EVALUATION OF A DEVELOPED INTERACTIVE WEB-BASED LESSON FOR INSTRUCTIONAL DELIVERY IN NIGERIAN HIGHER INSTITUTIONS

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Abstract

This study evaluated a developed interactive web-based lesson (WebQuest) for teaching and learning in Nigerian higher institution. The research was a development and evaluation type. The development involved WebQuest design components, using ADDIE model. The sample of the study comprised 15 educational technology experts and forty-seven 200 level undergraduate students. The rubric evaluation model and WebQuest content evaluation questionnaire (WCEQ) were used as instruments. The instruments were validated by educational technology experts and tried-out on 42 students. The findings of the study showed that developed WebQuest met up with the standard required when evaluated by experts using rubric evaluation model as it was rated 86.0%; the content of the developed WebQuest covers the required educational technology concepts when evaluated by experts and was rated 79.0%; and the experts revealed that the task contained in the developed WebQuest conforms to the standard questions for the concepts and were sequentially arranged and rated 76.7%. The implication was that developed WebQuest is good as instructional strategy and suitable for effective teaching and learning in Nigerian higher institution. It was recommended that higher institution lecturers should endeavour to develop and utilize WebQuest as an instructional strategy, and government and policy makers in education should introduce the use of web-based instructional tools like WebQuest into teacher education curriculum in the tertiary institutions so that the use of Web-based lesson can become the norm in instructional technique.

Keywords: WebQuest, Interactive Web-Based Lesson, Educational Technology, Rubric Evaluation Model, Higher Institutions

Introduction

Technology is an increasingly influential factor in education. It allows new types of teaching and learning experiences to flourish and provides new ways to engage students (Joseph, 2002; Venzon, 2011). Brandsford, Brown, and Cocking (1999) proposed that many new technologies are interactive, making it now easier to create environments in which students can learn by doing, receiving feedback, and continually refine their understanding and build new knowledge. Students in technology integrated environments find themselves immersed in learning activities that require computer use which in turn individualizes the educational process to accommodate the needs, interests, proclivities, current knowledge, and learning styles of students (Schacter & Fagnano, 1999).

The use of the web as an instructional tool has provided teachers with a wide range of new and exciting teaching experiences that are not possible in traditional classroom, such as accessing information at any time and place, online presentation of information, interactive task-based activities, effective dissemination of information, and long distance education (Nam & Smith-Jackson, 2007; & Hadjerrouit, 2010). Besides web-based learning are potentially powerful tools for enhancing learning experiences and improving the learning outcomes (Hadjerrouit, 2010). This century has been described as an era where every conceivable activity has gone virtual and electronic (Jenson, Lewis, Smith, & Fraser, 2002). In fact, there is growing evidence that ICT is permeating into every facet of education and therefore, the existence of ICT not only has revolutionized how knowledge can be imparted, but also has changed how learning environment and situation can be outlined, and in the process, the roles of students and teachers alike can take new shapes and turns (Hafizoah & Zuraina, 2007).

The impact of ICT on learning is currently discussed almost entirely in relation to the use of digital media and the Internet (Thorpe, 2010). Educators see the internet as a medium for locating and retrieving data and reference materials, researching information, displaying projects, delivering in-
service programmes, posting news, participating in continuing education and talking with colleagues (Ekoko & Ekoko, 2004). The Internet has become an indispensable tool in the twenty first century (Ibrahim, John & Michael, 2006). Educators nowadays and education in general, are highly challenged to adapt the continually increasing technological advances in the learning process in order to ensure the quality of the learning outcomes (Cox, 2008).

The influx of ICT gadgets in education must have necessitated the review of the definition of educational technology by the Association of Education and Communication Technology (AECT). Thus, educational technology is referred to as the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources (Richey, 2008: 24). According to Januszewski and Molanda (2008), the focus of educational technologists now is on designing, developing, utilizing and managing appropriate technological processes and resources. Etim (2006) explained some of the benefits of educational technology utilizing ICT to education as easy-to-access course materials, student motivation, wide participation, and subjects made easier to learn.

**Instructional Values of WebQuest Application for Effective Teaching-Learning Process**

A Web-based lesson is simply a lesson that incorporates a web site or many web sites. A Web-based lesson can be conducted entirely online or it can be a traditional classroom lesson with an online component. A web site can be used in education for a variety of purposes these include research, reading, writing, publishing, communication and collaboration with teachers and learners around the world (Mendoza, 2006). Aremu and Morakinyo (2008) asserted that the main Web-Based lessons are Cyber Guide, Filamentality and WebQuests.

A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet, optionally supplemented with videoconferencing (Cheng-Yee, 2009; Kathy, 2009). It is a classroom-based lesson in which most or all of the information that students explore and evaluate comes from the World Wide Web (Dodge, 2004). WebQuest is an activity of guided inquiry in which learner are given a task, which requires internet access to complete Dodge (2004). This inquiry-based approach to learning makes excellent use of internet-based resources by involving students in a wide range of activities (Vidoni, & Maddux, 2002).

WebQuests can be designed as a short and longer term activity. A short term WebQuest is designed to be completed in one to three class periods while longer term WebQuest will typically take between one week and a month in a classroom setting (Dodge, 1997). To achieve that efficiency and clarity of purpose, WebQuests according to Dodge (1997) should contain at least the following parts; these are introduction, task, process, resources and evaluation.

WebQuests are designed to use learners’ time well, so that they can focus on using information rather than looking for it and to support learners’ thinking at the levels of analyses, synthesis and evaluation. WebQuests are appealing because they provide structure and guidance both for students and teachers. WebQuests promote student-centred learning environment and its model has been effectively applied to all levels of education, from elementary to post graduate study (Eugene, 2004). A well develop WebQuest requires that students go beyond fact-finding. It asks them to analyze a variety of resources and use their creativity and critical-thinking skills to derive solution to a problem. The problem is often ‘real-world’ that is, one that needs genuine and reasonable solution. This makes students usually become so busy with the task at hand that they have no time for discriminate web surfing (Aremu & Morakinyo, 2008).

Vidoni, and Maddux (2002) explained that WebQuest makes students access the web to complete a task or solve a problem, elicit higher-order thinking rather than simple information searching and recall. The tasks that are involve problem solving, judgment, synthesis, and analysis of information (Kathy, 2009). Some studies have revealed the benefits of using WebQuest in theoretical terms. March (1998) grouped WebQuests constructs under three headings which are student motivation and authenticity, developing thinking skills, and cooperative learning. On the other hand, Zheng, Stucky, McAlick, Menchana, and Stoddart (2005) in their research concluded that WebQuests have four constructs which are critical thinking, knowledge application, social skills, and scaffolded learning. Tsai (2006) investigated the impacts of using the WebQuest model in English as a Foreign Language (EFL) program. In his study, the students who completed the WebQuest activities were rated higher on measures of vocabulary performance and story reading performance.
It is important that the school experiences integration of new technologies like WebQuest that have great potential to supplement traditional learning and can provide new opportunities to explore high-level cognitive activities such as autonomy, creativity, problem solving and teamwork while providing teachers with the means to take into account individual needs of students, especially while using web-based technology.

Statement of the Problem

The fact that Web-based instructional strategies such as WebQuest enhances a more student-centred learning approach is often cited as among its most important benefits (Balanskat, Blamire & Kefalla, 2007). The use of it in Nigerian higher institution is yet to be known. Therefore, this study evaluated a developed WebQuest application on educational technology concepts for teaching and learning in Nigerian higher institution.

Purpose of the Study

This study was designed to evaluate a developed interactive Web-based lesson (WebQuest) on educational technology concepts (WebETC) to assist in empowering students to develop abilities to solve problems and also get involved in both self-learning and cooperative learning. Specifically, the study:

1. evaluated the developed WebQuest with WebQuest rubrics (WebQuest evaluation model designed by Dodge in 1995) by educational technology experts and students.
2. evaluated the content contained in the developed WebQuest by educational technology experts.
3. evaluated the task contained in the developed WebQuest by educational technology experts.

Research Questions

The research questions which were answered in this study are:
1. Does the developed WebQuest meet up with the standard required when evaluated with rubrics evaluation model designed purposely for WebQuest development?
2. Does the subject matter content of the WebQuest cover the required educational technology concepts?
3. Does the task given in the developed WebQuest conform to the standard questions for the concepts and are they sequentially arranged?

METHODOLOGY

Research Design

The research is development and evaluation research type. The study used this research type to carry out the development and evaluation of a WebQuest Web-based lesson for teaching and learning of students in Nigerian higher institutions. The development involved WebQuest design components, using ADDIE model. Figure 1 shows the internet-based lesson of a developed WebQuest.

Figure 1: WebQuest Homepage on Educational Technology Concepts
Population and Sample

The population for this study comprised all higher institution students in Nigeria. However, educational technology experts from University of Ilorin, Obafemi Awolowo University, National Open University, Ekiti State University and Federal University of Technology, Minna were selected as sample, using purposive non-probability sampling techniques. Fifteen educational technology experts participated (two Professors, nine Ph.D. holders and four M.Ed. holders). Five experts from Obafemi Awolowo University, Ile-Ife, five from University of Ilorin, one from Ekiti State University (formerly known as University of Ado-Ekiti), one from National Open University of Nigeria (NOUN) and three from Federal University of Technology, Minna. 47 of the 200 level education undergraduate students from University of Ilorin participated as students' evaluation.

The two concepts in educational technology selected (Communication process and Instructional system design) for the development of WebQuest were chosen based on the fact that they are global concepts and all the pieces of information required for the students to study the concepts are available and accessible on the Internet.

Research Instruments

The following instruments were used for this study:

1. **Rubric for evaluating WebQuest Software adapted from Dodge (1995).** This instrument was used to evaluate the developed WebQuest by the educational technology experts and students to determine its standard as an instructional package. The change made to rubric developed by Dodge (1995) was only on remarks. Dodge remarks the rubric from beginning, developing to accomplished, while the rubric used for this study was remarked from poor, fair to good. This change was made just because of the familiarity of teachers and students in Nigeria institutions to poor, fair and good in remark to grades. The rubric contained two sections (A and B). Section A of the rubric comprised information on respondent’s demography while section B contained five areas for which WebQuest software was evaluated. This was rated from 0 to 50 points.

2. **WebQuest content evaluation questionnaire (WCEQ) adapted from Oyelekan (2009).** This questionnaire contained items that were used to evaluate the content contained in the developed WebQuest. WCEQ is a modified form of Oyelekan (2009) “Subject Content Validation Questionnaire” which consisted of 8 items. The questionnaire for this study also consisted of 8 items. Item 1, 2, 3, and 4 were used to evaluate course content of the developed WebQuest while item 5, 6, 7 and 8 used to evaluate the tasks given in the WebETC. Furthermore, the questionnaire contained two sections (A and B). Section A consisted of information on respondent’s demography whilst section B comprised items rated from 1 to 5 points (i.e. from poor to excellent).

Validation and Reliability of the Research Instruments

The developed WebETC was validated by the researcher’s supervisor, three experts (two educational technology experts and one ICT software developer). This was done to determine the appropriateness of the WebQuest. The experts’ comments and suggestions were used to correct some errors while their commendations were appreciated. Forty-two students participated for field try out and usability testing of the developed WebQuest. The students selected fall between the population of the study but did not take part in the actual study. Rubric evaluation format was given to the students and this was retrieved immediately after they had responded to it. 84.6% score was obtained and this showed that the developed WebQuest was suitable for the learning of educational technology concepts. Their corrections and comments helped in the final phase of the development.

Procedure for Data Collection

The procedure covered two weeks for experts’ evaluation because the experts in these universities requested for enough time for the evaluation and also requested for a CD copy of the developed WebQuest. This made the researcher to take another step to download all the URL links in
the WebQuest and made the application to autorun for evaluators to have easy access to all information without being connected to the Internet. Thus, the developed WebQuest could be accessed online (over the Internet) or offline. Two weeks was also used for students’ evaluation where they were exposed to developed WebQuest in the first week and the software was copied and downloaded for their own personal copy, then students were given rubric (WebQuest evaluation model) for the WebQuest evaluation. Second week was used to collect data distributed. In all four weeks was used for this procedure.

Results

The process of evaluation of the WebQuest software was done in three ways, these include WebQuest Software Development, Content and Tasks contained in the developed WebQuest. To make a conclusion about the standard and evaluation level of experts and students in the developed WebQuest, the interpretation of the result was based on the popular grading scale used in the Nigerian universities. Below 40% = Fail, 41% - 49% = Pass, 50% - 59% = Good, 60% - 69% = Very Good, 70% - 100% = Excellent.

The analysis in Table 1 was used to answer the formulated research questions:

**Research Question 1:** Does the developed WebETC meet up with the standard required when evaluated with rubric designed for WebQuest evaluation purpose?

<table>
<thead>
<tr>
<th>Evaluation Items</th>
<th>No. of Respondents</th>
<th>Evaluation Score</th>
<th>Average Score Obtained</th>
<th>Average Percentage of Score Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebQuest Software Development</td>
<td>Experts</td>
<td>50</td>
<td>40.6</td>
<td>81.2</td>
</tr>
<tr>
<td></td>
<td>Students</td>
<td>50</td>
<td>42.8</td>
<td>85.6</td>
</tr>
<tr>
<td>WebETC Content</td>
<td>15</td>
<td>20</td>
<td>15.8</td>
<td>79.0</td>
</tr>
<tr>
<td>WebETC Task</td>
<td>15</td>
<td>15</td>
<td>11.5</td>
<td>76.7</td>
</tr>
</tbody>
</table>

In answering research question 1, Table 1 showed that the average score and percentage of the respondents who were given the WebQuest package to examine and assess using the rubric evaluation model for WebQuest software out of 50 points experts points was 40.6 and students’ points was also 42.8, the percentage of the two scores were 81.2 and 85.6% respectively. The result of the WebETC software evaluation was favourable and satisfactory. The implication of the result was that the respondents agreed that the developed WebQuest software on Educational Technology Concepts met up with the standard required when evaluated with rubric.

**Research Question 2:** Does the subject matter content of the WebQuest cover the required educational technology concepts?

The respondents (Educational Technology experts) were given the WebQuest software package to go through and evaluate the content contained in the developed WebQuest using WCEQ. From the analysis in Table 1, the respondents’ average score out of 20 was 15.8, this translated to 79.0%. The result simply implied that the contents contained in the developed WebQuest which they were given to assess cover the required educational technology concepts. This answered research question 2.

**Research Question 3:** Does the task given in the developed WebQuest conform to the standard questions for the concepts and are they sequentially arranged?

From the analysis of the respondents in item 3 of Table 1, it was shown in the table that after the respondents had assessed and evaluated the questions contained in the task of the developed WebQuest using WCEQ, they scored the task to be standard and sequentially arranged. This was because the respondents’ average score out of 15 points was 11.5 while average percentage of the score was 76.7%. This answered research question 3.
Discussion of the Study

The result obtained on from evaluation’s analysis of the package showed that developed WebQuest was scored favourably and meet up with the standard in line with WebQuest development and curriculum operating in Nigerian university education as adjudged by the experts. This is in line with Mudiwa (2003) developed WebQuest for middle school social studies and Shwu (2005) in English as a foreign language reading instruction. The students’ evaluation was to ensure that developed WebQuest considered various learners’ characteristics. The students’ responses showed that the developed WebQuest is good and suitable for teaching and learning in Nigerian higher institutions. The result also revealed that subject matter content contained in developed WebQuest cover the required educational technology concepts (communication process and instructional system design). The evaluators confirmed that the content contained in the WebQuest was understandable for the level of students it was being developed for and the various sub-headings in the WebQuest were well explained for students to understand the concepts. The task given in the developed WebQuest conforms to the standard questions for the concepts and they were sequentially arranged.

However, this study is in line with study of Shwu (2005) who developed a reading instruction by using a WebQuest learning module as a computer-assisted instruction (CAI) enhancement on college students’ reading performance in Taiwan. Sox and Rubinstein (2009) advocated for the adaptation and use of WebQuest and they developed WebQuest for English language learners as a strategy to enhance English language learners comprehensible input. Kristen (2005) developed webQuest on Osmosis, and Haller (n.d.) developed WebQuest for 3rd Grade Science on plant.

WebQuests were also introduced to special education study. Chien-Hui, Pei-Wen and Cecile (2011) developed a WebQuest to train special education pre-service teachers in Singapore. In social studies, a WebQuest was developed by Sim, Lee, Chang and Kho (2004) to explore the use of WebQuest in the learning of social studies content and their study was to explain what WebQuest is all about and explore it in primary social studies to show its applicability in achieving important instructional goal in social studies teaching and learning.

Conclusions and Recommendations

According to the result in this study, the developed WebQuest is a valuable instructional strategy because it pleases the students, motivated to read resources provided in the WebQuest and also developed their thinking skills. Many preferred learning using WebQuest to the lecture-based approach because it was a different way of learning concept and it was both fun and challenging.

Based on the major findings of this study, the following recommendations were made:

1. teachers in Nigerian universities should endeavour to develop and utilise WebQuests for teaching and learning. This will further increase teachers’ knowledge on new innovations in ICT-Based instructional strategies;
2. educational technology teachers should expose the students to ICT-Based instructional strategies like WebQuest to promote students’ autonomy to knowledge acquisition, discovery learning and student-centred instructional approach;
3. students should help themselves by making use of information on Internet for instructional purpose and shift their focus from using it for fun and entertainment only;
4. government and policy makers in education should endeavour to introduce the use of web-based instructional tools like WebQuest into teacher education curriculum in the universities so that both the lecturers and students will be using it for instructional purposes.

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