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Predictors of Web Search Effectiveness from the Perspective of Library and Information Science Students

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Abstract

Rationale of Study – This study is an empirical analysis of the determinants of library and information science students' Web search effectiveness at the University of Ilorin, Nigeria. Three hypotheses on the correlation between the determinants were tested to reveal their relationships.

Methodology – A total enumerative method was used where all the 146 third and fourth undergraduate students of the Department of Library and Information Science participated in the study. Through a survey approach, a questionnaire was used to collect data. Collected data was analysed using percentages, correlation and multiple regression analysis methods.

Findings – The results of the study demonstrate that factors such as Internet and computer self-efficacy, information literacy skills, use of Boolean operators, and use of appropriate search terms significantly correlate with and determine Web search effectiveness among Library and Information Science students at the University of Ilorin, Nigeria.

Implications – The findings in this study imply that without user being Internet and computer self-efficacious, possessing information literacy skills, using Boolean operators and appropriate search terms, effective Web search may be a daunting task and not achievable.

Originality – This research is an original idea from the authors which has not been published anywhere by any scholarly communication outlet.

Keywords

Information retrieval, Web search, Searching skills, Search terms, Boolean operators

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1 Introduction

As more information is uploaded on various websites, the searching of such websites to satisfy academic information needs by undergraduate students generally, and library and information science undergraduates particularly, is on the increase. The emergence of the Internet has created millions of end users who search for information themselves as postulated by Xie (2010). Web search or information searching can be defined as users' purposive behaviour in finding relevant and useful information in their interactions with the information retrieval systems (Knight, & Spink, 2008). Searching and accessing relevant and comprehensive information is difficult because of the complexity in searching literature from various information sources, especially on digital platforms.

Web searching is now a common phenomenon among undergraduate students. Most of these students now depend largely on Web information resources to tackle given assignments and research. The Web has grown into a vital channel of communication and an important vehicle for information dissemination and retrieval. This is exerting pressure over the evolution and development of information-seeking behaviour (Martzoukou, 2005; Tella & Oyegunle, 2016; Kwanya, 2016). The enormous amount of digital information accessible today poses a great challenge to information retrieval systems in effectively meeting the information needs of the users. Within this dynamic and vastly diverse searching environment, traditional search systems are not able to provide mechanisms for rich information retrieval to users as compared to searching through the Web (Martzoukou, 2005). Web search engines such as Google and Yahoo are now the facilities that people use to find information. Some studies that investigated such issues (Gichora & Kwanya, 2015; Lewandoski, 2015; Alhenshiri, & Duffy, 2010; Ford, Miller, & Moss; 2005; Ford, Miller & Moss, 2002) have recommended that Web search trends are important for both users and Web search engines alike (Florida Community College, 2018). Users' Web search context can be examined at many levels, including the information environment/social level, organisational level, information seeking level, human-computer interaction level and query level (Spink & Jensen, 2004). To understand Web search effectiveness better, there is need to understand the factors that promote or otherwise influence search effectiveness.

The Web has enabled users to electronically publish information and make it accessible with ease to millions of people. However, as the quantity of this information grows the ability of those people finding relevant materials decreases dramatically (Awuor et al.,

2019). A number of researchers (Russell-Rose, 2011; Tella, 2011a; Tella & Oyedokun, 2014; Tella, et al., 2017; Khan & Muaz, 2018) have shown a growing interest in the information-search activities of undergraduate students. These scholars emphasise that people want information at the point they need them but do not bother about the necessary skills they need to develop to access the needed information (Kwanya et al., 2013). Students, when confronted with a decision-making situation (such as seeking for information to satisfy a need), they must decide when and where to search for information, when to rely on their own expertise or intuition, and when to rely on the advice of others. Time and resource constraints also undoubtedly influence their information-searching activities as well as the importance they place on different issues.

Web search activity and online information retrieval and information search studies through surveys, observations and experiments have been carried out (Moon, 2004; Kim, 2008, Lopes, 2016; Khan, 2018). In a comprehensive review of these studies, Malik and Mahmood (2009) and Khan (2018) concluded that research on web search activities and behaviour is still in the formative stage. However, they stated that it is not clear whether the factors influencing the search process, effectiveness or outcomes are understood well enough to be effectively studied in a cause-effect study. Studies have also examined web search activities and behaviour most of which generally focus on managers and students. However, limited studies have focused on web search behaviour among undergraduate students from a specific discipline such as Library and Information Science knowing full well that their training is all about assisting users in retrieving information from the information systems such as the web, the library, electronic databases or social media platforms and how they themselves go about web searching (Omekwu et al., 2013; Saunders et al., 2015). As such, it is important to organise various factors identified in the literature by researchers to see how they determine web search effectiveness. This will provide a framework for integrating the results of previous studies and for guiding future researchers in their choice of research problems and variables so that their studies might form a cumulative body of knowledge.

In view of the foregoing, the current study empirically analyses the determinants of web search effectiveness among the LIS undergraduate students at the University of Ilorin, Nigeria. The specific objectives were to establish the correlation among the factors identified as determinants of Web search effectiveness; determine the correlation among Internet self-efficacy, computer self-efficacy; information literacy skills; use of Boolean operators, and use of appropriate search terms with Web search effectiveness; and

determine the contributions of Internet self-efficacy, computer self-efficacy; information literacy skills; use of Boolean operators, use of appropriate search terms and knowledge of institutional repositories to Web search effectiveness. To achieve these objectives, the following hypotheses were formulated and tested at 0.05 level of significance.

There is no significant correlation among the factors identified as determinants of Web search effectiveness.

Internet self-efficacy, computer self-efficacy; information literacy skills; use of Boolean operators, use of appropriate search terms and knowledge of IR will not significantly determine Web search effectiveness.

Internet self-efficacy, computer self-efficacy; information literacy skills; use of Boolean operators, use of appropriate search terms and knowledge of IR will not significantly contribute Web search effectiveness.

2 Literature Review

Web searching activity is the act of searching for and finding information from the Web. It is synonymous with browsing, sourcing, searching, navigating, seeking. This study uses Web search and browsing synonymously. According to Bates (2007), Web search, or browsing, is the activity of engaging in a series of glimpses, each of which may or may not lead to a closer examination of a physical or represented object, which may or may not lead to a physical and/or conceptual acquisition of the object. Browsing provides an alternative strategy for locating information of the first kind and may provide one of the crucial ways for information of the second kind to be encountered. It is observed that much has been written on information search activities in Library and Information Science literature (Bronstein, 2010; Omekwu et al., 2013; Bronstein, 2014; Saunders et al., 2015). It is on that note that Naughton (2016) argued that it is difficult to specify browsing based on three reasons. Firstly, the conditions under which browsing is used vary widely. Secondly, it seems to be rather unpredictable in its very nature. Thirdly, it seems to be employed in both more and less directed, intentional ways. When comparing searching and browsing, Rice et al. (2001:177) indicated that the source in which browsing appears have been most comprehensively reviewed and discussed. Common definitions identified by Rice and others are in three categories are1) directed browsing, 2) semi-directed or predictive browsing, and 3) undirected browsing. Directed browsing is when a user has a specific target in mind. It is fast and systematic, making use of quick scanning and selective focus in the process.

Users browsing with directed focus are likely to ignore most content only focusing on content relevant to their target. Semi-directed or predictive browsing occurs when browsing is predictive or generally purposeful; the target is less definite and browsing is less systematic. An example is entering a single, general term into a database and casually examining the retrieved records; while undirected browsing is the type of browsing with little goal or focus. It occurs when there is no real goal and very little focus. Examples include flipping through a magazine and channel-surfing (Choo, Deltor, & Turnbull, 2000).

There are many reasons or factors that make both access to and utilisation of the Web more desirable and necessary. Its ubiquitous nature has deemed access to and familiarity with the Internet an assumption of the modern age; not using the net may even be socially undesirable, as suggested by Wolfinbarger, Gilly and Schau (2005). Obviously, the human computer interface is becoming increasingly intuitive as inexperienced users are still having formidable problems coping with its use. The Internet has the potential to impact many facets of daily human lives, but for many people, the ability to exert that power is limited by an inability to control that potential. Self-efficacy for technology use may be an important factor resulting in Web search effectiveness. In other words, there are other factors identified in literature that can determine Web search effectiveness. These include information literacy skills, Internet self-efficacy, computer self-efficacy, emotional intelligence, participation in online discussion forum, knowledge of Boolean operators, and use of appropriate keywords. These are considered numerous to focus (Tella et al., 2007; Ross et al., 2016; van Laar et al., 2020). In the light of this, five of these factors have been the focus in this study leaving the remaining ones for the future researchers. The ones focused on are Internet self-efficacy, computer self-efficacy, information literacy skills, use of Boolean operators and use of appropriate search terms. These five were selected for this study because limited research has considered each or a combination of them to determine Web search effectiveness or information retrieval effectiveness.

According to Cassidy and Eachus (1999), self-efficacy is an important factor in understanding the frequency and success with which individuals use computers. This can also apply to using and searching the web. Compeau, Higgins, and Huff (1999) tested the influence of computer self-efficacy beliefs, outcome expectations, affect, and anxiety on computer use, and found that computer self-efficacy beliefs had a significantly positive influence on computer use. In relation to this, the study expected that, Internet and

computer self-efficacy should enhance or influence Web search effectiveness. Relevant to the examination of self-efficacy and computer self-efficacy in relation to Web search effectiveness, Tella, Anyim, Memudu and Olaniyi (2017) examined predictors of information retrieval effectiveness among Library and Information Science (LIS) undergraduate students in universities in Kwara State, Nigeria. The results demonstrated that an inter-correlation exists among the independent variables and information retrieval effectiveness. Additionally, factors such as emotional intelligence, Internet self-efficacy and use of Boolean search operators significantly correlate with and predict information retrieval effectiveness. The findings also revealed that computer self-efficacy has the highest predictive value compared to other variables while emotional intelligence has the least predictive value of information retrieval effectiveness. Based on the findings, the study recommended that LIS students should be more computer self-efficacious so that they can be more effective in their information retrieval activities. It was also suggested that students should engage themselves in self-efficacy and computer training. The experience is assumed will go a long way assisting the students thereby enhancing and facilitating their information retrieval activities.

Information literacy has been considered to be a set of abilities requiring individuals to recognise when information is needed and to have the ability to locate, evaluate, and use effectively the needed information (ACRL, 2000; Olaniyi, 2018). The term information literacy encompasses a wide range of competencies acquired through a multiplicity of methods of library instruction focused on educating its users. They are variably known as information fluency, user education, library instruction, bibliographic instruction, information competencies, information skills, development of information skills (Tella, 2014). On this note, Chinyere (2014) found that user education equipped library users with the skills that enabled them to be independent in searching literature and helped them to retrieve needed information. It is noted that information literacy is another name for user education. Therefore, it is expected in this study that information literacy skills possessed by library and information science undergraduate students will determine their Web Search Effectiveness.

Boolean operators are a logical method of connecting search terms with AND, OR, and NOT (known as "Boolean Operators") to narrow, expand, or exclude information in a search. Boolean searches allow users to combine words and phrases using the words AND, OR, NOT to limit, widen, or define your search (Collins, 2018). The use of Boolean operators is typically about 10% in Web searching studies (Jansen & Eastman,

2003; Jansen & Pooch, 2001). It is generally assumed that the proper use of query operators would increase the effectiveness of Web searches. Similarly, retrieval effectiveness was associated positively with best-match searching and use of Boolean operators in Web queries (Ford, Miller, & Moss, 2002; Upstate Library, 2018). Since more than two decades ago that Ford et al. (2002) and others examined the use of Boolean operators and how they enable search effectiveness, more developments have taken place that call for researchers to revisit the matter. Furthermore, it is also observed that findings on the use of Boolean operators to determine Web search effectiveness are mixed.

The key to engage in an effective Web search is to use appropriate search terms and techniques that can be applied to most Web searches (Victor Valey College, 2018). On that note, Russell-Rose and Chamberlain (2017) investigated the search behaviour of healthcare information professionals, uncovering their needs, goals, and requirements for information retrieval systems. A survey questionnaire was distributed to healthcare information professionals via professional association email discussion lists. It investigated the search tasks they undertake, their techniques for search strategy formulation, their approaches to evaluating search results, and their preferred functionality for searching library-style databases. Similarly, Lewandoski (2015) compared five major Web search engines (Google, Yahoo, MSN, Ask.com, and Seekport) for their retrieval effectiveness, considering not only the results but also the results descriptions. The findings demonstrated that information retrieval effectiveness is mostly experienced with the Google search engine followed by Yahoo, and Ask.com. The findings also revealed that when real-life queries were used, the two major search engines, Google and Yahoo performed best compared to other search engines, and that there is no significant difference in their performance. Google delivers significantly more relevant result descriptions than any other search engine. This could be one reason for users perceiving this engine as superior.

It is evident from the review of literature, particularly from the explorative aspects, that the five variables (Boolean operators, information literacy skills, and use of appropriate search terms*)* focused in this study have not been widely researched. In addition, research on Web search effectiveness that focused precisely on undergraduate students of a discipline has not been considered. Similarly, literature has revealed limited research regarding identification of factors contributing to or determining Web search effectiveness particularly in the African context generally and Nigerian Library and

Information Science research context specifically. It is in the light of this that this study examines Web search effectiveness among Library and Information Science undergraduate students at the University of Ilorin, Nigeria.

3 Methodology

This study adopts a quantitative methodology using a survey design. The survey design was chosen because it enables the researcher to cover a substantial percentage of students to enable a generalisation of the findings to the entire students' population (Babbie, 2014). Moreover, the survey design was chosen because it enables generalisation and external validity of the findings of the study (Malik & Mahmood, 2011; Tella, 2013; Tella et al., 2017).

The population of the study comprised of third and fourth year students in the Department of Library and Information Science in the Faculty of Communication and Information Sciences, at the University of Ilorin, Nigeria. These two classes were chosen because they have registered for, and were offered a course on information retrieval while in their third year of study. Hence, they were considered as a good fit to provide the data needed for this study. Students at postgraduate levels were not included in the study because a course on online information searching is not included in their curriculum. A total enumerative sample technique was used. Thus, the entire population of students in both classes participated in the study. Third year students were 75 while fourth year students were 71. This gave a total of 146 students as the population used in the study.

A questionnaire designed by the researcher was used for data collection. The use of questionnaire for data collection was in line with the quantitative method used in this study. The design of the questionnaire was informed by the objectives and research questions of the study. Items in the questionnaire were adapted from the related literature (Zhang, Anghelescu, &Yuan, 2005; Malik & Mahmood, 2009). The questionnaire was divided into two sections A and B. Section A collected data on the respondents' demographic information including gender, year of study, and age. The section B was sub-divided into parts based on the objectives and research questions. The parts were as follows: Part 1: Internet Self-Efficacy, Part 2: Computer Self-Efficacy; Part 3: Information Literacy Skills; Part 4: Use of Boolean Operators, Part 5: Use of Appropriate Search Terms and Knowledge of IR, and Part 6: Web Search effectiveness.

The response format followed a five-point Likert type ranges from Strongly Agree to Strongly Disagree.

The instrument was given to two experts (a lecturer and a librarian) with expertise in online information retrieval and Internet/web search research. The suggestions and comments by the experts assisted in the moderation and modification of the items in the questionnaire. To ensure the reliability of the questionnaire, it was administered on 20 students who registered in online search class in an LIS department of another university in Nigeria. A test-re-test reliability method of two weeks' interval was employed, and the responses collected were subjected to Cronbach alpha test. The overall reliability of the questionnaire returned an r = 0.93 which exceeded the minimum standard of 0.80 suggested for basic research (Creswell, 2014).

The researchers administered the questionnaire to the respondents. The respondents were given a voluntary opportunity to participate in the study while at the same time educated on the benefits of the research to them. Their informed consent was also sought before the administration of the instrument. The questionnaire was administered in two batches with each level of study (year of study) constituting a batch. The exercise took three days. The entire 146 copies of questionnaires administered were returned filled representing 100% return rate. These were used for data analysis on the study.

4 Data Analysis and Results

Descriptive statistics including percentages and frequency count together with inferential statistics were used for the analysis of data. These methods were adequate because descriptive statistics was used to analyse the demographic data while inferential statistics (multiple regression) was used to analyse data on the hypotheses. The results obtained are presented hereunder.

Table 1: Demographic Information (N = 146)

Demographics	**Frequency**	**Percentage %**
Gender		
Male	61	41.8
Female	85	58.2
Total	**146**	**100**
Level/Year of Study		
300 Level (Year Three)	75	53.19

400 Level (Year Four)	71	48.63
Total	**146**	**100.0**
Age		
21– 25 years	105	71.92
26 - 30 years	37	25.34
31years +	4	2.74
Total	**146**	**100**

The demographic information of respondents who took part in the study is summarised in Table 1. The findings reveal that more male than female students took part in the study. In addition, the study revealed that the majority of the respondents fall between the ages of 21-25 years while the least respondents are those who are 31 years of age and above.

Table 2: Inter-Correlation Matrix among the Variables (N = 146)

Determinants of Web Search Effectiveness	Internet Self-Efficacy	Computer Self-Efficacy	Information Literacy Skills	Use of Boolean Operators	Use of Appropriate Search Terms	Web Search Effectiveness
Internet Self-Efficacy	1000					
Computer Self-Efficacy	0.115*	1000				
Information Literacy Skills	0.076	0.211*	1000			
Use of Boolean Operators	0.062	0.023	0.121*	1000		
Use of Appropriate Search Terms	0.008	0.0199	0.176*	0.234*	1000	
Web Search Effectiveness	0.871*	0.889*	0.761*	0.702*	0.421*	1.000

**** Correlation is significant at the 0.05 level (2-tailed).**

The inter-correlation between the independent variables (Web search effectiveness) and the independent variables (Internet self-efficacy, computer self-efficacy, information literacy skills, use of Boolean operators, use of appropriate search terms and Web search effectiveness) showed that a significant inter-correlation exists among the variables. The results in Table 2 show that all the Web search effectiveness variables identified in this study were significantly correlated with Web search effectiveness. To establish the joint prediction of the factor and contribution of each to the prediction of Web search effectiveness, a multiple regression analysis was conducted. The result is presented as follows in Table 3.

Table 3: Model Summary

Multiple R					**.434**
R Square					**.611**
Adjusted R Square					**.531**
Std. Error of the Estimate					**.73549**
Log-likelihood Function Value					**-362.211**
ANOVA					
	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Regression	**213316. 327**	**4**	**53,329**	**17.47**	**.185**
Residual	**431892. 351**	**141**	**3,053.1**		
Total	**645,208.678**	**145**			

Table 3 suggests that the R square = 0.61, R value adjusted =0.53, and the overall correlation of all the Web search effectiveness determinants yielded an R = 0.43, while the standard error of the estimate yielded 531. In the second step, the analysis of variance performed on multiple regressions yielded an F-ratio value of 17.47. This was found to be significant at 0.05 levels. These results suggest that all the four web search effectiveness factors together made 61% of Web search effectiveness. This suggests that all the five factors jointly determine web search effectiveness.

Table 4: Coefficients of the Contribution of each factor

	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	B	**Std. Error**	**Beta**	**Std. Error**		
(Constant)	16.777	3.452			7.542	.000
ISE	.072	.205	.653	.087	3.789	.334
CSE	.456	.222	.412	.085	.411	.012
ILS	.421	.114	.532	.078	1.286	.999
UBO	.356	.176	.427	.066	1.112	.005
UAST	.562		.416	.045	2.257	.651

Key: ISE – Internet Self-efficacy

CSE – Computer Self- efficacy

ILS – Information Literacy Skills

UBO – Use of Boolean Operators

UAST- Use of Appropriate Search Terms

Table 4 demonstrates that each of the five independent variables had significant effect on Web search effectiveness. In terms of the magnitude, Internet self-efficacy made the most significant contribution with (Beta, .653, t = 3.789), followed by information literacy skills with (Beta = 0. 532, t = .1.286). The next contributing value was exerted by use of Boolean operators with (Beta = 0.427, t =1.112; followed by use of appropriate search terms with (Beta = 0. 416, t = .2.257) while computer self-efficacy made the least contribution with (Beta = 0.412; t = 0.411). This suggests that all the factors are good determinants of Web search effectiveness.

The results in Table 5 suggest that all the constructs significantly correlate with users' Web search effectiveness. This answered research questions 1. The results also revealed the mean and standard deviations for each of the independent variables.

5 Discussion of Findings

This study examined the determinants of library and information science students' web search effectiveness at the University of Ilorin, Nigeria. The findings of the study have

revealed that internet self-efficacy, computer self-efficacy, information literacy skills, use of Boolean operators, and use of appropriate search terms significantly correlate with Web search effectiveness. Similarly, the results suggest that all the five factors jointly determine web search effectiveness. In order of magnitude of the prediction, internet self-efficacy exerted the most significant determinant/prediction of web search effectiveness followed by information literacy skills, use of Boolean operators, and use of appropriate search terms while computer self-efficacy was the least determinant of Web search effectiveness.

Table 5: Relationship among variable Paired Samples Statistics (N =146)

Paired Variables	Mean	N	Std. Deviation	Correlation
Internet Self-efficacy and Web Search Effectiveness	20.34	146	10.22	0.789**
Computer Self-efficacy and Web search effectiveness	18.44	146	9.33	0.411**
Information Literacy Skills and Web search effectiveness	18.34	146	8.43	0.286**
Use of Boolean Operators and Web search effectiveness	18.11	146	8.12	0.112**
Use of Appropriate Search Terms and Web search effectiveness	18.02	146	8.01	0.257**

Significant Correlation**

The results that Internet self-efficacy, information literacy skills, use of Boolean operators and appropriate search terms together with computer self-efficacy determine Web search effectiveness. Tella et al. (2017) corroborate this finding pointing out that an interaction effect exists between Internet self-efficacy, and use of Boolean search operators and that the factors significantly correlate with and predict information retrieval effectiveness. The determinant capability of factors like Internet self-efficacy to Web search effectiveness should not be co-incidence. This is because Internet self-efficacious will go a long way to assist ones' search activities on the net and undoubtedly that will result to search effectiveness. The result could also be based on the knowledge of the courses such as online information gathering and online information retrieval which the respondents in this study have taken as part of their Bachelor's degree

curriculum. It is possible that the knowledge and experience in those courses come to play in this study and the consequence is the effectiveness in the search activities of the respondents.

The rationale behind information literacy taught at the undergraduate and graduate level is for them to be able to know when information is needed, how to search for such information, and how to use and apply such information to make certain decisions and solve information need problems. It is not surprising, therefore, that this factor relates with and determines Web search effectiveness in this study. Adequate information literacy skills will no doubt result in the development of good information search skills and the eventuality is effectiveness in search activity on the Web. Therefore, searching would not be a difficult task to perform.

The correlation of the use of Boolean operators and its contribution to Web search effectiveness is also not a co-incidence. Using Boolean operators in search activity enable the searcher to get relevant and useful information that satisfies his/her needs. In the light of this, it is generally assumed that the proper use of query operators would increase the effectiveness of Web searches. This provides credence to the findings of this study. Similarly, the finding that retrieval effectiveness was associated positively with best-match searching and use of Boolean operators in Web queries (Ford, Miller & Moss, 2002) and Upstate Library (2018) corroborate the present finding in this study. Additionally, this study reveals that the use of appropriate search terms positively correlates with and determines web search effectiveness. This is in consonance with the position by Victor Valey College (2018) which indicated that the key to engaging in an effective Web search is to use appropriate search terms and techniques that can be applied to most Web searches. Marchonni, Dwiggins, Katz, and Lin (1993) earlier claimed that the use of appropriate search terms enables quick retrieval of relevant information without having to shift through thousands of unrelated links. The agreement between the findings of the current study and the previous studies implies that the current study has joined other studies to emphasise that those five factors (Boolean operators, information literacy skills, and use of appropriate search terms) focused in this study are important to determine Web search effectiveness. This finding is unique in the sense that it has revealed the connections between Computer and Internet Self-efficacy, Boolean operators, and use of appropriate search terms to determine Web search effectiveness.

6 Conclusion

This study has demonstrated that not much has been done on determining Web search effectiveness considering factors like internet and computer self-efficacy, information literacy skills, use of Boolean operators and appropriate search terms. This is considered one of the contributions of this study to knowledge. The study has established the factors such as Internet and computer self-efficacy, information literacy skills, use of Boolean operators and appropriate search terms as the determinants of Web search effectiveness as well show that there is correlation among Internet and computer self-efficacy, information literacy skills, use of Boolean operators and appropriate search terms with Web search effectiveness. The study has also shown that Internet self-efficacy, computer self-efficacy; information literacy skills; use of Boolean operators, use of appropriate search terms significantly contribute to Web search effectiveness.

7 Recommendations and Future Research Directions

This study recommends that LIS students need to be more Internet and computer self-efficacious so that their Web search activities can yield better results. They can engage themselves in self- efficacy, computer self-efficacy training on the Web, or enrol for information literacy in their university library to further improve their skills of searching information on the Web. Moreover, enrolling for more training on the use of Boolean operators and use of appropriate search at the university library will also go a long way to assist the students. The experience is assumed to enhance and facilitate their search activities. There is no doubt of the fact that, in real life, computer and the Internet will constitute the only avenue through which we can gather and use information.

Future research is needed to examine the relationship between individual characteristics and other variables such as domain knowledge of subject that might have an important effect on Web search effectiveness. This is because there is preference in information search by individuals based on information needs which is usually varied and dictated by needs and wants. Future researchers should endeavour to develop specific measure that can successfully be used to determine Web search effectiveness. This is because such measure will guide against difficulty that is usually experienced by users when searching information on the Web, and it will also save the users' time when searching for information.

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