaching and learning in HE. Lecturers teach their subjects from the relative security of their departmental lodgings, whereas students read for their degrees within the comparative safety of the subject syllabus and reading lists. Both groups have a base for negotiating change, even if their ground is shifting under great pressure to transform.

Not so the information literacy specialist: this leads to the second issue. At present, information literacy is mainly advocated as a “new” approach to developing information and library skills and/or a response to the current demand for “generic” or “key” skills. In both cases, reference to C&IT or e-learning is often made to justify and canalize change. These factors combine to weaken effort and divert attention from the need to develop and communicate information literacy in its own right as a crucial aspect of the information society. This in turn tends to concentrate attention on local initiatives aimed at “embedding” or otherwise enhancing information literacy in existing programs of study. That approach will tend to underplay the complexities, which we have discussed, and be prone to compromise and dilution of effort.

Our position is that information literacy needs to be seen as a discipline in its own right and initiatives to introduce it to the HE curriculum should proceed from that basis in order to achieve maximum benefit to individuals and society as a whole. Allied to that approach is the

task of pioneering what may prove to be new curricular forms for education and learning in universities. This task should draw on insights from management development and educational development practice, as much as from librarianship and information science. We have explored some of the possibilities for transformation (Johnston & Webber, 2004) by using a concept of an information literate university and case studies in course design. In addition, issues raised by debate on the place of graduate attributes in business education, and the implications for changing curriculum and course design, have also been investigated (Johnston & Watson, 2004). However, for present purposes, we shall revisit the information literacy standards discussed above.

In both the U.S. and the Australian and New Zealand Information Literacy standards, information literacy is framed as part of other things: of lifelong learning, of other disciplines, of varying contexts: "Information literacy forms the basis for lifelong learning. It is common to all disciplines, to all learning environments, and to all levels of education" (ACRL, 2000, p. 3). The Australian Framework, while making substantial additions and changes to the ACRL introduction, retains the latter sentence (Bundy, 2004, p. 5) and also the following one:

> "Achieving competency in information literacy requires an understanding that this cluster of abilities is not extraneous to the curriculum but is woven into the curriculum's content, structure and sequence." (ACRL, 2000, p. 5; Bundy, 2004, p. 6).

The Australian document goes even further in identifying four approaches to information literacy design: generic (extra curricular classes or packages); parallel (extra curricular, but complementing the curriculum); integrated (classes or packages are part of the curriculum); and embedded ("Curriculum design where students have ongoing interaction and reflection with information"; p. 6). It is unambiguously stated that "The most effective of these components is the embedding of information literacy throughout the curriculum" (Bundy, 2004, p. 7).

ACRL (2000) says explicitly that while all the basic competencies should be addressed by a student, there will be variations in emphasis depending upon the student's course of study. This is framed as acceptable and indeed desirable. The Australian Framework adds a figure which shows Discipline and Topic as "information literacy elements" (Bundy, 2004, p. 7) and emphasizes the way in which application of the Framework is affected by disciplinary context.

We concur that it is valuable to identify the varying information literacy experiences of different disciplines and have indeed been exploring this in our research (http://www.dis.shef.ac.uk/literacy/project/). However, a version of information literacy that is tailored to the information types and needs of a particular discipline will not necessarily prepare students for the three core areas (citizenship, economy, employability) highlighted above. There is also the issue of departments, disciplines, and faculty who are not well engaged with information literacy. Not least, there is the need to provide a knowledge base for those outside formal education to draw on in order to foster their own and their fellow citizens' information literacy. To encourage lifelong learning, the knowledge base should be evident and consistent to those within and without the HE context.

How HE institutions deal with the challenge of information literacy is really a matter of how they deal with the need to align the curriculum to social change. Matters of content, pedagogy,

and location in programs of study follow on from that debate, and questions of specific activities and tasks for students should logically come afterwards. In the present state of flux in HE, it is often the other way round, and information handling activities and skills are proposed for "embedding" with insufficient discussion of the broader social picture that we have been outlining. By contrast, a clearly described discipline of information literacy can offer a powerful intellectual and pedagogical force for coherence and relevance, and not just a new term for library user education, research skills, or generic attributes.

5. Conclusions—A creative opportunity in an information society

We started our journey with Bush's vision of the scientist liberated from information overload, stimulated to new, creative discovery:

> "His hands are free and he is not anchored. As he moves about and observes, he photographs and comments.… If he goes into the field, he may be connected by radio to his recorder. As he ponders over his notes in the evening, he again talks his comments into the record." (Bush, 1945).

We have noted that Bush's solution is technically realized not just for the scientist but for many citizens. However, new technology has brought with it new needs and responsibilities. Today's harassed citizen knows that with the freedom of mobile Internet, of podcasting and moblogging, go obligations to communicate effectively in different media to keep in touch and up-to-date and to respond appropriately. We have argued that acknowledging and developing information literacy, in terms of a disciplinary knowledge base and a curriculum, is a necessary way of supporting citizens in this information society. If this describes a utopia, we believe it is a necessary one.

Note: This paper is based on a keynote paper delivered by the authors at the WILU conference held in Guelph, Canada, in May 2005 (http://dis.shef.ac.uk/literacy/adelaide-webber-johnston.pdf).

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