

# A comparative analysis of information literacy curriculum standards in the educational programs of high schools in China and in the United States

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**Abstract** Our study aims to take a closer look at China's current information literacy (IL) program standards at secondary schools and to analyze their level of success and/or failures in a comparative way with those of the United States in terms of fulfilling their each other's mission-oriented mandates. Our research findings show that China's current IL standards of high schools contain a disproportionate emphasis on information technology (IT). Moreover, the stipulations of these IL standards are narrowly construed and without being solidly grounded on a broad and comprehensive educational perspective. We also suggest that there are two underlying causes for this set of unsound IL standards in China. Firstly, there is a lack of collaboration between two major competing forces engaged in the curricular development and research of IL in China: Those professionals in educational IT discipline *vis-à-vis* those in Library and Information Science. Secondly, library professionals have a very limited influence on major socio-cultural policies, even at their own institutions. As a result, this paper recommends the following three possible measures, which may help remedy this situation strategically: 1) Establishing a set of new IL curriculum standards based on an IL-centered educational perspective; 2) establishing a teacher-librarian's training program to promote school librarians' role in IL education; and 3) strengthening the research and development of an online IL education program and an accompanied evaluation mechanism.

**Keywords** Information literacy education, Curriculum standards, Information literacy evaluation criteria, Information literacy education policy, Information technology literacy, Secondary education, School librarian training, Teacher training

## 1 Introduction

Information literacy (IL) is an individual's ability to know when there is a need for information, to be able to identify, locate, synthesize, evaluate, and effectively use that information for the issue or problem on hand<sup>[1-2]</sup>. There is a marked difference between the understanding and the skillful application of IL. Its multifarious

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operational dimensions are reflected from its 6 key elements, namely, 1) Library literacy, 2) media literacy, 3) computer literacy, 4) Internet literacy, 5) research literacy, and 6) critical thinking skills<sup>[3]</sup>. Therefore, IL is seen to be a subject discipline that both intersects and overlaps with a large portion of the subject coverage of information technologies (IT), especially in the areas of adopting applicable hardware and software, information resources, and in formulating logical thinking for problem-solving.

Current IL education on a world-wide scale may be traced back to the release of a final report about IL by the American Library Association (ALA) in 1989. Since its publication, it has had a broad and significant impact on the world of learning at all levels in general and on the IL education in particular. For instance, several prominent national and international educational organizations have joined force to promote IL education, though each in their own unique and energetic way. Their common objective was to invigorate the school curriculum by taking full advantage of the emerging role of IL instructions, which had been haphazardly conducted at most secondary schools in the United States at this time. Among those organizations involved, they include but not limited to the following ones, namely, the National Forum on IL (NFIL) and the National Education Association (NEA) of the United States (NEA embedded IL in its project of “teacher education initiatives”). In addition, a host of other professional organizations, such as the American Association of School Libraries, the Association of Educational Communications and Technology (AASL/AECT published IL standards for student learning for students in K-12) also pitched in and gave strong support to this IL-centered curriculum innovation. Riding on this wave of curriculum reforms, the American Association for Higher Education endorsed the Association of College & Research Libraries’ (ACRL) IL Competency Standards for Higher Education; the Higher Education Reauthorization Act of 2008 declared IL as a necessary skill for teacher professional development.

Aside from the flurried activities of IL in the U.S. school systems at all levels, a few other important international organizations also took part in the IL drive on a world-wide scale. For instance, the *Prague Declaration and the Alexandria Proclamation* were promulgated by UNESCO (United Nations Educational, Scientific, and Culture Organization). There are also a few other heavy-weight international organizations such as IFLA (International Federation of Library Associations) and NFIL, which showed an intensive interest in promoting such an undertaking<sup>[4]</sup>. Last but not least, the International Alliance on IL was also set up to enhance IL education globally during the last decade.

In comparison with the school systems in the United States, IL education in China is somewhat unevenly constructed and implemented. Although the education of IT



appears to be stronger in Chinese high school systems, the education of information resources is relatively weak. The National Conference on IT Education in Primary and Secondary Schools was first held in 2000 under the aegis of the Ministry of Education<sup>[5-7]</sup>. A national campaign was subsequently launched to promote IT education in primary and secondary schools and the IT education was made a part of the required courses in the curriculum of Chinese elementary and secondary schools<sup>[8]</sup>. IT courses were offered either as a required or as an elective course within the general education program of universities and colleges at this time. Facilitated with favorable IT infrastructure, promoted by the National Computer Grade Examination System, the IT education in China is more or less well-established. By contrast, the education on information resources is relatively in a weak position. As of date, the Ministry of Education has issued three documents to request academic libraries to offer information retrieval courses. Nonetheless, information retrieval courses in most universities and colleges are elective courses. Both of the courses offered in the area of IL and the students' registration for such courses in colleges show a discouragingly low level of academic interest<sup>[9]</sup>.

As for the three official documents related to IL education in China promulgated so far, one is a set of standards and the other two, guidelines. The set of standards is named *High School Curriculum Standards of IT: A validation draft* (IT Curriculum Standards in China) issued by the Ministry of Education in 2003. It explicitly placed an emphasis on the enhancement of high school students' IL as one of its key curricular objectives<sup>[10]</sup>. The two guidelines are the *University Libraries Bill Amendment* and the *Library Regulations for Elementary and Secondary Schools Amendment*, issued by the Ministry of Education in 2002 and in 2003, respectively. They both required libraries to take the responsibility to foster their students' ability to be conversant in seeking and using information for lifelong learning<sup>[11-12]</sup>.

It has been more than 10 years since library science scholars began studying IL. So far, the research work done in initiating an IL education program at institutions of higher learning is showing some fruitful results<sup>[13-18]</sup>. But be that as it may, there has relatively little attention been paid really to IL education at the high school level. When studying IT Curriculum Standards in China drafted by those educators primarily in the field of educational IT, one could not help noticing that the grossly imbalanced curricular contents of the IL education, which are decidedly based on a partial or even a misconceived notion of IL. That is to say, it erroneously equates the conceptual understanding and skills associated with IT to those of IL.

The *High School Curriculum Standards of IT* is a basic framework document laying out the foundation of IL education at the stage of a formal schooling. It annotates the standards and provides an instrument for the measurement of the



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fulfillment level of the IL requirements at a formal high school education in China. It is our purpose to make a critical evaluation about the *High School Curriculum Standards of IT* by comparing it to the *Wisconsin's Model of Academic Standards for Information and Technology Literacy* in USA (Wisconsin's Standards for I&T Literacy)<sup>[19]</sup>. We intend to show that there are certain major differences in conception and also implementing disparities in practice of an IL education at the basic education level between the United States and China. We wish further to pinpoint the problematic areas, analyze their underlying causes, and propose a few appropriate countermeasures to address the problems of the IT Curriculum Standards in China. It is our hope that this study would help avert the current disarray situation of IL education in China, and pave the way for the development of a more effective and meaningful one.

The various national professional organizations' IL standards of USA only provide a conceptual framework for such practice. Each and every individual state is encouraged to tailor some of the IL standard statements to meet their own local needs. Wisconsin's Standards for I&T Literacy was released in 1998. The essence of these standards was stemming from the curriculum standards of several other states including some from its own in-state schools. After rectification and amendment, it has become a model set of curriculum standards, which amply reflects the overall expected level of sophistication and characteristics of IL education at most representative secondary schools in the United States.

The basic concept of the *High School Curriculum Standards of IT* in China is explicitly described at the onset that "information literacy is the essential quality of citizens in the information age" and that "the basic purpose of the IT courses is to further improve students' information literacy... so as to prepare future generation of citizens for the information age"<sup>①</sup>. Provinces in China do not normally have their own IL and/or IT standards. This set of IT Curriculum Standards of China is the only basis upon which an IL educational curriculum is being simultaneously developed and implemented at high schools in China. Therefore, these two standards of national origin are actually more or less comparable to each other in terms of their embodiment of the concept and varying levels of achievement measurement about IL education in each of their respective countries of the United States and China. A comparative study of them will shed light to the strength and weakness of each country's IL endeavor and hopefully will also yield some clues for us to find a better solution to the issues involved.



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<sup>①</sup> Ministry of Education. *High School Curriculum Standards of Information Technology (validation draft)* (in Chinese), 2003. p. 1.

## 2 Comparison of curriculum standards of IL in China and the U. S.

### 2.1 Main contents of IT Curriculum Standards in China

IT Curriculum Standards in China consists of 6 parts. The structure and main contents of each part are outlined in Table 1.

**Table 1 Structure and main contents of High School Curriculum Standards of IT in China**

Components	Contents
Philosophy of the curriculum	To improve students' IL. To develop the ability of lifelong learning, applying IT to solve problems and performing innovative practice and to cultivate the awareness of communication and cooperation.
Rationale of curriculum design	IT education is IL education. The curriculum goal underscores the fusion of IT application ability and culture literacy. The content should meet students' needs for physical and mental development. The structure should be conducive to an all-round and personalized development of each student. Each course should contain one compulsory module and five optional modules.
Curriculum goals	There are 3 goals: 1) Knowledge and skills, 2) process and methods, 3) attitudes and values as detailed below: Knowledge target: Knowing → understanding → transferable → applying. Skill target: Emulating operating → independently operating → skillfully operating. Emotion target: Experiencing and feeling → responding and identifying → comprehending and internalizing.
Content standards	Compulsory module: IT foundation  Optional modules: 1) Algorithms and programming, 2) multimedia technology application, 3) network technology application, 4) database management technology, and 5) preliminary artificial intelligence.
Suggestions for implementation	Suggestions for teaching, evaluation, textbook preparing, and development and exploitation of curriculum resources.
Cases	1) Antarctic exploration, 2) drawing 100 concentric circles, 3) the design of an expert system for "plant classification consultant," etc.

There are six IL learning modules, namely, a compulsory module and five optional ones. Each module is assigned with two credits. Students should obtain a minimum of four credits, two credits from the compulsory module and two credits from the optional modules, in order to acquire a high school IT certificate. The five optional modules are all in specialized subject field of IT. Furthermore, only the compulsory learning module, "IT foundation", (consisting of four sub-disciplinary areas, namely, "information acquisition", "information processing and expression", "information resources management", and "IT and society") is directly related to IL learning.

In order to regulate and guide the teaching of IL courses, a set of standards and expected skills were established so as to assess objectively the level of students'



achievement. Take the compulsory learning module of “IT foundation” for example. Its subject coverage and the expected IL skill achievement are detailed in Table 2.

Take the exercise case “An Antarctic adventure” as an example. This task can be found in “IT foundation” module, which covers all the above-mentioned four themes (“information acquisition”, “information processing and expression”, “information resources management”, and “IT and society”). There are two learning objectives related to information resources management: 1) To choose and use the right tools and information resources to complete the task and to solve the problems involved; 2) to examine and evaluate the reliability, relevance and comprehensiveness of the information resources gathered in dealing with the actual problem on hand. This task involves skills in data collection, information processing, problem solving, demo preparation and presentation. In order to impart students with such information resources management skills, the students are required to classify the material beforehand into the following categories: Text, images, audio, animation, video and others. Relevant websites for reference are listed at the end of this case scenario.

## 2.2 Comparison with Wisconsin’s Standards for I&T Literacy

### 2.2.1 Introduction to Wisconsin’s Standards for I&T Literacy

Wisconsin’s Standards for I&T Literacy is composed of 3 parts: Content standards, performance standards and indicators. It covers the whole process through pre-kindergarten to Grade 12 (PK-12), which is divided into 3 stages from pre-kindergarten to Grade 4, from Grade 5 to Grade 8, and from Grade 9 to Grade 12. There are 4 areas of standard I&T literacy training for each of these 3 stages of schooling, namely, 1) Media and technology, 2) information and inquiry, 3) independent learning, and 4) the learning community. Pertinent performance standards and indicators covering these 4 areas of I&T literacy training at each stage of schooling are detailed in Wisconsin’s Standards. Table 3 shows the subject coverage and performance standards, with a few adaptations, for I&T literacy training at high schools. It also provides us with a glimpse of this standard’s structure and features. Owing to this article’s space constraint, we can list the performance standards and the indicators for only one of the performance standards.

### 2.2.2 Comparison of the two different sets of standards

These two standards are both designed for improving students’ IL. Their understandings of IL are essentially in agreement. Despite the shared features, they are very different in subject contents and manifestations. The differences between the two standards are summarized in Table 4.



**Table 2 Subject coverage and expected achievement of IL skills of “IT foundation”**

Subject fields	Content coverage	Expected IL skills achieved
Information acquisition	<p>To describe the basic characteristics of information, give some examples of IT application, and understand the history and trend of IT.</p> <p>To know the diversity and practical significance of information sources, learn to determine information need and source, and choose the right methods to obtain information.</p> <p>To master major strategies and skills for network information retrieval, be able to obtain online information legally.</p> <p>To master the basic methods to determine values of information, learn to identify and evaluate information.</p>	<p>To know how to retrieve information from websites.</p>
Information processing and expression	<p>To be able to use tools such as Word and graphic processing software, process target information and express ideas. Choose the right tool software to process multimedia information and present theme and display creativity.</p> <p>To use the Internet and other media to publish information and express ideas in a standard way.</p> <p>To learn the basic methods to process information with computer, understand its working process and key features.</p> <p>To use intelligent information processing software tool, experience its basic working process and understand its application value.</p>	<p>To process information with computers and software tools.</p>
Information resources management	<p>To understand the purpose and methods of current common information resources management, describe the features of every method and analyze its rationality through practical operation or field trip.</p> <p>To use common database application system, appreciate the advantages of using database to store and manage large quantities of data and efficient retrieval.</p> <p>To analyze simple databases, understand the basic information management ideas and methods.</p>	<p>To build up featured databases, discuss the accuracy, diversity and authenticity of materials in the databases.</p>
IT and society	<p>To be able to explore the impact of IT on the development of society, science and technology as well as on personal lifestyle and learning.</p> <p>To be capable of employing modern information communication technologies to broaden cooperation and to solve problems in pursuit of learning and of life undertakings.</p> <p>To be increasingly conscious of complying with the law and regulations related to information seeking activities and responsibilities.</p> <p>To be able to navigate the Internet, recognize the basic norms and ethical codes of the cyberspace, to identify and resist negative information, and enhance the safety awareness in online communication.</p> <p>To raise the level of information safety awareness, master basic anti-virus and information protection skills, recognize the severity of computer crime and be able to handle it properly.</p> <p>To understand the potential threat of IT to a user's physical and mental health and to know how to use IT in an appropriate manner.</p>	<p>To draft norms in cyberspace, discuss the ethical issues related to privacy and confidentiality in using the Internet, discuss the different information transmitting structures and the impact on social life.</p>



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Table 3 Main features of Wisconsin's Standards for I&T Literacy for high school education

Subject coverage	Performance standards	Indicators
Media and technology	<p>To use basic media and technical terminologies and pertinent equipment.</p> <p>To identify common media formats and learn how to use them.</p> <p>To use a computer and a processing software to generate information.</p> <p>To use a computer and communication software to access and transmit information.</p> <p>To use media and technology to create and present information.</p> <p>To evaluate media and technology used in an information production or presentation.</p>	<p>There are 31 indicators in all. Here are the ones for the performance indicator # 6:</p> <p>To assess the purpose and effectiveness of a product or a presentation.</p> <p>To evaluate the appropriateness and effectiveness of the media and technology used.</p> <p>To prescribe criteria for the delivery, speed, focus, and technical quality of producing and/or presenting information.</p> <p>To determine how well the production or presentation of information meets specified criteria.</p> <p>To specify ways to improve future productions or presentations.</p>
Information and inquiry	<p>To define the needs of information.</p> <p>To develop information-seeking strategies.</p> <p>To locate and access information resources.</p> <p>To evaluate and select information from print, non-print, and electronic resources.</p> <p>To record and organize information.</p> <p>To interpret and use information to solve problems.</p> <p>To exchange research and inquiry results in an appropriate format.</p> <p>To evaluate the information product and process.</p>	<p>There are 41 such indicators. Here are the ones for the performance indicator # 4:</p> <p>To distinguish and select desired information related to the problem or question.</p> <p>To evaluate stereotypical, biased, and misrepresented information.</p> <p>To distinguish among fact, opinion, point of view, and inference.</p> <p>To determine if the information sources are authoritative, valid, reliable, accurate, relevant, and comprehensive.</p> <p>To evaluate misleading presentation and manipulated data projection in graphic images.</p> <p>To determine authorship for all relevant resources gathered and identify convergent and divergent points of views among them.</p> <p>To select most suitable information formats and genre for the subject matter on hand.</p>

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(Continued)

Subject coverage	Performance standards	Indicators
Independent learning	<p>To search for information related to various dimensions of personal well-being and academic success.</p> <p>To appreciate and derive meaning from literature and other creative expressions of information.</p> <p>To develop competence and selectivity in reading, listening, and observing.</p> <p>To demonstrate self-motivation and increasing sense of responsibility for one's own independent learning.</p>	<p>There are 18 indicators. Here are the ones for the performance indicator # 3:</p> <ul style="list-style-type: none"> <li>To choose materials at appropriate developmental levels.</li> <li>To identify and select materials that reflect diverse perspectives.</li> <li>To contrast characteristics of common literary genre.</li> <li>To evaluate how words, images, sounds, and illustrations are constructed to convey specific messages, viewpoints, and values to shape attitudes and influence actions.</li> </ul>
The learning community	<p>To participate proactively in study groups or other collaborative learning environments.</p> <p>To be responsible for the information, media, and technology used.</p> <p>To respect intellectual property rights.</p> <p>To recognize the importance of intellectual freedom and access to information in a democratic society.</p>	<p>There are 24 indicators. Here are the ones for the performance indicator # 3:</p> <ul style="list-style-type: none"> <li>To explain the difference between copyright and copyright registration.</li> <li>To explain why "fair use" is permitted for educational purposes but not in "for profit" situations.</li> <li>To distinguish among freeware, shareware, and commercial software.</li> <li>To recognize the legal consequences of plagiarism and the need for personal authenticity in their work.</li> <li>To explain conditions under which permission must be obtained for the use of copyrighted materials.</li> <li>To describe how to correspond with authors, publishers, or producers to obtain permission to use copyrighted materials in their work.</li> </ul>



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Table 4 Comparison of the two standards

Indicators	IT Curriculum Standards in China	Wisconsin's Standards for I&T Literacy
Title	<i>High School Curriculum Standards of IT</i> (Validation draft)	<i>Wisconsin's Model Academic Standards for Information and Technology Literacy</i>
Target group	High school students	PK-12 students
Main content coverage	Foundation of IT Algorithms and programming Multimedia technology Network technology Data management technology Preliminary artificial intelligence	Media and technology Information and inquiry Independent learning The learning community
Logic structure	Loosely connected subject matter and a lack of a logical sequence	Well structured and a unified conceptual framework
Explanation on indicators	Technical part is detailed and other aspects are too abstract and illusive	The interpretation for all indicators is comprehensive and detailed
Information resources	Focused on free online information	Focused on a diversity of information resources
Focus of training	Skills of IT tools	Ability to solve problems with information
Objectives of training	IT literacy	I&L literacy
Program implementers	IT teachers and educational IT researchers	Citizenry of the State in general
Language styles	Full of specialized terminologies and professional jargons	Simple, humorous, and intelligibly plain language
Definition of terminologies	N/A	Glossary of terms
Bibliography	N/A	Available
Contact list	N/A	Available

### 2.3 Main problems of China's IL standards

In terms of the intended IL educational purposes, the main problem of the Chinese set of standards is that there is a serious lack of subject content coverage for its IL curriculum.

First of all, the structure of subject composition is grossly imbalanced, in which IT related subjects hold an overwhelmingly dominant position. All 6 learning modules as mentioned above are focused on IT. Only one compulsory module "IT foundation" can be related exclusively to the study of information resources and information management. The basic guiding principle of IT Curriculum Standards in China is to improve students' information literacy by means of information technology education. This actually echoes its title *High School Curriculum Standards of IT* (Validation draft). However, the argument stating that "high school



information technology courses are to improve students' IL as the fundamental purposes" is quite misleading. It may cause teachers and students mistakenly to think that IL is none other than information technology literacy.

Secondly, the conceptual framework of the Chinese IL (or rather IT) standards and the interpretation of the tenets and its subject contents are too narrow. It is heavily technology and tools-oriented. Take the theme "information processing and expression" for example (cf. Table 2). With no exception, all the contents stress the use of technical tools to process information. They inadvertently mislead people to believe that information processing for transforming and handling information is dependent upon solely on IT tools. Actually, the ability to analyze, judge, choose, synthesize, and use information is much more important. Technologies and tools are only means to certain objectives but not an end *per se*.

Thirdly, some subject contents are too abstract, inaccessible and difficult to implement. Take the theme "IT and society" in the module "IT foundation" as an example (cf. Table 2). There are 6 subject coverage areas, and all are uniformly abstract and too broad to be measured in quantifiable terms. In addition, the proposed level of IL skill capabilities is relatively on one-sided IT focus and prone to empty rhetoric. There are many other similar cases.

Judging from the perspectives of these 6 key areas of subject emphasis, it can be said that China's IL standards tend to focus on computer literacy, Internet literacy and media literacy but to a large extent they have neglected the main tenets of library literacy, research literacy, and critical thinking skills.

## 2.4 Causes of the problems

### 2.4.1 Misconceived notion about the relationship between IT and IL

The set of China's IL standards indicates that its framers have only a vague and partial understanding about IL. IT education in primary and secondary schools originates from computer literacy education. Most teachers and educational IT researchers still believe their educational goals are achievable through technology-driven means<sup>[20]</sup>. This can be seen from the confusion and contradictions arising during the process of setting up the standards for IT curriculum<sup>[21]</sup>. Although it was assumed that IT educators would automatically bear the responsibility of IL training for students, there is a lack of consensus and support among teachers for such an undertaking both in its theoretical and in its empirical terms for a meaningful curriculum construction and implementation. It is difficult to set up a set of IL standards with authority, stability and sustainability. Computer skills and IT knowledge both focus on technology itself while IL is the cognitive capacity to understand, reveal, evaluate and utilize information<sup>[24-25]</sup>.



This shows that IT scholars regard IT knowledge and skills as an integral part of IL training. Based on this conception, they take IL achievement of sophistication as the goal of IT courses. But this interpretation fails to recognize the nature of IL, which is rooted in library education, thus making it difficult to integrate the essential components of IL such as the understanding, discovery, evaluation and utilization of information into the standards of IT courses.

#### 2.4.2 Disproportionate personnel composition structure

IT Curriculum Standards in China is written by scholars in the field of educational IT, but scholars in other pertinent fields, such as library science and educational pedagogy are not involved. This unbalanced representative composition structure of the standard-framing committee severely curtails its vision about how to promote IL education at all levels of schools in a judicial manner.

By contrast, the composition of the representatives of the American standard-framing committee is more balanced. The framers of the Wisconsin's Standards for I&T Literacy were from universities, secondary schools, libraries, education administrations, media, business and technology industries. Here is another example. *Information power: building partnerships for learning* was drafted and released by AASL and AECT jointly, which profoundly affected school libraries in the United States<sup>[26]</sup>.

#### 2.4.3 Ineffective library administrative structure and limited socio-cultural influence of the library profession on the society

Although China has established a large library system, the library plays relatively a less important role in people's lives than that of the United States. Generally speaking, National Library, university libraries and research institution libraries are better equipped and play a more important role in socio-cultural activities. But that cannot be said for public libraries and school libraries whose socio-cultural influences on the society are limited indeed. By 2004, only 52.87% of the primary and secondary schools had established their own libraries (Data source: Teaching Instrument Institute of the Ministry of Education, 2007)<sup>[27]</sup>. The insufficient and poorly selected collections, incompetent staff and outdated facilities in the established libraries diminish their popularity among students. Pressure stemming from college entrance examinations reduced school libraries to an even inferior role in the secondary education system. Inadequacy of library budget stymies the acquisitions of supporting library materials for library literacy education in China. This lends to a partial explanation as to why the role of the library and librarians is overlooked in the membership composition of the IT Curriculum Standards Committee in China.



In the United States, school libraries have become the community of learners, and librarians are playing an active role in teaching and learning. School librarians have a broad undergraduate education with a liberal arts background and usually hold a master's degree from a program that combines academic and professional preparation in library and information science, education, management, media, communication theory, and technology. School librarians are required to meet both state certification requirements for school librarians and also for teachers. As being such, all school librarians have faculty status<sup>[28]</sup>.

In student-centered learning activities, librarians are encouraged to move to the center of teaching and learning<sup>[29]</sup>. Wisconsin Association of School Librarians edited a book to guide librarians and teachers to collaborate and integrate IL and IT into school curriculum<sup>[30]</sup>. Librarians, classroom teachers and administrators from public schools in Lincoln, Nebraska, collaborated to produce the guidelines for the IL education program in Nebraska. A series of IL training activities were conducted based on the guidelines and achieved fruitful results<sup>[31]</sup>. More than 500 teacher-librarians in Washington State were involved in a 4-year social studies project. Librarians' expertise in evaluating sources, organizing access to resources, and bibliographic/information searching skills became an indispensable part of the initiative<sup>[32]</sup>. In group learning, librarians' help is in demand not only in the information searching process, but also in the process of reaching conclusions from a wide-range of pertinent information resources<sup>[33]</sup>. Such a positive role of school libraries is based on its strong library collections, modern facilities, well-trained librarian team, and a high standard of operation as well. Even in those schools with insufficient library collections and wired facilities, IL education can be implemented by means of tapping the resources of public libraries nearby, for there is a complete public library support system for elementary and high school students in the United States.

IL curriculum standards play a key role in guiding the implementation of IL courses. Actually, the two different standards in China and in the U.S. have resulted in radically different results. As stated above, Wisconsin's Standards for I&T Literacy has successfully guided librarians and teachers to develop I&L education in schools all over Wisconsin<sup>[30]</sup>. By contrast, the implementation of IT courses in schools in China is less satisfactory. Since its release, IT courses have been implemented according to this set of standards in high schools of 21 provinces. Published surveys show that there are deficiencies in the areas of IT facilities, IT teachers, and teaching results. In some schools, 3 students share a computer in IT classes. The overall level of professional qualifications of IT teachers is not high. Most teachers believe that their knowledge about the subject matter is inadequate. Furthermore, they erroneously believe that the objective of IT courses is only to



develop students' information processing ability. The contents of textbook are usually out-of-date and do not even measure up to the IT knowledge level of students. Thus, it is only natural that students' satisfaction with these IT courses is low<sup>[34-38]</sup>. This fully reveals that the IT Curriculum Standards in China is not as successful as originally designed in guiding the IL education.

As China's overall national strength is increasingly on the rise, it is speeding up its construction of public libraries, primary and secondary school libraries and other cultural and educational facilities. In 2008, two official documents, namely, *Quota of Land Used for Public Library Construction* and *Standards for Public Library Construction* were promulgated by the Central Chinese Government. In March 2008, the bill about a library law was accepted as one of the second-tier legislative meeting agenda of the 11<sup>th</sup> National People's Congress Standing Committee<sup>[39]</sup>. This means that libraries will play an increasingly important role in people's lives. Children and youngsters in China will have greater opportunities in using libraries at their basic education stage or even at an earlier pre-school stage. Therefore, China should prepare its librarians for the rejuvenated new IL education program accordingly and with much greater consensus in the years ahead.

### 3 Suggested problem solutions for China

#### 3.1 Setting up a set of curriculum standards based on an IL-centered educational perspective

In order to equip students with a lifelong learning ability at an early stage of schooling, it is necessary for both information educators and students to develop a right perspective about the IL education issue. Obviously the existing IT curriculum instruction at most schools fails to meet the practical information needs of their respective students. Therefore, a new set of curriculum standards with a broad educational perspective should be developed. Along this line of thinking, we make the following suggestions:

First of all, we ought to strengthen the cooperation and collaboration among all concerned parties and educators for the establishment of a new curriculum for IL education at all school levels. It is especially important to have qualified school librarians to participate in such an undertaking.

Secondly, it is necessary to include and/or enrich the IL educational program with two additional important subject contents (or courses), namely, research methods and critical thinking. There is a lack of systematic training in the subject areas of research methods and critical thinking in the nationally prescribed curriculum at all levels of schools including both secondary and tertiary education in China. It is highly desirable to include these subject matters in the new IL curriculum. We



should definitely go beyond the current IL subject contents, such as information processing, retrieval, analysis, and utilization in order to function effectively in a modern society.

Last but not least, the subject coverage of an IL educational program should move from one phase of study to another one smoothly in terms of subject sophistication and in accordance with the grade level such as at the elementary, middle or high school level of education. The instructional format should maintain coherent, and repetition of contents in each of these stages should be avoided. To do otherwise, students will lose their interest in attending IT classes as they do now.

### **3.2 Establishing a teacher-librarian's training program to promote school librarians' role in IL education**

School libraries in China are inhibited from playing an active role in IL education. One of the key reasons is that the overall qualifications of school librarians vary greatly and they are not high in general. So it requires some urgent measures to cultivate a group of school librarians to serve as the backbone force for advancing the newly conceived IL-based primary and secondary education in China. For such an undertaking, they should draw lessons from the practice of their American counterparts. That is to say, the teacher-librarians should further upgrade their academic credentials and also pass a screening procedure to make themselves qualified as full-fledged teacher-librarians. Only in this way, they can play a meaningful role along with their academic colleagues together on an equal footing for the advancement of an IL-centered educational program in their respective schools. The following 5 measures are suggested along this line of thinking.

- To set up a certification mechanism and standards for aspiring school librarians and school teachers to become qualified as a certified teacher-librarian. After passing the certification screening procedure, a teacher-librarian should be required to take a credit-bearing continuing education program in order to get his or her certification renewed periodically. This will improve school librarians' academic status and their overall level of job performance as well.
- To advocate the IL education as a required course of a general education program for college students, especially for normal school students. To reconstruct the current information retrieval course according to ACRL's IL standards for higher education and making it a required course for all normal school students. In this way, a group of qualified teachers for IL education will be trained and made available to promote IL education in schools in a few short years.
- To strengthen on-job training for IT teachers and school librarians by offering them a series of non-credit-bearing IL-related short-term training classes.





- To establish a national online education system to teach self-directed IL learning in a systematic way.
- To carry out an IT-supported pedagogical reform at schools and to foster an institutional culture in the library as a place not only congenial to self-directed study but also congenial to the collegial collaboration for knowledge sharing and knowledge creation undertakings among school students and teachers alike.

### 3.3 Strengthening the research and development of an online IL education program and an accompanied evaluation mechanism

Evaluation can be a guide and a motivation force to promulgate IL education. Unfortunately, this mechanism is by and large overlooked in China to some extent. Current IL evaluation is mostly confined to research work rather than assessing its practical performance periodically. Although scholars have conducted a few in-depth studies on the standards of IL evaluation and have proposed some criteria for IL evaluation, an authoritative IL educational program and a set of evaluation standards for its performance have not yet been established. Neither is there a national online assessment system based on a given set of authoritative standards for evaluation purpose. So, it is necessary to deepen and quicken the research and development process for an online IL education. Suffice to say, we need to develop a scientific, rational, and strategic plan for an online IL evaluation. The ultimate goal is to promote teaching and learning through evaluation by establishing an authoritative national assessing system similar to that of the National Computer Grade Examination. In this way, learners can gradually improve their sophistication level of IL by online learning and self-testing.

## 4 Conclusion

IL education is becoming an essential one crossing school curriculum for it is absolutely crucial for us to function effectively in a modern society. The primary and secondary education, being at the initial stage of a person's formal schooling, will lay a solid foundation for a person's lifelong learning pursuit. IL education at this initial stage of formal schooling is especially important in terms of knowledge acquisition and character building. IL curriculum standards give assurance to the sound development and practice of an IL educational program. A solid IL education will not only make our thinking and doing more rational but it will also equip us with a more competitive edge over our competitors in overcoming all kinds of obstacles that we may face in our life. Professionals in the field of library science and education should attach great importance to the IL education at children's



formative years of a formal schooling. We should not only strengthen our research in this area, but also participate actively in developing a set of workable IL education curriculum standards at all schools.

We should also strengthen the training for primary and secondary school librarians, develop a highly qualified librarian team for IL education, allow teacher-librarians to play a meaningful role in IL education in primary and secondary schools. Currently, China is launching a nation-wide education reform and beginning to pay attention to IL education at the basic education stage. It is now the opportune time to push forward for the establishment of a certification mechanism in order to recognize the academic status of qualified teacher-librarians. We should learn from the practice of the United States, hiring college graduates with both a library science diploma and a teacher certificate as librarians. With a faculty status, librarians will have opportunities to get involved in teaching IL courses. By including the IL teaching load to the overall assessment of a librarian's job performance, we will emancipate librarians' teaching and research potential to an unprecedented level of height for pursuing academic and professional excellence. In this way, teacher-librarians will play a leadership role in IL education in China as they should be and are deserving to be. It follows that the current situation of IL education, which overemphasizes IT and overlooks the contents of information resources, will be remedied fundamentally and meaningfully.

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