THE APPLICATION OF WEB 2.0 IN ENHANCING TEACHING AND LEARNING OF TECHNOLOGY EDUCATIONAL COURSES IN TERTIARY INSTITUTIONS IN RIVERS STATE

DEEBOM, MTORMABARI TAMBARI
tambari.deebom@ust.edu.ng

AMASO, TENYANI FELIX
amasostf@gmail.com

Department of Vocational and Technology Education,
Rivers State University of Science and Technology, Port Harcourt,
Nigeria.

Abstract

This study investigated the application of Web 2.0 in enhancing the teaching and learning of technology education courses in tertiary institutions in Rivers State. A sample of 360 respondents (students, 300; lecturers, 60) was used for the study. The study adopted a descriptive survey design. Simple random sampling technique was used to compose the sample. Four research questions were answered while one hypothesis was tested in the study at 0.05 level of significance. The primary data were gathered with a structured questionnaire design after Likert-5-point rating scale. The instrument used for data collection was "Questionnaires for Lecturers/Student's Perception on Usability Level of Web 2.0 Technologies (QL/SPULWT)". The QL/SPULWT was objectively used to elicit both lecturers and students' responses on the following: the usability level of application in the classroom, the conditions necessary for its application, its benefits and the barriers associated with the application of these tools. A reliability coefficient of 0.75 was established through Cronbach Alpha. Mean with Standard Deviation was used to answer the research questions while z-test was used to test the hypothesis. It was found that the major problems of Web 2.0 applications in teaching and learning are inadequate training facilities, low bandwidth and time constraint. It was recommended among others that there should be in-service workshop training on Web 2.0 tools; schools should provide a fast speedy internet facility with high bandwidth and also to provide constant power supply sources.

Keywords: Web2.0, Technology Education, E-teaching, E-learning.

Introduction

Technology education is the study of technology in which students are taught about the processes and knowledge related to technology. As a field of study, it covers the human ability to shape and change the physical world to meet needs by manipulating materials and tools with techniques (ITEA, 2005b). These tools and materials may involve the use of computers and its facilities. Technology education plays a crucial role in advancing students towards technological literacy. Student of technology education are mostly engaged in both cognitive and psychomotor activities that foster critical thinking, decision making, enhances creativity, problem solving, evaluation and understanding of the designed world.

For these to be achieved, technology education should be continuous, promoted and taught in the classroom with modern facilities and materials which aid technological performance. As cited above (ITEA, 2005a), these tools involve the use of technological development such as audiovisual equipment, mass media, computers / internet and its applications like Automatic Computer Aided Design (AUTOCAD), Statistical Package for Social Sciences (SPSS), Web 1.0 and Web 2.0 etc. These applications will help to enhance and optimize the teaching and learning process of technology educational courses.

The Web 2.0 is an advancement and modification of Web 1.0. Web 1.0 was known as (READ-ONLY) where internet users went online to find information. It was similar to going to the library to find books and other information. Web 2.0 is defined as the collective set of Internet-based tools such as wikis, blogs, web-based applications, social networking sites and so on. The Web 2.0 now regarded as (READ/WRITE) is a zone where educators have become active participants and content creators. They not only find information on the internet, but they also create and shared content (Thompson, 2007).

It is not a gainsaying that the browser has been transformed from a space where users passively retrieved information to a participatory, knowledge sharing social networking and collaboration users created content and folksonomy (Brown & Adler, 2008; Thompsom, 2007; Richardson, 2009). It is a collective term for series of web-based technologies that include blogging and micro-blogging platforms, wikis, twitter, flickr, media-sharing sites, podcasting, content aggregators, social networks, social book-marking sites and other forms of participatory and social media. By these applications, learners' critical thinking skills can be enhanced through the opportunity to regularly compare their own contributions to those of their peers; and the affirmation of their relative standing in the class may be powerfully motivated for learning (Hurlburt, 2008). Since technology education deals with the application of critical thinking (cognitive domain) and the psychomotor domain, hence the application of Web 2.0 becomes necessary in teaching and learning of technology educational courses in tertiary institutions in Rivers State. The innovation of Web 2.0 provides numerous opportunities for social interactions and collaboration among students, teachers, subject matter experts, and professionals in different fields as well as a host of others with related interests (Hartshorne & Ajjan, 2009; Vygotsky, 1978). For the purpose of this paper, Web 2.0 is defined as a second generation Web applications that is more personalized and communicative having Web spaces that can effectively support and enhance active participation, connectivity, collaboration and sharing of knowledge and ideas among teachers and learners.

Statement of problem

Different courses have their own method that can best be taught with for better and easy delivery. This is determined by individual lecturers with his/her teaching method. It is pertinent to say that the worlds' advancement in technology today (e-world) has transcended and applied into diverse areas of discipline including education (e-teaching/learning). This has in one way or the other affected teaching and learning method, as individual lecturers and students are trying to acquaint and adapt themselves into the adaptation of the e-teaching/learning processes. For this electronic based instructional process to be effectively utilized in the classroom settings, the lecturers and students must have the knowledge and awareness of the computer and its application, possession of certain computer skills necessary for its operation, the institution must be equipped with the needed facilities.

It is true that all the lecturers and students in an institution teach and learn with the same facility and under the same condition but they have a varying level of skills, techniques and exposure. It is likely that the nature of individual lecturers and students, that is, their exposure to modern educational facilities like computers and its applications may have influenced their teaching and learning methods and its applications in the classroom.

Web 1.0 and other computer applications do not provide an avenue for visual interaction between the teacher and the learner or for immediate feedback. Today's students are digitally exposed and make increasing use of Web 2.0 technologies in their lives but vast majority of educators (teachers) still have little or no experience with these new tools (prensky, 2007) and it is against this backdrop that this study tends to investigate the application of Web 2.0 in the teaching and learning of technology education courses in Rivers State tertiary institutions as the problem addressed by this study.

Purpose of the study

The main purpose of this study is to describe how technology education courses can be taught and learnt in the classroom setting with Web 2.0 computer application. Specifically, the study seeks to:

- Examine the level of lecturers and students' usability of Web 2.0 in teaching and learning of technology education in tertiary institutions in Rivers State.
- Describe the conditions necessary for the application of Web 2.0 in teaching and learning of technology education in tertiary institutions in Rivers State.
- Determine the benefits of using Web 2.0 technologies in teaching and learning technology education courses in tertiary institutions in River State.
- Identify the barriers of using Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State.

Research Questions

The following research questions were answered in the study:

- What is the level of usability of lecturers and students of Web 2.0 in teaching and learning of technology education courses in tertiary institutions in Rivers State?
- What are the conditions necessary for the application of Web 2.0 in teaching and learning of technology education in tertiary institutions in Rivers State?
- What are the benefits of using Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State?
- What are the barriers of using Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State?

Research Hypothesis

H_{O1}: There is no significant difference in the mean response of the lecturers and students on the level of usability of Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State.

Methods and Materials

A descriptive survey design was used to carry out the study. The study was conducted within selected higher institutions in Rivers State which include Rivers State University of Science and Technology (RSUST), Port Harcourt and Ignatius Ajuru University of Education (IAUOE), Port Harcourt. According to Wikipedia, Rivers State is bounded by Bayelsa State Westward, Akwa-Ibom State Eastward, Imo and Abia State Northward and bounded Southward by Atlantic Ocean but lies on latitude (lat.4.8580767) and longitude (long.6.9209135). The target populations of the study were all lecturers and students from the selected institutions. A sample size of 360 (300 students and 60 lecturers) were selected for the study through simple random sampling technique. A self-structured questionnaire was used as data gathering instrument. A-5 point Likert rating scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD) with the numerical value of 5, 4, 3, 2 and 1 respectively was used. The instrument used was title "Questionnaires for Lecturers/Student's Perception on Usability Level of Web 2.0 technologies (QL/SPULWT)". The instrument consists of 33 items based on the research questions and hypothesis. Mean with Standard Deviation were used to analyze data for research questions while z-test was used to test the hypothesis at 0.05 level of significance. Experts in measurement and evaluation and vocational and technology education validated the instrument. The internal consistency reliability of the instrument was established by taking 13 students and 5 lecturers who were not part of the sample. A reliability of 0.75 was obtained using Cronbach alpha.

Result and Discussion of Findings

Research Question 1: What is the level of usability of lecturers and students of Web 2.0 in teaching and learning of technology education courses in tertiary institutions in Rivers State?

Table 1: Mean Response of Students and Lecturers Usability Level of Web 2.0 in Teaching and Learning (N_1=300, N_2=60)

S/NO	Item Statement	Students		Lecturers		Decision
		X_1	SD_1	X_2	SD_2	
1	Are you aware of Web 2.0	3.13	0.53	3.16	0.86	Accepted
2	Have you used Web 2.0 application	2.73	0.84	2.58	0.54	Rejected
3	There was high performance with web 2.0 during your first usage.	2.04	0.61	2.13	0.71	Rejected
4	Web 2.0 is widely used for teaching and learning in your school.	2.06	0.93	2.17	1.05	Rejected
5	The application of Web 2.0 enhance teaching and learning.	2.80	0.66	2.58	0.86	Rejected
6	Web 2.0 is effective in the learning of technology education courses.	2.20	1.03	2.83	0.79	Accepted
	Average	**2.49**	**0.76**	**2.57**	**0.80**	**Rejected**

Source: *Researchers' Survey work, 2017;* Mean ($\bar{X}$)≥ 3.00 is Accepted otherwise Rejected

The Table shows the level of usability of Web 2.0 by students and lecturers of technology education in Rivers State tertiary institutions. The result shows that the respondents only accepted item 1 that they are aware of Web 2.0. From the Table, respondents rejected items 2-6.

Research Question 2: What are the conditions necessary for the application of Web 2.0 in teaching and learning of technology education in tertiary institutions in Rivers State?

Table 2: Mean Response of Students and Lecturers on the Necessary Conditions for Web 2.0 Application in Teaching and Learning (N_1=300, N_2=60)

S/NO	Item Statement	Students		Lecturer		Decision
		X_1	SD_1	X_2	SD_2	
7	Lecturers' computer literacy is a condition for teaching with Web 2.0.	4.01	0.87	4.15	1.05	Accepted
8	Availability of power supply is necessary for teaching with Web 2.0.	3.76	0.64	3.66	0.81	Accepted
9	Mobile devices (IPad) can be used to teach and learn Web 2.0.	3.90	0.90	3.83	0.71	Accepted
10	Students' computer literacy is a condition for learning with Web 2.0.	3.43	1.04	4.08	0.63	Accepted
11	The use of personal computer is compulsory for lecturers to teach Web 2.0.	3.80	1.12	3.58	1.04	Accepted
12	E-classroom is necessary for the application of Web 2.0.	3.63	0.61	4.06	0.62	Accepted
13	Internet accessibility is a condition for Web 2.0 usage when using personal computer.	4.12	0.74	3.67	0.68	Accepted
14	The possession of personal computer by the student is necessary for Web 2.0 usage	3.06	0.58	3.50	0.84	Accepted
	Average	**3.71**	**0.81**	**3.82**	**0.79**	**Accepted**

Source*: Researchers' Field Survey, 2017:* Mean ($\bar{X}$) ≥ 3.00 Accepted else Reject

It is very clear that Web 2.0 technologies are only functional and applicable depending on certain factors. Some among them are: Lecturers level of computer literacy, availability of power supply, mobile phone can be used in teaching and learning, students' computer literacy and the use of personal computer by the respondents. Also, the respondents conceded that e-classroom, internet accessibility, possession of personal computer by the students are factors for its application. From Table 2, respondents agreed that items 7-14 are conditions necessary for the application of Web 2.0 in teaching technology education courses.

Research Question 3: What are the benefits of using Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State?

Table 3: Mean Response of Students and Lecturers on the Benefits of using Web 2.0

(N_1=300, N_2=60)

S/NO	Item Statement	Students		Lecturers		Decision
		X_1	SD_1	X_2	SD_2	
15	Web 2.0 enhances interaction between lecturers and students.	3.16	0.87	3.08	1.04	Accepted
16	It helps to build communication skills of lecturers and students.	3.79	0.61	3.73	0.67	Accepted
17	It fosters collaboration in solving academic problems among students.	4.03	0.65	4.09	0.57	Accepted
18	It is a platform for knowledge creation and sharing.	3.68	1.02	4.37	0.84	Accepted
19	Web 2.0 strengthens students' critical thinking.	3.50	0.92	4.18	0.73	Accepted
20	It enhances learners' creativity through peer review.	4.21	0.59	3.33	0.90	Accepted
21	Web 2.0 encourages the teaching and learning outside the classroom environment.	4.16	0.90	4.50	1.01	Accepted
22	It promotes learners' self-participation outside the classroom.	4.20	1.03	3.58	1.04	Accepted
23	It develops learners' writing speed and accuracy.	3.50	1.01	3.57	0.64	Accepted
24	It bridges the gap between home and school.	3.86	0.81	3.16	0.67	Accepted
	Average	**3.81**	**0.84**	**3.76**	**0.81**	**Accepted**

Source*: Researchers' Field Work, 2017:* Mean ($\bar{X}$) ≥ 3.00 Accepted otherwise Reject

From the respondents' opinion in Table 3 on the benefits of using Web 2.0 technologies in teaching and learning technology education courses, the respondents agreed that items 15-24 are benefits of using Web 2.0 in teaching and learning.

Research Question 4: What are the barriers of using Web 2.0 technologies in teaching and learning of technology education courses in tertiary institutions in Rivers State?

Table 4: Mean Response of Students and Lecturers on Barriers Negating Web 2.0 Application (N_1=300, N_2=60)

S/NO	Item Statement	Students		Lecturers		Decision
		X_1	SD_1	X_2	SD_2	
25	Internet affects the performance of Web 2.0	4.01	0.81	3.41	0.69	Accepted
26	Lack of adequate facilities for its application	4.30	0.64	3.75	0.53	Accepted
27	Lack of users interest to use Web 2.0	4.06	0.52	4.08	0.64	Accepted
28	Low bandwidth.	3.78	0.83	3.16	0.82	Accepted
29	Lack of adequate facilities for Web 2.0	3.96	0.65	3.50	0.66	Accepted
30	Poor public awareness by lecturers and students	2.64	1.04	2.83	0.97	Rejected
31	Lack of funds to undergo individual training	4.13	1.08	3.82	0.87	Accepted
32	Inadequate power supply	4.67	0.67	4.47	0.68	Accepted
33	Lack of Web 2.0 skills	4.63	0.73	4.01	0.74	Accepted
	Average	**4.02**	**0.77**	**3.67**	**0.73**	**Accepted**

Source: *Researchers' Field Work,* 2017: Mean ($\bar{X}$) $\geq$ 3.00 is Accepted else Reject

The result in Table 4 of this study reveals that the major barriers encountered by lecturers and students in teaching and learning with Web 2.0 technologies include: internet performance, lack of adequate facilities to used, lack of users' interest, low bandwidth. Others are: lack of adequate training facilities, low public awareness, lack of funds for individual training, inadequate power supply and lack of Web 2.0 skills.

Discussion of Findings

The result of item 1 is in agreement with the work of Okonedo, Azubuike and Adeyoyin (2013) which reveals that 135 (60%) out of 225 respondents of information and library professionals in south-west Nigeria libraries are aware of this technologies (Web 2.0). In another confirmation, prensky (2007) affirmed that "todays' students are digitally exposed and … increasing (tending to) use web 2.0 technologies in their lives". Item 1 shows that the respondents (Lecturers and Students) are aware of web 2.0 while item 2-6 indicated that this technology has not been used by the respondent in teaching and learning. This result is in contention with prensky (2007).

From Table 2, respondents agreed that items 7-14 are conditions necessary for the application of Web 2.0 in teaching technology education courses. This is in support with the observation that "Not all students have computers, not all are skilled users and not all want to use technology" (Oblinger ,2008; p.8).

In examining the benefits of Web 2.0 tools, item 15 is in agreement with the submission of Thompson (2007) that "it has the potential to provide more interactive and customized learning environments where students create knowledge, rather than passively receive information from instructors, interact with those who have similar interests globally". In another dimension, item 22 findings support the suggestion of Elgort, Smith and Toland (2008) as pointed out that "many students (learners) still favour individual learning instead of working collaboratively". The finding is in confirmation with the study of (Cattafi & Mertzner, 2007) as affirmed that "collaborative tools can serve as a knowledge platform for a community of professionals where members of the community can share their knowledge with the group, post information, work together and critically discuss issues".

From the Table 4 analysis, item 29 identifies inadequate facilities (computers) as a barrier for Web 2.0 application. Today's students integrate technology in their everyday activities which help them connect to their families, friends, and other pals through technology. This result is in consistence with Oblinger (2008) when it contends that "not all students have computers, not all are skilled users and not all wanted to use technology" (p.18). Findings from the study revealed that lack of internet accessibility and low public awareness of the existence of Web 2.0 technologies affect its application in teaching and learning in tertiary institutions in Rivers State. This is in collaboration with Atulomah (2010) who observed that there was lack of formal workshops in southwest (Rivers State) Nigeria to acquaint librarians (lecturers and students) with the emerging concept of web 2.0. From the findings of this study, the major barriers faced by lecturers and students in Rivers State tertiary institutions in the application of Web 2.0 tools are low bandwidth, time constraint. However, other barriers include inadequate power supply, lack of funds to undergo individual training, lack of users' interest and lack of Web 2.0 skills among others. This agrees with the submission of (Buur & Larsen, 2008; Eyitayo, 2010; Harnesk, 2010; Mostert, 2008; Banda, 2011) who found out that the problems associated with the use of Web 2.0 tools were linked to inadequate power supply, low bandwidth, inadequate training facilities, lack of Web 2.0 skills and time constraint.

Test of Hypothesis

Table 5: z- test Analysis of Mean Response of Lecturers and Students on the Usability Level of Web 2.0

Group	N	Mean ($\bar{X}$)	SD	Df	Zcal	Zcrit	Decision
Student	300	2.49	0.76			1.960	Accepted
Lecturer	60	2.57	0.80	358	-0.71		

Decision: Zcal < Zcrit; Accept Ho_1 **N_1=300; N_2=60**

Since the Zcal (-0.71) is less than Zcrit (1.960) at 0.05 level of significant, this implies that the null hypothesis is accepted that there is no significant difference in the mean score of students

and lecturers on the level of usability of Web 2.0 in teaching and learning of technology education courses in Rivers State tertiary institutions.

Conclusion

The awareness and usability level of Web 2.0 technologies among lecturers and students in Rivers State tertiary institutions as they are exposed to more modern digital technologies. It is therefore imperative to state that the future of these technologies (Web 2.0) in educational circle will continue to improve teaching and learning processes especially for effective transfer and delivery of lectures, seminar presentations etc. This research paper considers the present level of awareness and use of Web 2.0 tools, benefits, conditions necessary for its application as well as barriers. From this study, it is convincing that lecturers and students are aware of the existence of Web 2.0 technologies but more publicity needs to be done on the level of usability and their benefits for teaching and learning in tertiary institutions.

Recommendations

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

I. Each departments, faculties and universities should provide technical support for staff in-service training of Web 2.0 technologies.

II. All relevant bodies and organizations on social networking should assist in creating more awareness forum on the use and benefits of Web 2.0 technologies as applies to teaching and learning.

III. The Nigerian University Commission and other relevant bodies, organizations and agencies should organize more workshops, seminars on Web publishing and computer literacy to enable lecturers and students acquire skills for the use of Web 2.0 technologies.

IV. Universities and other tertiary institutions should adopt the use of Web 2.0 technologies for lecture delivery, seminar presentation, project, theses and dissertation defence. This will compel the university community and other higher institutions to use these technologies for official and research purposes.

V. The institutions should provide alternative means of power supply system such as solar system, inverter etc.

VI. The institutions should provide a fast and speedy internet facilities service with a wider coverage (bandwidth).

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