Measuring The Effect of Information Literacy on the Undergraduates' Academic Performance in Higher Education

Mohd Idzwan Mohd Salleh
Universiti Teknologi MARA
Faculty of Information Management
Kelantan, Malaysia
idzwan201@kelantan.uitm.edu.my

Ahmad Faiz Abdul Halim
Universiti Teknologi MARA
Faculty of Business Management
Kelantan, Malaysia
abugarcia6235@gmail.com

Raja Abdullah Raja Yaacob
Universiti Teknologi MARA
Faculty of Information Management
Selangor, Malaysia
rary@salam.uitm.edu.my

Zulkarnain Yusoff
Universiti Teknologi MARA
Centre for Islamic Thought and Understanding
Kelantan, Malaysia
zul713@kelantan.uitm.edu.my

Abstract—**Information literacy is a necessity to equip the students in higher education to learn more effectively, to develop the creative thinking and to produce a high quality academic material of a course of study. Once they entered university, they have been exposed to a basic information literacy course conducted by the library during orientation week. This course should be held on an ongoing basis by the faculties to ensure their students to have highly skilled in searching, evaluating and utilizing of reliable information sources. A new reform of educational system nowadays has more focused on measuring the students' learning outcomes. This is why the information literacy is essential in the way the students can demonstrate their abilities by applying relevant knowledge and skills to achieve high standards of academic achievements in acquiring a good grade in line with the high expectations of university and job market needs. This research is concerned on examining the effect of information literacy on the academic performance among undergraduates in a Malaysian public university. It is significant to explore whether the information literacy can affect the academic performance of the students as these skills have been embedded into their learning processes for them to be more critical thinker instead of improving their academic writings in preparing themselves to cope with such complex challenges in their future life and at work places soon.**

Keywords-Information literacy; higher education; information sources; academic performance; undergraduates

I. INTRODUCTION

Information literacy as the concept and principle has been formally emerged in the United States of America since the early 1990s. It could be defined as a set of abilities requiring individuals to recognize when information was needed and have the ability to locate, evaluate and use effectively the required information [1] that existed as a result of the rapid advancement of information and communication technology [ICT] and its implications on the information retrieval. Through widely utilization of ICT, the library shifted its roles from the repository of knowledge to the facilitator of knowledge. Hence, the responsibilities of the information professionals like librarians have moved from the preservation of knowledge to the management of knowledge for the purposes of accessing and utilizing by the library patrons to accomplish their specific tasks. Information literacy evolved over a long history of library traditions that was library orientation, library instruction or bibliographic instruction. The trend over the past 30 years had been a shift from the concept of orientation to instruction in the use of the collection and services of a particular library to a set of concepts which encompassed principles of library organization as well as the nature and organization of library resources including both print and electronic. In line with the focus on the concept and principle of information literacy, the roles of universities in the teaching and learning processes have acquired wide attention. Faculties were viewed not only as information and knowledge providers but also as facilitators to instruct the students on how to search, collect, evaluate and use the information sources effectively. It has become increasingly obvious that the students could not learn everything they need to know in their field of study in a few years in the universities. Information literacy would equip them with the critical skills to become more independent lifelong learners. It was extremely essential in this information age by instructing them the proper ways on

how to get the required information, where to locate it effectively and efficiently as well as on how to analyze and evaluate it by considering the academic and research ethics in using both traditional and digital libraries. As the ALA's Committee said that "ultimately, information literate people are those who have learned how to learn" [1].

In Malaysia, the government was still giving a large effort on the production, use and distribution of knowledge through the development of knowledge economy with the publication of information sources by the institutions of higher education. As these sources published, there was a need for the students to identify, critically interpret and utilize it to fulfill their coursework requirements. They must have the necessary knowledge and skills to determine the relevant sources to be information literate. From a global perspective, Mohammed-Saleh [2] noted that the developing countries have faced the two major problems in developing their information literacy programs in which were traditional educational system and low level of academic material publications.

In relation to information literacy in Malaysian higher education, Mohd Sharif, Nor Edzan and Zainab [3] mentioned that due to the information overload and sophistication of information technology for storage and retrieval, students were confronted with the task of finding effective ways to access, evaluate and use the various formats and channels of information. Information could be retrieved from the library shelves or from home or office workstation. Nevertheless, retrieving information from any sources required an understanding of how information was organized accompanied by skills to retrieve and using it effectively. The uncertain quality and expanding quantity of information pose large challenges for undergraduate students in universities. The sheer abundance of information would not in itself create a more informed citizenry without a complementary cluster of abilities necessary to use information effectively. Information literacy has formed the basis of learning processes which could be practised to all disciplines, to all learning environments and to all levels of education that enabled learners to master content and extend their investigations, become more self-directed and assume greater control over their own learning [4]. Adam and Wood [5] more stressed that lack of information literacy was partly the cause of underutilization of existing ICT and information resources. Mutula, Wamukoya and Zulu [6] also noted that students were ill-equipped with requisite information literacy skills such as the ability to identify, locate, review, select and apply information needed for their studies and had difficulties in using relevant tools to locate information and knowledge.

Universiti Teknologi MARA was one of the largest public universities in Malaysia which had a campus in each state that included more than 100,000 numbers of students. New registered students have to attend an information literacy course which was organized by the library during their orientation. They would be exposed to the techniques of search and retrieval of information sources using online databases subscribed by the university. On the other hand, lecturers might obtain the services of librarians to add more related courses to enhance the students' knowledge and skills when needed. The main issue was whether the information literacy of students could help them to improve their academic performance. Much literature has talked about the information literacy from the global and local Malaysian situations but the effect of information literacy on the students' academic performance was rarely touched. Accordingly, this research has been carried out to achieve an objective:

1. To examine the impact of information literacy among the undergraduates on their academic performance.

The related research question and hypothesis were formulated:

1. To what extent does the effect of information literacy among the undergraduates on their academic performance?

Hypothesis to address RQ1:

H0: There is no significant effect of information literacy among the undergraduates on their academic performance.

H1: There is a significant effect of information literacy among the undergraduates on their academic performance.

II. LITERATURE REVIEW

A. The Significance of Information Literacy

Many countries in the developed and developing parts of the world have recognized the importance of information literacy among their citizens and have implemented programs to inculcate the information literacy competencies and skills among students at all levels. In the United States, the National Forum on Information Literacy established in 1989 and the Institute for Information Literacy that established in 1998 were the instrumental in formulating IL Standards for school and higher education sectors. The US Department of Education has included information literacy as one of the country's five goals in education since December 2000. Information literacy developments have also taken place in Canada, China, Japan, Mexico, Namibia, New Zealand, Singapore and South Africa [7]. In Europe, many European countries have implemented information literacy programs as a result of realizing the importance of information literacy, seen in the following Memorandum on Lifelong Learning: "Europe has moved towards a knowledge-based society and economy. More than ever before, access to up-to-date information and knowledge, together with the motivation and skills to use these resources intelligently on behalf of oneself and the community as a whole, are becoming the key to strengthening Europe's competitiveness and improving the

employability and adaptability of the workforce. Hence, learning how to learn, to adapt to change and to make sense of vast information flows are now generic skills that everyone should acquire." [8].

B. Information Literacy Models, Standards and Relevant Past Research

Due to the information overload and sophistication of information technology for storage and retrieval, students were confronted with the task of finding effective ways to access, evaluate and use the various formats and channels of information. Information could be retrieved from the library shelves or from home or office workstation. Conversely, retrieving information from any sources required an understanding of how information was organized accompanied by skills to retrieve and using it effectively. Academic libraries should ensure that the students acquire the appropriate information literacy competencies to enable the graduate to be productive members of society and lifelong learners. Libraries have also been transforming its' users education program from library orientation, bibliographic instruction or user education to information literacy courses. Implementations of information literacy in academic libraries have also taken a variety of forms either in the form of stand-alone courses or classes, course integrated instruction, workbook based or online [9].

Mohd Sharif Saad, Nor Edzan Nasir and Zainab Awang Ngah [10] further explained that the processes of studying user behaviour in searching, evaluating and using information have developed into a variety of information search process models. Among the most referred models were those proposed by Irving's Information Skills [1985], Stripling/Pitts's Research Process [1988], Kuhlthau's Information Search Process [1989] and Eisenberg and Berkowitz The Big 6 [1990]. All these models have contributed to the theoretical foundation of information literacy. The theories were being utilized to facilitate the planning and teaching of information literacy at all levels of education all over the world. Through these models information literacy have gain widespread acceptance. Furthermore, standards have also been conceptualized, developed and endorsed to help in the planning, implementation and continuous evaluation of information literacy initiatives. These standards were aimed to help libraries and librarians to understand the concept of information literacy, their roles in fostering it literacy programs. The standards have enabled libraries to measure students' and graduates' information literacy competencies. Among the most referred information literacy standards in higher education was the ACRL Information Literacy Competency Standard for Higher Education published by the ACRL, ALA [2000], the Australian-New Zealand Standard by CAUL [2000] and the Seven Pillars of Information Literacy championed by Society of College, National and University or SCONUL [1999].

From a study done by Bailey (2007) to assess the impact of four series of information skills workshops conducted among pre-registration nursing Diploma students at Northumbria University, United Kingdom, the findings revealed that all students who attended at least one workshop improved their academic grades in their next assignment besides increasing their confidence levels and information literacy. There were no failures (below 40%), four students achieved 70% or above, 15 over 50% and only one student who attended all four workshops improved from 38 to 65%. Focus group interviews and questionnaires were used as the methods for data collection. Assignment grades were also recorded and analyzed to determine the outcomes of the workshop interventions [11].

A different example was demonstrated in the research conducted at the University of Wolverhampton which combined both focus group and tutor interview techniques to examine the impact of students' information skills training. The findings indicated that students' confidence in using library resources had indeed increased and their tutors reported that they began to use new resources in their learning. Results of the training shown that there were mark improvements for students' evaluation and they better understood in accessing and retrieving quality electronic resources [12].

A more longitudinal study performed at Glendale College, California to measure the impact of information competency programs embedded into nursing curricula that stressed on the students' retention and grades. The research concluded that such training had to be integrated into curricula to boost the students' enthusiasm and learning interest [13].

III. CONCEPTUAL FRAMEWORK

A conceptual framework was a model on how one theorized or made logical sense of the relationship among the several factors relevant to the problems being studied. The variance in the dependent variable was academic performance which could be explained by the three independent variables namely Searching Skill, Evaluating Skill and Referencing Skill from the components of information literacy as typically taught by Malaysian academic libraries in their respective literacy courses. The framework of this study was drawn in Fig. 1:
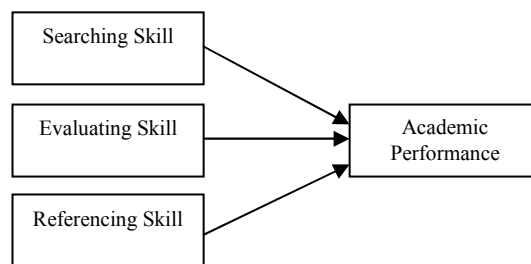

Figure 1. Conceptual Framework

IV. METHOLODOGY

This research has adopted the quantitative method where self-administered questionnaires would be delivered to the respondents to answer. Target population was a Malaysian public university in the state of Kelantan namely UiTM Kelantan. Targeted respondents were the full time final year undergraduate students who studied in the four major fields of studies such as accounting, marketing, finance and statistic at both Machang and Kota Bharu campus branches. Final year students were selected because of their extensive experiences and have already mastered the fundamental skills of information literacy in searching, retrieving, using, evaluating and referencing the information sources relevant to their course assessments.

V. RESULTS AND FINDINGS

The questionnaire had a total of 50 items which was divided into 2 parts. The first part consists of 1 section and the second part consists of 4 sections in which were Searching Skill, Evaluating Skill, Referencing Skill and Academic Performance. The questionnaires were administered to 627 final year undergraduates' in their respective classrooms for minimizing the mortality rate. On the whole, 549 returned questionnaires were used for data analysis. The sequences of data analysis were performed using the Statistical Package for Social Science [SPSS] software as follows:
1. Descriptive analysis.
2. Recode data into categories.
3. Multivariate analysis: Regression analysis technique to test the effect of one variable of an outcome while controlling for another.

Descriptive statistics were used to describe the main features of a collection of data quantitatively. From the analysis, the total numbers of male and female respondents were 153 and 396 respectively which indicated that 72.1% of them were female. The average age among the respondents was between 21 to 23 years old about 80.9%. Then, the mean for current Cumulative Grade Point Average [CGPA] among them was 3.6102. It was found that many of the respondents have obtained between 2.50 to 3.50 of CGPA. For the program enrolments, majority of the respondents were from the accounting and business faculties while the computer science faculty has contributed the lowest numbers of respondents.

Reliability test was conducted to see whether the questions were related to each other or not. In the Section A [Searching Skill], question 2 was removed due to the increasing of Cronbach's Alpha to 0.828 if the item was included. The means shown in close range indicated that few questions could be grouped into one variable. For Section B [Evaluating Skill], all the questions were accepted because of the Cronbach's Alpha was at 0.867 and the means were in close range. Section C [Referencing Skill] has Cronbach Alpha at 0.882. However, question 16 from the Section C [Reference Skill] was removed to increase the Cronbach

Alpha to 0.898. For the section D [Academic Performance], Cronbach's Alpha was at 0.942 and the means were in close range. Hence, the groups of questions in the section have been grouped together as a variable. After removing the non-related questions, the remaining data would be computed according to their categories to provide meaningful variables. One way ANOVA was used to determine the level of academic performance with current CGPA of undergraduates. The analysis has shown a significant difference among the groups [$p < 0.001$]. Students with CGPA 3.50 and above shown the greatest academic performance [M = 7.9186, SD = 1.52018]. The same analysis also was adopted to determine the level of academic performance with program enrolments. The analysis indicated not significant differences among the groups [$p > 0.109$] and the greatest mean fall was [M = 8.0667, SD = 1.16292]. Multiple regression was applied in the multivariate analysis to predict the values on a quantitative outcome variable [Academic Performance] using several other predictor variables such as Searching Skill, Evaluating Skill and Referencing Skill.

TABLE I.   RESULTS OF REGRESSION ANALYSIS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.624[a]	.389	.386	6.51627

As illustrated in Table I, multiple correlation coefficients has indicated the value of 0.624 which meant the relationship between dependent variable and independent variables were positive. R square was at 0.389 and adjusted R square was 0.386 which were low. Adjusted R square was taken into a consideration the number of observations and the numbers of predictor variables to make sure that those things were not too inflated. If adjusted R square was at 0.386, therefore all independent variables could explain the dependent variable for only 38.6%. The remaining 61.4% which might clarify the dependent variable might come from other variables that were not included in the study. The model also was found significant at 5% [$p < 0.001$] from ANOVA test results [see Table II].

TABLE II.   RESULTS OF ONE-WAY ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14763.659	3	4921.220	115.898	.000[a]
	Residual	23141.634	545	42.462		
	Total	37905.293	548			

In the coefficients model as demonstrated in Table III, constant [4.115] determined the value of academic performance when all independent variables equal to zero. For Section A, the Beta was 0.118 means 1% increase in searching skill would increase academic performance by 11.8%. Section B shown that the variable was not significant [p > 0.237]. Then, for Section C, the Beta was at 0.187 means 1% increase in referencing skill would improve academic performance by 18.7%.

TABLE III.   RESULTS OF REGRESSION COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 [Constant]	4.115	1.794		2.293	.022
Sect A compute	.118	.024	.219	4.932	.000
Sect B compute	.044	.037	.064	1.185	.237
Sect C compute	.187	.024	.412	7.694	.000

VI.   CONCLUSIONS & RECOMMENDATIONS

The null hypothesis raised to guide the study was supported. Based on this, it was found that there was no significant effect of information literacy on the academic performance among undergraduates. Specifically, the null hypothesis could not be rejected due to the adjusted R square for the model was too low. To improve the R square, the study should consider more independent variable that need to be included and examined. In other words, the model could not be used due to unreliable. The findings therefore were inconsistent with previous findings acquired by the earlier researchers who mostly found that students' academic grades could be improved with increasing levels of information literacy due to certain variables which have not been studied in this research such as study skills, research skills and academic writing that might be attained by the undergraduates from formal classrooms, motivational courses and other forms of training programs. It is expected that the future study will be focused on this. On the other hand, primary data can be collected among first and second year's students through interviews which will disclose more in-depth information and explanations instead of using questionnaires. With regards to the findings of this study, few recommendations suggested in the efforts to achieve a high quality of academic achievements among undergraduates through incorporating information literacy included these skills have to be integrated into the university curriculum and taught in every program. Lecturers should know on how to guide their students in doing their assignment tasks and continuously monitor their progresses. They also have to allocate one session during the classroom lectures to teach and communicate the concepts of information literacy. Besides that, online tutorials of information literacy can be conducted with the usage of Learning Management System instead of face-to-face workshops. Librarians must be able to coordinate the selection and evaluation of the best information sources for the university programs with the assistance of faculties and academic staffs. To ensure the successful of any information literacy programs, university management should provide more opportunities for faculties, librarians and other information professionals to collaborate between each other in organizing any form of information literacy programs as well as lead in planning and budgeting for those programs.

ACKNOWLEDGMENTS

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