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Information literacy and its relationship to knowledge management

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Abstract

This paper explores the perceived commonalities between information literacy (IL) and knowledge management (KM) and the different contexts in which the two areas of theory and practice manifest themselves. It approaches the study in terms of, first, the widespread interest in KM within the Library and Information Services (LIS) community; second, the belief, supported by research into workplace IL, that IL and the fostering of an information literate workforce are key components in any KM initiative; and, third, the LIS profession's long-standing interest and expertise in IL instruction. KM is put into context with reference to two publications by Standards Australia and from this the main functions of a knowledge manager are delineated. It is suggested, with reference to IL in higher education and workplace contexts and to well-articulated models of knowledge transfer, such as SECI, that there are significant commonalities between IL and KM but that there are equally significant differences between the two. The paper argues that research in each domain can inform the other but that IL represents a fraction of the KM domain, so attempts to conflate the two may cause confusion rather than providing a pathway for information professionals and others pursuing workplace IL. Finally the paper provides recommendations for further research and suggests a scalar approach to conceptualising KM and IL practice.

Keywords

information literacy; information literacy planning overview; knowledge management, leveraging knowledge, knowledge literacy.

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1. Introduction

As much of the research has demonstrated, the influence of context has to be taken into account when examining the theory and practice of information literacy (IL). This paper examines a distinct but, some would argue, closely related area of theory and practice, knowledge management (KM), and asks whether the perceived commonalities between IL and KM are significant, given the different contexts in which the two sets of theory manifest themselves. One of the common themes in the *Journal of Information Literacy* has been the close association between IL and learning. In the school environment, in particular, there has been a conscious effort to position IL *within* the learning process and not outside it, where, in the past, some definitions of IL have appeared to place it. In other words, IL refers to the *total* learning process and suggests a whole-school focus. Referring to a report on an IL programme developed in a Melbourne school (Ryan & Hudson 2003), James Herring points out that '[a] key aim of this programme was to incorporate information skills into the school curriculum and not to teach information literacy skills as a separate "subject" in the school library, something for which teacher librarians have often been criticised' (2007, p. 34). The tendency to embed IL in the learning process is especially strong in countries such as Australia and the USA, which employ dual-qualified teacher librarians, as distinct from Library and Information Science (LIS) qualified school librarians. The broadening of the definition of IL and of IL instruction (ILI) has spread to other sectors, especially the higher education sector, in which, for several years, efforts have been made to integrate ILI into the curriculum (Bruce & Candy 2000; Levy 2000; Stubley 2002; Ferguson & Ferguson 2005).

Learning is generally also regarded as an important component in KM theory and practice. In a frequently cited KM paper, Marianne Broadbent suggests that, integral to the implementation of knowledge management, 'is understanding the organisation's information flows and implementing organisational learning practices which make explicit key aspects of its knowledge base.' Knowledge management, she writes, 'is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning' (1997, pp.8-9). Underlying KM principles is an earlier theory of the 'learning organisation', which 'encourage[s] people to grow and develop, to share their knowledge and learning with others, and to learn from errors' (Debowski 2006, p.21), thus ensuring that the organisation is adaptive and dynamic. Definitions of KM abound: a 2002 review by Hlupik et al. identified eighteen (Bouthillier & Shearer 2002). However, it is generally seen in terms of the development of strategies and processes that will encourage the sharing of knowledge or, more typically, the 'leveraging' (realising the value) of knowledge at all levels of an organisation, while the role of the 'knowledge manager' is seen, in broad terms at least, as the development of an organisational culture and a technological infrastructure that encourage the sharing of knowledge and foster the development of a learning organisation.

The focus of this paper is the perception, especially within the LIS community, that IL and KM are closely related areas of theory (although perhaps not practice). It examines the oft-repeated claim that LIS professionals have a significant role to play in the KM environment, a role that is considerably strengthened by the profession's expertise in IL instruction. Second, it outlines the KM function in an organisation by examining the attempt by Standards Australia to codify KM in a standard (2005) and to provide examples of KM practice (2006). Third, it draws out underlying approaches to information literacy or, what the Standard calls, 'knowledge literacy', to place IL in the context of a common model of KM – SECI (as outlined, for instance, by Nonaka & Konno 1998). Taking this approach allows conclusions to be drawn about the perceived commonalities and differences between IL and KM and how KM's focus on the Learning Organisation might inform IL theory and practice.

2. The LIS profession and the KM domain

The project is prompted in part by the widespread interest in KM within the Library and Information Services (LIS) community, not simply in terms of its application to the profession's own management practice, but also with an eye to opportunities for LIS professionals in the KM domain. LIS professionals are well placed to take on the role of knowledge managers, the argument goes, because they have been managing knowledge from time immemorial (Butler 2000, p.40; Corrall 1999; Townley 2001, p.53). Indeed, there is some evidence of re-badging of positions in the LIS sector, with the appearance of complex job titles such as 'Knowledge Professional (System Librarian)', 'Librarian/Knowledge Manager' and 'Senior Project Officer (Library & Knowledge Management)' (Ferguson et al., 2006).

There is a considerable body of literature addressing the relevance of the Library and Information Services (LIS) profession's skills to Knowledge Management (KM) activities (Martin, Hazeri & Sarrafzadeh 2006; Koenig 2005; Broadbent 1998; Church 2004; Corrall 1998; Abell & Oxbrow 2001; Ajiferuke 2003; Loughridge 1999; McGown 2000; Shanhong 2000; Koina 2003; Pantry & Griffiths 2003; Rowley 2003; Sinotte 2004; Ferguson 2004; Henczel 2004). A 2004 IFLA collection, with the provocative title *Knowledge Management: Libraries and Librarians Taking up the Challenge,* opens with the challenging claim that KM is one of those concepts that librarians take time to assimilate, only to reflect ultimately 'on why other communities try to colonise our domains' (Hobohm 2004, p.7). LIS interest in KM is also reflected in monograph publications such

as the practical text by Sylvia Webb (1998) and the edited collection by Kanti T. Srikantaiah and Michael Koenig (2004). Rooi & Snyman (2006) conducted a content analysis of the body of literature that explicitly addresses opportunities for librarians in KM and concluded that there are five broad roles for librarians in KM: facilitating an environment conducive to knowledge sharing; managing the corporate memory; transfer of information management and related skills to a new context, linked to business processes and core operations; development of corporate information literacy; and finally, management of information in a digital/electronic environment.

A few years ago, Standards Australia published 'sample job descriptions' for the KM sector, compiled by Karen Bishop and based on her expertise as a recruitment consultant. She listed specific 'knowledge-enabling' tasks performed by these positions, including:

- knowledge strategies to develop/improve the knowledge processes that support organisational development and performance;
- knowledge auditing to develop maps of organisational knowledge, identify gaps in knowledge and barriers to knowledge discovery/exchange/development;
- 'information literacy' training programs for improved use of information and knowledge resources;
- facilitation skills for improved group dynamics, and coaching programs for improved communication skills to help with collaboration and innovation;
- designing systems and procedures to enable effective creation of, and access to, recorded knowledge; and
- managing changes in organisational behaviour in line with knowledge-focused organisational strategy (Bishop 2002, p.12).

Although not all LIS professionals would claim to be able to perform the full range of tasks listed here, many clearly do have some expertise in areas such as information literacy and provision of access to recorded knowledge (Ferguson 2004). More recently, in a discussion of the contribution of librarians to KM, Ainslie Dewe of Auckland University of Technology highlighted their role in the promotion of IL, defined as the '[a]bility to identify, access, evaluate, organise and communicate information and knowledge' and seen as a '[c]ore capability for the knowledge society' (2005). It is worth noting that this definition goes beyond 'use of information and knowledge resources', a point to which this paper will return.

A strong part of the rationale for the involvement of LIS professionals in KM, then, stems from the strong professional interest in IL and the perception that IL and the fostering of an information literate workforce are key components in any KM initiative. This position is reinforced by workplace IL research. Annemaree Lloyd, for instance, argues that 'effective information or knowledge management systems depend on workforces able to operationalize the cognitive, affective and embodied skills of information literacy, to solve workplace problems independently and to develop new strategic knowledge' (2003, p.88). IL 'pursues the same goal as KM, which is to develop and nurture the knowledge sharing practices and information literate workforce that are necessary if organisations are to be adaptive, innovative and robust' (Ferguson & Lloyd 2007). Lloyd is one of those who argue for a broadening of the definition of IL, reconceptualising it as a 'way of knowing' the sources of information that exist in an information landscape, including, significantly, physical and social information sites of knowledge (Lloyd, 2004) and not only the textual sources with which information professionals and researchers commonly deal. Lloyd sees this reconceptualisation as corresponding to and, indeed, being central to KM's interest in the capture of 'tacit knowledge', or the knowledge locked away in people's heads and not stored in some exosomatic form (commonly called 'explicit knowledge').

Before exploring the relationship between IL and KM and asking specifically about the literacies

required in the 'learning organisation', it would be worth establishing the main contours in the KM landscape. The 'explicit knowledge' shared by Standards Australia in its publications (2005; 2006) is worth mining.

3. KM in context: an Australian standard

There have been many uses of the term 'knowledge management' (KM) over the years, including its association with expert system development and the attempt to encode the knowledge of a human expert in a knowledge base, which could then be interrogated by others using a human-computer interface and an 'inference engine'. As much of the literature demonstrates, our understanding of fields such as information science or information literacy is shaped by context. In the LIS sector, for instance, some believe that librarians have been practicing KM for a long time, a view that stems in part from the profession's emphasis on documentary forms of knowledge. In the information systems area, on the other hand, the focus tends to be the supporting systems and technologies while, for the human resources people, it tends to be human resources.

For several years, standards bodies such as the British Standards Institute (2001; 2003) and the European Committee for Standardization (2004) have helped to develop a degree of consensus about KM through the publication of KM guidelines. In 2005, Standards Australia took the bold step of revising and publishing its earlier KM guide, formally labelling it as one of its standards. While some may quarrel with Standards Australia's attempt to develop a KM standard and codify something that defies coding, the Standard has the merit of having provided a framework by means of which organisations and individuals can approach KM. It also had the merit of a development committee (MB-007) that embraced a diverse range of professions and backgrounds, including a number of librarians and other information professionals (Chatwin 2006, p.8).

The Standard provides the following definition of KM:

> A trans-disciplinary approach to improving organisational outcomes and learning, through maximising the use of knowledge. It involves the design, implementation and review of social and technological activities and processes to improve the creating, sharing, and applying or using of knowledge.
>
> Knowledge management is concerned with innovation and sharing behaviours, managing complexity and ambiguity through knowledge networks and connections, exploring smart processes, and deploying people-centric technologies (Standards Australia, 2005, p.2).

There are a number of keywords in this definition, not least 'organisational', which provides the context for the theory and practice of KM; 'learning', which is of particular interest to this paper; and 'social activities', which are foregrounded (as they are in Lloyd's studies) and given equal status with the technological. Systems and technology are generally seen to play a major role in KM but what is especially noteworthy here is the recognition of the social sources of information and knowledge in organisations and their role in knowledge generation and transfer. Knowledge is defined as '[a] body of understanding and skills that is constructed by people and increased through interaction with other people and with information' (Standards Australia 2005, p.2).

It would be worth exploring further Standard Australia's approach to KM, which promises to inform much of the understanding and practice of KM in the Australian corporate sector. Underlying its approach is the notion that the organisation is a 'knowledge ecosystem', consisting 'of a complex set of interactions between *people, process, technology* and *content'* (Standards Australia 2005, p.8; italics added). It might help to add some context in the form of one of Standards Australia's case studies, published in the year following the release of the Standard. One of these describes

a small financial company, Diversified Portfolio Managers Limited (DPM), which includes three principal staff members, 'all with a high level of expertise and senior experience in the finance sector' and a 'distributed community of independent financial planners' developed and supported by the company. In this case, the four 'elements' of the knowledge ecosystem can be thought of as:

- people, such as the expertise of the principals
- process, such as regular interviews between DPM staff and the planners
- technology, such as a contact database, an Internet site and an extranet site
- content, such as market intelligence and the content of the contact database, Internet site and extranet site. (Standards Australia 2006, pp. 28-9).

Standards Australia suggests that there needs to be balance amongst these four elements and that one element should not be developed at the expense of another (Standards Australia 2005, p.10; Halbwirth & Sbarcea 2005).

All four elements are regarded as important components of the knowledge ecosystem, at the heart of which lie the *organisational outcomes,* those objectives 'that focus on creating an innovative and adaptive organisation' and which 'flow from the contextual environment (culture and strategic intent) and the manner in which an organisation operates within the external environment' (Standards Australia 2005, p.9). '*Context*', '*Culture*' and '*Strategic Intent*' are also listed as key components in the ecosystem, each shaping knowledge. By 'Culture' the authors of the Standard mean 'the combination of an organisation's skills and competencies' (which it is the aim of KM to foster and enhance) with those 'collective behaviours and values' that need to be understood for the purposes of knowledge-centred initiatives (Standards Australia 2005, p.9). In addition to these eight components, the knowledge ecosystem includes '*drivers*' and '*enablers*'. Drivers are largely external factors such as competitive pressures, customer service and legislative requirements (Standards Australia 2005, p.15), in another context they might be referred to as change factors.

The term 'enablers' refers to the 'tools, techniques and activities' (Standards Australia 2005, p.35) used to implement KM initiatives or, as they are termed in the Standard, 'knowledge interventions'. The enablers are drawn from a range of fields, principally (1) management theory and practice, for instance, after action reviews (AARs), mentoring and coaching, and a number of techniques aimed at encouraging people to communicate such as communities of practice, 'share fairs' and strategic conversations; (2) information management, for example, content management, environmental scanning, information auditing, and taxonomies and thesauri; and (3) systems and technologies such as chatrooms, blogs, data mining, databases, portals and intranets, many of which would fit Tom Wilson's description of KM systems as re-labelled IM systems (2002, 2005). There is also a group of enablers that clearly belong to the emerging (or emergent) field of KM: knowledge auditing, knowledge mapping and knowledge literacy (the last of which merits discussion, below). Two of the enablers from the 'Management' toolbox are also listed separately as key components of the knowledge ecosystem, namely, '*Networks and Communities*' and '*Champions and Advocates*', emphasising again the centrality of social interaction.

Other than the lengthy list and descriptions of enablers, thirty-four in all, a large part of the Australian Standard is given over to a framework for developing knowledge initiatives and implementing KM. This framework, seen as the 'key feature' of the Standard by its authors (Standards Australia 2005, p.7), is a cyclical one that bears some resemblance to traditional Systems Analysis and Design and comprises three main phases: Mapping, Building and the inelegantly named 'Operationalising'. Each of these can be supported by appropriate 'enablers' and each can be revisited 'according to the demands and needs of [the] organisation' (Standards Australia 2005, p.11).

As the name suggests, the Mapping phase of the knowledge intervention cycle explores key components of the knowledge ecosystem, such as strategic intent, organisational culture and proposed organisational outcomes, and attempts to gauge the 'gap between the existing and desired state of the knowledge ecosystem' (Standards Australia 2005, pp.13-14). The mapping process would be expected to cover the four 'elements' of the knowledge ecosystem, namely: people, process, technology and content. To return to the case study of DPM, content issues explored might include whether data in the database are 'mined' for trends and patterns; what strategic purpose the internet content serves; whether the right information is available in the extranet; whether any value adding is done to extranet content; and the level of rigour with which monitoring of the external environment is conducted (Standards Australia 2006, p. 29).

Once the Mapping phase has measured the gap between the existing and desired states of the knowledge ecosystem, the Building phase examines ways in which these gaps can be addressed and how to begin introducing knowledge interventions. Typically this involves the development of prototypes or pilot studies. Once these developments have been tested, the Operationalising phase identifies 'what works' and attempts to move knowledge interventions that have been piloted or tested 'to a level where they are sustainable on a day-to-day basis and capable of being scaled across the ecosystem' (Standards Australia 2005, p.29). The Building and Operationalising phases in the DPM case study discussed above might, for instance, address content issues identified in the Mapping phase, by focusing on outcomes such as 'collect and monitor the … external environment' and 'collect, synthesise and add value to information'. The *enablers* that could be employed in this instance include environmental scanning, competitive intelligence, an expertise locator (identifying sources of expertise in the organisation), 'best practice' and lessons learned, storytelling, and information design and architecture (Standards Australia 2006, p. 30).

4. Differing forms of literacy

The KM Standard recognises the need for a 'literate' workforce but information literacy, as it has traditionally been defined and understood by the LIS profession (with its original focus on bibliographic instruction), is not advocated in this document at least as a key in the corporate sector's efforts to leverage organisational knowledge. The Standard does recognise a number of literacies that individuals require if they are to 'fully participate in an organisation', including 'basic literacy (the ability to read and comprehend), technology/ computer literacy (the ability to use the tools) and information literacy'. The last of these, however, is defined in narrow procedural terms as 'the ability to find and use information' (Standards Australia 2005, p.41), a definition that is increasingly being questioned.

According to the authors of the Standard, the 'challenges of a knowledge-focused organisation may require additional skills, attitudes and mind sets' over and above those listed above:

- Skills such as those for storytelling, participating in strategic conversations, engaging with content, documenting processes and mentoring.
- Attitudes such as openness to new ideas and willingness to share knowledge.
- Abilities such as assimilation of new knowledge into existing knowledge frameworks and effective participation in cross-functional teams (p.41).

These additional skills, attitudes and abilities are labelled *knowledge literacy*, a term that enjoys very little currency in the LIS community, although as long ago as 2002 Jan Houghton and Sue Halbwirth used it in a paper provocatively entitled 'Knowledge management and information literacy: A new partnership in the workplace?' and discussed the need, as they put it, for information professionals to develop additional skills 'if they are to continue their role as a change agent within the information environment of an organisation in the process of moving from

information management to knowledge management' (2002, p. 76).

How does Standard Australia's view of 'knowledge literacy' compare with the understanding of IL that has been developed within the LIS community in recent years? As a first step it would be worth considering some of the different contexts in which IL manifests itself.

4.1 Information literacy in the LIS context

Clearly the form of 'literacy' referred to in the Australian KM Standard goes well beyond information literacy as it has traditionally been understood in the LIS profession. It is ironic that the Standard should define IL in narrow, process-orientated terms at the very time that many researchers have been calling for a *broadening* of its definition. Jennifer Kirkton and Lyn Barham (2005, p.365), for instance, argue that IL 'goes beyond simply acquiring the skills to use information tools and to find information resources. It includes lifelong learning and professional development, and the ability to interact in the information society.' For Mandy Lupton (2004), IL is 'about higher order analysis, synthesis, critical thinking and problem solving. It involves seeking and using information for independent learning, lifelong learning, participative citizenship and social responsibility' (cited in Lupton et al. 2004). Lloyd, who also calls for a broadening of the concept of information literacy, refers to the term 'information literacy' being used in library and higher educational contexts to describe 'functional activities of defining, locating and accessing and evaluating information' (Lloyd 2003, p. 89).

In the LIS sector, the most commonly used definition of IL in recent years has been the one developed by American College and Research Libraries (ACRL) 'Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate *and use effectively the needed information*' (ACRL, 2000, p. 2; italics added). More specifically, the ACRL definition also refers to the information-literate individual being able to:

- determine the nature and extent of the information needed
- access needed information effectively and efficiently
- evaluate information and its sources critically
- incorporate selected information into their knowledge base
- use information effectively to accomplish a specific purpose
- understand the economic, legal and social issues surrounding the use of information, and use information ethically and legally (ACRL 2000, p.3).

This definition, which has been extremely influential, it has been adapted for instance by the Australian & New Zealand Information Literacy Framework (Bundy 2004), goes beyond 'traditional' library-orientated approaches to IL, which, as Lloyd suggests, have tended to focus on the skills covered in the first three bullet points. This broad notion of IL has relevance for the LIS sector as a whole but it is worth pointing out that the context and use in which the ACRL view of IL manifests itself is basically an academic one.

4.2 Information literacy in the educational context

As suggested earlier, part of the impetus for a broadening definition of IL came from the school sector, where IL is seen as an integral part of the learning process. In a review of IL models

developed for use by teacher librarians, teachers and students, James Herring describes one of the models used in both primary and high schools in Australia, Ryan and Capra's Information Literacy Planning Overview (ILPO) (Ryan and Capra 2001), as containing the following elements:

- defining
- locating
- selecting/analysing
- organising/synthesising
- creating/presenting
- evaluation (Herring, 2007, p.33).

This clearly positions IL firmly within the learning process and takes it a long way from Standard Australia's narrow definition of IL as 'the ability to find and use information'.

For several years, libraries in the higher education (HE) sector have also made efforts to promote the integration of IL instruction (ILI) into the curriculum. There has been a growing body of opinion that suggests ILI should be integrated into academic programs (Stubley 2002). As a Nordic survey put it, '[i]nformation literacy is not a "library thing" and it is not concerned only with database searching and Boolean logic; information searching is a part of the learning process and should be taught as such embedded in the curriculum' (Skov & Skærbak 2003, p. 332). Part of the enthusiasm from HE librarians for the integration of ILI into curriculum stems from the realisation that where ILI 'remains an add-on, or extra-curricular, learners generally tend to forget these skills very soon' (Karelse 2000, p. 44). Philippa Levy (2000, 47-8), drawing on a constructivist notion that 'knowledge is constructed through, and builds upon, experience', suggests that 'skills are most effectively learned when related to learning needs arising directly from academic work'. Librarians in HE institutions have increasingly taken a team approach, building bridges to academic staff and learning support units (Currier 2003). Teaching, learning and information resources cannot be compartmentalised.

Professional bodies such as the Australian Library and Information Association (2003) promote IL as a key to fostering 'lifelong learning, personal fulfilment, improved decision making, knowledge development, innovation, imagination, creativity and cultural continuity' in 'a democratic, progressive, technologically sophisticated and culturally diverse society'. One of the issues that remains largely unresolved, however, is whether the literacies developed in the school and higher education sectors are transferable to work-based or societal situations once students complete their formal education.

The question of transferability is too large and complex to be addressed here, but the differing contexts are worth considering. While IL in academic libraries may be seen in broader terms than it may have been in the days when ILI was largely concerned with resource discovery and the teaching of specific search tools, it still remains the case that library-based ILI focuses on codified forms of knowledge, what the KM proponents call explicit knowledge, and most specifically *published* information products. The workplace IL research mentioned earlier, however, draws attention to non-codified forms of knowledge in the work environment, notably, the social sources of knowledge.

4.3 Information literacy in the context of workplace learning

Underlying the attempts to develop IL models is the assumption that one can study a set of

information users, such as school students, and develop an education program based on a notion of the broad strategies that people follow in order to locate and use information. This is challenged by much of the research on workplace IL. Bonnie Cheuk, amongst others, draws on the sense-making assumptions and methodology developed by Brenda Dervin (1992) to approach IL from the information users' perspective: studying 'people-in-situation rather than people as a group' (2000, p.179-180). Her study of auditors in Singapore led her to suggest that IL in the workplace involves 'critical evaluation of information system/sources', as distinct from being 'an obedient user' of them; 'collaborative competence, not individual competence'; 'a creative, iterative and dynamic process', not a process of following 'rigid step-by-step guidelines'; 'deep thinking and personal meditation', as distinct from 'having a set of information skills and knowledge'; and development of 'personal information seeking strategies' (Cheuk, 2000, pp.185-186). The point about collaborative competence is especially interesting in the KM context because it is a recognition that there is a division of labour in the workplace and that not every member of a work group requires the same information skills.

This is highlighted in more recent research, which grouped participants in terms of seniority in their respective departments and found similar information skills within groups but significant differentiation amongst the groups, with some information related tasks involving 'delegation, repetition and collaboration' (Hepworth & Smith, 2008, pp.224-226). The same project mapped participants' responses against the JISC (Joint Information Systems Committee) 'i-skills' model and found some that 'did not easily fit into the headings offered by the model, but which nonetheless had a significant bearing on staff management of information': comments relating to 'time management and information overload', 'social networking' and 'team working' (Hepworth & Smith, 2008, p.220). In the same theme issue of *Australian Library Journal*, Mary Somerville and Zaana Howard put the case for a soft systems approach to workplace IL, pointing out (2008, p.259) that '[w]orkplace information literacy is not simply an individual experience' but rather 'develops within a workplace context and is collectively experienced at both group and organisational levels.'

As mentioned earlier, Lloyd is one of those researchers who has argued for a broadening of the definition of IL. Her interest in what she sees as the physical and social information sites of knowledge in an organisation stems from her firefighter study (Lloyd, 2004; 2005), which considers ways in which newcomers to the workplace develop an understanding of workplace practices. This is accomplished in part through the use of codified knowledge, such as administrative and procedural manuals and the formal curriculum of initial training, all of which represent formal work requirements. For new workers, Lloyd suggests, there is a high acceptance of these codified forms of knowledge, with access and use remaining uncritical (Ferguson & Lloyd 2007, p.230).

Her study draws particular attention to social sources of information in the form of experienced practitioners who generally (although *not* always) assist new staff to access corporate knowledge that is not necessarily documented formally. Much of this knowledge is what the proponents of KM call *tacit* knowledge, that is, knowledge that is stored in people's heads, which may not be articulated easily. Through practices such as narration and storytelling, such organisational information 'is disseminated in a way that facilitates the development of shared understanding about practice and profession, which introduces and eventually binds newcomers to the community of practice'. In this way, 'experienced practitioners can mediate and influence interpretations about practice.' Lloyd's study recognises the role of social information in 'the development of IL practices relevant to gaining access to relevant and authentic workplace information' (Ferguson & Lloyd 2007, pp.229-230).

In addition to documentary and social forms of information, Lloyd's study identifies a third form, namely, physical information, which 'is accessed through bodily experience and is observed through the bodies of other practitioners.' In the case of firefighters, expert practitioners can see what is missing from novice learning by observing their bodily practices while, for the novice,

'[r]ehearsal allows the subject body to connect codified information with actual practice' (Ferguson & Lloyd 2007, p.230). While such concerns may seem far removed from the environment of knowledge workers such as lawyers or the financial planners discussed earlier, it is worth bearing in mind that for many in the workforce physical sources of information may be as important as the other two, particularly for the novice.

For Lloyd, then, IL cannot be linked exclusively to accessing information through text but also requires engagement with social and physical sources of information. 'Information literate people,' she suggests, 'are engaged, enabled, enriched and embodied by social, procedural and physical information that constitutes an information universe.' She sees IL, not as a measurable phenomenon, but as 'a way of knowing' that information universe (Lloyd 2004). Such a definition is not far from Standard Australia's definition of knowledge literacy, mentioned earlier, which talks, for instance, about requiring mind sets such as 'openness to new ideas and willingness to share knowledge' and abilities 'such as assimilation of new knowledge into existing knowledge frameworks' (Standards Australia 2005, p. 41). There are clearly differences, however, not least the fact that IL, as defined in Lloyd's study, focuses on the novice's development of a 'way of knowing' by being introduced to practices that facilitate access to the textual, social and physical sites of information in the organisation. The divergences between the IL and KM approaches are seen more clearly by considering the models used in KM to describe the generation of knowledge in a learning organisation.

5. Learning organisations and the generation and transfer of knowledge

The contexts in which IL manifests itself, outlined in the preceding section, emphasise the links between IL and learning. Learning is also a key part of KM as it is conceived and practiced in the organisational context. As pointed out earlier, KM is underpinned by an earlier theory of the 'learning organisation', which encourages knowledge sharing and implementation of sound practices of organisational learning (Broadbent 1997; Debowski 2006). In general terms, a learning organisation (LO) 'is one in which the environment is structured in such a way as to facilitate learning as well as the sharing of knowledge among members or employees' (Chunharas 2006, p.653). A more specific approach sees the LO paradigm being 'grounded in the strategic use of information to resolve problems in service delivery', with organisational success relying on employees sharing responsibility 'for identifying and solving problems' (Brown & Brudney 2003, p.31). Broadbent suggests that the following are characteristic of LOs: funding for 'learning and knowledge transfer', processes to 'distil learning from past experiences', frequent events that allow sharing of 'ideas, wisdom and experience', wide access to 'information on performance, current activities and best practices', IT support for 'communication and collaboration among employees', design of information systems that 'increase the speed and precision with which tasks are completed', facilitation of 'opportunities for informal learning', procedures that 'retain the business knowledge acquired by people who leave the organisation', and use of 'mechanisms to learn from external sources, industry, customers, suppliers and competitors' (Broadbent, 1997, p.14).

Before examining a model for the generation and transfer of corporate knowledge, it might be useful to consider the nature of knowledge in an organisational context. The scope is summed up helpfully in Thomas Davenport and Laurence Prusak's description of organisational management as 'a fluid mix of framed experience, values, contextual information, and expert insight' that is typically 'embedded not only in documents or repositories but also in organisational routines, processes, practices, and norms' (2000, p.5). As the earlier discussion of KM suggests, corporate knowledge cannot necessarily, or easily, be expressed in the form of a document or database, hence the focus on a range of human resource management techniques such as after-action reviews, mentoring and strategic conversations. According to Karl Wiig (1993, p.156), one of the

most influential and most often cited writers on KM in the business sector, corporate knowledge can take the following forms: *tacit* knowledge, such as the kind found in skills and habits or in non-associative learning; *explicit* knowledge, for example, production knowledge, which can be expressed in written form; *implicit* knowledge, which might be held in historic records of past decisions; *procedural* knowledge, typically present in computer programs; *anecdotal* knowledge, such as memory of a particular 'case' in someone's mind; and *embedded* knowledge, in other words, knowledge embedded in organisational structures, systems and procedures, and in technology.

C.W. Choo (2005, p. 89) reduces corporate knowledge to three basic types: tacit, explicit and cultural knowledge. As indicated already, the term 'tacit knowledge' refers to knowledge in people's heads, much of it learned skills that cannot be expressed in written form, whereas 'explicit knowledge' subsumes those forms of knowledge that can be expressed in written form, including, for instance, the procedural knowledge mentioned above, which can be expressed in computer code. 'Cultural knowledge' refers to an organisation's 'beliefs based on experience, observation and reflection about itself and its environment' (Choo, 2005, p.89) and can be either tacit or in the form of implicit rules about practice and performance.

5.1 The SECI model

The most common model of knowledge generation and dissemination in the KM literature, the so-called SECI model, developed by Ikujiro Nonaka and his colleagues, reduces knowledge still further to the two basic types *tacit knowledge* and *explicit knowledge* in order to capture the process of knowledge transfer in an organisation. In their model, tacit knowledge is said to interact with explicit knowledge, in a spiralling process, in which individuals learn from others and from the shared knowledge of the organisation's community of practice, to create new knowledge, which in turn becomes part of corporate knowledge and thus part of the new spiral of knowledge creation. The process is considered to include four types of interaction, represented by the acronym, SECI:

- Socialisation, which involves individuals sharing tacit knowledge and in the process becoming part of 'a larger self that includes the tacit knowledge of the others'
- Externalisation, which involves expressing tacit knowledge in a form that can be understood by others, during which the individual 'becomes one with the group'
- Combination, which entails the collection of explicit knowledge, from sources inside and outside the organisation, and its combination, editing, processing and distribution (what in library and information management might be called 'information consolidation')
- Internalisation, in which the newly created knowledge, which is in explicit form, is converted into the organisation's tacit knowledge, through training and through individuals learning to 'access the knowledge realm of the group and the entire organisation' (Nonaka & Konno, 1998).

These interactions can be expressed in a more concrete form by considering the KM systems and technologies used to facilitate them in an organisational context, as in figure 1

Figure 1: The SECI model and corresponding systems and technologies (Ferguson & Weckert 2005; reproduced with permission)

Socialisation *Tacit to tacit* Groupware Expertise location systems	Externalisation *Tacit to explicit* Groupware Workflow systems
Internalisation *Explicit to tacit* Innovation support tools Corporate learning software	Combination *Explicit to explicit* Office automation systems E-document management systems Business intelligence systems Knowledge-based systems Data warehouses Digital libraries Autonomous agents Knowledge maps, taxonomies etc. Knowledge portals Search technologies

For the sake of simplicity, most applications have been placed into only one quadrant but that is not the case with groupware, because it appears to be equally divided between Socialisation and Externalisation. Groupware tools that are positioned within the Socialisation quadrant are used to provide collaborative work spaces and facilitate person-to-person communication. Groupware is also positioned in the Externalisation quadrant because many groupware applications produce explicit knowledge in the form, for instance, of email and discussion list postings. Similarly, knowledge-based systems (one type, 'expert systems', was mentioned earlier) could be said to cover different types of interaction. They are noted for their capture of tacit knowledge into so-called knowledge bases and therefore support Externalisation, but from an information seeker's perspective they provide information (via concept mapping, an inference engine and a user-computer interface) thus making them an instance of Combination, and they may even act as online tutors and therefore as tools that support Internalisation.

Clearly computer literacy supports all four forms of interaction delineated in the SECI model. So too does knowledge literacy, defined by Standards Australia as storytelling and willingness to share knowledge (Socialisation), documenting processes (Externalisation), engaging with content (Combination) and assimilation of new knowledge into existing knowledge frameworks (Internalisation). Information literacy, of the kind that characterises the majority of libraries, is supportive to some extent of the interrogation of specific types of information retrieval system and relates largely to those interactions described as Combination. Attempts in school and higher education contexts to teach IL in an integrated manner suggest that IL is also an intrinsic part of the learning process and therefore contributes to those interactions categorised as Internalisation. ILI programs can inform corporate learning although whether this potential is manifested in the corporate sector in any concrete sense remains to be seen.

Finally, the expanded version of IL, as defined for instance in Lloyd's firefighter study, could be seen to support the process of Socialisation, although it has to be said that IL in this context is closer to knowledge literacy than it is to IL, at least as it is traditionally understood and practiced. It is also unclear whether staff running a corporate information service, such as a company library or a knowledge centre, understand and are able to leverage the social sites of corporate knowledge better than those in the human resources division of the organisation or in the appropriate business units. Broadening definitions may give the profession a fresh context to consider but it does not alter corporate structures, practices or cultures.

6. Commonalities and differences between KM and IL

The preceding section suggests that there are significant commonalities between KM and IL, insofar as developing an information literate workforce can be seen as a step towards the creation of adaptive and innovative learning organisations. Given the different contexts in which KM and IL manifest themselves, however, one might expect significant divergences between the two. IL, as understood by the LIS profession, currently focuses on the personal development of the information seeker or learner, with particular emphasis on text-based information resources and those resource discovery systems that support areas such as personal self-development, teaching and learning and, in some cases, the successful completion of learning assignments. When it comes to workplace IL, the focus is still on the professional development of people within organisations, from novice to expert. It should be added, however, that this development is both subjective and *inter-subjective*, with individuals developing the ability to work collectively.

KM, on the other hand, appears to take a broader approach, in the sense that personal development is only one of many objectives in the sharing of corporate knowledge. In particular, the focus is on the generation of new knowledge and innovation, as distinct from the transmission of the existing stores of corporate knowledge and understanding that appears to characterise workplace IL. There are areas of LO theory and practice that are not dealt with in the literature on IL, such as workplace IL which includes procedures for retaining the knowledge of people leaving the organisation or the mechanisms used to learn from external sources. This is not to suggest that the development of workplace IL is not going to have a significant impact on an organisation's ability to learn, quite the contrary it proposes that workplace IL is a narrower area of endeavour than the KM interventions outlined earlier. The sites of information may be broader in a workplace context than they are in an educational institution but the focus remains individual learning, despite the lessons from workplace IL studies about IL being a collaborative activity, noted earlier. With KM, the focus is on the organisation itself. It is the organisation's capacities for learning that are central, not those of individual members, however important individual capacities may be.

It might help to consider the learning organisation in terms of an organic metaphor, in which the organisation adapts to external threats and opportunities (the 'drivers') to further its strategic objectives and in which the role of a knowledge manager is to create, or help create, the organisational structures and culture that facilitate the movement of information to parts of the organism that require it and encourage innovative behaviour and practice that will allow the organisation to exploit opportunities and/or avoid threats. The organic metaphor is present in the LO paradigm that informs much of the thinking on KM. In an account of LOs in the public sector, Mary Brown and Jeffrey Brudney refer to '[i]nformation and its associated technologies … [providing] the knowledge – signals – that organizations need to read the environment and to adapt to change (2003, p. 31). Change in external and internal environments, another paper suggests, requires organisations to transform themselves into LOs and so 'increase their adaptability and responsiveness and encourage development and improvement processes by quick and effective

knowledge creation and transfer' (Ursic et al., 2006, p. 82). The organic metaphor is clearly enunciated in this latter account of the LO, which, it is suggested, 'learns from its own successes and mistakes in the past and from experience of others (benchmarking). Also it is capable of quick and effective transformation of knowledge throughout the LO, constantly innovating its way of response and operation' (Ursic et al, 2006, p. 82).

LO theory's organic metaphor finds its way into KM, in that in KM it is the *organisation* itself that learns, not simply the individuals who belong to it at particular moments. That much is clear, for instance, in the idea that, in the interests of organisational well-being, organisations need to ensure that they do not lose significant corporate knowledge when individuals leave. In accounts of workplace learning, the novice learns to recognise the sources of information in a new organisation (whether textual, social or physical), but in KM an organisation invests in time-intensive practice such as strategic conversations and 'share fairs', and in the supporting technologies, because senior managers are persuaded, rightly or wrongly, that pooling knowledge is achievable and beneficial in terms of organisational health and adaptability. The organic metaphor informs David Snowden's classic definition of KM as:

> a new way of thinking about the organisation and society. It challenges the dominant mechanical metaphor of scientific management, in thinking of the organisation as a complex, self-structuring ecology in which the secret is to achieve minimal intervention for maximum beneficial effect. It is about creating adaptive systems that learn, in preference to systems that are optimal within a specific context (Snowden, 1999).

A similarly organic metaphor is embedded in Standards Australia's 'knowledge ecosystem' with, at its core, the organisational outcomes, which 'focus on creating an innovative and adaptive organisation' and which 'flow from the contextual environment (culture and strategic intent) and the manner in which an organisation operates within the external environment' (Standards Australia, 2005, p.9). In terms of Standards Australia's knowledge ecosystem, it seems to me, IL, and particularly workplace IL, is a *cultural* enabler. Culture, according to the Standard, is 'the combination of an organisation's skills and competencies' with those 'collective behaviours and values' that need to be understood for the purposes of knowledge-centred initiatives (Standards Australia, 2005, p. 9). The commonalities between KM and IL are most apparent in the knowledge manager's task of fostering and enhancing such skills and competencies, with its parallels to workplace IL and *its* focus on the subjective development of the novice and the inter-subjective capacity to work collectively. The divergences between IL and KM are seen more clearly by considering the models used in KM to describe the generation of knowledge in a learning organisation. The chief differences lie in the attempt by the KM proponents, many of them business consultants, to develop a paradigm that embraces *all* the knowledge and information related issues and practices in an organisation.

7. Conclusion: implications and further research

This paper has argued that the perception that IL and KM are closely related areas of theory is largely justified. It remains to be seen whether IL instruction gains a role in the KM environment. Perhaps this is an area in which empirical research would be useful. Workplace IL, of the kind promoted by Lloyd, provides a bridge of sorts between IL, as it is traditionally understood, and KM, insofar as it foregrounds social sources of information within organisations, which are also a major focus of KM, and on the development not just on the subjective development of the novice but also on the inter-subjective capacity to work collectively. The broad view of IL promulgated by Lloyd and others suggests that IL could be added to the thirty-four KM enablers listed by Standards Australia, except that the authors of the Standard would argue that the concept has broadened to the point where a new term, knowledge literacy, is in order.

It is clear that understanding of IL has changed over the years, first in the school sector and more recently in the higher education sector, and embraces the idea that IL is an intrinsic part of learning. Those who work in these sectors should have no problem with the notion of knowledge literacy and concomitant skills such as those required for storytelling, attitudes such as willingness to share knowledge and abilities such as that of assimilating new knowledge into existing frameworks, as set out in the Australian KM Standard. It has been suggested that IL may have something to contribute to the KM domain but it may also be the case that concepts promoted by the Standard and related documents, notably the notions of knowledge ecosystem and knowledge literacy, provide a way of thinking that could inform IL research and even practice.

It also has to be noted, however, that the concept of knowledge literacy, with its wide-ranging set of attitudes and abilities, is a long distance from IL as it has traditionally been understood, and that the differences between KM and IL are as significant as their commonalities. In the LIS environment, in particular, there are problems associated with the attempt to broaden the term information literacy to include understanding of the social sites of information in an organisation. One could argue, for instance, that if IL is taken to refer to a 'way of knowing' the sources of information that exist in an information landscape, *including* physical and social sites of knowledge, then it no longer makes sense to describe what libraries do as IL instruction, since they cover only the codified and largely textual sites of knowledge.

If we do reconceptualise IL, as suggested here, we are left with the apparently inevitable conclusion that libraries tell only a part of the IL story, and *can* tell only part of the story, given their overall function as collectors of knowledge in various codified forms. This remains one of the main barriers to LIS involvement in KM (Ferguson, et al 2007). Michael Koenig, a long-time proponent of the LIS profession's involvement in KM, sees this barrier beginning to crumble, arguing that KM is moving into a new stage of recognition for the importance and incorporation of knowledge and information *external* to the parent organisation (Koenig 2005). His argument is an abstract one, however, and again the need for empirical research is highlighted.

Further, the bridge provided by the workplace IL model does draw attention to the fact that there *is* a gap between the traditional view of IL (however much that may have moved beyond a procedural approach) and the knowledge literacy promoted by KM proponents. Some of the skills, attitudes and abilities associated with knowledge literacy do not relate to formal educational environments but to a different type of 'learning organisation', one in which knowledge, taken to include explicit forms (information) as well as tacit, embedded, procedural and anecdotal knowledge, is seen as the life-blood of a corporate organism that needs to adapt quickly to its external environment, such as the market, competition, government regulation or globalisation. KM's focus is on the organisational perspective, as a 'learning organisation', and hence on ensuring that information is readily available and renewable and that individual capacities and knowledge sharing processes support the required levels of organisational learning.

If, indeed, KM's focus on the organisational perspective, that of an organic, adaptive learning organisation, is a long distance from the largely individual focus of ILI, as it is traditionally understood and practiced, might it be worth considering the operational perspective and specifically the *scale* at which one is operating. Could it be that both IL and KM, in the context discussed here, might well benefit by thinking in scalar terms or, in other words, in terms of a total or general knowledge/information space, global and local, from the micro through the meso to the macro, and vice versa? The question then becomes are individual capacities solely to be seen within such terms and, if so, are those information professionals who operate in a KM environment willing and able to embrace such a paradigm?

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