Capacity Building for Lifelong Learning: A Study of Practitioners' Perceptions on Information Literacy Framework

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Abstract. Information literacy (IL) has spawned a proliferation of studies in the past two decades. Information literacy is deemed pivotal to the pursuit of both personal empowerment and the economic development of a society. Most of the contemporary interpretations of information literacy are inextricably intertwined with lifelong learning. In this paper, we will (1) examine the commonalities exhibited among a variety of information literacy frameworks developed in different regions; and to deepen our understanding of school principals' and teachers' perceptions on information literacy framework and its role in learning. The research findings indicate that the practitioners share the view that IL should embrace learning outcomes of the four dimensions of learning: cognitive, meta-cognitive, affective and socio-cultural. Results of this study indicate that the traditional notion of information literacy is inadequate to address the learning needs in the 21st century and a spiral approach to developing students' information literacy is deemed necessary.

Key words: information literacy, capacity building, standards and indicators.

1. Introduction

The ongoing, unprecedented growth of information and communication technology, coupled with the globalization of the economy, has created a huge challenge for education. The pursuit of information literacy in education has become widespread with the extensive pervasiveness of global networks. Information literacy education is thus seen as a way to address a growing awareness and demand for preparing students to effectively participate in the emerging global knowledge economy. Bates (2000) contend that, in order to struggle against social exclusion and to maintain competitiveness in a global economy, education must go beyond the framework of initial schooling in order to prepare and support citizens for life-long learning (Curriculum Development Council, 2001). Parallel to the current education reform implemented in Hong Kong, the information literacy is therefore expected to provide a framework which empowers learners to engage critically in information processing and inquiry learning, to become more self-directed, and to assume greater autonomy and social responsibility over their own learning.

Information literacy has spawned a proliferation of studies in the past two decades. The notion of information literacy, emerging with the advent of information and communication technologies, has been shaping the way in which people perceive, process, use and create information. Most of the contemporary interpretations of information literacy are inextricably intertwined with lifelong learning (O'Sullivan, 2002). Information literacy is deemed pivotal to the pursuit of both personal empowerment and the economic development of a society. It is recognised as a kind of "new economy" (O'Sullivan, 2002) and includes lifelong learning skills that are essential for people to cope with the rapidly evolving changes in the era of information age. The World Summit on the Information Society in 2003 stated that "each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate actively in, and benefit fully from, the Information Society and the knowledge economy" (World Summit on the Information Society, 2003, para. 29).

In 1998, the Hong Kong Special Administrative Region Government heralded the first IT in education policy, "Information Technology for Learning in a New Era: Five-year Strategy – 1998/99 to 2002/3", signifying her commitment to transforming school education from a largely teacher-centred approach to a more student-centred approach. Riding on what have been achieved, the Education and Manpower Bureau (EMB) of the Hong Kong Special Administrative Region Government issued the second policy document entitled "Empowering Learning and Teaching with Information Technology" in July 2004 (Education and Manpower Bureau, 2004). While the five-year strategy emphasizes the provision of the necessary IT infrastructure for IT in education to launch, one of the goals of IT in education, as espoused in the new strategy, is to empower students to acquire the necessary skills, knowledge and attitudes for lifelong learning and problem solving in the fast-changing information era (Curriculum Development Council, 2000; Education and Manpower Bureau, 1998; Education and Manpower Bureau, 2004; Education and Manpower Bureau, 2005). In this respect, it is thus necessary for both the Government and the practitioners to conceptualize the notion of information literacy and to develop

an overarching framework to guide the development in curriculum. It is anticipated that the information literacy framework will help teachers to define clear learning outcomes and facilitate students to develop in them the capacity for lifelong learning.

2. Theoretical Underpinnings

Despite its widespread use in literature, the traditional way of conceptualizing information literacy solely as either information retrieval skills or IT skills is deemed inadequate to encompass the visions of education in the 21st century (Menou, 2002). Information literacy is a process of turning information into meaning, understanding, and new ideas (Sanford, 2000). This process would require students to understand the rationale behind using information as well as actually knowing the exact procedures of conducting the information search. Students need to 'know-how', but more importantly, they must first 'know-why'. Hence, being information literate would contribute towards personal empowerment through the learning to learn.

The emerging digital culture coupled with the trends in economic globalization and the quest for a knowledge-based society have been creating tremendous momentum to drive the development and infusion of information literacy in education and all spheres of political, economical and social life of the twenty-first century. In this regard, we argue that information literacy should be framed in a way to empower students to develop in them the capacity for lifelong learning, and to assume greater autonomy and social responsibilities over their learning. The notion of information literacy should be broadened to embrace a wider spectrum of learning outcomes manifested in different dimensions of learning in the information age.

3. Research Methodology

The purpose of this study is two-fold: (1) to identify the patterns and commonalities exhibited among the information literacy frameworks formulated in different countries or regions; and (2) to examine how teachers and principals perceive information literacy and its role in the student learning.

To develop a global perspective on and deepen our understanding of the current trend in the development of information literacy, a set of representative information literacy models from different regions were selected for scrutiny. The eight selected models were SUNY (State University of New York, 2002), ACRL (Association of College & Research Libraries, 2003), AASL (American Association of School Librarians and the Association for Educational Communications and Technology, 1998), SCONUL (Standing Conference of National and University Libraries from the United Kingdom, 2004), AkASL Alaska Association of School Librarians, 2003), WLMA (Washington Library Media Association, 2004), ANZIIL (Australian and New Zealand Institute of Information Literacy, 2004) and JULM (Juarez University Libraries, 2004). Adopting the grounded theory approach (Strauss and Corbin, 1998), the goal of analysis was to identify key features

Table 1

Demographic data of the survey

Category	No. of schools invited	No. of questionnaires sent	No. of questionnaires returned	Response rate (%)
Total primary schools	786	2358	1589	67.39%
Total secondary schools	522	1566	1019	65.07%
Total	1308	3924	2608	66.46%

commonalities exhibited among the selected IL models. While there were no a priori categories of information literacy standards, the analysis was initiated with open coding. Initially, two researchers in the team generated independently the coding scheme for the information literacy standards. The two researchers then reviewed these two initial coding schemes to arrive at a consensus on the important coding categories that can best reflect the attributes of each IL standard. A new coding scheme was subsequently formulated and used to recode the original set of transcriptions. This exercise of modifying the coding rubric and comparing independent coding results continued until the inter-coder reliability (Cohen's kappa) for the two coders reached 0.8 or above. As a result, a set of categories or a coding scheme of information literacy standards was derived.

On the other hand, to deepen our understanding of teachers' and principals' perceptions on information literacy framework for students in Hong Kong, a questionnaire was developed. The questionnaire was divided into four parts that covered goals, knowledge and attitude, implementation, and expected difficulties. A total of 3924 questionnaires were sent, along with a cover letter that explained the background of the study and the concept of information literacy, to all 1308 primary and secondary schools in Hong Kong in December 2004 to invite the participation of principals, curriculum coordinators, teachers responsible for coordinating IT across the curriculum and teacher librarians. The total number of questionnaires returned was 2608 for a response rate of 66.46%. Table 1 illustrates the demographic data of the survey.

4. Results and Discussions

4.1. *Building the Framework for Information Literacy*

For the purpose of initial coding, we propose a working framework comprising four dimensions of learning (see Fig. 1): cognitive, meta-cognitive, affective and socio-cultural. As such, the cognitive dimension addresses the need to enable students to master the necessary information skills to inform decisions and problem solving; the meta-cognitive dimension emphasises on developing students as reflective learners; and the affective dimension addresses the need to enable students to appreciate and enjoy the process of inquiry; and the socio-cultural dimension addresses the need to empower them with greater

Fig. 1. A conceptual model for Information Literacy.

autonomy and social responsibility over the use of information in their individual as well as collaborative learning. Thus, these four key dimensions of learning provide the theoretical underpinnings for coding and formulation of the entire IL framework.

Despites the variations in scope and coverage exhibited among various models of information literacy, results of the analysis indicated that the IL standards of the eight selected frameworks could readily be classified into the four key dimensions of learning: cognitive, meta-cognitive, affective and socio-cultural dimensions. Table 2 gives a brief illustration of the classification of IL standards of the eight selected frameworks according to the four dimensions of learning. The independent coding rubrics derived by the researchers were constantly compared and modified. A set of coding scheme was finally derived with the inter-coder reliability (Cohen's kappa) reached 0.87. The coding scheme, as depicted in Fig. 2, represents the commonality exhibited among a variety of

Table 2

Classification of information literacy standards of the eight selected models. The number attached to each label represents the corresponding IL standard of that model

| Cognitive	Meta-cognitive	Affective	Socio-cultural
ANZIIL1, ANZIIL2, ANZIIL3, ANZIIL4, ANZIIL5, WL1, WL2, WL3, WL4, WL5, WL6, AkASL1, AkASL2, SCONUL1, SCONUL2, SCONUL3, SCONUL4, SCONUL5, SCONUL6, SCONUL7, AASL1, AASL2, AASL3, AASL4, AASL5, ACRL1, ACRL2, ACRL3, ACRL4, SUNY1, SUNY2, SUNY3, SUNY4, SUNY5, SUNY6, SUNY7, JULM1, JULM2, JULM3, JULM5, JULM6, JULM7	ANZIIL1, ANZIIL2, ANZIIL3, WL4, WL6, AkASL4, AASL1, AASL4, AASL5, ACRL1, ACRL2, ACRL3, ACRL4, SUNY1, SUNY2, SUNY9, JULM4	AkASL3, AkASL4, AASL4, AASL5, ACRL3, SUNY9	ANZIIL6, AkASL4, AkASL5, UK4, SCONUL6, AASL3, AASL4, AASL7, AASL8, AASL9, ACRL4, ACRL5, SUNY3, SUNY7, SUNY8, JULM8
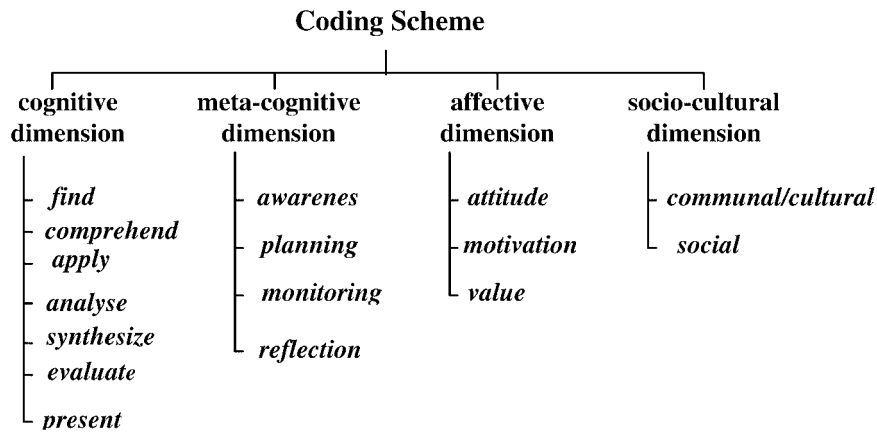
Coding Scheme

Fig. 2. A coding scheme for analysing the selected models of information literacy.

IL frameworks formulated in different regions of the world, in responding to the quest for developing in students the capacity for lifelong learning and assuming greater autonomy and social responsibility over their learning. The coding scheme thus provides a hierarchical skeleton for framing the IL framework for Hong Kong students.

To embrace all of the aforementioned dimensions of information literacy, eleven standards were formulated. Among those standards, four are in the cognitive dimension, three are in the meta-cognitive dimension, two are in the affective dimension and two are in the socio-cultural dimension. Table 3 provides a summary of the information literacy standards constructed. For each standard, it encompasses a number of indicators that provide detailed descriptions for formulating the corresponding anticipated learning outcomes. Each indicator of the IL standard entails a set of learning outcomes that detail the levels of proficiency in a particular performance area in information literacy. Levels I, II, III and IV indicate respectively the expected IL learning outcomes for students at Junior Primary, Senior Primary, Junior Secondary and Senior Secondary (Kong *et al.*, 2005).

4.2. *Practitioners' Perceptions*

In the questionnaire design, a 4-point Likert scale was adopted with 1: strongly disagree; 2: disagree; 3: agree and 4: strongly agree, to examine teachers and school principals' views on the 32 indicators derived from the 11 standards of the IL framework (Kong *et al.*, 2005). Over 95% of respondents agreed that information literacy should be infused into curriculum. This shows that the practitioners considered that students being information literate was very important. The average ratings on the indicators regarding the four dimensions of the derived framework show that most practitioners were in agreement on each indicator. To further study the framework in terms of using IT for developing basic abilities in information processing, all participants were asked to rate the indicators of the four dimensions. Tables 4–7 show the average ratings of the cognitive, meta-cognitive, affective and socio-cultural dimensions, respectively. The average ratings of the indicators

Table 3

Information literacy standards in 4 dimensions: cognitive (C), meta-cognitive (M), affective (A) and socio-cultural (S)

Code	Information literacy standards
C1	An information literate person is able to determine the extent of and locate the information needed.
C2	An information literate person is able to apply information to problem solving and decision making.
C3	An information literate person is able to analyse the collected information and construct new concepts or understandings.
C4	An information literate person is able to critically evaluate information and integrate new concepts with prior knowledge.
M1	An information literate person is able to be aware that information processing is iterative, time-consuming and demands effort.
M2	An information literate person is able to plan and monitor the process of inquiry.
M3	An information literate person is able to reflect upon and regulate the process of inquiry.
A1	An information literate person is able to recognise that being an independent reader will contribute to personal enjoyment and lifelong learning.
A2	An information literate person is able to recognise that information processing skills and freedom of information access are pivotal to sustaining the development of a knowledge society.
S1	An information literate person is able to contribute positively to the learning community in knowledge building.
S2	An information literate person is able to understand and respect the ethical, legal, political and cultural contexts in which information is being used.

ranged from 3.30 to 3.54, which indicate that most participants either agreed or strongly agreed with each indicator. The average ratings of the indicators of cognitive dimension ranged from 3.30 to 3.48, of the meta-cognitive dimension ranged from 3.30 to 3.50, of the affective dimension ranged from 3.47 to 3.54 and of the socio-cultural dimension ranged from 3.44 to 3.51. This implies that the standards and indicators formulated were well received by most of the school principals and teachers.

In the average ratings of the expected abilities possessed by primary students after graduation, four indicators in the affective dimension and three indicators in the socio-cultural dimension were rated in the 10 most important indicators that should be possessed by primary students when they were graduated. For secondary students, four indicators in the affective dimension and four indicators in the socio-cultural dimension were rated in the 10 most important indicators that they should possess. This illustrates that both the affective and socio-cultural dimensions were believed to be important elements for primary and secondary students.

The difference between the expected abilities possessed by primary and secondary students can be seen from one indicator in the cognitive dimension. When compared to other indicators, primary practitioners did not expect too much from primary students in terms of being able to apply information in problem solving. In contrast, secondary practitioners considered this ability to be vital for secondary students. Primary school participants considered cultivating primary students to read for information and pleasure

Table 4

Average ratings of the indicators of the cognitive dimension

	When students graduate, they are expected to be able to:	Average (1–4)	S.D.
g.	Apply information in problem solving	3.51	0.53
a.	Identify a variety of potential sources of information	3.48	0.52
b.	Develop strategies for locating information	3.46	0.54
e.	Apply information to inform decisions	3.45	0.53
c.	Frame appropriate questions based on information needs	3.42	0.52
f.	Apply information in critical thinking	3.42	0.57
i.	Critically analyse information collected	3.41	0.55
l.	Determine the accuracy, relevance and comprehensiveness of information	3.41	0.56
d.	Determine the nature and scope of the information needed	3.38	0.52
m.	Assimilate new concepts into their knowledge bases and value systems	3.37	0.55
h.	Record, categorise and manage the information and its sources	3.36	0.55
k.	Make inferences, connections and draw conclusions	3.34	0.55
j.	Derive new concepts or understandings from the information collected	3.30	0.57

Table 5

Average ratings of the indicators of the meta-cognitive dimension

	When students graduate, they are expected to be able to:	Average (1–4)	S.D.
b.	Understand that information processing requires time, diligence and practice	3.50	0.51
a.	Recognise that the information seeking process is evolutionary and changes during the course of investigation	3.45	0.52
e.	Reflect upon the development process of the product/performance and identify areas of improvement	3.45	0.55
c.	Define a manageable focus and timeline	3.42	0.53
g.	Review the information seeking process and revise search strategies as necessary	3.37	0.56
f.	Devise strategies for revising, improving and updating self-generated knowledge	3.31	0.57
d.	Apply new and prior information to the planning and creation of a particular product/performance	3.30	0.57

as an essential element of information literacy, whereas recognising that being an independent learner will contribute to lifelong learning was regarded to be most significant for secondary students. Tables 8 and 9 present respectively the 10 highest rated abilities expected for primary students and secondary students.

Despite the variation in practitioners' views on the relative importance of the IL standards and indicators, the set of the 10 most important indicators selected by practitioners from both the primary and secondary sectors comprises indicators derived from the cognitive, meta-cognitive, affective and the socio-cultural dimensions of learning. This indi-

Table 6

Average ratings of the indicators of the affective dimension

	When students graduate, they are expected to be able to:	Average (1–4)	S.D.
d.	Recognise that being an independent learner will contribute to lifelong learning	3.54	0.53
b.	Recognise and select materials appropriate to personal abilities and interests	3.51	0.51
c.	Recognise that accurate and comprehensive information is the basis for intelligent decision-making	3.49	0.53
a.	Read for information and pleasure	3.47	0.54
e.	Recognise the importance of freedom of information access to a knowledge society	3.47	0.53

Table 7

Average ratings of the indicators of the socio-cultural dimension

	When students graduate, they are expected to be able to:	Average (1–4)	S.D.
e.	Understand and respect for the principle of intellectual freedom	3.51	0.53
b.	Collaborate effectively in groups to pursue and construct knowledge	3.48	0.54
d.	Understand and respect the principles of equitable access to information	3.48	0.53
a.	Share knowledge and information with others	3.45	0.52
c.	Recognise that information is underpinned by values and beliefs	3.44	0.54
f.	Observe laws, institutional policies and social etiquette related to access to and the use of information	3.44	0.53

Table 8

The 10 highest ratings by primary school practitioners of the abilities expected to be possessed by primary students

Code		When students graduate, they are expected to be able to:	Average (1–4)	S.D.
A	a.	Read for information and pleasure	3.36	0.52
M	b.	Understand that information processing requires time, diligence and practice	3.33	0.50
A	b.	Recognise and select materials appropriate to personal abilities and interests	3.32	0.52
S	a.	Share knowledge and information with others	3.27	0.48
S	e.	Understand and respect the principle of intellectual freedom	3.27	0.55
S	b.	Collaborate effectively in groups to pursue and construct knowledge	3.25	0.54
S	d.	Understand and respect the principles of equitable access to information	3.24	0.54
M	a.	Recognise that the information seeking process is evolutionary and changes during the course of investigation	3.22	0.50
C	g.	Apply information in problem solving	3.22	0.54
A	d.	Recognise that being an independent learner will contribute to lifelong learning	3.19	0.64

Table 9

The 10 highest ratings by secondary school practitioners of the abilities expected to be possessed by secondary students

Code		When students graduate, they are expected to be able to:	Average (1–4)	S.D.
A	d.	Recognise that being an independent learner will contribute to lifelong learning	3.49	0.53
A	b.	Recognise and select materials appropriate to personal abilities and interests	3.45	0.51
C	g.	Apply information in problem solving	3.45	0.53
S	e.	Understand and respect the principle of intellectual freedom	3.45	0.53
A	c.	Recognise that accurate and comprehensive information is the basis for intelligent decision making	3.44	0.54
M	b.	Understand that information processing requires time, diligence and practice	3.44	0.51
S	d.	Understand and respect the principles of equitable access to information	3.41	0.54
A	a.	Read for information and pleasure	3.40	0.54
S	f.	Observe laws, institutional policies and social etiquette related to access to and the use of information	3.40	0.53
S	b.	Collaborate effectively in groups to pursue and construct knowledge	3.40	0.55

cates that the traditional way of conceptualizing information literacy solely as a kind of cognitive skills is seen to be inadequate to address the learning needs in the 21st century. Through the process of interacting with information, students may undergo a multitude of learning experience. In curriculum design, it is therefore desirable to adopt a spiral approach to developing students' information literacy so that at each level of their schooling they are able to have the learning experience stipulated in the four dimensions of learning.

5. Conclusion

Information literacy is the mastery of the processes of becoming informed. It is considered to be crucial for people to cope with the rapid changes in the information age, driven by the emerging digital culture, globalisation and the development of a knowledge-based society. These changes have necessitated the infusing of information literacy into the school curriculum and thus the development of an information literacy framework for students. The development of such a framework should therefore enable students to master the skills that are necessary for information processing, instil in them the ability to reflect on and regulate their learning, enable them to appreciate that being independent learners will contribute to personal growth, enjoyment and lifelong learning, and empower them with greater autonomy and social responsibility over the use of information in their individual and collaborative learning.

The information literacy framework should encompass the learning outcomes derived in the four dimensions of learning: cognitive, meta-cognitive, affective and socio-cultural. The research findings showed that the standards and indicators established were recog-

nized. Over 95% of the respondents agreed that information literacy education is needed for students in Hong Kong. The average ratings of the indicators (sets of expected characteristics that were developed based on information literacy standards) ranged from 3.30 to 3.54 on a 4-point scale, which shows that they were well received. Results of this study indicate that the traditional notion of information literacy is inadequate to address the learning needs in the 21st century and a spiral approach to developing students' information literacy is deemed necessary.

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Mokymosi visą gyvenimą stiprinimas: informacinio raštingumo struktūros tyrimas remiantis praktikuotojų patirtimi

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Informacinis raštingumas per pastaruosius pora dešimtmečių smarkiai prisidėjo prie studijų paplitimo. Informacinis raštingumas laikomas lemiamu veiksniu siekiant tiek asmeninės sėkmės, tiek visuomenės ekonominės plėtros. Dauguma šiuolaikinių informacinio raštingumo interpretacijų yra neatskiriamai susiję su mokymosi visą gyvenimą koncepcija. Straipsnyje nagrinėjami informacinio raštingumo koncepcijų, sukurtų įvairiose pasaulio vietose, bendrumai. Taip pat nagrinėjamas mokyklų vadovybės ir mokytojų turimi vaizdiniai apie informacinio raštingumo koncepciją ir jos reikšmę mokymuisi. Tyrimo rezultatai rodo, jog internetinio raštingumo praktikuotojų nuomone, informacinis raštingumas turėtų apimti keturias mokymosi dimensijas: kognityvinę, metakognityvinę, emocinę ir sociokultūrinę. Šio tyrimo rezultatai parodo, jog tradicinė informacinio raštingumo samprata nebeatitinka XXI amžiaus mokymosi poreikių. Prieinama prie nuomonės, jog ugdant studentų informacinį raštingumą būtina vadovautis spiraliniu požiūriu.