Loss of faith in the origins of information literacy in e-environments: Proposal of a holistic approach

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Abstract

The original concept of information literacy (IL) identifies it as an enabler for lifelong learning and learning-to-learn, adaptable and transferable in any learning environment and context. However, practices of IL in electronic information and learning environments (e-environments) tend to question the origins, and workability, of IL on the grounds that the generic models of IL are inadequate for the complex and evolving context of e-environments. Conducting an analytical review of the literature on the approaches taken to adapt IL in e-environments, we discuss how a failure in understanding the dynamic context and components of e-environments and IL have resulted in the emergence of a marginalised way of viewing and practicing IL in these environments. Drawing on Nazari's (2011) contextual study of IL in an online distance learning programme, we propose a holistic way of viewing and practicing IL in EL environments which is aligned with IL origins; it enables the e-learner to conceptualise IL and customise it to their actual learning style and needs. This study can be of value to IL scholars and practitioners who are interested in the concept and practice of IL in e-environments.

Keywords

contextual research, digital literacies, e-learning, electronic information and learning environments, information literacy

Problem statement

As information and communication technologies have become widely adopted, information literacy (IL) has become a crucial component of learning and teaching in e-environments (Andretta, 2005; Bridgland and Whitehead, 2004; Doherty et al., 1999; Hadengue, 2005; Joint, 2003; Spitzer et al., 1998). There has been a trend towards adapting IL to dynamic e-environments: environments in which the forms, content, and ways of searching, accessing, evaluating, and using information sources and services are evolving (Andretta, 2005; Bridgland and Whitehead, 2004; Eskola, 1998; Hadengue, 2005; Joint, 2003; Kennedy, 1998; Ray and Day, 1998; Todd, 2000).

IL has been identified as an enabler for lifelong learning and learning-to-learn (Bundy, 2004). However, several authors (e.g. Martin, 2003; Savolainen, 2002; Williams, 2006) identify IL as inadequate for the complex and evolving context of e-environments. In this article, we argue that this is because these authors are working from a false premise that present a marginalised view of IL which doubt or deny its origins and workability in e-environments. This narrow view may indeed be identified in some academic frameworks such as Association of College and Research Libraries (ACRL) (2000). However, we contend that this is not a true reflection of the original concept of IL, which is still valid and robust. We shall focus in particular on IL's place in e-learning (EL), drawing on Nazari's doctoral study on IL in online distance learning environments (Nazari, 2011; Nazari and Webber, 2010).

Conducting a comprehensive and critical review of the literature, approaches to adapt IL to e-environments were explored in a wide range of scholarly documents and research literature. These were mainly obtained through Web of

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Knowledge, LISA and some relevant Internet resources. The literature search focused on two main areas: (a) literature reflecting librarians' and information professionals' views and practices of IL in e-environments; (b) literature reflecting practices of IL in EL environments from the perspectives of librarians and EL educators.

Using IL origins and promises as a merit, we critically review the emergent adaptation approaches to illuminate a loss of faith in IL origins in e-environments, and to discuss why such a transition is happening.

We will start by reviewing discussions of the concept of IL, concentrating in particular on IL's origins, and on key ways IL has been discussed in relation to the use of e-resources and in e-learning. We will proceed to propose an alternative perspective, based on findings from Nazari's research, in which IL is seen holistically in the context of an online distance learning programme. More specifically, we will propose a way of viewing the various components of IL (e.g. the nature of information, the nature and scope of information need and needed information) in the context of information/learning tasks in EL environments which is aligned with the origins of IL.

The origins of information literacy

Zurkowski (1974) is widely credited with having coined the term 'information literates' and 'information literacy', in his paper for the National Commission on Libraries and Information Science. As with subsequent definitions, his focus is on the information literate person, rather than the concept of IL. He emphasises using information in problem solving, not just information seeking:

> People trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information solutions to their problems. (p.6)

Zurkowski recommended taking initiatives to achieve universal IL. However, it was his more specific recommendation for training in electronic information tools and improvements in online information products (so that people needed fewer IL skills) that indicated the trend for the following years. A focus on searching skills is evident in the literature written by those in the industry (for example Unruh, 1978) and by practitioners (for example in Haygarth Jackson, 1989). This narrower focus on searching continued as online services moved into the mainstream in the 1990s. Tiefel (1995: 323) also notes the impact of the bibliographic instruction tradition, saying that the 'search strategy approach […] has dominated library instruction since the mid 1970s because it is a simple and adaptable teaching framework'.

However, as librarians were transitioning from what Zurkowski (1974) characterises as the Reading Services Environment to the Information Services Environment, the concept that was variously called user education, bibliographic instruction or library instruction was being explored more thoughtfully. The American Library Association Presidential Committee on IL (1989) produced their seminal report, which looks at the broader context of knowledge and skills for citizenship and empowerment. It identifies IL 'as a survival skill' in the information age, characterising information literate people as 'those who have learned how to learn. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand'.

This connection with Lifelong Learning has been made repeatedly in key documents (e.g. ACRL, 2000; Bundy, 2004; Candy, 2004; Candy et al., 1994) with the Prague Declaration on Information Literacy (IL Meeting of Experts, 2003) identifying IL as 'a prerequisite for participating effectively in the Information Society, and part of the basic human right of lifelong learning'.

Lifelong learning itself has been identified from two key perspectives. In the first perspective it is described as a requirement for being a competent and participative citizen who can contribute to the development of 'a knowledge-based economy' (Grace, 2006). Beddie's (2004) and Kenny's (2004) perspectives on lifelong learning also can be categorised in this strand (Grace, 2006).

The second perspective focuses on lifelong learning as a set of skills that enables individuals to act successfully at all stages of their personal and professional life (e.g. Candy, 2000; Candy et al., 1994; Boylan, 2002, Catts, 2004, Jarvis, 2000 cited in Grace, 2006). For example, Grace (2006: 4) highlights Candy's (2000) statement on lifelong learning as a set of transferable skills including 'technical knowledge and skills, communication competence, time-management and organisational skills, computer skills, and capacity to work collaboratively'. Some of the skills are part of IL, but, importantly, IL is also seen as an enabler of lifelong learning as a whole.

As well as being linked with lifelong learning, IL has been identified as relevant to, and supportive of, activities in personal, social and economic spheres, and in all disciplines of study (e.g. Bundy, 2004; Langford, 1998; Shapiro and Hughes, 1996; Webber and Johnston, 2000). Some models of IL, developed for use in formal education, lose sight of this breadth of application (e.g. ACRL, 2000 with its emphasis on the information literate student). Lloyd (2005) identifies this narrower focus as a traditional library perspective.

The full scope of IL is more often captured in statements and proclamations, for example the statement of overarching principles for the second edition of the Australian and New Zealand IL framework. The principle that information literate people 'individually and collectively search for and use information for decision making and problem solving in order to address personal, professional and societal issues' (Bundy, 2004: 11) recalls Zurkowski's (1974: 6) statement that information literates are competent in 'molding information solutions to their problems'.

Information literacy in e-environments: Perspectives from the literature

However, the trend to see IL as a narrower concept, when it is viewed in the context of e-environments (focusing on search and retrieval), continued with the result that authors increasingly identified IL as insufficient to meet people's digital information needs. In this section we will identify key positions and approaches taken by commentators in the literature when considering IL's ability to enable performance and problem solving in electronic information and learning environments.

First, there are those who believe in the workability of IL, identifying IL as an enabler for learning-to-learn in e-environments, but who do not pursue the full implications of this view. These authors show awareness of the importance of IL for learning how to learn, which implies that the components of IL need to be re-thought in order to make it work in e-environments (Andretta, 2005; Bridgland and Whitehead, 2004; Hadengue, 2005; Joint, 2003); however, there is no clear approach or recommendation on *how* to make it work.

For example, Andretta (2005) states the importance of IL for learning how to learn in online distance learning environments. However, she does not deliver guidelines for teaching IL and embedding it in such environments in a way that facilitates the development of information literate learners who can learn how to learn. Johnston and Webber (1999, 2005) identify IL as a discipline, essential for developing empowered citizens in an information society. As such, it is not seen as needing to be supplemented by e-literacies, but as a robust and evolving concept which can support the needs of learners who are consuming and creating information in a variety of media. However, again, Johnston and Webber do not specifically relate their concept of IL to e-environments. Markless (2009) does directly address the question of the concept of IL that is appropriate to higher education in a Web 2.0 era, and proposes a model of information and critical literacies. Once more, however, she does not explain specifically how this helps students engage with, and make sense of, information as part of online learning.

A second approach principally concerns the definitions and frameworks of IL developed by librarians. These have been adapted to the electronic age by including examples of various types of electronic information sources and communication technologies. Spitzer et al.'s (1998) account of IL developments, and Behrens' (1994) historical overview of IL definitions, provide evidence of such an adaptation process from the beginning of information and communication technological advancement. By the time of the ACRL (2000) standards, e-resources such as websites and search engines were mentioned explicitly as information sources and the Chartered Institute of Library and Information Professional's (CILIP) (2004) definition gives an even broader range of examples, including CD-ROM, DVDs, film and the Web. Overall, this approach broadens IL definitions to cover a wider range of information and communication sources and tools to assure the workability of the IL concept in dynamic e-environments. However, the focus is primarily on expanding the concept of information (to include lists of digital media), rather than defining more holistically the skills and knowledge required to be information literate within an e-environment.

The third approach is to revisit IL models specifically for e-environments by relating IL to other literacies. A characteristic of this approach is that IL is not seen as sufficient by itself, but requires other literacies to supplement it. Bawden (2001) reviews the ways in which IL, digital literacy and related literacies have been defined since the 1980s. He identifies the onging complexities, and contradictions, in definition and relationship between the terms. Bruce (1997) is also helpful in outlining some of the key literacies that other scholars have included in their exploration of literacies for an e-environment, namely: IT literacy, computer literacy, library skills, information skills and learning-to-learn.

Some examples illustrate the ways in which IL has been positioned in relation to other literacies over a number of years. McClure (1994) and, later, Savolainen (2002) both provide models which present the relationship between IL and other literacies in networked environments; in each case IL is seen as core but not sufficient. McClure's (1994) key focus is on literacies which help people to learn how to use network environments and networked electronic resources. He puts IL at the centre of his literacies, at the point where traditional literacy, media literacy, computer literacy and network literacy intersect. His model is also interesting in that he positions it in the context of information problem-solving skills. However, he feels that 'recasting IL definitions into those of a networked society is mind boggling' (p.118). Thus, rather than engaging in this challenging task of recasting IL, he focuses, for the majority of his paper, on exploring the concept of network literacy and advocating ways to foster it.

Similarly, Savolainen's (2002) focus is on 'network competence' (Figure 1). He sets out to analyse the competencies
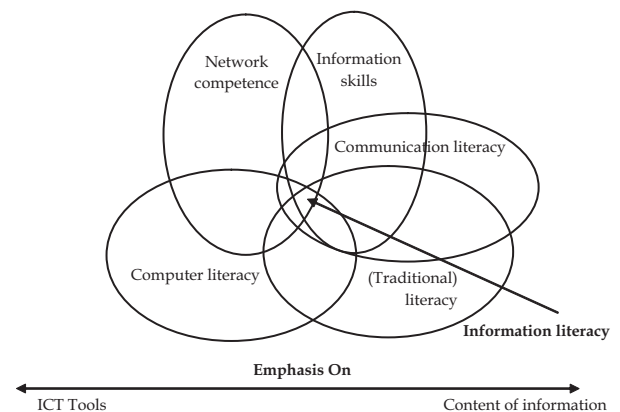

Figure 1. Mapping the major concepts of information-related competencies.
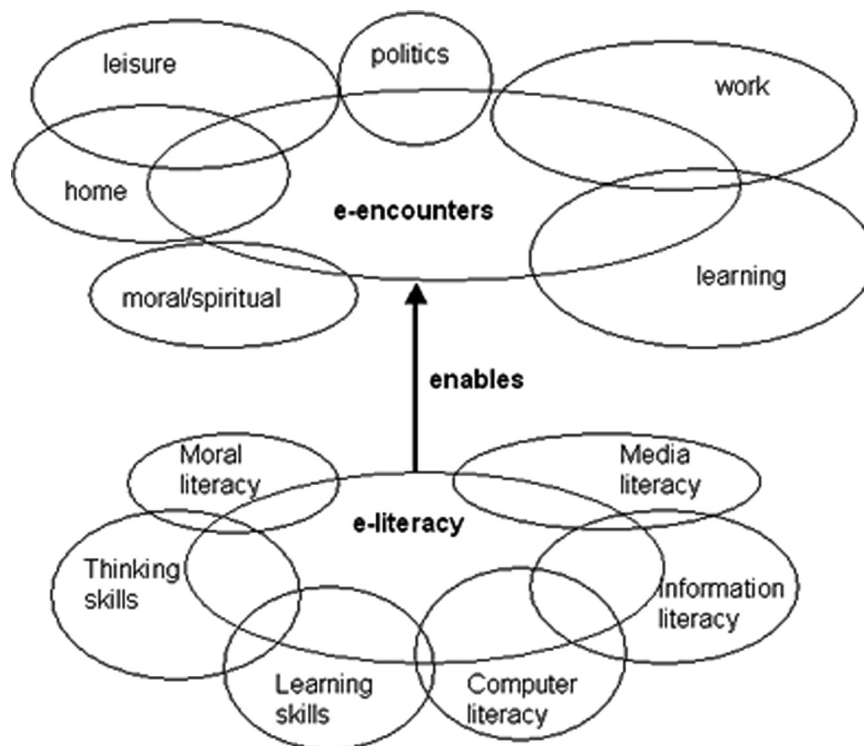*Source:* Savolainen (2002: 216).

Figure 2. IL as a part of the e-literacies framework.
Source: Martin (2003: 22).

needed for everyday information seeking in a networked information environment. IL is again identified as the 'common denominator of information-related competencies' (p.216) and is put at the centre of Savolainen's Figure. However, he rejects IL as the concept which could encompass the skill needs of information seekers in electronic environments seeing it as conceptually problematic and, rather than elaborate these conceptual problems within IL, he chooses to model a new concept of network literacy.

Martin (2003) subordinates IL completely as one of a number of literacies, under the bigger umbrella of e-literacies. As shown in Figure 2, Martin (2003) concentrates specifically on the e-environment, seeing e-literacies as enablers of performance in different areas of life. He positions IL as one of six literacies in a broader framework which empowers individuals to achieve qualifications and skills they require to deal with an increasingly electronic world.

More recently, Beetham et al. (2009) identify information literacy as one of the sets of learning literacies required for the digital age, and they recommend that greater stress is placed on 'literacies of the digital' (p. 66). These approaches imply that IL can only assist individuals to solve a problem in an e-context if IL has the other literacies amended to it, or if IL itself is embedded in the e-literacies or problem-solving frameworks.

Overall, these views of IL in e-environments doubt or deny the origins and promises of IL in e-environments. The perspective from the literature is that IL is not independently

capable of developing information literate individuals in e-environments, and only works if other literacies are attached to it. We contend that this is because these authors have not viewed IL holistically in the dynamic context of e-environments. Within these environments the nature of information, problems, problem-solving process and requirements are constantly changing, depending on their context. This influences the nature of IL and the way in which one needs to develop information literate people for such dynamic environments. Below, this has been illuminated further.

Approaches to adapt information literacy in e-learning environments

Nazari (2010: 188), in her study of IL in an online distance learning (ODL) GIS (Geographic Information Science/ Systems) programme, states that IL is 'a contextually-constructed phenomenon which needs to be contextually researched in order to be adopted in different contexts'. Using a case study approach, Nazari explored the concept and nature of IL in a joint ODL GIS programme offered by three universities, and developed a contextual model of IL for this programme. She identifies that understanding of three main contextual aspects of a case are essential in order to conceptualise and practice IL in ODL contexts. These are (Nazari, 2010; Nazari and Webber, 2008):

- the physical context: the learning environment and requirements;
- the disciplinary context: ways in which information is conceived and used to accomplish tasks, ways of viewing and learning the subject, and the nature and process of problem-solving in the context of the discipline;
- the educational context: the nature and characteristics of learning and teaching, e.g. curriculum design, pedagogy, students' assessment methods etc.

Drawing on the Nazari's (2011) study, in this section we analytically review approaches have been taken to adapt IL in EL environments. Focusing on the library and information (LIS) professionals' and EL educators' views on three components of EL (i.e. learning environment, learning process, and learners' tasks), we will demonstrate how lack of a holistic and contextual view of IL in EL environments has resulted in a generic and incomplete image of IL which has deprived the stakeholders of the full exploitation of IL in EL practices. According to the Department for Education and Skills (DFES) (2003), EL is a means of learning which involves people using information and communication technologies.

LIS professionals', and EL educators', perspectives on EL

We will start by contrasting the ways in which LIS professionals and EL educators have talked about EL and the ways in which they have discussed IL in an EL context.

LIS professionals have argued that, in EL environments, IL needs to be adapted in a way that enables learners to find, evaluate and use different types of information sources and communication technologies (e.g. Bridgland and Whitehead, 2004; Hadengue, 2005; Joint, 2003; Kennedy, 1998; Todd, 2000). From this perspective, e-learners' tasks are still coursework or research projects that require learners to use different types of information sources including journals, online databases and the Internet.

By contrast, educational literature on EL implies that learning in EL environments is an interactive process requiring e-learners' participation in the learning process and interaction with the learning environment including peers, tutor, learning content and context. Mason (2002) highlights interaction as one of the main characteristics by which EL can be distinguished from other types of course:

> In higher education, the majority of the content of the course may be delivered through lectures or through distance-education textual material, but the course is categorised as e-learning because interaction with the tutor, dialogue with other students, the searching for resource materials, conduct of collaborative activities, access to course outlines and supporting material are all conducted online.

Thus there is more emphasis on the process elements of the activities. Referring to Coomey and Stephenson's (2001)

comprehensive review of the literature on EL in higher education, Mason (2002: 3) describes four major features of good EL practices as follows:

1. Dialogue: this includes different interactive opportunities that are created by tutors or moderators in EL as part of the course content to facilitate learning. Email, real-time and asynchronous chat, bulletin boards, and group discussions and debate are some examples.
2. Involvement: this assures the engagement of learners in learning through providing learners with structured tasks and group activities.
3. Support: this has been highlighted as a vital characteristic of successful online courses and refers to any feedback and support learners get during their course of study (e.g. face-to-face contact, online feedback from tutors or peers, software tools).
4. Control: this highlights learners' control of their learning activities and the freedom that is given to the learners to practise such control. This includes 'responses to exercises, pace and timing, choice of content, management of learning activities, navigation through course content, overall direction and assessment of performance'.

An examination of research and practices in learning and teaching in EL environments reveals that EL constructs (i.e. interaction, communication, collaboration and engagement in the learning) have primarily been used as the main criteria for assessing students (Sims, 2000; Wallace, 2003). For example, students' use of blogs, discussion boards, chat rooms and other communication tools to engage and interact with the learning content, their peers, tutors and EL tools, may be used to measure whether learning has been taking place in EL courses (Mason, 2002; Sims, 2000; Wallace, 2003).

Table 1 compares LIS professionals' and EL educators' perspectives on key components of EL, as reflected in the literature. The implication of Table 1 is that educators and librarians with these different perspectives are likely to specify different activities, design different types of assessment, and approach the learning and teaching tasks in a different manner. The authors will proceed to highlight some examples of the LIS professionals' perspective on the EL components listed in Table 1.

Ashmore and Grogg (2004) provide an example of the learning environment conceived as an information environment, namely through a library virtual tour. Whereas there is evidence that face-to-face library induction is becoming more interactive, for example through use of the 'Cephalonian method' (Morgan and Davies, 2004), the virtual equivalents might not move out of the 'Learning environment' box to engage with the 'Information process'.

Herron and Griner (2000) describe a web-based course which does address the learning processes and tasks, but again with an emphasis on information processes and activities

Table 1. A comparison of LIS professionals' and EL educators' perspectives to EL.

Perspectives EL components	LIS professionals' perspective	EL educators' perspective
Learning environment	Information including electronic sources and services	E-learning materials and tools
Learning process	Research: Carrying out a coursework or a project	Interaction Communication Collaboration Participation Engagement
Learners' tasks	Developing searching strategies; Locating and finding information; Evaluating and using information	Using EL tools and materials to communicate, collaborate, and engage in the learning process: Chat, uploading a coursework, reading discussion board, …

(e.g. searching the library catalogue and evaluating material on the Internet).

Getty et al. (2000) do look at the EL environment itself, in their description of developing library instruction for distance learners. They explain how they used the tools available in their EL courseware, but the focus for student activity and assessment is still on information tasks and processes like using a periodical database or finding a book in the library. Dupuis (2001) describes how they use an online tutorial, TILT, as part of a blended learning approach to library instruction. TILT is described as an interactive learning environment, defined in terms of interacting with the computer in quizzes etc., to complete information-related activities and test knowledge about them. Dupuis identifies the value of the tutorial in making the students 'familiar with fundamental terms and concepts' and with 'basic library resources' (Dupuis, 2001: 22) and in making the students more likely to 'participate in class discussions'. Thus again the approach falls into an 'LIS perspective' as defined in Table 1.

Hadengue (2005) outlines an interesting pedagogical approach to designing a CAL (Computer-Assisted Learning) package to teach IL. She identifies different phases for the learning design of three modules: preparing the students for learning, focusing on the activities to be undertaken, integrating the students into the learning situation, consolidating their learning (for example reflecting on their learning) and transferring their knowledge to different situations.

However, when identifying the aims and nature of the modules, Hadengue (2005) describes the learning environment in terms of the information environment that the students interact with, i.e. specific information resources and tools. Although interaction with other students is mentioned in describing the above phases, the module descriptions and aims again relate

to specific information tasks and activities such as executing information searches and citing correctly. Thus, the implementation reveals an LIS rather than an EL perspective in terms of outcomes, activities and priorities, and additionally the aim of the package is 'to help students identify resources and research information' (Hadengue, 2005: 37): in other words, focusing on a narrow interpretation of IL.

Approaches to adapt IL in EL environments

LIS authors have mostly seen the EL environment as an environment in which e-learners require information skills that enable them to deal with different types of electronic information resources and tools. This can be traced in the findings of several studies on students' seeking behaviour in electronic environments (Eskola, 1998), student attitudes toward electronic information resources (Ray and Day, 1998), and studies on factors affecting success or failure of learning in EL environments (Day et al., 1996; Forsyth, 2003; Stansfield et al., 2004).

For example, Todd (2000) highlights differences in the information environments and student responsibilities in traditional and web-based information environments, based on a study of users' engagement with digital information environments. He highlights information overload, diversity in the range of information resources and hence information evaluation criteria as challenging tasks in web-based information environments which require particular attention by stakeholders.

As stated by Farmer (2001), in such environments, students today need to be more information literate than ever. Indeed, this statement forms the central notion underpinning the approaches to adapting IL to EL.

The adaptation of IL that we have discussed in the previous sections can be seen in the application of IL in the EL environment. First, there are approaches that expand IL skills to include the skills that users would need to locate, access, evaluate and use different electronic information resources. In this approach, students are provided with the skills they would need to use electronic information resources that are mainly beyond the boundary of traditional library resources. Examples include Fahey (2003) in her account of Australian community training; Armstrong and Georgas (2006), describing a tutorial developed by librarians at the University of Illinois at Chicago which focuses on information searching; and the credit-bearing module MOSAIC delivered by the Open University in the United Kingdom (Parker, 2008), which was designed to help students 'develop both skills and confidence in finding, using and handling information, with a particular emphasis on the use of electronic media - from search engines to on-line libraries' (Kubiak, 2002).

Second, there are adaptation approaches that use EL technologies and capabilities to facilitate the development and delivery of IL skills as a separate module or embedded in the modules/curricula. An example is Patalong (2003) who
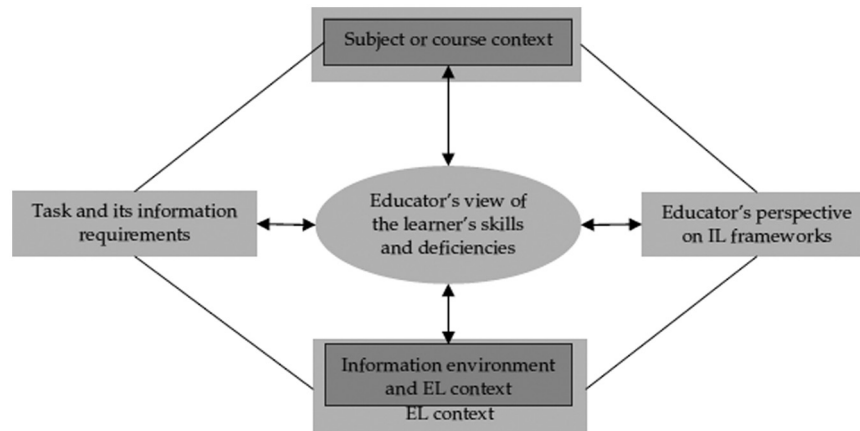
Figure 3. Approaches to IL in EL environment from the literature.

describes using a Virtual Learning Environment to enhance information skills teaching at Coventry University. The approach involved customisation and user focus, but still centred on information sources.

Due to the popularity and wide capabilities of EL technologies there is a growing interest in using EL technologies and software such as WebCT to develop and deliver IL tutorials that engage learners in active learning and problem-solving modes of learning. However, this does not necessarily mean that they are developing a holistic approach to IL. Indeed, Sundin (2008: 34), in his textual analysis of Nordic information literacy tutorials, discovered a focus on information sources, on behaviour (paying 'considerable attention to the practical skills of information seeking seen in relation to the ICT that provides users with increasing access to databases') and on information seeking as a process to be followed through.

Sundin (2008) proposes a link between the concepts of IL he identifies in the Nordic IL tutorials, and dominant themes in the IL and information behaviour literature (for example, a behaviourist approach to teaching in the 1960s and 1970s). An increasing interest in pedagogy (as evidenced, for example, by more frequent reference to educational literature), and in teaching collaboratively with non-librarians can be observed in literature in the 21st century. Walton et al. (2007) describe their IL intervention in a Sports and Exercise programme in terms of the interactions and communication that took place, and the activities themselves involved online discussion and reflection.

A holistic adaptation approach

We have argued in this study that, losing contact with the origins and promises of IL, an incomplete image of IL has been projected into e-environments, because of a lack of holistic understanding of IL in these contexts. We propose combining the views of IL in EL environments identified in the LIS professionals' and EL educators' approaches to produce a more holistic and productive approach, more in keeping with the early promise of IL.

We argue the current approaches to IL in the EL environment view the 'information need' as a static phenomenon in a dynamic context. We will do this by comparing the approaches expressed in the literature with our view of the original concept of IL in a dynamic information and learning environment. Figures 3 and 4 present these differing approaches, involving the key elements in the interaction with the learner.

First we consider Figure 3, which presents the approach from the literature we have reviewed. The elements in the figure are:

- the learning task, that requires students to interact with and use information for its accomplishment;
- the subject context in which learning takes place (i.e. the subject or course of study);
- the information environment which the teacher sees as appropriate for the task;
- the EL context in which the student is carrying out the task (e.g. the EL systems);
- the framework and/or conception of IL against which the teacher is evaluating the student (this may be a formal framework, such as the ACRL standards, or their own view of IL developed through experience);
- the teachers' view of the learner and his/her skills and deficiencies.

In the approaches to IL in EL environments which are expressed in many of the cited articles, there is a focus on the *task*, which is related to the information environment, and which may be related, to a greater or lesser extent, to a subject or course context. The task is set by reference to IL standards; formal ones or the librarian/educator's own IL standards. The learner will be measured against these standards. In some cases the educator/librarian will make assumptions about where the learner is in relation to the IL standards and the task (what existing knowledge and deficiencies are).
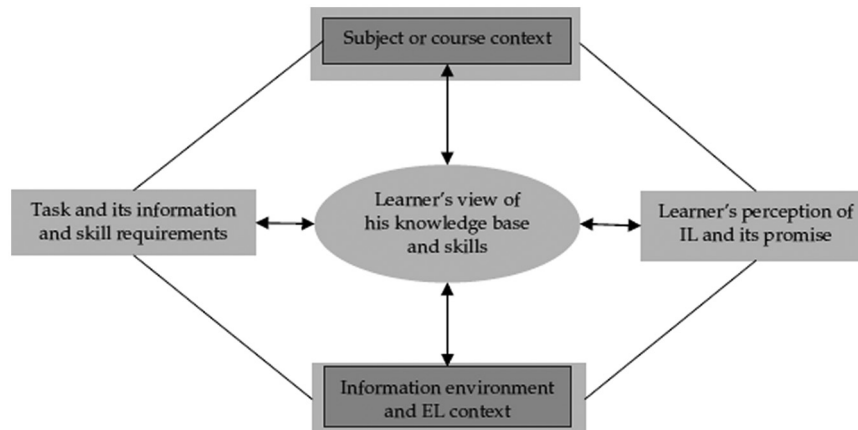
Figure 4. The proposed holistic approach to IL in EL environment (enabling the learner to customize IL to his actual learning style and needs).

In other cases they may try test or question them to find out where they are starting from. So in this context, the 'needed information' is what is required to do the information task well, to the required standard.

For instance, in the context of writing an essay, the information need may be seen as a need for information on the topic, with a focus on certain elements that the learner is supposed to write about in the essay. This is seen as helping him or her to determine and gather information about that topic and become knowledgeable in that area. However, even this simple scenario in an EL environment may require the learner to develop knowledge and skills in certain areas to be able to write and disseminate the essay in the e-environment, as listed in the Table 1 'EL perspectives' column. This means that there is a need to contextualise the information need, as a dynamic phenomenon, within the EL environment. Figure 4 presents our approach to IL in the EL context. The elements in this figure are:

- the learning task, which expands to include the learner's diagnosis of their information and skill requirements to complete the task;
- the subject context, as in Figure 3;
- the information environment seen by the learner and teacher as appropriate for the task;
- the EL context, as in Figure 3;
- the learner's view of his/her knowledge/skill base;
- the learner's perspective on their needed IL.

Our approach makes some elements more explicit; in particular the 'knowledge base & skills' of the learner becomes a separate item, but the key constructor in the scenario, since the learner's ability to reflect on, and then develop, this base is key to learning. This moves away from the view of the learner which sees him or her as a subject of instruction with some skills and deficiencies that have to be rectified in relation to given tasks and goals. A key goal is enabling or facilitating the learner in determining his or her information and learning needs in relation to the other areas in the diagram: the learning task, within the context of the subject, EL and information environments. The learner needs to think and question critically to identify his/her own information and learning needs in relation not just the task, but the other elements.

For example, an activity may be set with the learning outcome of understanding the opinions and arguments surrounding a particular medical condition, with learners using a discussion board to share links to news stories and articles and discuss the positions and information they have discovered. This would require, not just skills in searching and evaluating external sources, but also understanding of how to use the medium of a discussion board. This includes understanding the basic structure and layout, presenting and linking information and postings, interacting with other learners and navigating through the postings and information that accumulate on the discussion board. These elements fit well within the original concept of IL, but require a fresh view of what is encompassed by determining the information need and, indeed, a holistic view of the nature of information. We contend that, whilst an EL perspective (see column 2 of Table 1) might take account of the interaction and communication aspects of a learning task, this perspective would not take full account of the information dimension; our review has shown that these interaction and communication aspects tend to be neglected in existing accounts of IL, however.

This implies certain pedagogic approach from anyone with an educational role: lecturer, librarian or learning technologist. Figure 4 would be difficult to achieve if you were a teacher who thought that teaching was about transmitting knowledge.

Conclusion

The critical review of the approaches to define and adapt IL in e-environments revealed that doubts overshadow the

thoughts and practices of scholars and practitioners. Some have attempted to keep their faith by stretching some components of IL such as the scope of types and forms of information sources, and skills needed to find, evaluate and use these new forms of information. Others have appended other literacies to the IL framework, or marginalised IL by situating it under the umbrella of e-literacies to make it work in e-environments.

Adaptation approaches in EL environments, on the other hands, came from two different perspectives: LIS professionals' and EL educators'. Their approaches are influenced by their perceptions and translation of the EL components (i.e. learning environment, learning process and learners' tasks). Although the view of each group uncovers some contextual aspects of IL, none delivers a holistic view of IL in EL. The suggested approaches fail to provide the stakeholders with robust guidelines on how to fully exploit IL in a way that enable e-learners to mold solutions (of information or competency genre) in their problems (learning tasks), as suggested in the origins of IL (Zurkowki, 1974: 6). Instead they support the marginalised view of IL which doubts its workability, as an enabler for learning-to-learn and problem-solving, in e-environments.

As suggested in Nazari's (2011) contextual study of IL, to conceptualise IL in e-environments, in alignment with its origins, we need to holistically re-view our view of what constitute learning in EL, and more broadly what constitute problem-solving in e-environments. Combining the views of LIS professionals and EL educators on the EL components, we proposed a contextual approach for conceptualisation of IL in EL which is fully aligned with the origins of IL. Instead of having the educator or librarian to conceptualise IL, this study suggests enabling the e-learner to conceptualise IL and customise it to their actual learning needs and style. This emerges from their recognition of their information and competency needs as a result of their informed interactions with the subject/course, learning task, and the information and learning environment within which the learning takes place. This is supported by their knowledge of the nature of IL in the dynamic context of e-environments which develops throughout their course of study.

This implies, pedagogically, the EL programmes should be designed in a way that engage students in thinking and questioning their knowledge base and skills while interacting with the subject/course, tasks and the learning and information environment. It is through such informed interactions and pedagogical concerns that then the learner will be able to diagnose their information and competency needs and identify appropriate sources of information to meet the needs.

In sum, instead of stretching or squeezing IL to fit the diverse and evolving IL needs of e-learners, we suggest empowering the e-learner with the knowledge and vision they need to be able to: a) conceive the dynamic world of e-information and e-learning and its implication for IL and successful learning; b) diagnose their information and competency needs within this context and in the context of the subject and tasks they are dealing with; c) and to adopt appropriate approaches and resources to meet their needs. This certainly requires the contextual and holistic analysis of IL in EL and account of the pedagogical concerns suggested in this study.

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