From Information to Knowledge:
The Information Literacy Conundrum*

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ABSTRACT

The fusion of learning, information, and technology presents dynamic challenges for all librarians, educators and students in 21st century libraries and schools. At the heart of this fusion is the growth of a pervasive, integrated information environment characterized by vast quantities of digital content, open choice, collaborative and participatory digital spaces, and the transition of the web environments from consumption of information to creation of information. This environment heralds important opportunities for librarians and teachers to rethink, re-imagine and recreate a dynamic approaches to information literacy instruction.

Drawing on an extensive body of research undertaken through the Center for International Scholarship in School Libraries (CISSL), and published research on both information literacy and constructivist learning, this paper provides a critical examination of the current status of information literacy: its multiple conceptualizations, competing models, viewpoints, and its operationalizations in educational and library environments. The paper will challenge information literacy practices which center on simplistic, reductionist approaches to information literacy development, and the separation of information process and knowledge content. In particular it will address apparent contradictions in espoused conceptions of information literacy which revolve around "knowledge": knowledge construction, critical thinking, problem solving and the development of knowledgeable people; and information literacy practices which revolve around "information": a predominant focus on skills of access and evaluation of resources and with less attention given to engaging with found information to develop deep knowledge and understanding. The paper will present a series of challenges for moving forward with information literacy agendas in libraries and schools.

Keywords: Information Literacy, Information Use, Evidence-based Librarianship

1. Introduction

It is a privilege to be present at this celebration of the 40th Anniversary of the Korean Society for Library and Information Science. For almost 40 years now, the concept and practice of information literacy has been part of the LIS field; clearly a significant concept in school and academic libraries, as well as in a range of social contexts, and advocated as foundation for contemporary education, workplace sustainability and social engagement (Horton, 2008; Lloyd, 2006; UNESCO, 2008). This paper examines some of the current conundrums surrounding the discourse on information literacy. It overviews some key milestones in the information literacy discourse; will focus specifically on the problematic of information use, and will also briefly discuss opportunities in relation to future directions and developments in information literacy.

2. Background

Historically the roots of information literacy were in developments in the USA in the 1960s, including discourses surrounding the growth of knowledge, technological changes, the need for education systems to address "learn how to learn", large scale funding of libraries in USA, revisions in the training of librarians, and the use of libraries in teaching and learning (Behrens, 1994; Bruce, 1997, Markless & Streatfield, 2007). This appears to have crystalized more coherently in subsequent decades with the emergence of wider social commentary on the Information Society in the 1970s and 1980s, developments of mass computerization, further alignment of discourses related to continuing education and life-long learning, and educational concerns about physical and intellectual barriers to information access.

By all accounts, the term information literacywas first used by Zurkowski (1974) in a National Commission on Libraries & Information Science (Washington DC) Report titled: "The Information Service Environment, Relationships and Priorities." In this report, information literacy was posited as an individual's capacity to use information tools and information sources to address problems. This appears to be the foundation for the American Library Association (1989) Presidential Committee on Information Literacy: Final Report which defined information literacy accordingly: "Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them.

They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand" (ALA, 1989). This formalization spawned many variations of definitions as institutions and organizations globally gave it increasing focus, particularly in articulating sets of skills deemed necessary for people in all walks of life to effectively engage in the rich information landscape (for example, AASL & AECT, 1998), as well as identifying attributes of "information literate" people (Doyle, 1992, 1994). Common to these approaches was the conception of information literacy as the ability to access, evaluate and use information towards a specific purpose, and its operationalization as instructional practices centering on the mastery of a range of discrete information handling skills (Bruce, 1997; Lupton, 2004; Markless & Streatfield, 2007).

Contributing to the pervasiveness of information literacy as a global phenomenon was the establishment of information literacy-centric organizations and associations, and their advocacy of information literacy as a significant social and educational construct. The National Forum on Information Literacy founded in 1989 by the American Library Association, now representing over 90 national and international institutions and organizations, aimed at promoting the importance of information literacy in all areas of society (National Forum on Information Literacy, 2008) including education, the workplace and everyday life. The Prague Declaration (2003) titled "Towards an Information Literate Society" embedded information literacy in the process of lifelong learning and its value as a human right. In this declaration, information literacy was posited as encompassing "knowledge of one's information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues or problems at hand; it is a prerequisite for participating effectively in the Information Society, and is part of the basic human right of lifelong learning" (Prague Declaration, 2003, 1). The Alexandria Proclamation on Information Literacy and Lifelong Learning (2005) endorsed by IFLA, National Forum on Information Literacy and UNESCO, focused on engaging governments and intergovernmental organizations to pursue policies and programs to promote information literacy and lifelong learning. In a similar vein, the IFLA/UNESCO School Library Manifesto, ratified in 199 and now translated into 35 languages, established the development of information literacy as core work of school libraries (IFLA/ UNESCO, 2006).

While the library community has been sustained in its commitment and actions centering on information literacy, in the early 1990s we see the emerging threads of the information literacy conundrum, initially centering within the library community on the distinction between

conceptions such as Information literacy, bibliographic instruction, user education, information skills, library skills, library literacy, information literacy skills, information literacy skills instruction (Langford, 1998). Foster (1993, 345), for example, declared it "a phrase in quest of a meaning." Amid much posturing on behalf of the library community as to the importance of information literacy to even life survival it appears that such early terminological confusion, and quest for meaning and relevance, produced considerable skepticism on part of some regarding the validity of concept, considering it the latest buzz word and an exercise in public relations, and seen by others as part of a broader struggle of libraries to assert both authority and relevance in an increasingly digital information environment (Todd, 2000). Despite this conceptual murkiness, it continued to be championed by librarians across educational and public sectors as an essential dimension of progressive library practice. During the 1990s, the debate became wider than libraries, touching on other conceptions of literacy as part of this conundrum. Candy (1993, 280) claimed that we are being "bombarded by other concepts of literacy: functional, visual, media, computer, political, information." From the library community, it was argued that literacy is fueled by information and hence all literacy is information literacy. This struggle for supremacy, in my view, continues to the present day. I spoke at the 4th National Information Literacy Conference in Adelaide, Australia in December 1999, and made the comment that information literacy is often seen by others as "a clarion call by committed protagonists to improve literacy and learning outcomes" (Todd, 2000, 29), rather than as an action-centered process where tangible outcomes could be demonstrated.

Stern (2002) in a white paper prepared for UNESCO, the US NCLIS and National Forum for Information Literacy titled: "Information literacy unplugged: teaching information literacy without technology" sought to establish a more holistic and integrated spectrum of literacy that included: alphabetic literacy, functional literacy such as reading and writing; social literacy, such as communication in a cultural context; information literacy with a focus on critical location, evaluation and use of information; Digital information literacy, with application of information literacy in the digital environment. Other holistic positionings also emerged, such as Shapiro and Hughes (1996) "Information Literacy as a Liberal Art" which proposed a typology of information literacy as:

- tool literacy (using tools of current information technology relevant to education and the areas of work and professional life that the individual expects to inhabit:
- resource literacy (ability to understand the form, format, location and access methods of information resources);

- social-structural literacy (understanding how information is socially situated and produced);
- research literacy (ability to understand and use the IT-based tools relevant to the work of today's researcher and scholar);
- publishing literacy (ability to format and publish research and ideas electronically, in textual and multimedia forms);
- emerging technology literacy (ability to make use of the continually emerging innovations in information technology);
- Critical literacy (ability to evaluate critically the intellectual, human and social strengths and weaknesses, potentials and limits, benefits and costs of information technologies).

Underpinning these is not merely an attempt to establish the territory, but also to assert the supremacy of information literacy. At the COLIS 2010 conference in London, Mackey & Jacobson (2010) proposed reframing of information as metaliteracy, amid the continued flurry of competing terms: media literacy, digital literacy, ICT literacy, visual literacy, cyberliteracy; information fluency, critical literacy and even disciplinary domains like health literacy. The Transliteracy Research Group also has posited the following working definition of transliteracy as "the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks." The Transliteracy Research Group is based at De Montfort University, Leicester, UK, in the Institute of Creative Technologies and the Faculty of Humanities. The group coordinates theoretical and practice-based research into transliterate materials and behaviors (Transliteracy Research Group).

Where are we today? At best I would posit that while the field has developed considerable complexity over the last 40 years, but with it has come multiple contradictions: terminological confusion; a plethora of understandings, definitions, descriptions and models of information literacy. I would posit that this arena has not developed a strong theoretical foundation, has not a strong framework of intellectual critique (Todd, in Candy's book); there is no comprehensive critical examination of the way information literacy is portrayed in organizations; and little exploration of what constitutes meaningful pedagogy for information literacy instruction / interventions; limited substantive articulation of the impacts / benefits of information literacy agendas, beyond mastery of a range of information literacy skills.

There are an extensive range of practice-centric information literacy models and schemas today, particularly skills-based models and standards as a framework for information literacy

instruction. There are research models, process models, attribute models, skills typologies, information literacy standards, experience-based models, relational models, inquiry based approaches (a good review of these is provided by Kerr, 2010; Gibson, 2007). Many of these models are without theoretical foundation, and not derived from systematic research to be strongly tested and validated models; they often do not take into account research validated patterns of information seeking. A major exception to this is the research-derived and validated model of Kuhlthau, the Information Search Process (Kuhlthau, 2004; Kuhlthau, Heinstron, & Todd, 2008). For example, a number of models have central information concepts such as defining, locating, selecting, organizing, presenting and evaluating information. They typically start with "defining information needs" whereas research indicates that information users often lack well-formed statements of information needs and are unable to articulate gaps and anomalies in their existing knowledge that enable them to interact with information systems, services and sources in meaningful ways. Some models rely on a problem-solving rhetoric. Often, the need for information and its use are situated in circumstances that are not as well-defined, discrete, and monolithic as problems (Doty, 2003). These models often articulate numerous performance indicators which are considered best practices for the implementation and assessment of information literacy programs. They often do not take into account individual differences, and assume that all who come together to engage in information literacy instruction are at the same place in thinking, expertise, and indeed, need. Sterile, generic and decontextualised information literacy curriculums; Scope and sequence models of Information Literacy which are devoid of disciplinary content, typically treat information literacy as a separate discipline (the librarian teaches information skills; the content is left to the disciplinary instructor).

One of the central conundrums in the current information literacy discourse is its resource focus, rather than any strong focus on the "use" concept which is embedded in the rhetoric of information literacy. What is "use"? In the information literacy discourse, this term is largely undefined and explicated, and when it is, its focus appears to be on accessing, finding, and evaluating information sources, rather than on giving some attention to enabling people to something with the found information, that is, the complex cognitive processes required to engage with the found information and to transform information into deep knowledge, actions, decisions. Information literacy seems to me to miss the central dynamic of the very word "information" The notion of human understanding is the essence of the word "information": *inform.ereinformo, informare, informavi, informatus* = inward forming. What then is the purpose and goals of information literacy? It is to create the illusive "information literate person"? Is it to create

people whose behaviors mirror librarians? Or is it part of libraries and information agencies providing the best information opportunities for people to make the most of their lives as sense-making, constructive, independent people, people who know how to connect with, interact with and utilize their information rich world to enable them to build knowledge and understand their world around them, to think though issues and make decisions to sustain and enrich their own lives. Information is the heartbeat of libraries. But its hallmark is found in the richness, diversity, empowerment, discovery, creativity, knowledge and understanding that it enables in the lives of everyday people. It is about empowerment, connectivity, engagement, interactivity, and its outcome is knowledge construction. Brown & Duguid (2002, p.18), expresses it with great simplicity and elegance: "The ends of information, after all, are human ends." The current information literacy discourse in my view falls short of this in that it celebrates the found, rather than the understood.

Little attention has been given to explicating the concept of "use" in the information literacy discourse. The notion of information use/utilization has been identified as an important concept in the study of people's information seeking behavior for over a decade now, albeit a seldom studied area (Vakkari, 1997, 460). Historically, its study has emerged from several different traditions, including sociology of knowledge, applied social science research, innovations diffusion, organizational change, and more recently, information user behavior. Like the information literacy discourse, it too is an area characterized by terminological inconsistency where the terms "information use", "knowledge use", "information utilization" and "knowledge utilization" are often employed interchangeably and generally with little clarification of meaning, and further clouded by terms such as "utility", "under-utilization", "over-utilization" and "misutilization". There are a diverse range of definitions built on different conceptions of what information is. These range from notions of applications of specific social science research programs to decisions in ways to make a difference, to consumption of information, helps, and active strategies of adoption (Todd, 1999). As a whole, the literature however conveys the sense that information use is all about people and information coming together; it is about people "doing something" with information that they have sought and gathered themselves, or provided by someone else. Taylor, for example defines "uses of information" as "what information does to or for the recipient and for his or her problem or situation" (Taylor, 1991, 221). Machlup claims that to "use" information "is to listen, to look at, to read; in short, it is its reception and, if possible, the full or partial understanding by the recipient". Machlup distinguishes between doing something cognitively with the information, and doing something with the end product, what he calls

knowledge. He claims "The use of the knowledge is something else. The act of delivering is one thing. The object delivered is another … it seems more reasonable to me to keep use and effect of use separate" (Machlup, 1979, 63, 64).

The shift in the last three decades to a user-oriented paradigm in information science (Dervin & Nilan, 1986) has also seen emphasis being placed on the study of information use in a wider social context of the information needs and information seeking behaviors of individuals, and from the perspective of the individuals. Information use is conceptualized more holistically as a complex interactive change process, with attention given to the process of "thinking" - a cognitive "doing", as well as "acting", the behavioral outcomes and end-states. This more holistic view of information use firmly embeds the notions of cognitive change and behavioral change as central concepts. The focus is on the complex dynamic of information needs, context, information seeking, interaction with information sources, and cognitive and behavioural outcomes.

The Sense-Making theory developed by Dervin has contributed substantially to this perspective. As a set of assumptions about the nature of information and human communicating, and how people use information (Dervin, 1992), sense-making is portrayed as a constructive process, and sense is the product of that process. Information use is posited as a "constructing" activity, that is, "the successive modifications of internal pictures of reality, a series of constructings and reconstructings" (Dervin, 1983, 5). These modifications are the steps people take to construct sense out of their worlds, the process through which individuals inform themselves through their interactions with information. Consistent with the constructing activity, Dervin's uses/helps, conceptualized in terms of how the individual is helped, facilitated, or sometimes impeded by the information, are presented as verbs, rather than nouns. This view, as with the other interpretations of information utilization as interactive change process, gives precedence to the individual, to cognitions, and to the importance of making things happen and moving forward.

The empirical investigation and measurement of information use also has a long trajectory of research over four decades. This research has produced the classification of conceptual, instrumental and symbolic utilization (Pelz, 1978; Beyer & Trice, 1982), a tripartite classification that continues today as a dominant classification of findings about information use.Instrumental use describes the range of organizational outcomes, impacts, end-states and physical changes in practice and procedures which are a direct result of applications of information. Conceptual information use is an umbrella term that loosely categorizes what is happening in people's minds

when they do something with information. Huberman presents it as an activity "in which one processes information, construes and reasons" (Huberman, 1983, 495). Its focus is on people actively thinking about information that has been made available to them, rather than on the overt behaviors and actions that may result. It is internal rather than external - cognitive rather than physical - and it relates to knowledge people already have. It suggests that mentally working with information has some effect. In essence, conceptual utilization is about cognitive processes and change; about transformative and formative mental processes where information is incorporated in a person's store of knowledge, where it is translated and then applied to working situation in actions as instrumental use. Symbolic utilization is portrayed as engaging with information to legitimate or sustain predetermined positions, such as taking information selectively or otherwise distorting it to justify actions taken for other reasons (Pelz, 1978: 347-352). According to Weiss (1986) it may involve utilization of information for political motives, where information becomes the ammunition for the side that finds its conclusions congenial and supportive. Instances of symbolic information utilization often cited include: using information for self-serving purposes of justification; personal aggrandisement; to support a predetermined position; to give confidence to advocates of a position, to reduce uncertainties, to provide an edge in a continuing debate, and to neutralize opponents. It may also involve utilization for tactical reasons, where information is used, for example, as proof of responsiveness, as a tactic for delaying actions, to deflect criticism, to avoid responsibility for unpopular policy outcome, or tactic for enhancing individual or organizational prestige, to provide a ritualistic assurance that appropriate attitudes about decision making exist (Feldman & March, 1981).

The work of Bruce (1997) is significant here. Her empirical portrayal centers onSeven Faces of Information Literacy as an integrated relational and holistic model. Her research focused on understanding and creating a picture of the different ways in which information literacy is experienced by higher educators, including academics from a range of disciplines. The seven faces give rich insight into interaction with the world of information as people experience it, help librarians and educators understand critical differences in people's experiences with information. The sum of these different ways of experiencing information, is information literacy. According to Bruce information literacy education is helping learners change and or broaden their repertoire of experiences with information. Dewald posits that successful learning of complex knowledge requires the student to engage in the production of new knowledge, self evaluation, reflection and application of that knowledge (1999).The Seven Faces of Information Literacy are:

- Category one:

  the information technology conception: Information literacy is seen as using information technology for information retrieval and communication.

- Category two:

  the information sources conception: Information literacy is seen as finding information located in information sources.

- Category three:

  the information process conception: Information literacy is seen as executing a process.

- Category four:

  the information control conception: Information literacy is seen as controlling information through storage, filing, brain

- Category five:

  the knowledge construction conception: Information literacy is seen as building up a personal knowledge base in a new area of interest.

- Category six:

  the knowledge extension conception: Information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained.

- Category seven:

  the wisdom conception: Information literacy is seen as using information wisely for the benefit of others.

The above examination serves to highlight that in the current explications of information literacy, little attention is given to "use", at least by providing interventions that enable people to use information – instrumentally, conceptually and symbolically. Some of the research that I have been involved in over recent years provides evidence to support this view. In research undertaken on behalf of the Governor's Task force on School Libraries in Delaware from 2004-2006 that sought to document the infrastructure, resources, staffing and program (including information literacy) activities of school libraries in Delaware (Todd, 2008). In this study, data were collected from 154 public school libraries in Delaware (91 elementary, 31 middle and 30 high schools, and 2 composite schools).

In terms of information literacy initiatives, the school librarians engaged in a range of information literacy instruction initiatives. These are shown in 〈Tables 1〉 (Scope of Participation in Information Literacy Instruction) and 〈Table 2〉 (Scope of Participation by School Type):

〈Table 1〉 Scope of Participation in Information Literacy Instruction

Dimensions of Information Literacy Instruction		N	%
Knowing about the school library.		145	94%
Understand the different strategies in doing effective research.		118	77%
Knowing about different sources and formats of information.		146	95%
Knowing how to use the different sources and formats of information.		120	78%
Identifying main ideas in information sources (analyzing information).		91	59%
Sorting and organizing ideas (Synthesizing information).		84	55%
Evaluating information for quality.		109	71%
Using information ethically (e.g. Plagiarism, citation, bibliography).		117	76%
Creating information products.		66	43%
Communicating/presenting ideas (orally and/or in writing).		83	54%
Accommodating differentiated learning styles and abilities.		107	69%

〈Table 2〉 Scope of Participation by School Type

Dimension	Elementary	Middle	High
Knowing about the school library.	95.6%	93.5%	90.0%
Understand the different strategies in doing effective research.	70.3%	80.6%	90.0%
Knowing about different sources and formats of information.	91.2%	100%	100%
Knowing how to use the different sources and formats of information.	70.3%	87.1%	90%
Identifying main ideas in information sources (analyzing information).	56.0%	61.3%	66.7%
Sorting and organizing ideas (Synthesizing information).	53.8%	58.1%	53.3%
Evaluating information for quality.	59.3%	83.9%	93.3%
Using information ethically (e.g. Plagiarism, citation, bibliography).	67.0%	96.8%	83.3%
Creating information products.	38.5%	54.8%	43.3%
Communicating/presenting ideas (orally and/or in writing).	57.1%	54.8%	43.3%
Accommodating differentiated learning styles and abilities.	72.5%	67.7%	60.0%

As shown in 〈Tables 1 and 2〉, the data suggest that the core focus of information literacy instruction centers on knowing about the school library, and its sources – knowing the library, knowing the different formats and sources, knowing how to use them, and knowing how to

determine their quality and appropriateness. This is an important foundation for developing information literate students. However, information literacy instructions and interventions that focus on the holistic experience of learners in the process of constructing new understandings and meanings of their curriculum content were not strongly represented in the data: ie doing something with the found information – either instrumental, conceptual or symbolic. Negligible mention was made of the information literacy skills that relate to learners developing deep knowledge and deep understanding of their curriculum topics: skills such as analyzing the information to identify important and needed components, interpreting the information against existing knowledge as well as other sources, identifying and understanding the key ideas, organizing the salient ideas into some meaningful structure to create a personal understanding, critiquing multiple viewpoints and opposing ideas, structuring arguments and formulating conclusions; creating information products that best represent the new knowledge gained, and developing communication processes to effectively share new understandings. While some of the school librarians provided some indication that they were moving beyond "source orientations" to "knowledge orientations", this more holistic view of information literacy – involving access and use of information was not pervasive.

A similar pattern emerges in the nature of information technology instruction provided by the school librarians, as shown in ⟨Table 3⟩.

⟨Table 3⟩ Instructional Activities for Effective Use of Information Technology

Dimension		N	%
Searching strategies for the World Wide Web.		124	81%
Evaluating the quality of websites.		101	66%
Using computer programs to do school work (i.e. Power Point, Excel).		76	49%
Using UDLibSearch, other electronic databases/library catalogs and directories.		113	73%
Teaching about the ethical use of the internet.		103	67%
Integrating technology in the content areas.		86	56%

Most typically this includes interaction with sources, rather than interaction with ideas, central to the "use" dimension. These include searching strategies for the world wide web, using UDLib/Search and other electronic databases, evaluating web sites, and teaching about the ethical use of the internet. In putting emphasis on the doing (=accessing, finding, evaluating) we have failed to seriously address the knowledge outcomes dimension of information literacy

It is further noteworthy to situate these findings in terms of "use." The school libraries were asked to identify the outcomes of their information literacy instruction:

39% indicated school library had helped students develop skills in locating, selecting, organizing and evaluating information;

37% indicated school library helps improve reading skills; interest & motivation in reading

22% indicated improvement in technology skills

16% indicated development of positive attitude to libraries

4.5% indicated outcomes linked to curriculum standards and goals, or to kids living, growing up

While this research focuses on the school context, recent research in academic libraries highlights some similar patterns. The research of Kerr (2010)that investigated the relationships between conceptions and practice of information literacy in academic libraries is significant in this context. Based on the framework of Argyris & Schön (1974) in which professional practice is investigated through espoused theories and theories-in-use, Kerr sought to provide a richer understanding of the relationships between foundational beliefs and conceptions of information literacy, and the actual practice of information literacy in eleven academic libraries in the USA. Espoused theories of information literacy were examined by investigating the conceptions and understandings of information literacy as expressed in mission and policy documents of these libraries, and the formalized vision, mission and goals-outcomes statements of the university of which they were a part. Theories-in-use were identified by analyzing how information literacy is practiced through a range of online tutorials which are utilized by these libraries to provide information literacy instruction. Her study examined approximately150 online tutorials. While there are a range of approaches to the implementation of information literacy in these libraries, online tutorials were both predominant and consistently used as the main approach to implementing information literacy. Kerr also conducted structured interviews with information literacy leaders at each of these libraries to develop a richer understanding of these dynamics.

Her findings revealed considerable complexities in the relationship between conceptions and understandings of information literacy, and its practice as identified in instruction initiatives. According to Kerr, there was no single consistent conceptualization of information literacy either espoused or in practice in this academic library community, as well as considerable incongruity between widely accepted beliefs held by the information literacy community and its actual implementation and practice in the academic libraries.

Specifically, her analysis found explicit espoused theories of information literacy, both at the university level and library level, coalescing around knowledge creation and lifelong learning themes. These themes typically identify capabilities of knowledge discovery and generation, critical thinking, problem solving and lifelong learning in a globalized and connected world. On the other hand, her analysis of the practice of information literacy though her analysis of the content of online tutorials, found that the emphasis was on engagement with information sources, rather than the knowledge-based competencies of engaging with found information to build knowledge (Kerr, 2010, 300-301). Strategies and approaches used in instruction initiatives through online tutorialspredominantly ranged from teaching procedural skills in accessing, locating and evaluating resources to meet quality criteria such as authority and recency, and fostering ethical approaches to the use of information, particularly plagiarism and academic integrity. A small number of tutorials addressed procedures for developing research plans towards creating assignments, embracing a more holistic cycle from information access to presentation and representation of new knowledge. A noticeable absence was the information literacy dimension of "use" - the complex critical and reflective thinking processes, analysis and synthesis of information to build and demonstrate the development of knowledge. Only two of tutorials included strategies on the process of developing knowledge (Kerr, 2010, 309-312).

Kerr concluded that there were major contradictions and incongruence in the relationships between conceptions and practices of information literacy. While Kerr found connections between the institutional goals of universities and the of focus of libraries on espousing instructional collaboration and curriculum integration, the practice, coalescing around information literacy, seemed to fall short on realizing knowledge outcomes of universities. Kerr suggests that professional standards such as AARL may in fact inhibit the full realization of intellectual goals since there may be focus on building skills and competencies historically associated with libraries which are seemingly more doable and easier to address, and which are embedded in these standards. This may explain dilemmas in which libraries espouse intellectual and knowledge-focused goals and explicate these through an explicit approach to teaching students to engage with information sources (Kerr, 2010, 309-312).

Kerr also concludedthat while there may be merit in this rich diversity and individuality in definitions as a means toself-expression and branding of information literacy programs ,at a broader level this range of conceptions may indeed contribute to a confused, muddled and chaotic conception of what constitutes information literacy (Kerr, 2010, 307-308). This is not denying the importance of developing source-based capabilities. Kuhlthau (2004) for example,

argues that source-based capabilities and interventions provide the essential foundations for building knowledge but this is the beginning of an information-to knowledge journey, not the end point. It might be argued that if the predominant focus of libraries is on finding information, without development of the necessary capabilities for engaging with that information to build new knowledge, then are libraries, particularly libraries in academic and school contests which have instructional mandates, are contributing to the plagiarism problem, facilitating the stockpiling of information without facilitating the use of that information. Indeed, Kerr's study (2010) of academic libraries showed that tutorials that focused on developing ethical approaches to using information tended to take on an explicit "Don't" "theme", but without the essential knowledge-building scaffolds to enable students developto these capabilities of engagement with information to build knowledge.

3. Conclusion: Key challenges

The above review and analysis suggest three key challenges for the future of information literacy.

3.1 Challenge 1

Educational systems around the world are adopting orientations and practices that can be labeled as evidence-based education. Central characteristics include an emphasis on scientifically-based research to provide foundation for learning and instruction, and a focus on scientifically-based research as a framework for professional decision making and action. These are set within calls to make education less vulnerable to fads and untested interventions. Underpinning this focus on scientifically-based research as a framework for professional decision making and action is the need to avoid fad, fancy, and personal bias, and the advocating of stances and positions, which Whitehurst refers to "strong calls to action"-without the supporting evidence derived from empirical research (Whitehurst, as reported in Kersting, 2003, 1). Davies, likewise argues that turning to evidence-based education would make education less vulnerable to "political ideology, conventional wisdom, folklore, and wishfulthinking", not to mention "trendy teaching methods based on activity-based,student-centered, self-directed learning and problem solving" (Davies, 1999, 109).

At the same time, there is considerable attention being given to evidence-based librarianship as a framework for practice. Eldredge defines evidence-based librarianship as an approach to librarianship that employs the best available evidence based on library science research to arrive at sound decisions about solving practical problems in librarianship. It merges scientific research with the pressing need to solve practical problems (Eldredge, 2000, 290, 291).

Against this backdrop, it is my belief that information literacy practice needs to implement research-based and research validated information literacy models as a foundation for effective practice. Few such models exist. Kuhlthau's model of the Information Search Process, developed in the 1980s and refined in the 1990s is a significant exception (Kuhlthau, 2004). Since its conceptualization and development, the model has been used as a framework and diagnostic tool for understanding the information search experience of people in a variety of library and information settings, and as a framework for developing instructional interventions to support the information-to-knowledge journey of people in a range of library settings, particularly school and academic libraries. The model is founded on the belief that learning is a process of personal and social construction developed by influential 20th century educational thinkers such as John Dewey (1859-1952), George Kelly (1905-1967), Jerome Brunner (1915-), Jean Piaget (1896-1980), Howard Gardner (1943-) and Lev Vygotsky (1896-1934). According to Kuhlthau's research, the Information Search Process has been found to occur in seven stages: Initiation, Selection, Exploration, Formulation, Collection, Presentation, and Assessment (Kuhlthau, Maniotes, & Caspari, 2007, 19). These stages are named for the primary inquiry task to be accomplished at each point in the process. Each of these stages provides opportunities for instructional interventions that integrate cognitions, emotions and behaviors, and enabling people to progress on their information-to-knowledge journeyA review of the application of this model to an extensive range of research and professional contexts is provided by Kuhlthau, Heistrom & Todd (2008).

3.2 Challenge 2

This challenge centers on developing more explicit knowledge-based standards. This in essence calls for a much richer elaboration of capabilities - the skills, abilities and habits of minds - which underpin working with information to build deep knowledge and understanding. This is not intended to be a laundry list of such capabilities, rather, an approach to working diagnostically and developing interventionswhich focus on the complex cognitive processes of

knowledge construction. With particular reference to school and academic libraries, this also requires a complex understanding of how various fields of knowledge exhibit distinctive structures or patterns of meaning, and understanding the different and complex ways of "coming to know" - that is, how knowledge is created and developed in a subject or disciplinary field, how it is validated. It revolved around questions like: how do, for example, scientists, historians, artists, musicians go about making discoveries, create and develop new knowledge. Phenix (1986) argues that each of the disciplines has different epistemological and ontological assumptions which shape how knowledge is generated and validated. What this suggests that simplistic models of information research and information processes advocated by libraries may be inconsistent with how disciplines build deep knowledge and deep understanding. Phenix argues that there are any different conceptions of the information-to-knowledge process. This implies that each discipline has its own unique conception or model of information literacy, and that there is no one-size-fits-all model of information literacy. The AASL Standards for the 21st Century Learner (AASL, 2007) targeted for school libraries are an important step in this direction. They are set within a knowledge construct, and are framed around four themes which center on the skills (key abilities needed for understanding, learning, thinking, and mastering subjects); dispositions in action (ongoing beliefs and attitudes that guide thinking and intellectual behavior that can be measured through actions taken); responsibilities (common behaviors used by independent learners in researching, investigating, and problem solving), and self-assessment strategies(reflections on one's own learning to determine that the skills, dispositions, and responsibilities are effective). The four themes are: 1. Inquire, think critically, and gain knowledge. 2. Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge. 3. Share knowledge and participate ethically and productively as members of our democratic society. 4. Pursue personal and aesthetic growth.

3.3 Challenge 3

Engage in some careful audit or analysis of vision, mission and goal statements of the institution, information literacy mission and policy documents, and situate instructional approaches against this, to identify possible areas ofcongruence and contradictions, particularly between instructional practices and the rhetoric of the organization. This will also bring into sharper focus some reflection on explicit teaching practices. For example, if the organization espouses inquiry and knowledge discovery, then instructional practices need to engage with

discourses on inquiry-based learning in shaping instructional practices.

Such challenges are part of the future of information literacy: celebrating its journey, building its future. It is in the spirit of John F. Kennedy, 35th President of the USA, 1961-1963 who said: "We set sail on this new sea because there is knowledge to be gained." This is the fundamental reason why information literacy is so important today.

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