

## *Assessing Information Literacy Skills of First Year Undergraduate Students*

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### **Abstract**

The present study aimed at assessing the information literacy skills of first year undergraduate students from author's university. This study included four essential areas: the ability to (1) identify information needs and sources; (2) locate information; (3) evaluate information; (4) synthesize information. We measured information literacy skills with questionnaire and multiple-choice knowledge test from 61 first year undergraduate students. The findings indicate that the majority of the participants lacked information literacy skills on all areas. The result signifies that further instructional support to foster undergraduate students' information literacy skills is essential and important.

Keywords: information literacy, information problem solving, information skills, freshmen

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## **Introduction**

In the Internet era, university students always use information from the Internet for solving daily-life problems or assignment questions. It requires students to learn how to identify information needs, locate information, evaluate information and use information effectively, such skills are the key elements of information literacy and information problem solving. It enables university students to be successful in their academic and professional lives (Fain, 2011). However, teachers believe that students should develop information problem solving skills and information literacy skills spontaneously (Walraven, 2008; Van Deursen, 2013). Researchers have shown that university students have difficulties in solving information-based problems (Fain, 2011; Probert, 2008; Walraven, Brand-Gruwel & Boshuizen, 2008). In order to develop appropriate training program for our undergraduate students, it is necessary to examine the information literacy skills of our first-year undergraduate students. This research focuses on four essential information literacy areas. It examined students' ability to: (1) identify the information needs and internet sources; (2) locate information from the Internet; (3) evaluate the quality of information; and (4) synthesize information. The results may help university members to develop appropriate information literacy course at undergraduate level.

## **Literature Review**

In 1974, Paul Zurkowski introduced the term information literacy, but it was related to workplace. The first and most widely cited definition of information literacy in education was proposed by American Library Association (ALA):

*“To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information.” (ALA, 1989, n.p.).*

The first information literacy model was presented by Eisenberg and Berkowitz in 1988. Eisenberg and Berkowitz (1990) proposed the Big 6 model to develop information literacy skills. The Big 6 model emphasized on using information problem solving skills. It has provided six steps to help students in solving information problem. These steps were task definition, creating information seeking strategies, locating and accessing information, synthesizing information and evaluating information (Eisenberg and Berkowitz, 1990).

In addition to information literacy model, some organizations developed Information Literacy framework for different levels of students. The most cited model was proposed by the Association of College and Research libraries (ACRL) – Information literacy competency standards for higher education. It proposed five information literacy standards with 22 performance indicators for university students. In the United Kingdom, the Society of College, National and University Libraries (SCONUL) presented seven pillars model of information literacy in 1999 and revised in 2011. It defined the core skills and competencies (in terms of ability) and attitudes and behaviors (in terms of understanding) at the most important part of information literacy development in higher education (SCONUL, 2011). In 2016, the Hong Kong Education Bureau introduced new Information Literacy for Hong Kong students. There are eight literacy areas in three categories. It includes (1) effective and ethical

use of information from lifelong learning; (2) Generic Information Literacy (identify, define, locate, access, evaluate and organize information); (3) Information World (Education Bureau, 2016). This new Information Literacy provides some idea for schools to develop students' knowledge, skills and attitude to use information.

Some Information Literacy frameworks were developed for library sciences, it does not reflect the required knowledge in this information-rich internet environment. Based on the above frameworks, this study focuses on solving problems by using information from the Internet, it covers four dimensions, they are (1) identify information needs and internet sources, (2) locate information from the internet, (3) evaluate information from the Internet and (4) synthesise information.

In terms of assessment, Abdullan (2010) categorized the information literacy assessment data as perception-based data and evidence-based data. The perception-based data are collected from the self-rated questionnaire while the evidence-based data are collected from the performance of knowledge tests or specific tasks. Some researchers developed self-rated questionnaire to evaluate the perception of information literacy skills. Serap Kurbanoglu (2006) developed a 17-item information literacy scale with three main components, which were basic, intermediate and advanced information literacy skills. OuYang (2007) developed an evaluation instrument of information problem solving skills on Internet resources. It included (1) define information problem, (2) search information, (3) scan information, (4) process information, (5) organize and present information and (6) regulation, which evaluate the developmental level and confidence level of participants' information problem solving skills.

Knowledge test include a list of questions for students to answer. There are several large scale information literacy tests such as Tool for Real-time Assessment of Information Literacy (TRAILS) and Project Standardized Assessment of Information Literacy Skills (SAILS) but they are not able to track changes in IL skills of individual students (Fain, 2011). Belie (2009) developed the information literacy assessment scale for education. It included 22 multiple choice questions that reflect cognitive dimension of information literacy. In a recent study, Boh Podgornik (2016) developed a new information literacy test for all study programs in all scientific disciplines.

## **Methodology**

The study included a group of 61 first year undergraduate students. All of them enrolled in the first year first semester foundation information technology module. We assessed all participants by using questionnaire and multiple-choice questions. We collected all data on the first two weeks of the module.

A customized questionnaire was used to measure the perception of information literacy. The questionnaire items were revised based on Ouyang (2007)' and Serap Kurbanoglu (2006)'s instrument for measuring the perception of information literacy. It mapped to the four essential abilities (i.e. identify information needs and sources, locate information, evaluate information and synthesise information). It consisted of 18 Likert-type questions. Each question had a 7-point Likert type scale.

We used multiple-choice knowledge test to check their actual performance. We revised Beile (2009) and Neely (2006)'s assessment items. A total of 18 multiple choice questions, mainly addressing information problem solving issues was developed.

To validate all instruments in this research, all questionnaires and multiple-choice knowledge test questions were sent to experts in Information Literacy for comments.

## Results and Discussion

This section discusses the results of the survey and multiple-choice knowledge test. Table 1 and 2 show the results of first information literacy area – identify information needs and sources on survey and multiple choice knowledge test respectively. The participants perceived that they had difficulties in defining the information needs (Mean=4.24) and using electronic database (Mean=4.32), but they had relatively confidence on selecting information sources (Mean=4.89). On multiple-choice knowledge test, more than 50% of the participants got a correct answer on this area. It is aligned with the survey results. Around 70% of the participants were able to determine the best information sources while less than 50% of the participants were able to use the electronic database in university library.

Survey item: I feel confident to ....	Mean	SD
define the information I need.	4.24	1.43
identify a variety of potential sources of information on Internet	4.63	1.26
use electronic database in university library	4.32	1.43
select the most appropriate information sources	4.89	1.09

Table 1 Survey results: identify the information needs and sources

Item	Correct %
Define the information needs	61.90%
Use of the electronic database in university library	49.20%
Determine best information source (event that took place two days ago)	69.80%
Determine best information source (articles on specific topic)	55.60%

Table 2 Multiple-choice knowledge test results: identify the information needs and sources

Table 3 and 4 show the survey and multiple-choice knowledge test results of locating information respectively. The participants perceived that they had difficulties in using Boolean logic (Mean=4.3), but they had confidence in using different keywords (Mean=5.03) and advanced Google search (Mean=5.29). Refer to the results of multiple choice knowledge test, less than 50% participants got the correct answer on all multiple-choice questions. Only 12.7% of the participants were able to understand the meaning of truncation (\*). In addition, only 23.8% of the participants were able to use different keywords to limit their search. In revising the search strategy, the majority of participants did not know how to retrieve more or less results based on the initial search. It reflects that they have poor performance on locating information. It contradicts the results with survey. Participants believe that they are able to locate

information but they do not have the necessary skills to locate information. They have wrong perception of locating information. They know how to type the keywords on the search engine but they don't know how to revise the search strategy by using different techniques.

Survey item: I feel confident and competent to ....	Mean	SD
limit search strategy by using different keywords	5.03	1.09
limit search strategy by using Boolean logic	4.30	1.16
limit search strategy by using advanced Google search	5.29	1.18
revise search strategy to retrieve more results	4.86	1.16
revise search strategy to retrieve fewer results	4.52	1.19

Table 3 Survey results: locate information

Item	Correct %
Limit search strategy by using different keywords	23.80%
Limit search strategy by using Boolean logic	49.20%
Use of operator - Truncation	12.70%
Search strategy – revise strategy to retrieve more results	27.00%
Search strategy – revise strategy to retrieve fewer results	30.20%

Table 4 Multiple-choice knowledge test results: locate information

Table 5 and 6 show the survey and multiple-choice knowledge test results of evaluating information respectively. The participants perceived that they had confidence in determining the information sources by using different evaluation criteria. The mean score of this area ranged from 4.68 to 4.89. Refer to results of multiple-choice knowledge test, less than 50% of participants got the correct answer on determining the authority and objectivity of information sources.

Survey item: I feel confident and competent to ....	Mean	SD
determine the authority of information sources	4.81	1.23
determine the currency of information sources	4.83	1.19
determine the reliability of information sources	4.89	1.12
determine the objectivity of information sources	4.68	1.10
determine the accuracy of information sources	4.76	1.06

Table 5 Survey results: evaluate information

Item	Correct %
Determine the authority of information sources	41.30%
Determine the currency of information sources	55.60%
Determine the reliability of information sources	55.60%
Determine the objectivity of information sources	47.60%
Determine the accuracy of information sources	74.60%

Table 6 Multiple-choice knowledge test results: evaluate information

Table 7 and 8 show the survey and multiple-choice knowledge test results of synthesizing information respectively. In general, the participants perceived confidence in synthesizing information. The mean score of this area ranged from 4.76 to 5.00. Refer to multiple-choice knowledge test, they had difficulties in citing information. Only 31.7% of participants were able to select the correct citation and only 11.1% of participants were able to understand the meaning of the volume of a journal. They don't know the differences between volume and issues of a journal. It contradicts the results with the survey. Participants believe that they are able to make citation and use quotations (Mean=4.83) but they do not know how to make correct citation and the meaning of journal citation.

Survey item:	Mean	SD
I feel confident and competent to ....		
determine whether the information retrieved is relevant and sufficient for solving the information problem	4.81	1.15
categorize and manage located information	4.76	1.21
make citations and use quotations within the text	4.83	1.11
summarize information obtained from the Internet	5.00	1.06

Table 7 Survey results: synthesize information

Item	Correct %
Make citations	31.7%
Structure of journal citation – journal title	54.00%
Structure of journal citation – page number	61.90%
Structure of journal citation – volume	11.10%

Table 8 Multiple-choice knowledge test results: synthesize information

## Conclusion and Suggestions

This paper reports the information literacy skills of the first year undergraduate students in Hong Kong. By using questionnaire and multiple-choice knowledge test, it shows that participants have limited knowledge of information literacy. On the area of identifying information needs and sources, participants were not able to use electronics database on university library. On the area of locating information, they were not able to use different keywords with Boolean operators and how to revise the search strategy based on initial search results. On the area of evaluating information, they had difficulties in determining the authority and objectivity of information sources. On the area of synthesizing information, they had difficulties in citing information. As we have a small sample size in one particular module at one university, it limits the generalizability of the findings to other programmes in other institutions.

Refer to the results of survey and knowledge test, we can focus more training on each Information Literacy area. On the area of identifying information needs and source, we should provide more training on the electronics database. Faculty members can collaborate with university library. On the area of locating information, undergraduate students should learn how to formulate keywords other than the words from original problem. In addition, students should learn how to use Boolean logic and how to formulate advanced search statements. In order to help them learn better, instructors should demonstrate the benefits of using appropriate keywords, Boolean search and

advanced search strategies. On the area of evaluating information, instructors can provide some checklists of web evaluation. On the area of synthesizing information, instructors should provide more training on citing information in different type of information sources. The result signifies that further support to develop university students' information literacy skills. Further studies can systematically investigate how to foster university students' information literacy skills in formal curriculum.

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