
ISSN:

Print - 2277 - 078X

Online - 2315 - 747X

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**Journal of
Humanities, Social
Sciences and Creative
Arts**

WEB 2.0 AS AN INSTRUCTIONAL TOOL IN TEACHING LARGE CLASSES AT FUNAAB, NIGERIA

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ABSTRACT

Digital technology has become an indispensable communication tool for students and educators in the past two decades. Currently, academic institutions view digital technologies as essential instructional content delivery media for both pedagogical and research purposes. This study assesses the extent of improvement of students' learning through the use of Web 2.0 as an instructional tool in large classes using Analysis of Variance (ANOVA). It juxtaposes this with the overall performance of students after the use of traditional lecture delivery method on some selected courses at the Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria. These experiments were carried out at the end of the 2014/2015 academic session. Within this period, out of the selected courses, two courses (GNS 103 and GNS 204) were taught without the use of ICT technology while the others (HSM 207 and AAD 507) were taught using Web 2.0. The study revealed that there was a significant difference in the evaluation of the academic performance of the students taught with Web 2.0 technology, compared with those taught without it: 95.4% of the students taught with Web 2.0 technology in class were able to make evaluative comments and contributions to the courses. Finally, the study called for future innovation and opportunities for additional research

Keywords: Web 2.0, instructional tools, academic performance, interactive learning, social media, user-generated content

INTRODUCTION

Before now, students and researchers had difficulty getting sufficient information for their research work, sifting library materials but with the advent of the Internet, it has become possible to access thousands of gigabytes of information within seconds. The internet has, indeed, revolutionized and expanded available information, access and management. It has profoundly facilitated academic work for both the learning and the teaching processes. Recently, with the

introduction of social media applications, students have become "digital natives" (Prensky, 2007), as they make increasing use of Web 2.0 technology in their daily lives. Web 2.0 is also known as Learning 2.0: it provides users with online networks and communities for multi-directional communication and knowledge exchange and allows them to publish and share digital contents, such as photographs, videos and music (Redecker, 2009). Online videos, podcasts, and wikis are used for teaching, and students

are sometimes required to view them to upgrade their assignments. Aborisade (2012: 16) posits:

In order for us to nurture a generation of lifelong learners, 21st century workers and global citizens, we, as teachers, need to be versatile and proficient in digital and information technologies, and be competent in incorporating ICT ICTs provide valuable tools to improve teaching and learning. For teachers, ICTs provide a professional resource and mode of course delivery that takes advantage of all known learning modes, especially when combined with traditional face-to-face teaching. For students, ICTs provide opportunities to interact more effectively and to develop literacy skills including skills in critical literacy.

Web 2.0 packages, such as Facebook, Micro-blogs (Twitter), YouTube, Flickr, Blogs, Instagram, Blackberry messenger, WhatsApp, among others, afford teachers opportunities to extend their practice and develop their research abilities. Students in the twenty-first century have gone beyond using the Web for accessing information, they have evolved an active and interactive online communication culture which holds a lot of promise, and possesses hidden potentials, for transforming higher education (Tomita, 2009). Bodunde *et al* (2012) also confirmed the collaborative use of "Google Doc" and "Google Scholar" in the development of improved and qualitative writing among students.

Baron (1999) reported that Web 2.0 has successfully enabled new forms of knowledge creation and connectivity, through Wikis and interactive blogs, which have af-

fectured how users analyze, gather, use, and disseminate information. The use of Web 2.0 technology in teaching and learning provide Web interfaces where students and educators easily connect and widely share information. Its learning enhancements involved the use of Microsoft Office tools such as PowerPoint and e-mail; other innovative applications include online interactive Web chats, specific interest forums, streaming video, electronic conferencing and Voice-Over-Internet-Protocol systems, such as Skype and "blended learning" programmes (Hawawini 2005). These technologies have encouraged and facilitated teaching and learning in classrooms, distant learning, and anywhere there is Internet access. O'Reilly (2005) claims that its applications rely on user-generated content and interactivity; and by this, he means that students have control over the content and the choices they make in relation to what is preserved and what is discarded.

In view of the enhancement of Web 2.0 in teaching and learning in the current dispensation, this study assessed and juxtaposed the effect of Web 2.0 as an instructional tool in large classes and the overall students' performances as against the use of conventional lecture delivery on some selected courses at FUNAAB. As it was discovered that large classes have been found to hinder active participation of students in the learning process, reduce both the quality of instruction and the frequency of feedback to students This study was conducted during the 2014/2015 academic session in which two courses *Social Problems and Culture* (GNS 103) and *Logic and History of Science* (GNS 204) were taught without the use of ICT technology i.e. strictly using the traditional lecture delivery approach, while two others courses *Household Resource Management* (HSM 207) and *Training and Development* (AAD 507) were taught using

Web 2.0. The result of Web 2.0 application on students' academic performance in these courses was considered and compared.

What is Web 2.0?

Web 2.0 is a read or write online communication technology which describes the new interactive cultural trends such as social networking, blogging, podcasting and streaming media. It is a development over Web 1.0, which was read-only technology where Internet users were able to simply retrieve or forward information online. Web 2.0 provides ways for creating information and new knowledge for users to control their online experience and influence the experience of others (Funk, 2008). Hence, users have now become active participants and content creators. The interactive and collaborative advantages of Web 2.0, which is a powerful motivation for learning, expose learners to new knowledge and critical thinking skills by comparing their contributions with that of their peers and affirming their relative standing among their classmates (Hurlburt, 2008).

The interactive nature of Web 2.0 and its graphics facilities have inadvertently brought about a paradigm shift in Web usage as students are more receptive to graphics than plain text and function best when networking (Prensky, 2001a & Prensky, 2001b). Baguley, Pullen, & Short (2010: 4) submit that "the growing range of technologies provides us with choices that allow for sophisticated visual, auditory, graphic and digital representation which require new understanding of how messages are sent, received, stored, replicated and reshaped". The participatory and open nature of Web 2.0 creates conducive ground for collaboration with new knowledge, empowering connections and fostering a sense of commu-

nity among users. Knowledge is, therefore, decentralized, more accessible and co-constructed among a broad range of users. Its applications have participative elements that not only encourage, but also allow users to add, edit or simply rehash content. Thus, Association of College and Research Libraries (2000:9) declares that if adopted as classroom tool, Web 2.0 will grant students the "opportunity for self-directed learning. It encourages them to become engaged through the use of a wide variety of information sources to expand their knowledge, ask informed questions, and sharpen their critical thinking for still further self-directed learning".

With the adoption of Web 2.0, educators have begun to alter their pedagogical approaches to align with their students' culture, assisting them to complete their set tasks in a familiar environment (Halverson, 2009). With the vast variety of information accumulated and disseminated with Web 2.0, learners have been influenced into the culture of reading and writing, developing new genres and modes that require additional metacognitive skills. Students' existing social online behaviour and practices are formalized and their thinking processes redirected in consonance with the rapid exchange of information required by the digital age. Despite the ingenuity of Web 2.0 and its functionality, Akeredolu-Ale *et al* (2014) suggests that it cannot be a once-and-for-all step but a scheme of steps, scalable and sustainable, for updating knowledge and skills in constantly emerging technological tools and evaluating them to determine the most appropriate teaching situations.

Using Web 2.0 technology in teaching and learning

The introduction of Web 2.0 as a tool for

teaching and learning has helped to overcome some noticeable challenges of the conventional teaching methods, such as rigidity and abstract nature of lecture delivery method, boring lecture sessions and decline in students' lecture attendance. These problems are traceable to the difficulties which students encounter in taking notes and comprehending lectures at the same time.

The use of PowerPoint with appropriate graphics and clarity in presentation enhanced quick and easy teaching and learning, thereby supporting and encouraging students to actively participate and interact in the classroom. An interactive lecture dissolves passivity of students in class. It creates deeper understanding of course material by getting students involved and active in the learning process. Adopting Web 2.0 technology for teaching instills a sense of community, increases interaction and communication among the instructor, students, and other people, and promotes collaboration and resource sharing (An *et al.*, 2009). It reduces the distance between the teacher and the students. Students learn about new ways of collaboration. Students and teachers now see learning as a social process and not just about the book and the reader. Students are given the opportunity to create content themselves instead of just listening to lectures, and this supports active and student-centered learning in which students autonomously take responsibility and initiative in the learning process. The teacher plays the role of a facilitator of learning rather than that of a distributor of knowledge. Hence, teaching and learning become more of a collaborative and flexible activity enabling students to easily develop writing and technological skills. This is a radical departure from the conventional rigid method where students only listen to lectures as dic-

tated by the lecturer. It provides an environment that helps teachers to understand better the world of their students, and, thus, motivates them accordingly. Web 2.0 tools remove time constraints by providing a more flexible learning environment that is not inhibited by classrooms walls. Web 2.0 tools are flexible and easy-to-use.

However, the open nature of Web 2.0 technology is relatively overwhelming for many students. For this reason, they are uncomfortable and reluctant to participate in class activities where such facility is in use. These students prefer one-to-one teacher-student interaction to the public and peer-to-peer interactions. Some students have problem adjusting to new technology and encounter some technical issues using Web 2.0 tools. Obviously, it takes time to learn and manage new technologies. Thus, it might take a substantial amount of time learning its application, and this might take the teacher and students away from the subject matter of the course content for a while. Educators should therefore be prepared to support, guide and supervise students in this process, especially students who are not very conversant with social media.

Web 2.0 and students' academic performance

Tuckman (1975) defines performance as the apparent demonstration of understanding, concepts, skills, ideas and knowledge of a person, and proposes that grades clearly depict the performance of a student. Hence, it is important to keep and manage effectively those factors that could positively influence the academic performance of students from time to time. Thus, the use of the Internet, particularly Web 2.0, in learning and teaching, is one factor that currently affects students' academic performance positively or

negatively.

A study in the University of New Hampshire revealed that 63% of students who were heavy users of the Internet obtained higher grades while 65% of light users obtained lower grades (U of NH, 2009). Majority of the students used social networking for social connections and entertainment; but at the same time, they also used it for educational and professional reasons. Linda *et al* (2006) cited in Ishfaq *et al* (2011) also reported that students who used the Internet frequently scored higher on reading skills test and had higher grades than those who did not.

Background information and problem statement

The Federal University of Agriculture, Abeokuta, (FUNAAB) Nigeria, is a practical and application-oriented university offering degree courses in Agriculture, Natural Sciences, Engineering, Veterinary Medicine, Environmental and Management Sciences. It is a third-generation institution in Nigeria, established in 1988. At FUNAAB, a typical degree course has the duration of eight semesters, and generally, the fifth and sixth semesters are devoted to industrial attachment and farm practical.

Over the years the number of candidates seeking admission into Nigerian universities has increased, with FUNAAB witnessing an increase from about 1500 to about 3500 in the past 5 years. This situation has no doubt compounded the problem of managing large classes, a difficulty which teachers and students were confronting before the prodigious increase (Aduradola and Akeredolu-Ale, 2013).

There has been a mounting debate on the negative effect of large classes on students' performance and effective teaching and learning experiences (Koshy, 2011; Ker, 2011 cited in Aduradola and Akeredolu-Ale, 2013). Large classes have been found to hinder the active participation of students in the learning process, reduce both the quality of instruction and the frequency of feedback to students; further, it inhibits student motivation and development of cognitive skills in the classroom experience (Aduradola and Akeredolu-Ale, 2013).

A major reason for the increase in the intake of students can be traced to "the democratization of (higher) education." According to Koshy (2011) cited in Aduradola and Akeredolu-Ale, 2013, "Educators have had to adopt new practices to facilitate teaching and learning process without compromising quality". While group work is desirable, the lack of stimulation of the audience, little involvement of presenters, unequal distribution of assignment and unhealthy relationship among members are identified as limitations of oral presentations in group work (Koshy, 2011 cited in Aduradola and Akeredolu-Ale, 2013). In addition, large classes make effective assessment of individual students and all aspects of the teaching and learning process Herculean tasks for teachers.

Reliance on the traditional approach which subjects students to written examinations, quizzes and term papers are inadequate to assess individual students' ability so if we want to change the way students learn and the content of what they learn, the most effective way is to change the way we assess them (Birenbaum *et al.*, 2005). The challenges of managing large classes at FUNAAB are quite enormous due to insufficient time allocation for lectures, staff strength and space.

This background provides a justification for the need to adopt alternative/complementary assessment methods and strategic approaches to make teaching and learning viable, more appealing and result-oriented. Therefore, the use of Web 2.0 application was introduced as an additional method to the traditional teaching methods. This blended approach has enhanced performance and output in the courses into which it had been incorporated.

METHODOLOGY

The e-learning experiments at FUNAAB

Stratified sampling technique was used to select respondents for this study. The students were stratified into two groups, that is the experimental group which consist of students offering AAD 507 and HSM 207 while the control group consist of students offering GNS 103 and GNS 204. Furthermore, the students were initially grouped into a size of 10-15 but, with increased student population, the group size increased to 20-25 subject to students' departmental affiliation. The awareness raising aspect of the courses was done as a means of introducing students to the syllabi and the mode of operation for teaching and learning interaction. These activities involved the course lecturers giving practical and task-based examples, encouraging discussions through drills, question and answer sessions and use of mobile devices to demonstrate to students that for communicative competence to be achieved there is the need to check and re-check on the various aspects of communication skills being acquired. For the teaching of AAD 507 and HSM207, the students were grouped into a size of 12-15 and each group was to research on given topics. The groups were engaged in presentations and discussions using digital tech-

nologies especially PowerPoint while other class members asked questions on the different topics and there was interaction among class members for better understanding of the courses.

The score performance of students who participated in AAD 507 and HSM 207 using the methodology described above was compared to the score performance of students who were not exposed to the methodology. GNS103 and GNS 204 were taught using the traditional approach of lecture method, where the teacher manned the podium or an elevated platform to teach the students and various tasks were assigned to them to test their absorption of information and knowledge acquisition. These two courses were used for this evaluation.

Objectives of the study

This research was undertaken to compare the academic performance of the students taught with or without Web 2.0 so as to determine the extent of improvement of students' learning through digital technologies, their ability for absorption of information and knowledge acquisition and, classroom interactive ability.

Hypothesis of the study

To achieve this objective, the hypothesis of the study is that there is a significant difference in the academic performance of students taught with Web 2.0 technologies, as compared to that of those taught without it.

RESULTS AND DISCUSSION

The academic results of students who took the four courses under consideration, GNS 103& GNS 204 on the one hand, and HSM 207 & AAD 507 on the other, were subjected to test of difference. This was done by comparing the scoreperformances of the stu-

students in the two courses in which they were taught using Web 2.0 application with the two courses in which they were taught without using the Web 2.0 application.

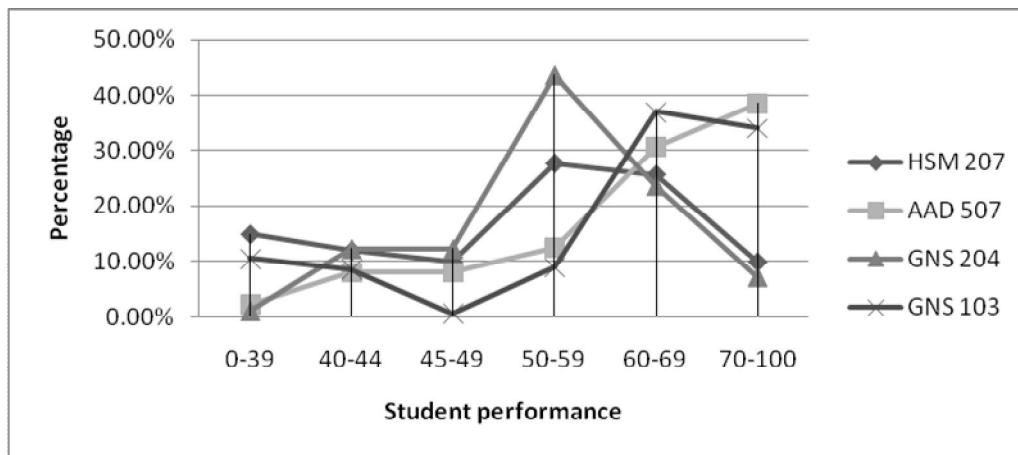


Figure 1: Student academic performance in the four (4) courses

Fig. 1 shows the academic performances of students in the four courses under consideration. For HSM 207 which was taught using Web 2.0 application, more than 25% of the students scored between 50% and 59%, followed by another 25% scoring between 60% and 69%. For AAD 507, the second course taught using Web 2.0, about 30% of the students scored between 60% and 69%, while more than 35% scored 70% and above. More than 35% of the students taught GNS 103 without Web 2.0 scored between 60% and 69%, while more than

30% of the students scored 70% and above. Also, the academic performance of the students who were taught GNS 204 without Web 2.0 indicated that more than 40% of them scored between 50% and 59%, while more than 20% scored 60% and above. This corroborates a study in the University of New Hampshire which revealed that students who were heavy users of the Internet obtained higher grades, while those who were light users of the Internet obtained lower grades (U of NH, 2009).

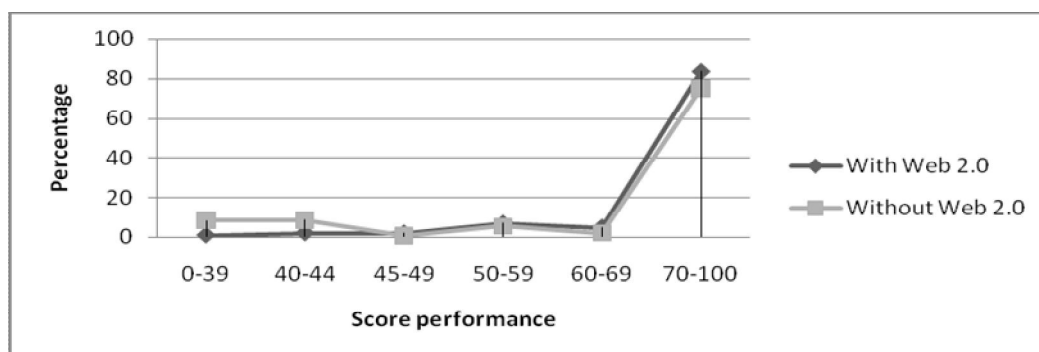


Figure 2: Student academic performance with and without web 2.0

Table 1: Benefits of Web 2.0 in enhancing respondents' academic skills

The result in Table 1 presents the benefits of web 2.0 in enhancing respondents' academic skills. Findings indicated that the 64.0 percent HSM students agreed that face-face instruction received from their teachers increased their awareness of academic skills while 63.8 percents agreed to the facts that the potentials offered by ICTs for interacting with their teachers is immense. On the other hand, 61.3 percent of the AGAD students agreed that their use of ICTs as a platform for learning has improved their academic skills while 56.5 percents posited that the potentials offered by ICTs for interacting with their teachers is immense.

The result in Figure 2 showed that there is a significant difference ($p < 0.05$) in the academic performance of the students in the two courses taught with Web 2.0 application and the two courses taught without it. This implies that the use of Web 2.0 application enhanced academic performance of the students in the courses where it was used. This is in consonance with Linda *et al.* (2006), which reported that students who used the Internet frequently scored higher on reading skills test and had higher grades than those who did not.

Students' evaluation of Web 2.0

Though the performance in the examination results of the students showed very little significant difference, at the end of the session, positive feedback was given by the students based on the survey conducted via a questionnaire at the end of the AAD 507 and HSM 207 experiment. The following benefits of using digital technologies presented in Table 2 were inferred:

1. Students now have improved academic skills in the use of digital technologies as 96% of them reported that their academic skills have improved. The exposure to Web 2.0 made them read more, be more active and attentive in class. Hulburt (2008) justified this position, stating that learners' exposure to Web 2.0 improved their motivation to learning.
2. A high number of the students (95.4%) reported that they are now able to make evaluative comments and contributions in class sessions, unlike those students who were taught without using Web 2.0 application.
3. More than 90% of the students were able to locate good sources of learning from other relevant sites.
4. About 88.6% of them were able to make inferences from different topics as a result of the collaborative and interactive advantage of Web 2.0 applications, corroborating Prensky's (2001a and 2001b) claim that when students are exposed to the diverse nature of Web 2.0 technologies, they perform at their best.
5. In all, 87.0% claimed that they now have a better understanding of the courses.

As observed elsewhere, this finding corroborates Jones (2003) that the use of Power-Point promotes clarity of presentations and improves structure of lectures. Amongst many other benefits, it encourages active note-taking based on the course outline, thereby facilitating understanding of the courses (Fapojuwo *et al.*, 2015).

Table 2: Benefits of Web 2.0 in enhancing respondents' academic skills

Variables	HSM					AGAD				
	SA	A	SD	D	U	SA	A	SD	D	U
My use of the ICTs as a platform for learning has improved my academic skills	24(39.3)	34(55.8)	34(55.8)	2(3.3)	1(1.6)	20(32.3)	38(61.3)	2(3.2)	1(1.6)	1(1.6)
My use of the ICTs for interacting with my teachers has improved my academic skills	13(21.3)	30(49.1)	8(13.9)	2(3.3)	8(13.1)	16(25.8)	31(50.0)	8(12.9)	5(8.0)	2(3.2)
My use of the ICTs for interacting with my peers has led to an improvement in my academic literacy skills	21(34.4)	32(52.4)	3(4.9)	3(4.9)	2(3.3)	15(24.2)	34(54.8)	7(11.3)	2(3.2)	4(6.5)
The potentials offered by ICTs for interacting with my teachers is immense	16(26.2)	39(63.8)	4(6.6)	1(1.6)	1(1.6)	21(33.9)	35(56.5)	3(4.8)	2(3.2)	1(1.6)
The potentials offered by ICTs for interacting with other learners is immense	14(23.0)	32(52.5)	9(14.8)	6(9.8)	-	16(25.8)	33(53.2)	8(12.9)	2(3.2)	3(4.8)
The face-to-face instruction that I received from my teachers increased my awareness of academic skills	13(21.3)	39(64.0)	6(9.8)	2(3.3)	1(1.6)	14(22.6)	34(54.8)	8(13.0)	2(3.2)	4(6.5)
The face-to-face instruction that I received from my teachers increased my knowledge of academic skill	24(39.3)	35(57.4)	1(1.6)	1(1.6)	-	22(35.5)	34(54.8)	8(13.0)	2(3.2)	4(6.5)
The face-to-face Instruction that I received from my teachers enhanced my performance in the test of academic skill	23(37.7)	31(50.8)	4(6.6)	-	3(4.9)	22(35.5)	33(53.2)	3(4.8)	4(6.5)	-
ICT is a useful platform for learning	22(36.1)	28(42.6)	5(8.2)	3(4.9)	3(4.9)	25(40.3)	31(50.0)	4(6.5)	2(3.2)	-
Use of ICTs has increased my awareness of academic literacy skills	28(45.9)	26(42.6)	2(3.3)	2(3.3)	3(4.9)	23(37.1)	29(46.8)	8(13.0)	1(1.6)	1(1.6)
Use of ICTs has increased my knowledge of academic literacy skills	28(45.9)	26(42.6)	2(3.1)	2(3.3)	3(4.9)	27(43.5)	27(43.5)	3(4.8)	4(6.5)	1(1.6)
Use of ICTs has increased my performance in test of academic literacy skills	23(37.7)	29(47.5)	2(3.3)	1(1.6)	6(9.8)	17(27.4)	33(53.2)	7(11.3)	4(6.5)	1(1.6)
The ICT is a good platform for learning from my teachers	23(37.7)	29(47.5)	293.3)	1(1.6)	6(9.6)	18(29.0)	31(50.0)	2(3.2)	9(14.6)	2(3.2)
The ICT is a good platform for learning from my peers	23(37.7)	30(49.2)	2(3.3)	2(3.3)	4(6.6)	15(24.2)	35(56.5)	3(4.8)	8(13.0)	1(1.6)
The ICT is a good platform for learning from sources such as learning sites	22(36.1)	31(50.8)	3(4.9)	4(6.5)	1(1.6)	15(24.2)	31(50.0)	7(11.3)	7(11.3)	2(3.2)

Source: Field Survey from Fapojuwo et al., 2015

Table 2: Test of difference of academic performance with and without web 2.0

Variables	Sum of square	DF	Mean square	F	P-Value	Decision
Between group	1651.073	1	1651.073	9.587	0.002	Significant
Within group	248513.9	1443	172.220			
Total	250165.0	1444				

Source: Computed from the survey data, 2015; P-value is significant at 0.05 level

CONCLUSION

Students in the twenty-first century grew up in the era of the Internet, hence, it is not out of place that they are influenced by it. The FUNAAB experience is evidence of our contribution towards a conscious effort to guard and guide students towards positive and effective use of the Internet in order to prevent it affecting their academic performance negatively. Shah *et al* (2001) proposed that students should use the Internet positively, particularly, for knowledge creation and dissemination. Students' use of Internet resources only for pleasure or leisure activity will definitely affect their academic performance negatively. Web 2.0 tools are excellent aids for presentation in that they facilitate teaching and learning, provided that each presentation is considered from an instructive, educational, academic and pedagogical viewpoint, bearing in mind class size and different ways in which students learn to avoid passivity in classroom interaction. When used appropriately and based on the creativity of the teacher and students, Web 2.0 tools are flexible to improve and facilitate the development of interactive teaching and learning among teachers and students. Since the introduction of the blended approach through the incorporation of Web 2.0 tools, experiences suggest a more convenient and

faster assessment of students' assignments, more interactive relationships between teachers and students, and among students. Apart from the evidence of improved performances observed from students' responses in the classroom, their class attendance has also improved, with both students and teachers enthusiastically looking forward to the next class (Aduradola and Akeredolu-Ale 2013). Finally, there is need to monitor and document the factors influencing observed outcomes and impact which the incorporation of the Web 2.0 applications is having on academic performance. This is the only way to ensure that there is a sound empirical basis for the rational review of teaching methods whenever the need for such arises.

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(Manuscript received: 17th February, 2017; accepted: 24th April, 2017)