ASSESSMENT OF UNDERGRADUATE STUDENTS' METACOGNITIVE SKILLS FOR E-LEARNING IN NIGER STATE, NIGERIA

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Abstract

This study was designed to assess undergraduate students' metacognitive skill for e-Learning. It adopted a descriptive survey approach to determine the extent that undergraduate students in Nigeria deploy metacognitive skills for e-learning. Two research questions and two null hypotheses were stated to guide the study. Three institutions in Niger state were purposively selected and a total of 287 students were used for the study. The Metacognitive Skill for E-learning Questionnaire (MSELQ) was used for data collection. The instrument was validated and the reliability tested. Data analysis was conducted using the mean and standard deviations and t-test statistic. The findings of the study revealed that most of the students use the metacognitive skills. However, the extent of use of skill was low. Gender has no significant influence on problem and uses of metacognitive skills on e-learning. It was recommended that for effective e-learning, students need appropriate instructions in the utilization of metacognitive skills for effective e- learning through internet.

Introduction

The world has been described as a global village mainly due to the introduction of the latest inventions in electronic learning (e-learning). The relevance of e-learning has been felt in every sphere of human Endeavour-business, government and most importantly education. The use of Internet based learning in education has opened a new world of learning opportunities for students from all areas of specialty through the Internet. The Internet not only created new learning opportunities but has served to expand learning experiences to the extent previously unimagined (Eze, 2010). The universality of the Internet makes it a practical and valuable resource for delivering courses and other related educational materials. It is known to offer remote access to information from everywhere and at anytime to those with internet connection. Consequently, learners from different parts of the world can access learning materials placed on the web by the best lecturers or

researchers in the world. Learners are no longer limited to those teachers/lecturers close to them but able to gain access to knowledge of the best experts in different fields of specialization through e-learning. For example, the influence of e-learning have exposed the students to different search engine to include web-crawler (http://www.webcrawler.com), meta crawler, (http://www.metacrawler.com) and academic search engine such as Google scholar (http://schorlar.google.com and Microsoft academic search (http://academicsearch Microsoft.com) and so on.

The Nigerian government has been working assiduously to create an enabling environment for the integration of e-learning into every aspect of our national life especially in the education sector. In line with the above effort, the Federal Government of Nigeria in the National Policy of Education mandated the immediate incorporation of e-learning into her educational system at

all levels (FGN, 2007). The Nigerian educational system, especially at the tertiary levels is currently experiencing a gradual shift away from the traditional library system with physical books on the shelves. Though this library system has played a central role in the knowledge generation and dissemination process in Nigerian tertiary institutions. A national survey indicated that less than one percent of the libraries in Nigerian Universities, Polytechnics and Colleges of Education stocked current journals, book titles and abstracts in the various areas of knowledge (Okebukola, 2002). The recent introduction and emphasis on internet in many tertiary institutions in the country has made easy the process of knowledge generation and dissemination through the availability of IT technologies. Through the internet, electronic books and journals are made available to a vast number of audiences everywhere, anywhere and in places where the required resources exist (Eze, 2010). This implies that many computer literate students now have access to the universe of global information which is required not only for human development but national survival. With access to the internet and availability of information, the assumption is that the Nigerian learners are now poised and equipped to contribute in the process of global knowledge generation and dissemination made possible through e-learning. The computer based training make the Nigerian learners no longer dependent entirely on what goes on in their immediate classrooms but also on learning experience made available through the internet by the best universities and research institutions in the world.

However, making relevant information available to students, e-learning is not enough for effective learning to occur (Schraw, 2008). Observation has shown that being online requires students to assume ownership of how and when learning takes places (Brown, 2012). According to Brown (2012), students who are poor in metacognitive skills experience severe handicap in web-based learning. Thus, the relevance of learning experience available through e-learning depends on students' metacognitive skills for navigating through the mass of information.

E-leaning has been described as a useful research tool, which by nature is unorganized. It has been compare to a library containing almost every book in the world, which are scattered on the floor rather than organized in shelve (Schraw, 2008). The huge quantity of information found on the e-learning has been suggested to possess the potential for stimulus overload, unmotivated rambling among learners and result to learner distraction and disorientation; this demands that training requires students to assume responsibility for managing their own learning through the application of strategic approaches, without being overwhelmed by the amount of information available through internet based learning (Veenman, & Spaan, 2005).

Metacognitive skills consist of deliberate planning, monitoring, regulation and evalution of cognitive process and its outcome (Umaru, 2010). These skills, which enable a learner to be aware of, understand, monitor, control and manipulate their learning processes (Eze, 2010). These suggest that learners with appropriate metacognitive skills are able to organize, monitor and direct their own learning processes. According to Schraw (2008), & Flavell (1979) metacognitive

strategies support individual development of learning strategies and makes learning more available to the learner. The development of metacognitive skills enhances students' ability to construct knowledge, assume responsibility for their own learning, and realize that learning is a personal experience that requires active and dedicated participation (Veenman, van-Hout-wolters, & Afflerbach, 2006). As such, they become more active and self-directed in their learning experiences. What makes the difference between successful and unsuccessful learners lies on how effectively they can manage their own learning.

With the increasing availability and access to e-learning resources to undergraduate students in Nigeria, the questions that readily come to minds are to specific problems students who engage in e-learning encounter during the learning process. And to what extent do students use metacognitive skills during e-learning exercise.

This study was guided by the following research questions:

1. What specific problems do students who engage in e-learning encounter by gender use?
2. To what extent do students use the metacognitive skills during e-learning by gender?

Hypotheses

1. There is no significant relationship in the mean score of response to the problem associated with e-learning by Gender
2. There is no significant relationship in the mean score of

the extent the students use metacognitive skills during e-learning by Gender.

Methodology

This study adopted the descriptive survey research design. It is a survey of the extent undergraduate students utilizes metacognitive skills in managing their e-learning. A total of 287 students from three tertiary institutions in Niger state were used for the study. The tertiary institutions are: Federal University of Technology, Minna, Ibrahim Babangida University, Lapai and Federal Polytechnic, Bida. The tertiary institutions were purposively sampled to ensure that the institutions to be used have internet facilities within their campuses. This also enables the researcher to have easy access to tertiary students who use the internet. Students who consented to be part of the study were used. This was done to ensure that only students who used the internet for learning purpose were sampled. Through the above approach, 50 students were selected from FUT Minna, 50 from IBBUL and 60 from Federal Polytechnic. Bida, Niger State. The Metacognitive Skill for E-learning Questionnaire (MSELQ) is the instrument used for this study. It was designed to provide information that would help determine the metacognitive skills undergraduate students utilize during e-learning, the extent of such utilization and the specific problems they encounter during e-learning.

The instrument is a four point modified Likert rating scale. The items of the instrument were generated based on the review of relevant literature and the researchers' experiences with e-learning. The instrument has two major parts. Part

one sought for information on problems commonly experienced by students during e-learning. It requested participants to respond to statements on possible problems encountered during e-learning. The scale ranges from Very often (VO), Often (O). Sometimes (S). to Rarely (R). Part two of the instrument solicited for information relating to the metacognitive skills students use in e-learning and the extent the metacognitive skills are applied. This part has four clusters-Clusters one, two, three and four sought for information on planning skills implementation skills, monitoring skills and evaluation skills respectively. The rating scale used to measure the metacognitive skills required the participants to self-report on the extent of use of the skills on e-learning. The scale ranges from Always (A), Sometimes (S), Rarely [R] and Never (N). Item that were negatively stated were reversed scored.

The MSELQ was assessed by experts in Educational Psychology and library and information science, which ensured validity. The instrument was modified based on the inputs of the experts. It was then trial tested to further determine the suitability. A test of reliability using Cronbach Alpha procedure was conducted to determine the internal consistency reliability of the instrument. The internal consistency reliability estimate of 0.88, 0.85 was obtained for part one of the instrument. The second part of the instrument generated an Internal consistency reliability estimate of 0.83, 0.86 and 0.88 was established. Three research assistants were instructed on how to administer the instrument and they helped the researcher in the distribution of the questionnaires and subsequent retrieval from the respondents. A total of 160 copies of the questionnaires were retrieved and used for the study. An item with a mean ranging from 2.50 and above is interpreted as high extent while any mean below is interpreted as low extent.

Results

The results of the study are presented as shown in Table 1 and 2.

Research Question One: what specific problems do students who engage in e-learning encounter?

This research question was answered and presented in table 1.

Table 1:   Students' Responses to problems Associated with e-learning

S/n	Items: Problems Associated with e-leaning	Mean(x)
1	I get disoriented when faced with large quantum of information	1.55
2	I usually get involved in unmotivated rambling	1.00
3	The amount of information encountered in the internet often leads to cognitive overload	2.25
4	I experience difficulties using the search facilities to identity sources relevant to a topic of interest	2.60
5	I have difficulty staying focused on a topic	2.50
6	I do not find it easy assessing the relevance of presented information	2.20

7	I find it difficult coping with the largely unorganized learning materials found on the web	1.80
8	I easily loose focus as I encounter many interesting topics on the internet	2.40
9	I spend so much time surfing the internet without much useful information to show for it.	2.54

Table 1 shows that generally the students responded negatively to all the items on problem associated with e-learning. Out of the 9 items listed, only three had a mean above 2.50

Research Question Two: To what extent do students adopt the metacognitive skills during e- learning? Data relating to research question two are presented in Table 2. Below:-

Table 2: Showing Mean ($\overline{X}$) of the responses of students on Metacognitive skills for e-Learning

S/n	items	Mean($\overline{x}$)	Cluster mean($\overline{x}$)
A	**Planning skills**		
1	I identify my learning goals before embarking on online search for learning materials	2.50	
2	I set my priorities before learning online and focus on them	2.40	
3	I decide on strategies that would help me add meaning and organization to what I read	2.80	2.42
4	I plan my time before engaging in online learning	1.84	
5	I organize my search questions before engaging in any web search	2.55	
B	**Implementation skills**		
6	I engage in aimless search because I do not have appropriate web address	1.98	
7	In spite of the amount of information available, I try to remain focused	2.50	
8	I easily get distracted because of the availability of many interesting information online	2.68	2.58
9	I apply appropriate techniques that assist in concentration	2.36	
10	I focus only on information I consider pertinent to the topic of interest	2.62	
11	I quickly bookmark relevant information as I search the web	2.40	
12	I quickly scan through to see how relevant information is to my goals before I download	2.54	
C	**Monitoring skills**		
13	I change strategies applied when they are not helping in reaching my goals	2.60	

14	I use self-talk to direct my thinking while engage in online studying	2.80	
15	As I study online, I try to be aware of how well I understand the information.	2.11	
16	I try to be sure I understand what need to be done and how it should be done	2.50	2.50
D	**Evaluation**		
17	I usually seek to know whether the information available is relevant to my purpose	2.80	
18	I change strategies when I observed they are not effective	2.64	
19	I try to link what I study with what I already know	2.11	2.48
20	I make conscious effort to find out how what I learn may be used in future	2.40	

In answering the research question 2.The responder respond positively to all the items but rejected seven items (4, 6, 9,10,15,19 and 20 respectively. But table 2 Shows that the respondents, response to all accepted item 1,2,3,5,7,8,11,12,13,16,17 and 18 with a crit point above 2.50. Suggesting that most of the students use these metacognitive skills required for e-learning. Conversely in answering the research question 3, the respondent responses on the extent of the average uses of these metacognitive skills are low indicating an under utilization with a cluster means on planning skills (x=2.42) implementing skills (x=2.58) monitoring skills (x=2.50) and evaluating skills (x=2.48) respectively.

Hypothesis 1.

There is no significant relationship in the mean score of response to the problem associated with e-learning by Gender

Table 3: Showing T-test statistic of the responses to the problem associated with e-learning by Gender.

Gender	N	$\overline{X}$	SD	DF	t-cal.	t.crit	Decision
Male	80	2.46	1.01	158	0.318	1.96	NS
Female	80	1.07					

P<0.05

From table 3 it was discovered that at 0.05level of significant, 158 df, the cal. T 0.318is less than the critical of 1.96. That is the null hypothesis is upheld.

Hypothesis 2.

There is no significant relationship in the mean score of the extent the students adopt Metacognitive skills during e-learning by Gender.

Table 4:   **Showing t-test statistics of the extent students' use of metacognitive skills during e-learning by gender.**

Sex	N	$\overline{X}$	SD	Df	t-cal.	t.crit	Decision
Male	80	2.43	0.98	158	0.63	1.96	NS
Female	80	2.50	0.10				

$P < 0.05$

From table 4 it was found that at 0.05 level of significant and 158 df, calculate t 0.63 is less than the critical t. 1.96 therefore, Ho2 is upheld.

Discussion

Data on table 1 indicates the extent of the problems students encounter as they engage in e- learning. The analysis suggests that students encounter such problems as frequent disorientation as a result of large quantum of information, unmotivated rambling, cognitive overload due to stimulus overload, difficulty sourcing for relevant information using search facilities, difficulty staying focused on a topic, inability to assess the relevance of presented learning materials, inability to focus because of availability of many interesting materials and time management problem during internet exploration. The findings of this study are in line with the early finding. Veenman, and Spaan (2005) emphasized that these problems are particularly more with novice hypertext or hyper- media information researchers. E-learning according to (Brown, 2012) demands not only the ability to manipulate internet technology but the acquisition of appropriate self directed learning skills capable of enabling the learners learn new things and adopt dynamic approaches to complex situations.

Similarly, the data presented in table 2 revealed the metacognitive skills undergraduates' students utilized and the extent of utilization of such skills. The result of the data analysis indicated that many of the students use the planning, implementation, monitoring and evaluation skills required for metacognitive learning. However, the data also indicated that the extent of utilization of these skills for e-learning is low. Only very few of the respondents were found to always apply these skills for e-learning. These findings may account for the problems which learners have been observed to encounter during e-learning. It has been suggested that for students to be effective on web-based learning, they must develop the ability to use self-regulate learning skills (Desoete, 2007). This is so as materials delivered during their e-learning require students to assume ownership over how and when to learn rather than waiting for teachers/lecturers to take the decision. This is in line with Eze (2010) assertion that students with poor metacognitive skills are usually ineffective when it comes to online learning. Eze (2010) and Flavell (1979) in an earlier study asserted that students with poor self-regulatory skills are "equipped" in a www-based learning. With appropriate metacognitive and knowledge-building skills, students are in a position to know how to go about finding and judging information for relevance. This provides

opportunity for high level of learner control and application of higher order thinking skills, which facilitates learning for effectiveness. The implication is that when students fail to optimally utilize appropriates metacognitive skills for e-learning, they may not substantially benefit from such efforts. The Internet provides enormous learning resources, which if properly utilized will enhance learners learning opportunities, but these can only be tapped if learners have adequate metacognitive skills which are always deployed towards reaching a particular goal.

Conclusion

From the findings of this study, it was revealed that most tertiary students use the metacognitive skills of planning, implementation, monitoring and evaluation during e-learning. However, as the data suggested the extent of utilization of most of the specific skills within the broad categories of planning, implementation, monitoring and evaluation was low. Majority of the respondents reported using most of the skills rarely, which may be an indication of lack of the skills or knowledge of application of the skills in metacognitive knowledge, to enable them handle difficult or unorganized task.

Recommendations

The introduction of e-learning facilities in Nigerian educational system require that students be adequately equipped to maximally benefit from the vast learning opportunities provided. Equipping students requires that they are not only taught how to manipulate the internet technology to make available learning materials but they should also be instructed on the skills for managing their own learning opportunities. This demands that for the students to benefit optimally from the e-learning resources, they need appropriate instruction on the application of metacognitive skills for effective internet-based training on e-learning.

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