Assessing IL Skills of Primary-5 Students in Singapore

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Abstract. The study was conducted at the end of 2013 with collaborative efforts from a group of information literacy researchers, members of Singapore National Library Board, and child development experts in the Ministry of Education. Some 3435 students from 15 schools, spread across different geographical regions of Singapore, were sampled. Results of data analysis showed a mean percentage score of 64, meaning that students possessed basic IL skills. Students scored very well on cyber wellness questions, defining information task, synthesizing and using information. However, students performed poorly for questions related to seeking information from different sources. It was also observed that students performed poorly at identifying steps in conducting an information project. The results suggest that most of the P5 students might have not been given enough opportunity to carry out independent tasks that required them to find new information, or information may often be given to the students by teachers.

Keywords: Information literacy, survey, grade-5, assessment.

1 Introduction

Information literacy has received a great amount of attention in the academic field since 1974 when the term was first coined by Zurkowski [1]; however, as some researchers have pointed out, students often lack information skills to take advantage of rich information sources offered by school libraries such as electronic databases, online catalogues, websites and multimedia.

Information literacy (IL) has been described as the ability to locate access, search, evaluate and use information in different contexts [1]. In this day and age, with information being increasingly digitized, and the pervasive use of information and communication technologies (ICTs) in our daily lives, IL has become a basic competency to navigate through the deluge of information to meet our information needs for both work and leisure activities. For students, information literate competency should be a basic skill that will facilitate effectively screening through great amount of resources to identify reliable and pertinent information found through social networks, the Internet, smart phones, television, or friends, either for school-related work or for personal interest and amusement. For the majority of primary students, IL would provide them with the competencies to better take advantage of their information surroundings as a component of their informal and formal learning mechanisms [2]. In a broader context, the

S. Kurbanoğlu et al. (Eds.): ECIL 2014, CCIS 492, pp. 531–539, 2014.

significance of competent IL capabilities has been related to intellectual achievements likewise in the professional life [3]. Given the importance of IL competencies, some educative systems across the world have included IL skills in their curriculum, which are either taught as an independent component, incorporated into the curriculum with the foundation subjects pupils have to study, or in a sole session by the library [4-6].

Moore [7] has reported on the worldwide IL education programs. The impact of IL skills on project work and importance of training teacher librarians have also been highlighted by many authors [8-10]. As educative systems become more aware and appreciate IL competencies, different types of assessment, like questionnaires and tests, have been developed and applied to scrutinize the degree of IL competencies students and teachers possess. Outcomes obtained from diverse instruments across different regions also have been reported. However, most previous IL studies focused on secondary, high school, and university students.

Apparently, there is a heavy dependency on internet search engines compared to reliable sources in some research reports [11-13]. Besides IL competencies, some instruments have assessed search strategy practices [13-15]. Interesting findings includes the need to depend on other people to help them search for information using databases and the utilization of Google as the first information source [16-17]. Even now, IL is a subject on which common digital natives still need to improve [11-13], [15], [17]. Studies performed globally have uncovered possible correlations between IL and factors such as demographic background, access to the internet, way of life, computer usage, teaching approaches for IL, gender differences, ethnicity, working experience, and educational background [18-19].

Categories of Information Literacy Models have been created; for instance, IL models based on perspectives or components and those based on the Research/Information Seeking Process. Some of the models developed under these categories are the following: Seven Faces of Information Literacy [20], The Big6 model [21], the SCONUL Seven Pillars of Information Literacy Model [22], collaborative information seeking [23-24], The Seven Steps of the Research Process Model [25], Standardized Assessment of Information Literacy Skills (SAILS), Tool for Real-time Assessment of Information Literacy (TRAILS), and Research Readiness Self-Assessment (RRSA) assessing discrete information literacy skills [26-28] among others.

Recognized as one of the most successful in the world [29-30], the Singapore education system has been evolving constantly over years. As the country developed, the earlier efficiency-driven system has been replaced with ability-driven education (ADE) paradigm, in which creative thinking and learning skills are identified as important assets. IL in the Singapore school sector has also evolved since it was first introduced in 1997 [31]. Applications of the IL publications and guidelines in school curriculum were short-lived by the end of the last millennium, and after nearly a decade, IL reappeared in the school curriculum [32]. However, most of the past efforts were focused on high school level and above. More recently, in the Teacher Education Model for the 21st Century, abbreviated as the TE21 Model, published in 2009, information literacy skills were recognized among other 21st century skill sets to be taught to students from a younger age [33]. In 2010, several information literacy components were incorporated into textbooks of various subjects. Knowing where students stand today for their IL skills will be instrumental in assessing the impact of

new curriculum as well as guiding future plans in teaching content and pedagogy. This paper will report on the survey results of Singapore Primary 5 students' Information Literacy skills.

2 Methodology

The study was conducted at the end of 2013 with collaborative efforts from a group of IL researchers, members of Singapore National Library Board, and child development experts in the Ministry of Education. Some 3435 students from 15 schools, spread across different geographical regions of Singapore, were sampled. Due to younger age of the students, a paper-based survey questionnaire was used to collect data. Along with 4 items for demographic information, the questionnaire contained 24 IL related questions and was constructed with consideration of the IL related concepts taught in school, Singapore's multi-cultural context, and Primary 5 students' reading proficiency. The questions were divided into five categories, with the number of questions raged from two to nine in each category. The five categories were *Defining Information Task, Selecting Information Source, Seeking and Evaluating Information from Sources, Synthesizing and Using Information, and Appraising the Information Process and Product.* The last category was not analysed in this study due to students' age and only one question was asked, and Cyber Wellness was seen as an extra variable.

The analysis of several Information Literacy appraisal instruments illustrated that all of them had weaknesses and strengths. This study implemented the methodological approach of survey by testing knowledge since it is a cost-effective mean to a obtain large sample size. Assessing performance can produce more reliable outcomes, but it needs more resources.

The survey instrument was generated by a team consisting of Education faculty and Information Studies members of Nanyang Technological University (NTU) in Singapore, based on the model shown in Figure. 1 [31-32], [34-36]. A number of assessment tools developed previously were consulted (e.g. TRAILS, SAILS), the survey components were analysed, and it was formulated to be more appropriate to the Singapore context through many focus group exercises. The questionnaire was sent to information literacy experts from British Columbia, Hong Kong, Kuwait, and Thailand. Their recommendations were related to the structure of the questions and the length of the instrument. Both of such suggestions were included in the final questionnaire. It was subsequently pilot-tested with 35 students from primary five (P5) schools in Singapore [2]. Enhancements were introduced to the instrument based on the feedback obtained from the participants in the pilot study. For instance, a number of lengthy and complex questions were revised, and the words used in some of the questions were changed and simplified to improve the questionnaire readability and comprehension.

The questionnaire was divided into three sections. Section 1 had questions on demographic information about the participants, the primary schools in which they study, gender, internet access, and year of birth. Section 2 comprised 22 multiple-choice questions to test IL skills in five stages. Section 3 gathered information about students' cyber-wellness with two questions.

Fig. 1. Information literacy model

Questions for testing IL skills were weighted in a different way along with their perceived importance levels. For this, the answers were then normalised, where 0 = Incorrect, 1 = Correct (Nice to have) and 2 = Correct (Must have) to derive mean total scores and mean stage scores. The score was then converted to 100% for ease of analysis of findings and presentation in this report.

Data collection was conducted from 31 July 2013 to 15 Nov 2013. Data were analysed and focused on the first four stages in the proposed IL model with two statistical techniques, paired-samples t-tests and one-way between subjects ANOVA, and using Statistical Package for the Social Sciences (SPSS) 19.0.

3 Results and Analysis

This paper presents, mainly, the results of three different types of analysis in relation to Information Literacy for students in primary 5 in Singapore. The first analysis was paired-samples t-tests, comparing four information literacy stages with the Information Literacy total scores. The other two analysis were one-way between subjects ANOVA's. One of them compares gender differences for each one of the Information Literacy stages, and the other compares mean scores by Internet Availability at Home for each one of the Information Literacy stages. The total information literacy scale for Primary 5 was found to be reliable (21 items; $\alpha = 0.71$), in this case the analysis was run with the first four stages.

3.1 Comparing Total Score with Score of Each Stage

Four paired-samples t-tests were conducted to compare the mean of Information Literacy total scores and each one of the means of its four stages: Stage1 - Defining Information Task, Stage2 - Selecting Information Sources, Stage3 - Seeking and Evaluating Information From Sources, and Stage4 - Synthesizing and Using

Information. Stage 5 was not included because only one item was used to test the stage 5 skills. In all these tests, there were significant differences between Information Literacy total scores and each one of the four stages.

The Information Literacy total scores (M=63.58, SD=18.602) were lower than scores in these three stages - the Defining Information scores, Stage1, (M=65.15, SD=33.260); t(3434)= 3.831, p = 0.000; the Selecting Information Sources scores, Stage2, (M=64.28, SD=23.415); t(3434)= 2.556, p = 0.011; and Synthesizing and Using Information scores, Stage4, (M=65.28, SD=24.643); t(3434) = 5.780, p = 0.000. The Information Literacy total scores (M=63.58, SD=18.602) were higher than the score for Seeking and Evaluating Information From Sources scores, Stage3, (M=59.61, SD=24.214) scores; t(3434) = -12.795, p = 0.000.

It appears that Stage 3 is the weakest part among other stages, which pulled down the overall score.

3.2 Gender Differences - Females Scored Higher Than Males

Five one-way between subjects ANOVA's were conducted to compare the genders for each one of the information literacy stages and the total information literacy scores. Since each comparison is done between only two types of subjects, post hoc tests were not necessary. In all these tests, there were significant differences between genders in each one of the four stages and the IL total scores.

In Defining Information Task, Stage1, females scored significantly higher than males [F(1, 3426) = 17.721, p = 0.000]; in Selecting Information Sources, Stage2, females scored significantly higher than males [F(1, 3426) = 44. 208, p = 0.000]; in Seeking and Evaluating Information From Sources, Stage3, females scored significantly higher than males [F(1, 3426) = 44. 208, p = 0.000]; in Synthesizing and Using Information, Stage4, females scored significantly higher than males [F(1, 3426) = 51.722, p = 0.000]; and in Information Literacy Total scores, females scored significantly higher than males [F(1, 3426) = 64.049, p = 0.000]. Females scored significantly higher than males in all stages.

3.3 Internet Access-Students Having Internet Access at Home Scored Higher Than Those Having Not

Five one-way between subjects ANOVA's were conducted to compare the effect that having Internet at home has for each one of the information literacy stages and the total scores over the students. Since each comparison is done between only two types of subjects - students who have do not have access to the internet from home, post hoc tests were not necessary.

In Defining Information Task, Stage1, students with Internet access at home scored significantly higher than those without it [F(1, 3426) = 19.515, p = 0.000]; in Selecting Information Sources, Stage2, students with Internet access at home scored significantly higher than those without [F(1, 3426) = 41.529, p = 0.000]; in Seeking and Evaluating Information From Sources, Stage3, students with Internet access at home scored significantly higher than those without [F(1, 3426) = 71.848, p = 0.000]; in Synthesizing and Using Information, Stage4, students with Internet access at home

scored significantly higher than those without [$F(1, 3426) = 63.732$, $p = 0.000$]; and in the Information Literacy Total scores, students with Internet access at home scored significantly higher than those without [$F(1, 3426) = 89.435$, $p = 0.000$].

In all these tests, students with Internet access at home scored significantly higher than those without it.

3.4 Overall Results

Results of data analysis showed a mean percentage score of 64, meaning that students possessed basic IL skills. Students scored very well on cyber wellness questions, defining information task, synthesizing and using information. However, students performed poorly for questions related to seeking and evaluating information from different sources. It was also observed that students were not strong at identifying steps in conducting an information project. The results suggest that most of the P5 students might have not been given enough opportunity to carry out independent tasks that required them to find new information, or information may often be given to the students by teachers. Students in general possess a satisfactory amount of the expected IL skills at this grade level. However, it was surprising to see that many were unable to understand information from simple graphics, such as a pie chart.

4 Discussion

These research findings show some issues to be addressed. To start with, it was indentified that pupils had problems identifying resources, specifically, differentiating between fiction and non-fiction and finding a specific book in the library.

This research found that female students scored slightly higher than male students; students with internet access at home scored higher than those without; and Seeking and Evaluating Information from sources had the lowest scores among the four stages studied. These findings will require more detailed scrutiny since uncovering the specific causes of these results will require further research.

This research found that in general lower-order IL competencies (e.g. definition information task and selecting information sources) were possessed by more students than a higher-level competency (e.g. synthesizing and using information). The exception was seeking and evaluating information from sources. The previous finding may imply that there is enough recognition and endeavours in instructing these competencies in the Singapore school, probably as a result of the implementation of TE21 Model [29]. Inversely, it may imply that endeavours should continue to improve seeking and evaluating information from sources since it had the lower scores among the four stages studied. The higher-level competency may require more time and practice to acquire. Maybe, one of the most frequent mechanisms used to instruct students to obtain higher-level IL competencies is by collaboration between educators and librarians working in the school. The teamwork between school librarians and educators could secure and guarantee the access to reliable resources, both non-print and print, and it will more adequately support a unified IL curriculum suitable to Singapore students.

5 Conclusions

The findings of this research have cast light on the levels of IL competencies in Primary 5 students in Singapore schools. It is one of the first attempts to assess primary school students' IL skills on a large scale. In addition, this research has supplied understanding what Singapore P5 students conceive as their IL competencies, their comprehension of the information seeking processes and information organization, both in non-print and print sources, and their perception in terms of social responsibility and cyber wellness. The results may also suggest areas and better ways to help students to improve their IL competencies, such as collaboration among educators, information professionals, syllabus designers, and policy makers.

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