



Influence of Web Search Training on Web Search Behaviour of Undergraduate Students of Yusuf Maitama Sule University, Kano, Nigeria

¹**Babalola, Yemisi, T. (PhD)**

babalolay@babcock.ng.com, 08067812458

²**Salisu Dahiru**

salisudahiru4@gmail.com, 08067041558

¹ & ²Department of Information Resources Management, School of Management Sciences, Babcock University, Ilisan-Remo, Ogun State

Abstract

Web has been an indispensable source of information, upon which large number of university students depends for accomplishing their academic tasks. The study examined the influence of web search training programme on web search behaviour of undergraduates of Yusuf Maitama Sule University, Kano. The study found answers to two research questions and one hypothesis. Single group quasi-experimental (of pretest post-test) design was adopted. The population of the study comprised 11, 023 undergraduates of YUMSUK. Convenient sampling technique was used to recruit 53 students who participated in a six-weeks long training programme and lab sessions. One set of self structured and validated questionnaire was used for data collection at both pretest and posttest levels. The study revealed that web search behaviour of the participants was relatively poor prior to the training ($M=2.24$); the study also revealed that web search behaviour of the participants was good after the training ($M=2.82$); the study further revealed that web search training had significantly influenced the web search behaviour of the participants ($t(52) = 17.680$; $p < 0.001$, $\eta^2 = 0.857$). The study concluded that formal web search training is a key in molding web search behaviour and effective web search. The Study recommended that the National University Commission (NUC) should increase credit unit for use of library course to accommodate the practical web search sessions.

Keywords: Web search training; Web search behaviour; undergraduate students

1.1 Introduction

Web has been an indispensable source of information in 21st century, upon which large number of university students depends for accomplishment of their academic tasks. The study conducted by Oberiri and Timothy (2018) reported that university students in Nigeria like their international counterparts used internet resources (particularly surface web) as their main source of academic information. This preference of web over other sources of information is attributed to global trend in ICTs, flexibility of accessing devices, remote accessibility and availability of vast amount of information in form of text and graphics.

During their information search over the web, university students demonstrate exceptional information behaviour known as web search behaviour. Tella, Anyim, Memudu and Olaniyi (2017) described web search behaviour as preferred approach to information seeking on the web, which encompasses the method of query formulation, favourite search engine and frequency of web use. In essence, web search behaviour is the totality of behaviour exhibit by web users during their search processes. These include search engine use behaviour, search



strategies adopted, query formulation behaviour, use of advanced features of search engines and web navigation style.

Students' web search behaviour is influenced by web searching skills acquired through formal web search training programme. Kinley, Tjondronegoro, Patridge and Sylvia (2014) noted that users' searching skills (acquired through formal training) affect their web search behaviour. Web search training in this sense refers to an aspect of information literacy skills acquisition programme designed to educate web users on how to use different search tools and techniques with the view to exploring the variety of information resources on the web and to evaluate the retrieved information for reliability, relevancy and accuracy. The training is aimed at developing searching skills- the ability to formulate appropriate search terms, use different search engine, use advanced search features of the search engines and web navigation skills. Luca and Topi (2020) stressed that training web users on different searching skills is as important as capacity of the search engines

1.2 Statement of the Problem

Academic assignment and research projects are integral parts of university curriculum. Incidentally, surface web has been the predominant information source use by university students in this digital era. This could be as the result of its usability, easy accessibility, mobility of the accessing devices and availability of vast amount of information resources in different formats. Despite this, the study conducted by Tomowo-Ayodele and Arilesore (2020) revealed that over 50 percent of undergraduate students in some Nigerian universities exhibited poor web search strategies (web search behaviour) leading to retrieval of irrelevant search results, mass failure in academic assignments and consequently affect their general academic performance. Perhaps, the poor web search behaviour exhibited by university students is due to lack of formal web search training. It is on this premise that the study investigates the "Influence of web search training on web search behaviour of Yusuf Maitama Sule University, Kano, Nigeria".

1.3 Research Questions

The study found answers to the following questions:

1. What is the web search behaviour of participating students at pre-training intervention period?
2. What is the participants' web search behaviour at post- training intervention period?

1.4 Research Hypothesis

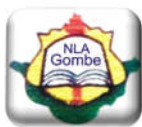
The study tested the below null hypothesis at 0.05 level of significance

H₀ Web search training has no significant influence on web search behaviour of the participants

2.0 Literature Review

Literarily, the term behaviour refers to a particular way a person or group of people perform their activities. Li (2008) defined web search behaviour as preferred approach to information seeking on the web, which comprises a user-search engine interaction. It is the activities carried out by a web user in manipulating the search term, with the view to retrieving more relevant result (Yamin & Ramayah, 2011).

The findings of the survey conducted among postgraduate students in Tanzania titled "Web search behaviour of postgraduate students at Sokoine University of Agriculture, Tanzania" by Sa'id (2013) revealed that majority of the respondents (74.6%) used simple search strategies only while few of them were adopt search strategies such as phrase searching (26.8%), Boolean



searching (20.8%), arithmetic signs/query modifiers (22.9%) and truncation (15.0%). This implies that large number of the study population are aware of the advanced search strategies based on query formulation, nevertheless, few use them in their queries.

The survey conducted on “Analysis of students’ online information search strategies, exposure to Internet pollution and cognitive absorption level based on various variables” among higher education students in Malaysia by Salehi, Du, and Ashman (2018) found that over 80% of higher education students used Google only as their preferred search engine. The survey conducted academics in South Africa by Cilvilcharram, Hudghes and Maharaj (2015) titled “Uncovering web search tactics of South African Higher education students” reported that 42.5% of South African students and academic staff (respondents) used multiple keywords (two to above) to query the search engines, while 34.9% of them use single keyword to query the search engines. In Nigerian context, the survey conducted among university academics by Dahiru, Ahmadu and Aliyu (2019) titled “Web searching skills of academic staff of universities in Kano” revealed that 48% of the respondents used Boolean operators to narrow or broaden the scope of their searches; 42% of them use keywords only (without Boolean logic) to search the web; and only 30% of the respondent used library of Congress Subject Heading and truncation respectively.

Previous studies established the close relationship between web search training/ skills and web search behaviour of students. Early study conducted by Aula (2019) reported that web search skills acquired through formal training has significant influence on the students’ web search behaviour. The survey research conducted among undergraduates of Nigerian University Nsukka by Nneka, Obiara and Agbo (2014) on “Internet search strategies employed by library and information science students” reported that web search training programme improved students’ conceptual knowledge and web search competency, but, did not change their search behaviour. Contrary to this finding, the survey research conducted by Naci, Dulkadir and Kabakci (2017) at University of Erbakan, Turkey on “Information Literacy and digital nativity as determinants of online information search strategies” reported that the students’ level of information literacy skills (including web searching skills) correlates with their search competencies and search strategies they adopted.

3.0 Methodology

The study adopted single group quasi-experimental design. The target population of the study came from all the six faculties and sixteen (16) departments of the university under study. These were summed up to 11, 023 undergraduate students. The participants were recruited by placing flyer around the university, making announcement during general courses classes and within the university library. Convenient sampling technique was adopted in selecting 53 participants. The choice of this technique was due to the fact that only available and interesting students participated in the study. Despite this, participants were screened to ensure that only students with high computer self-efficacy are allowed to participate, as computer self-efficacy is the pre-requisite knowledge for web search.

Self-designed Pre-experimental and post-experimental questionnaires were used for data collection. Web search training manual was also used as guide to the training programme. Cronbach’s Alpha coefficient, Kaiser Meyer Olkin (KMO) and Bartlett’s test of sphericity were used to determine the construct validity of the questionnaire. The result shows 0.8175 coefficients, thus the questionnaires are considered valid and reliable.

The data collection began by recruiting interesting students for participation into the experiment. The recruited students were assigned with a search task to be accomplished using



search engine of their choice and a pre-training questionnaire was administered to the participants. Later, a six weeks long web search training programme began. In the last day of the training, participants assembled in the e-library unit of the university, where they were assigned with yet another search task to be accomplished using search engine of their choice. At the end, another questionnaire (post-training questionnaire) was administered to the participants. The data obtained from both questionnaires were analyzed. The data related to research questions 1 & 2 were analyzed using frequency counts, simple percentages, mean and standard deviation, while the hypothesis was tested using paired sample t-test.

4.0 Data Analysis

The data collected was analyzed using SPSS version 23. The results are summarized in the tables below:

Research Question 1: What is the web search behaviour of the participating students at pre-intervention period?

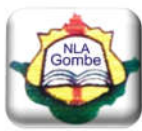
Research question one was analyzed with frequency counts, percentage, mean (M) and standard deviation (SD) statistics. The result of the analysis is reported in Tables 4.2.

Table 1: Web search behaviour of the participating students at pre-test period

Web search behaviour	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	M	SD
Search Strategies					1.78	0.52
I use both “ specific to general” and “general to specific” strategies to search the web for information alternatively	07(13.2%)	06(11.3%)	24(45.3%)	16(30.2%)	2.08	0.98
I neither use “ specific to general” nor “general to specific” strategy to search for information	02(3.8%)	08(15.1%)	27(50.9%)	16(30.2%)	1.92	0.78
I use the thesaurus to find the synonyms of a term, then use both interchangeably to search the web	03(5.7%)	05(9.4%)	23(43.4%)	22(41.5%)	1.79	0.84
I start my web search from specific topic then broaden my search to general topic by removing a word or phrase from the search term	03(5.7%)	09(17.0%)	12(22.6%)	29(54.7%)	1.74	0.94
I start my web search from general topic then narrow down my search to a specific topic, by adding a word or phrase to the current search term	03(5.7%)	01(1.9%)	10(18.9%)	39(73.5%)	1.40	0.79
Search Engine use Behaviour					2.17	0.46



I use only Google search engine to search the web for information	23(43.4%)	22(41.5%)	06(11.3%)	02(3.8%)	3.25	0.81
I use more than one search engine to search the web for information	06(11.3%)	18(34.0%)	13(24.5%)	16(30.2%)	2.26	1.02
I use meta-search engines such as Dogpile, Metacrawler, Zapmeta, Zoo, Ixquick, etc. To search the web	03(5.7%)	09(17.0%)	29(54.7%)	12(22.6%)	2.06	0.80
I use other search engines like Bing, Yahoo, Ask, WOW to search the web for information		06(11.3%)	24(45.3%)	23(43.4%)	1.68	0.67
I use academic search engines such as Googlescholar to search the web for information	02(3.8%)	02(3.8%)	23(43.3%)	26(49.1%)	1.62	0.74
Query Formulation Behaviour					1.82	0.52
I use keywords only to query the search engine during my search session	16(30.2%)	14(26.4%)	09(17.0%)	14(26.4%)	2.60	1.18
I use Boolean logic (AND, OR & NOT) in my search terms	03(5.7%)	06(11.3%)	16(30.2%)	28(52.8%)	1.70	0.89
I use truncation (*, ?) in my search terms	01(1.9%)	08(15.1%)	16(30.2%)	28(52.8%)	1.66	0.81
I use quotation marks (“...”) with my search terms	02(3.8%)	05(9.4%)	17(32.1%)	29(54.7%)	1.62	0.81
I use Arithmetic signs/modifiers (+, -) in my search terms	01(1.9%)	05(9.4%)	15(28.3%)	32(60.4%)	1.53	0.75
Use of Advanced Search Feature of Search Engines					1.69	0.37
I use the “document type” feature of search engines to restrict my search result to a particular document type e.g. “pdf”, “doc”, etc.	01(1.9%)	16(30.2%)	21(39.6%)	15(28.3%)	2.06	0.82
I use the search engine feature to restrict my search result by domain name such as .edu, .com, .net	02(3.8%)	04(7.6%)	28(52.8%)	19(35.8%)	1.79	0.74
I use the “range of period” feature of search engines to narrow my search result by year of publication	02(3.8%)	06(11.3%)	14(26.4%)	31(58.5%)	1.60	0.84



I use the search engine features to restrict my search results by a particular country	04(7.5%)	21(39.6%)	28(52.9%)	1.55	0.64	
I use the search engine feature to restrict my search results by a particular language	03(5.7%)	18(34.0%)	32(60.3%)	1.45	0.61	
Web Navigation Behaviour				2.08	0.50	
I use hyperlink to navigate the web	23(43.4%)	07(13.2%)	04(7.5%)	19(35.9%)	2.64	1.36
I use the scroll bar to navigate from one page to another, while searching the web	(30.2%)	14(26.4%)	09(17.0%)	14(26.4%)	2.60	1.18
I reformulate my queries with terms on the retrieved document, during my search session	04(7.5%)	04(7.5%)	30(56.6%)	15(28.4%)	1.94	0.82
I use sitemap to navigate the web	04(7.5%)	15(28.3%)	03(5.7%)	31(58.5%)	1.85	1.08
I use dropdown menu to navigate the web	04(7.5%)	12(22.7%)	37(69.8%)	1.38	0.63	
Web search behaviour before training (Average Weighted Mean = 1.91)						

Source: Researcher's Field Survey, 2022

Decision Rule: 1.0-1.49 = Very poor; 1.50-2.49 = Poor; 2.50-3.49 = Good; 3.50-4.0 = Very good

The result of Table 1 shows that web search behaviour of the participating students at pre-intervention period was poor, as indicated by the average weighted mean score of 1.91 on a four point Likert-type rating scale. Further analysis revealed that, before the intervention, search strategies adopted by the participants was poor (M = 1.78). Search engine use behaviour of the participants was also relatively poor (M = 2.17). The result in the above table further revealed that query formulation behaviour of the participants before the intervention was poor (M = 1.82). Use of advanced search feature of search engines among the participants was relatively poor (M = 1.69). Finally, the web navigation behaviour of the students was relatively poor (M = 2.08). This finding suggests the need for formal web search training to improve the web search behaviour of undergraduates of Yusuf Maitama Sule University, Kano to remain technologically relevant in the 21st century.

Research Question 2: What is the web search behaviour of the participants at the post training intervention period?

Table 2: Participants' web search behaviour at post intervention period

Kindly rate the following statements as they reflect your web search behaviour	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	M	SD
Search Strategies					2.95	0.69
I start my web search from specific topic then broaden my search to general topic by removing a word or phrase from the search term	32(60.4%)	08(15.1%)	09(17.0%)	04(7.5%)	3.28	1.00



I use the thesaurus to find the synonyms of a term, then use both interchangeably to search the web	24(45.3%)	12(22.6%)	13(24.5%)	04(7.5%)	3.06	1.008
I start my web search from general topic then narrow down my search to a specific topic, by adding a word or phrase to the current search term	16(30.2%)	20(37.7%)	15(28.3%)	02(3.8%)	2.94	0.86
I use both “ specific to general” and “general to specific” strategies to search the web for information alternatively	18(34.0%)	12(22.6%)	16(30.2%)	07(13.2%)	2.77	1.07
I neither use “ specific to general” nor “general to specific” strategy to search for information	19(35.8%)	13(24.5%)	08(15.1%)	13(24.5%)	2.72	1.20
Search Engine use Behaviour					2.91	0.43
I use other search engines like Bing, Yahoo, Ask, WOW to search the web for information	28(52.8%)	20(37.7%)	03(5.7%)	02(3.8%)	3.40	0.77
I use more than one search engine to search the web for information	16(30.2%)	30(56.6%)	05(9.4%)	02(3.8%)	3.13	0.74
I use meta-search engines such as Dogpile, Metacrawler, Zapmeta, Zoo, Ixquick, etc. To search the web	19(35.8%)	23(43.4%)	07(13.2%)	04(7.5%)	3.08	0.90
I use only Google search engine to search the web for information	12(22.6%)	17(32.1%)	15(28.3%)	09(17.0%)	2.60	1.03
I use academic search engines such as GoogleScholar to search the web for information	07(13.2%)	13(24.5%)	22(41.5%)	11(20.8%)	2.30	0.95
Query Formulation Behaviour					2.63	0.50
I use Boolean logic (AND, OR & NOT) in my search terms	17(32.1%)	19(35.8%)	14(26.4%)	03(5.7%)	2.94	0.91
I use quotation marks (“ ...”) with my search terms	19(35.8%)	19(35.8%)	07(13.2%)	08(15.1%)	2.92	1.05
I use Arithmetic signs/ modifiers (+, -) in my search terms	17(32.1%)	13(24.5%)	19(35.8%)	04(7.5%)	2.81	0.98
I use truncation (*, ?) in my search terms	10(18.9%)	13(24.5%)	14(26.4%)	16(30.2%)	2.32	1.11
I use keywords only to query the search engine during my search session	07(13.2%)	13(24.5%)	13(24.5%)	20(37.7%)	2.13	1.08



Use of Advanced Search

Feature of Search

Engines					2.88	0.61
I use the “document type” feature of search engines to restrict my search result to a particular document type e.g. “pdf”, “doc”, etc.	22(41.5%)	19(35.8%)	03(5.7%)	09(17.0%)	3.02	1.08
I use the “range of period” feature of search engines to narrow my search result by year of publication	22(41.5%)	15(28.3%)	10(18.9%)	06(11.3%)	3.00	1.04
I use the search engine feature to restrict my search results by a particular language	18(34.0%)	20(37.7%)	06(11.3%)	09(17.0%)	2.89	1.07
I use the search engine features to restrict my search results by a particular country	18(34.0%)	17(32.1%)	05(9.4%)	13(24.5%)	2.75	1.17
I use the search engine feature to restrict my search result by domain name such as .edu, .com, .net	17(32.1%)	16(30.2%)	08(15.1%)	12(22.6%)	2.72	1.15
Web Navigation Behaviour					2.76	0.53
I use the scroll bar to navigate from one page to another, while searching the web	28(52.8%)	15(28.3%)	05(9.4%)	05(9.4%)	3.25	1.0
I use the hyperlink to navigate the web	23(43.4%)	16(30.2%)	03(5.7%)	11(20.3%)	2.96	1.16
I reformulate my queries with terms on the retrieved document, during my search session	15(28.3%)	19(35.8%)	11(20.8%)	08(15.1%)	2.77	1.03
I use sitemap to navigate the web	09(17.0%)	15(28.3%)	25(47.2%)	04(7.5%)	2.55	0.87
I use dropdown menu to navigate the web	10(18.9%)	12(22.6%)	14(26.4%)	17(32.1%)	2.28	1.12

Extent of web search behaviour after training (Average Weighted Mean = 2.82)

Source: Field Survey 2022

Decision Rule: 1.0-1.49 = Very poor; 1.50-2.49 = Poor; 2.50-3.49 = Good; 3.50-4.0= Very Good.

Participants were asked to rate their web search behaviour (on 4-Likert scale) after undergoing the training. The result in table 2 shows that the web search behaviour of the participants after the intervention was improved as indicated by the average mean score of 2.97 as compared to the initial score of 1.78. This shows an average gain of 1.69 on the measurement scale after the training on web searching skills. It appears that the training had positive effect on web search behaviour; however, the significant of this effect is captured in Table 3 of the hypotheses section.



Test of Hypothesis

Table 3: Paired sample t-test analysis of the effect of web search training on web search behaviour

Web search behaviour scores	M	SD	Difference	T	eta squared statistic	df	p
Web search behaviour (Pretest)	1.91	0.32	0.91*	17.680	0.857	52	0.000
Web search behaviour (Posttest)	2.82	0.36					

NOTE: The value for the difference column is the change in the pretest to the posttest mean scores.

***p<.05. To interpret the eta squared values the following guidelines were used (Cohen, 1988): .01=small effect, .06=moderate effect, .14=large effect.**

A paired-samples t-test was conducted to evaluate the effect of the web search training on the web search behaviour of undergraduates of Yusuf Maitama Sule University, Kano in Table 4.8. The result shows that there is a significant effect of web search training on web search behaviour of the participants ($t_{(52)} = 17.680$; $p = 0.000$, Eta Squared = 0.857). Therefore, null hypothesis which states that Web search training has no significant influence on web search behaviour of the participants is rejected, because web search training has a significant effect on web search behaviour of undergraduates of Yusuf Maitama Sule University, Kano. The intervention accounted for 85.7% of the variability in web search behaviour of the participants as indicated by the Eta Squared value (0.857) in Table 3. The eta squared statistic (.857) indicated a large effect size. This result shows that web search training is very vital to molding the web search behaviour of undergraduates of Yusuf Maitama Sule University, Kano, Nigeria

Discussion

Research question one sought to find the web search behaviour of the participating students prior to training intervention. The result revealed that majority of the participants had poor web search behaviour prior to the training. This is evident as they adopted no specific search strategy that can lead to their successful web search, likewise, majority of them stick to Google search engine alone as their preferred search engine and use neither academic search engine such as GoogleScholar nor meta-search engine. The findings under this research question further revealed that few of the participants formulate good search term and used neither Boolean logic nor modifiers in their search terms. This finding agrees with the findings of the surveys conducted by Salehi, Du and Ashman (2018) which revealed that majority of respondents adopted Google as their only search engine. However, the finding of this study goes contrary to the findings of surveys conducted by Dahiru, Ahmadu and Aliyu (2019); and Civilcharran and Hudge (2015) which revealed that respondents were using Google, Yahoo and other search engines alternatively.

Research question two sought to determine the participants' web search behaviour after the training intervention. The findings of the study revealed that the web search behaviour of the participants was marked better after the training. This is evident from better use of different search strategic, better search engine use behaviour, significant change in the query formulation behaviour, increase in the use of advanced search feature of search engines, and web navigation behaviour of the participants after the course of the training. This finding is in agreement with the findings of the survey research conducted by Naci, Dulkadir and Kabakci (2017) which



reported that information literacy campaign (training) correlates with the adoption of appropriate search strategy.

Hypothesis of this study stated that web search training has no significant effect on web search behaviour of the participants. The study found that web search training programme has significant effect on web search behaviour of undergraduate students of Yusuf Maitama Sule University, Kano, therefore the null hypothesis is rejected. This finding concurs with the outcome of previous study conducted by Aula (2019) which reported that formal web search training has significant influence on web search behaviour of university students.

Conclusion

Web is an indispensable source of academic information in this digital era; however, its proper utilization among undergraduate students is challenged by their poor web search behaviour leading to retrieval of irrelevant result. The study uncovered that web search behaviour of the participating students was poor, likewise their level of complex search task accomplishment was low prior to the training intervention. By the end of the training, the participants' behaviour improved and the level of their complex search task accomplishment rose. Thus, the practical web search training is necessary for undergraduate students of Yusuf Maitama Sule University, Kano to develop appropriate web search behaviour and be able to accomplish complex search.

Recommendations

Based on the findings of this study the following recommendations are made:

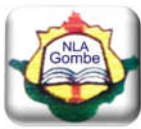
1. Academic librarians should include practical web search sessions in their use of library classes for freshmen.
2. The National University Commission (NUC) should increase credit unit for use of library course to accommodate the practical web search sessions.
3. NUC should ensure that more practical oriented courses on web search training are incorporated into the library and information science programme to better prepare the future librarians and information professionals for effective service in this digital era.

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