



Use of Web 2.0 Technologies for Teaching and Learning in Selected Federal Universities in Southwest Nigeria

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DECLARATION

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ABSTRACT

This study investigated the extent of use of Web 2.0 technologies for teaching and learning (TAL) purposes in selected federal universities in southwest Nigeria. The study addressed the following research questions: What kinds of Web 2.0 technologies are used by academic staff and students, and for what purposes? To what extent are Web 2.0 technologies integrated into TAL in Nigerian universities? How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the federal universities? How does attitude influence intention to use Web 2.0 technologies for TAL in the federal universities? How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the federal universities? What net benefits can be derived from the use of Web 2.0 technologies for TAL purposes? The study was guided by a blend of theoretical frameworks that included the updated DeLone and McLean model; the Media Synchronicity Theory and Technology Acceptance Model.

The study adopted the post-positivist paradigm and employed the mixed methods approach with quantitative method as dominant over qualitative method. A convergent mixed method design was employed along with the survey research design using structured questionnaires and semi-structured interviews to collect quantitative and qualitative data respectively. The population of the study comprised of undergraduate students and academic staff drawn from two purposively selected federal universities in Southwest Nigeria. Survey questionnaires were used to collect data from 195 academic staff and 331 undergraduate respondents, while interviews were used to elicit data from 8 heads of faculties and 8 faculty librarians. Quantitative data was analysed using descriptive statistics and SPSS while qualitative data was analysed using thematic analysis. Results of quantitative data analysis were presented using tables and charts while the results of the qualitative data analysis were presented in narrative description. Reliability and validity of survey instruments were ascertained through pre-test of data collection instruments and Cronbach Alpha test respectively. Response rates of 81.3% for academic staff, 93.8% for students and 87.5% for faculty heads and librarians respectively were achieved.

The findings revealed a high level of awareness and use of Web 2.0 technologies among academic staff and students. The findings further established frequent or occasional use of

Web 2.0 technologies such as Wikipedia, Instant messaging, Facebook, WhatsApp, YouTube, LinkedIn, Skype and blogs. The findings also revealed that students were more enthusiastic about the use of Web 2.0 than academic staff. Moreover, the findings revealed that service quality, information quality, and system quality jointly influenced attitude towards the use of Web 2.0 technologies for TAL. The findings revealed a significant positive relationship between attitude, media synchronicity and intention to use Web 2.0 and net benefits of using Web 2.0 for TAL purposes. The findings established system, information and service quality, net benefits, attitude, intention to use and media synchronicity as major factors influencing academic staff and students' use of Web 2.0 in Nigerian federal universities.

The originality of the study is based on the following facts: it examined a wide range of Web 2.0 technologies not covered in previous studies; it demonstrated an increase in the level of awareness and use of the technologies among academics and students particularly for TAL purposes; and provided a framework for developing Web 2.0 TAL models particularly for developing countries. The study makes significant contribution in the areas of policy, theory and practice. From the policy perspective, the study contributes towards the design policies that will support the integration and use of Web 2.0 technologies for TAL. Theoretically the study contributes towards laying a foundation to guide the design of models on information technology utilisation especially the Web 2.0 and particularly for studies conducted in developing countries. With regard to practice, the study contributes towards improving TAL activities and enlightening academics and students on various Web 2.0 technologies' usefulness for TAL purposes.

Based on the research findings, the following conclusions are drawn: the use of Web 2.0 technologies for TAL purposes was still low in the Nigeria universities surveyed; and that, attitude is an important factor that is most likely to influence the future use of Web 2.0 by academic staff and students. In addition, integrating Web 2.0 technologies that have greater benefits for TAL purposes is most likely to aid academic staff and students' intention to use the technologies. The study makes the following recommendations from policy, practical and theoretical perspectives: from the policy perspectives, the university should consider the development of institutional policy on the integration of Web 2.0 in TAL activities. As far as practice is concerned, the university should consider putting in place a programme of

capacity building to equip academic staff and students with skills needed to make effective use of Web 2.0 for TAL purposes. In addition, a programme of creating awareness about the utility of Web 2.0 technologies among academic staff and students for TAL purposes should be prioritized. From the theoretical perspectives, it is recommended that the gaps identified in literature and in the theories reviewed, should be further investigated in future research. Such gaps include among others: investigation on specific use of different Web 2.0 technologies for TAL in Nigerian universities; use of theories and qualitative approaches to investigate use of Web 2.0 among academics and students; identification of the most effective methods of integrating Web 2.0 technologies into TAL activities; and expanding studies to include postgraduate students.

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So then it is not of Him that wills, nor of Him who runs, but of God who has mercy (Romans 9:16)

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Success is determined not by whether or not you face obstacles, but by your reaction to them...each one strengthens you for the next - Ben Carson

DEDICATION

This thesis is dedicated to God the Father, Son and Holy Spirit, without whom I am nothing.

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LIST OF ABBREVIATIONS AND ACRONYMS

BI	Behavioural Intention
CMT	Computer-Mediated Tool
D&M model	DeLone and McLean model
DOI	Diffusion of Innovation Theory
DTPB	Decomposed Theory of Planned Behaviour
EE	Effort Expectancy
ER	Electronic Resources
FC	Facilitating conditions
FUNAAB	Federal University of Agriculture Abeokuta
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IRT	Information Richness Theory
IS	Information System
LMS	Learning Management System
MM	Motivational Model
MSN	Microsoft Network
MST	Media Synchronicity Theory
OAU	Obafemi Awolowo University
PE	Performance expectancy
PEOU	Perceived Ease of Use
PhD	Doctor of Philosophy
PU	Perceived Usefulness
RFID	Radio Frequency Identification
RSS	Really Simple Syndication
SI	Social Influence
SME	Small and Medium size Enterprise

SNS	Social Networking Site
SPSS	Statistical Package for Social Sciences
TAL	Teaching and Learning
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
U.I	University of Ibadan
UK	United Kingdom
US	United States
UTAUT	Unified Theory of Acceptance and Use of Technology
UKZN	University of KwaZulu-Natal
VC	Vice-Chancellor

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

The purpose of this study was to investigate the use of Web 2.0 technologies for teaching and learning (TAL) purposes in selected federal universities in the Southwest Nigeria. Emerging technologies, especially Web 2.0, have made learning environments more interactive, productive, and contextual than ever before (Lee, Williams and Kim 2012). Web 2.0 technologies are dynamic internet applications (Aharony 2008) that allow users to communicate with each other by creating, editing and sharing information. These technologies typically include Blogs, Forums, Wikis, micro-messaging, Cloud computing, RSS feeds, social networking tools, multimedia sharing, social bookmarking, podcasts and more (Moran, Seaman and Tinti-Kane 2011 and Emmanuel, Ebiere and Vera 2013). The Web 2.0 technology is different from the earlier Web 1.0 which is characterized as “read only web” (Drachsler, Hummel and Koper, 2008) and the evolving Web 3.0, a semantic web with networked digital technology to support co-operation of humans (Aghaei, Nematbakhsh and Farsani 2012). Web 2.0 technology is a “read-write web” (Mohammad 2011) which allow users do more than just retrieve information but also add, share or modify information. Rogers (2009) observes that in many cases “Web 2.0” and “social media” terminologies are interchangeably used to describe the same concept. Nevertheless, the term “Web 2.0 technologies” is a collective term for the social web which represents the online tools that facilitate collaboration, communication, and interactivity (Groff 2013).

Gaffar, Singh and Thomas (2011:129) noted that the rapid uptake of internet technologies, especially Web 2.0, around the world is astounding especially with the number of new users increasing daily. The rise of affordable handsets and broadband connectivity drives the fast penetration and use of the Web 2.0 technologies and social networks (Mutula 2013). Web 2.0 technologies are used by individuals, businesses, education, government, knowledge workers and other organizations as means of socializing, collaborating, communicating and disseminating information (Kay 2007; Olasina 2011; Lee and McLoughlin 2010). Web 2.0 technologies are increasingly enriching the learning environments by enhancing collaboration,

communication and interaction among learners and their peers (Rogers 2009; Narayan and Baglow 2010).

In developed countries, Web 2.0 technologies are used as key ingredients to achieving richer TAL experience. Web 2.0 technologies have helped to foster a collaborative and active community of learners in the United States (US) (Ferdig 2007). Despite the fact that some of the Web 2.0 technologies have the potential to disrupt academic activities, they have aided a more responsive learning (Christensen 1997 and Okello-Obura and Ssekitto 2015). In addition, students use Web 2.0 applications on a regular basis (Madden and Fox 2006) to actively participate in the learning process and to keep themselves up-to-date with recent developments in their various disciplines. A Report of the United States (US) Department of Education (2001 cited in Adedeji 2011) shows that colleges that integrate Information and Communication Technology (ICT) and technologies like Web 2.0 into their curriculum yield positive results both for students and academics. These tools are also becoming widely used among academics (Kumar 2008) to communicate and deliver needed information such as course outlines, questions and solutions to assignment and tests, audio or visual instructional materials, and substantially more to students.

The use of Web 2.0 technologies in education has also gained popularity in universities in Europe. For instance, Virkus (2008) examined how Web 2.0 technologies were used to deliver library and information science education at Tallinn University in Estonia. The results of the study demonstrated that some academics had successfully adopted Web 2.0 technologies in supporting face-to-face lectures or online learning. The study further reported that academics that had not fully adopted the Web 2.0 technologies in TAL were nevertheless experimenting with them. Similarly, Hramiak and Boulton (2013) in a study in the United Kingdom (UK) recounted how the use of Web 2.0 technologies, particularly blogs, had increased students' engagement in the classroom and motivated them to learn. In contrast Polish academics, as revealed by Grudzinska-Kuna and Papinska-Kacperrek (2013), seemed to underestimate the role of social media in teaching processes probably because they were still attached to traditional methods based on textbooks and printed handouts.

As in the developed world, developing countries are similarly striving to adopt various learning technologies (Unwin, Kleessen, Hollow, Williams, Oloo, Alwala, Mutimucuo, Eduardo and

Muianga 2010 and Lwoga 2012). Gupta, Singh and Marwaha (2013) pointed out in the context of India that Web 2.0 technologies had made distance learning more analytical, flexible, interactive and collaborative for both teachers and students. Okello-Obura and Ssekitto (2015) in a study among academics at Makerere University in Uganda averred that the adoption and use of Web 2.0 technologies among students and academics was progressively gaining momentum. They pointed out that Web 2.0 technologies were used to disseminate information to students; to provide online distance learning; to create learning materials and assessment of students.

In spite of the increasing use of Web 2.0 technologies to support TAL, the actual usage of these technologies is quite low in Africa especially in countries such as Ghana, Tanzania, and Nigeria (Ndume, Tilya and Twaakyondo 2008; Munguatosha, Muyinda and Lubega 2011; and Lwoga 2012). Nevertheless, Nwezeh (2010) points out that Nigeria and Ghana are conducting research into the use of ICTs to improve academic activities in higher institutions. Lwoga (2012) asserts that the situation is not the same throughout Africa, as some countries such as South Africa has a high use of e-learning technologies for TAL. Adam (2003) points out that South Africa has advanced in use of ICTs in higher education sectors because of high bandwidth and high-level of internet penetration. This study is focused on selected universities in Nigeria. As Usoro, Echeng and Majewski (2013) point out that many universities in Nigeria are yet to effectively espouse Web 2.0 technologies, particularly for TAL purposes. This is evidenced by the paucity of universities that have active online presence (Famutimi 2013). The reasons for the limited adoption of Web 2.0 by the universities in Nigeria do not seem clear. However some evidences seem to suggest low awareness, lack of recognition of the importance of Web 2.0 in learning, the dearth of technical support, poor ICT infrastructure, erratic power supply and slow technology acceptance culture (Anunobi and Ogbonna 2012 and Usoro, Echeng and Majewski 2013). Aramide and Akinade (2012) discovered a low level of awareness about Web 2.0 technologies for academic and research purposes among students in Nigerian universities. Ajise and Fagbola (2013) conducted a study in five Nigerian federal universities and found that lecturers used Web 2.0 technologies such as Facebook, YouTube, Twitter, Wikis, and podcasting, but the extent to which these were being used for TAL purposes was not identified in the study. According to Alton, Chua and Goh (2010), Onuoha (2013) and Lwoga (2014b), the use of Web 2.0 technologies in Nigerian universities for TAL

purposes remains under-exploited and under-researched. Previously studies by Olasina (2011), Alton, Chua and Goh (2010) and Onuoha (2013) focused on the use of Web 2.0 technologies among university librarians in providing information services but did not cover students and academics. Hence, the need to examine the extent to which Web 2.0 technologies is used to support TAL in university environments in selected Nigerian universities in south-west geopolitical zone. This study is situated within the library and information studies context because academic libraries play an important role in the provision of Web 2.0 based information services and also enable the effective and sustainable use of these technologies in the university.

The remainder of this chapter explains the research problem; research questions and hypotheses; significance of the study; delimitations of the study; theories of the study; preliminary literature; research methodology; structure of the dissertation and summary.

1.1.1 Use of Web 2.0 Technologies in TAL

The importance of Web 2.0 technologies to support TAL does not need to be over emphasized. Web 2.0 technologies provide an enabling environment and offer opportunities for students and lecturers to network, communicate, collaborate, co-create and aggregate knowledge (Narayan and Baglow 2010). Through technologies, collaborative learning is enhanced among students and this helps them to retain information better (Johnson and Johnson 1986). Similarly, Web 2.0 promotes student-centered learning and users have been observed to have an enhanced capacity to self-organize (Goodyear and Ellis in Voigt 2008). Web 2.0 technologies have also made inter-group communication and real-time learning possible for distance learners, and have also motivated them to learn (Wiid, Cant and Nell 2013).

Moreover, Web 2.0 technologies are potential pedagogical tools that can facilitate student-centered learning. These technologies provide an enabling environment for good interaction between the instructor, the learner and the information. Blogs allow users to give their opinions on information posted on the blog. Academics use blogs as an easy way to create dynamic learning settings while students use them as a substitute digital portfolio (Awodele, Idowu, Anjorin, Adedire and Akpore 2009). This portfolio is used as an electronic store for keeping TAL materials. Blogs have also been found useful in education, especially as support for collaborative work (Bartome 2008) and knowledge sharing (Guo, Tan, Chen, Zhang and Zhao

2009). Blogs can also be used by students and academics to share personal views on a subject and as a quick means of distributing information.

The Wiki is a collective website that gives users access to its information and authority to manage the content by editing or modifying the text (Ebersbach et al. 2006). Wikis are used as collaborative tool to support group work (Anderson 2007), update materials, enable co-operation among academic stakeholders, facilitate knowledge systems, and distribute information to students (Awodele et al. 2009). They also give students and academics the opportunity to explore particular topics of interest relating to their academic work. Common examples are Wikipedia (a free internet encyclopedia that supports declarative knowledge) and Wiki-how (an online platform that supports procedural knowledge and collects information on how to do things) (Thomson 2008; Albert and Alan 2009; Huang and Yang 2009 and Vrandecic, Gil and Ratnakar 2011).

The Really Simple Syndication (RSS) although not widely used in most e-learning systems, enables access to information based on collective intelligence and collaborative work (Bartome 2008). The RSS feed brings users up-to-date with the content of RSS-enabled websites, blogs or podcasts without the user actually having visited the site (Anderson 2007). Academics and students can use RSS to regularly provide updated contents on specifically chosen topics and convey this information to required destinations. Most students and academics have personal profiles on one or more social networks and can employ this tool to post pictures, audio files and videos on their sites to enhance TAL. Examples of common social network sites include Facebook, MySpace, Twitter, WhatsApp, 2go and Flickr (Xu, Ouyang and Chu 2009). Podcasts are also regarded as a viable tool for TAL (Hough and Neuland 2014). The social bookmarking tools are used to bookmark pages on the web (Awodele et al. 2009). Students and academics can also subscribe to other people's bookmarks and thus be informed when specific people bookmark a new page (Dalsgaard 2008).

Students employ Web 2.0 applications such as blogs, podcasting, RSS feeds and social networking tools in their daily lives (Lenhart and Madden 2007). Kumar (2009) in a study in Florida mentioned that students found some Web 2.0 technologies such as online forums or blogs, class-capture in the form of videocasts, audio podcasts or SmartBoard capture, Google Documents, Facebook or wikis as useful learning tools because they enabled a form of

communication that qualified as online forums. Mohammad (2011) in a study in Kuwait identified ten different Web 2.0 technologies used in education. These included MySpace, YouTube, Flickr, Delicious, Skype (a software application used for making voice calls over the Internet), Microsoft Network (MSN) Messenger, Blogger, Facebook, Twitter, and Wikipedia. Ajise and Fagboola (2013), and Celik, Yurt and Sahin (2015) also revealed social networking tools such as Facebook and Twitter as important for educational communication, social communication, resource sharing, and collaboration.

Poellhuber and Anderson (2012) in a study among four Canadian distant learning schools revealed that students were becoming more interested in using social media tools such as video sharing, social networking, web conferencing, blogging, photo-sharing, podcasting, wikis, electronic portfolios, virtual world, tweeting and social bookmarking for academic purpose. Singh and Gill (2015) in a study among students and research scholars of the universities of North India observed that Facebook and YouTube were used for academic activities.

Studies on the use of Web 2.0 technologies for TAL purposes seem to suggest that students appear to interact with Web 2.0 applications more consistently than academics. Mbatha (2013) in this regard asserts that academics at the University of South Africa have not fully espoused the use of Web 2.0 technologies for educational purposes. Lwoga (2012) also noted that adoption of e-learning and Web 2.0 technologies for TAL, especially among academics, was still in its infancy in Tanzania's public universities. Echeng and Usoro (2014) in a study on user acceptance and adoption of Web 2.0 technologies for learning in Nigeria discovered that there was still low enthusiasm towards their use for academic purposes. Voigt (2008) noted that students were more comfortable than academics with electronic communication media such as instant messenger and podcasting and already have a highly active extra-curricular online life on SNSs. However, Moran, Seaman and Tinti-Kane (2011:3) in an online survey of 1,920 US faculty members found that most faculty members had used social media during a class session and had posted content for students to view outside class.

It seems that there is increasing uptake of Web 2.0 for TAL in institutions of African. Chawinga (2014) in a study on the use of Web 2.0 technologies for TAL at Mzuzu University in Malawi found that academics and students used Web 2.0 technologies to upload, access and store teaching materials, communicate with colleagues, distribute assignments to students,

receive feedback and carry out collaborative educational activities. Ajise and Fagbola (2013) in a study in Nigeria found that academics used Web 2.0 technologies to engage students in conversation, relate, communicate and collaborate with colleagues and share educational materials. Diyaolu and Rifqah (2015) in a more recent study reported that students in two private Nigerian universities used Web 2.0 technologies especially Google docs, Wikipedia, blogs and social networking tools for sharing school assignments, school information and social interactions.

1.1.2 Use of Web 2.0 in Nigerian Universities for TAL Purposes

The academic environments in Nigeria are becoming transformed with the use of Web 2.0 and other emerging new technologies. Before the internet came into existence, TAL was always carried out within classroom environments (Okike 2012). Due to the global development in TAL techniques, Nigerian universities, in response to the need for academics to learn new skills to teach students how to search for and use information from the web (Nwezeh 2010), are adopting the necessary technologies to transform TAL activities. This is evident in the use of some Web 2.0 technologies in Nigerian universities which is making TAL more dynamic among academics and students without geographical limitation. Diyaolu and Rifqah (2015) found that Web 2.0 technologies such as Wikipedia, Google docs, blogs and social networking tools were used by students in two Nigerian private universities to share school assignments, disseminate academic related information and build friendships. Ajise and Fagbola (2013) reported that Web 2.0 technologies particularly Facebook, LinkedIn, and Wikis were used by academics in Nigerian universities to communicate with and engage students in conversation, share educational resources and also collaborate with their colleagues.

Okereke (2014) in a survey of awareness, competence and use of Web 2.0 technologies (particularly social media) in teaching among university academics in the Southeastern Nigeria found that about 86.2% of academics used Web 2.0 technologies for social activities and disseminating information about day-to-day events. This indicated that although the technologies were used within the academic environment, only a few academics used them for TAL purposes. Olasina (2011) observed that Web 2.0 technologies were predominantly used for entertainment. Olaniran (2014) in a survey on the use of Web 2.0 technologies among students at the University of Jos in Nigeria found that Web 2.0 technologies such as Twitter

had transformed the process of information gathering and sharing, learning and socialization by the students. Nevertheless, the study revealed that Web 2.0 technologies were basically used as social fora and news outlet. The study suggests that TAL activities in Nigerian universities are still being largely directed by the traditional face to face methods.

Adam (2003) was of the opinion that academics and students in Nigerian universities were not only expected to participate in the conventional „chalk and talk“ TAL process, but that the chalk and talk method also seemed to be the prevailing technique for TAL. Aramide and Akinade (2012) discovered that the low level of awareness of Web 2.0 technologies for academic and research purposes among students in Nigerian universities was due to inadequate provision of learning management systems (LMS) using social media tools. Ani's (2013) survey on the effect of accessibility and utilization of electronic resources by academic staff on productivity at two Nigerian universities discovered a low level of electronic information environment in relation to global practices. Aduke (2008) was of the opinion that academics in Nigerian institutions distanced themselves from computer-related training activities and relied more on traditional methods of teaching. Aduke explained that this distance between teachers and technologies was as a result of fear, negative perception of the technologies or ignorance.

Despite the fact that research on the use of Web 2.0 in Nigeria universities is increasing, the focus is on Librarians and information professionals (Olasina 2011; Atulomah 2010; Emmanuel, Ebieri and Vera 2013 and Onuoha 2013). There is a paucity of research on the use of Web 2.0 technologies among academics and students (Aramide and Akinade 2012; Ajise and Fagbola 2013; Usoro, Echeng and Majewski 2013; and Diyaolu and Rifqah 2015). The extent of integration of Web 2.0 technologies for TAL in the Nigerian universities remains uncertain. Hence the need to understand the extent of use of Web 2.0 technologies by students and academic staff for TAL purposes in Nigerian universities.

1.2 Contextual Setting of the Study

The study was conducted in two selected federal universities in Southwest Nigeria. There are six federal government owned universities in the southwest geopolitical zone. This zone spreads across the 6 states comprising Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. The six federal universities in this geopolitical zone include the University of Ibadan (UI), University of Lagos, Obafemi Awolowo University, the Federal University of Agriculture Abeokuta

(FUNAAB), Federal University of Technology Akure (Okafor 2011) and Federal University of Oye-Ekiti. The people of Southwest are predominantly Yoruba which is one of the largest ethnic groups in Africa. The University of Ibadan in Oyo state and the Federal University of Agriculture Abeokuta in Ogun State were purposively selected for this study based on the relative variance in their rating in research productivity (Okafor 2011) and recent global ranking of universities which placed UI and FUNAAB at 2nd and 11th positions respectively among Nigerian universities (4 International Colleges & Universities 2014; Cybermetrics Lab CSIC 2014).

The University of Ibadan is Nigeria's premier university founded in 1948 and located in Ibadan, the capital of Oyo State (U.I. Annual Report 2013). The university is the oldest and one of the most prestigious in terms of the quality of graduates produced and the number of academic programmes offered (Umana, Fawole and Adeoye 2014). U.I was ranked second among the federal universities in southwest Nigeria (Cybermetrics 2014). It is one of the conventional universities and comprises eleven faculties including Arts, Science, Agriculture and Forestry, Social Sciences, Education, Veterinary Medicine, Technology, Law, Public Health and Dentistry and College of Medicine in the university.

FUNAAB, on the other hand, is a third generation university founded in 1988 (Okafor 2011). It is located in Abeokuta, the largest city and state capital of Ogun State. FUNAAB is one of the specialized universities (in agricultural education) established by the government of the Federal Republic of Nigeria. The university is growing at a very fast rate and has 10 colleges including Environmental Resources Management; Physical Sciences; Biological Sciences; Plant Science and Crop Production; Engineering; Veterinary Medicine; Food Science and Human Ecology; Agricultural Management and Rural Development; Animal Science and Livestock Production; and Management Sciences. The university has also set the pace among other specialized universities in the production of quality graduates and research outputs of academic staff members. The university is ranked 4th among federal universities in the southwest region of Nigeria (Cybermetrics 2014). Figure 1 below presents the map of Nigeria showing states in the Southwest region.



Figure 1: Map showing States in Southwest Nigeria (Source: Nations Online Project 2015).

1.3 Statement of the Problem

Internationally, Web 2.0 technologies are extensively employed to facilitate TAL, particularly in higher education. Web 2.0 technologies express the perception of many educationists that learning takes place best within technology-supported environments where learners (or students) can on their own or collaboratively create and use content (Selwyn 2010). However, while many universities around the world are integrating these technologies to enhance TAL practices (Kumar 2008 and Hramiak and Boulton 2013), most African universities are still battling with some challenges that affect the effective integration of Web 2.0 technologies into the classroom. These challenges include but are not limited to electricity inadequacies, inadequate access to the internet, poor ICT infrastructure and limited technological skills (Olasina 2011; Okonedo, Azubuike and Adeyoyin 2013; Kibaara 2015; Olatokun and Ntemana 2015). For traditional learning environments (such as those obtained in developing countries, for example Nigeria), Web 2.0 technologies can help improve TAL.

Anecdotal evidence suggests that universities in Nigeria are yet to effectively embrace Web 2.0 technologies for TAL purposes as reflected by their limited web presence (Nwagwu and Agarin 2008 and Famutimi 2013). Mohammed (2015) asserts that Nigerian universities are yet

to perform well in the global academic ranking of higher education institutions. For example, the rating of Nigerian universities on Webometrics between 2013 and 2015 indicated that these universities were not performing well with the use of online technologies and that none of the universities was among the top 1000 in the world. The use of some Web 2.0 technologies such as web boards and newsgroup to facilitate TAL seemed scarce among students (Nwagwu, Adekannbi and Bello 2009) as access and proximity to internet cafe posed a major challenge. Mutula (2009) substantiated that students often complained of poor internet connectivity. The low or non-use of these tools could be linked to the poor performance of Nigerian university in Webometrics ranking. Nigerian universities have the potential to improve their performance in the global academic ranking of universities by integrating Web 2.0 technologies in their TAL as well as research to improve quality, productivity and visibility.

Currently, the extent of adoption of Web 2.0 technologies by universities in Nigeria for TAL by academics and students respectively is both limited and unclear. Studies by Olasina (2011), Atulomah (2010), Emmanuel, Ebierie and Vera (2013) and Onuoha (2013) researched use of Web 2.0 by librarians in providing information services. Understanding the extent of use of Web 2.0 among academics and students in Nigerian universities would assist policy and practical interventions to improve the quality and productivity of TAL as well as improve the visibility of the universities in the global academic environments. Web 2.0 technologies when effectively integrated into TAL would improve and democratize access to higher education. This study, therefore, sought to investigate the extent of use of Web 2.0 technologies by students and academic staff in the selected Nigerian federal universities.

1.3.1 Objectives of the Study

The main research objective of this study is to investigate the extent of use of Web 2.0 technologies in TAL in selected federal universities of Southwest, Nigeria. The study addressed the following research objectives:

- to determine the extent and purpose of use of Web 2.0 technologies by students and academics in universities in Southwest Nigeria;
- to examine the extent to which Web 2.0 technologies are integrated into TAL in the selected federal universities;
- to investigate the factors influencing the use of Web 2.0 technologies for TAL.

- to develop a model to investigate the use of Web 2.0 technologies for TAL.

1.3.2 Research Questions

The major research question which this study sought to address was: What is the extent of use and purpose of Web 2.0 technologies for TAL in selected Federal Universities of Southwest, Nigeria? To address the major research question, the study sought to answer the following specific research questions:

- What kinds of Web 2.0 technologies are used by academics and students, and for what purposes?
- To what extent are Web 2.0 technologies integrated into TAL in Nigerian universities?
- How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the federal universities?
- How does attitude influence intention to use Web 2.0 technologies for TAL in the federal universities?
- How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the federal universities?
- What net benefits can be derived from the use of Web 2.0 technologies for TAL purposes?

The above research questions are derived from three theoretical models underpinning this study namely the DeLone and McLean (D&M) model; Technology Acceptance Model (TAM); and Media Synchronicity Theory (MST).

1.3.3 Research Hypotheses

Based on the specific research questions and selected constructs from the theories adopted for the study, the study sought to test the following null hypotheses:

- H0₁ There is no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies for TAL
- H0₂ There is no significant relationship between attitude towards use and intention to use Web 2.0 technologies for TAL purposes
- H0₃ There is no significant relationship between media synchronicity and intention to use Web 2.0 technologies for TAL purposes

H0₄ There is no significant relationship between intention to use and net benefits of using Web 2.0 technologies for TAL purposes

1.4 Significance of the Study

This study is significant in a number of ways. The study extends existing knowledge and literature on the use of new technologies such as Web 2.0 for TAL purposes in universities. The findings of this study are expected to help in creating a level of awareness and use of Web 2.0 technologies among students and academics. The study also will assist the university libraries to integrate Web 2.0 into their services in order to improve access to and use of information resources. The university authorities will have data which they can use to promulgate relevant e-learning policies and resource planning to institutionalize Web 2.0 technologies into the academic endeavor. The study reveals new insights into technology adoption and use by developing a new model (see section 5.3.4, Figure 13) to understand the concept of use of Web 2.0 technologies from a developing country context. The study has contributed new knowledge which is useful to researchers. The research has triggered further areas of research. The findings will assist policy makers in formulating necessary policies to support the use of Web technologies in TAL.

1.5 Delimitation of the Study

The study was conducted at two federal universities: the University of Ibadan (U.I) and Federal University of Agriculture Abeokuta (FUNAAB) in the Southwest region of Nigeria. The study was also restricted to the faculties/colleges of science, technology and veterinary medicine. The two universities were selected based on the fact that one is a generic university (that is, university that offers diversity of disciplines) and Nigeria's premier university, while the second is a third generation and specialized university. Both universities were well ranked on the Webometric 2013 and 2014 criteria. The selected universities were also studied because of their easy access by the researcher, and the researcher's familiarity with the environment and cultural norms. This study focused on the use of Web 2.0 for TAL purposes by academics and students.

The study was limited by the paucity of literature on the use Web 2.0 for TAL purposes in developing countries such as Nigeria (Lwoga 2011). The researcher therefore relied on

literature, especially journal articles, in developed countries and some developing countries. The study was underpinned by three theories namely D&M model, TAM and MST. Despite these constraints, the validity and reliability of the findings was ensured by pre-testing of data collection instruments.

1.6 Theoretical Framework

This section introduces the theoretical models which guided the study. The detailed description of the theory/models underpinning this study is presented in Chapter Two (Theoretical Framework). This study was guided by a blend of theoretical frameworks which include the updated D&M model as the main underlying theory, complemented by MST and TAM to understand the extent of use of Web 2.0 technologies in TAL in Nigerian Universities. These theories have been employed in various studies to understand the concept of adoption, use, acceptance and success of information systems (IS) (Ryoo and Koo 2010; Phan and Daim 2011; Onyedimekwu and Oruan 2013 and Ani 2013). The study modelled academics and students' experience with the use of Web 2.0 technologies using selected constructs from D&M model, MST and TAM theories/models namely system quality, information quality, service quality, media synchronicity, attitude, use/intention to use and net benefits.

Table 1 below shows mapping of the research questions and hypotheses onto the variables of the corresponding theory/model.

Table 1: Mapping of Research Questions and Hypotheses onto Variables of respective Theory and Model

S/N	Research questions	Research Hypothesis	Key Variables Addressed	Theoretical Models
1	What kinds of Web 2.0 technologies are used by academics and students, and for what purposes?	-	Net Benefits	D&M, TAM
2	To what extent are Web 2.0 technologies integrated into TAL in Nigerian universities?	-	Attitude Towards Use	TAM
3	How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the federal universities?	There is no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies for TAL	System Quality, Information Quality, Service Quality, and Attitude Towards Use	D&M, TAM
4	How does attitude towards use influence intention to use Web 2.0 technologies for TAL in the federal universities?	There is no significant relationship between attitude towards use and intention to use Web 2.0 technologies for TAL	Attitude Towards Use and Intention to Use	TAM
5	How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the federal universities?	There is no significant relationship between media synchronicity and intention to use Web 2.0 technologies for TAL	Media Synchronicity and Intention to Use	MST and TAM
6	What net benefits can be derived from the use of Web 2.0 technologies for TAL?	There is no significant relationship between intention to use and net benefits of using Web 2.0 technologies for TAL	Intention to Use and Net Benefits	TAM and D&M

1.7 Preliminary Literature Review

This section introduces some literature reviewed in relation to the use of Web 2.0 technologies for academic purposes, gaps in literature and how this study helps address them. The

theoretical and empirical literatures are extensively reviewed in Chapter Three (Literature Review) of this thesis.

The growing trend to incorporate technologies such as Web 2.0 in education to fulfil some of the technological expectations of students (Mohammad 2011) has led to several investigations on adoption and use of web-based technologies in the academic environment. This study reviewed literature in different geographical areas of the world including United States(US), Europe, Australia and Africa to better inform the current study on various location of study, methodologies used, unique characteristics of study participants, their results, findings and recommendations. For instance Ajjan and Hartshorne (2008) and Hartshorne and Ajjan (2009) focused on the adoption of Web 2.0 technologies for TAL respectively in US using the Decomposed Theory of Planned Behaviour (DTPB). Similarly, studies such as Garoufallou and Charitopoulou (2011) in Greece; Kennedy, Dalgarno, Gray, Judd, Waycott and Bennett (2007) in Australia; and Demirbilek (2015) in Turkey investigated students' use of Web 2.0 technologies. In addition, is a number of studies on the use of Web 2.0 including Lwoga (2012); Kabilan, Ahmad and Abidin (2010); Diyaolu and Rifqah (2015); and Okello-Obura and Ssekitto (2015) emanating from developing countries in Africa.

The literature revealed that although students and academics are aware of Web 2.0 technologies they are unaware of their importance and use in TAL. In addition, for most studies, there has not been much focus on how students and academics use these technologies for TAL practices. Furthermore, the scope of most studies was limited to a few types of Web 2.0 and was also conducted on academics, students or librarians only. Some of these gaps were addressed in this study. Literature was reviewed based on the themes of research questions, key variables of the underlying theory and broader issues on the research problem. The broader issues around the research problem include technology acceptance and use; diffusion of innovations and applications; e-learning and Information and Communication Technologies (ICTs) in TAL. Within each theme, the international contexts followed by African and Nigerian contexts were examined.

1.8 Research Methodology

This section introduces the basic aspect of research methods and research employed in the study. The detailed discussion of the research methods is presented in Chapter Four (Research Methodology) of the thesis.

The study adopted the post-positivist paradigm which allows a combination of quantitative and qualitative approaches, i.e. mixed methods (Gray 2004). A convergent mixed method design was employed along with the survey research design using structured questionnaires and semi-structured interviews. The structured questionnaire was utilized to collect quantitative data from academics and undergraduate students; while the semi-structured interview schedule was used to elicit qualitative data from heads of faculties and librarians, on their opinions, attitude, feelings and experiences (Creswell 1998) with the use of Web 2.0 technologies for TAL purposes.

Two federal universities, the University of Ibadan, Ibadan (UI) and the Federal University of Agriculture, Abeokuta (FUNAAB) in the Southwest geo-political zone of Nigeria were purposively selected for the study. Academic staff and undergraduate students in the faculties of Technology, Sciences and Veterinary Medicine in UI and FUNAAB formed the units of analyses.

Survey questionnaires were used to collect data from academics and students. In addition, interviews were used to collect qualitative data from the faculty heads and librarians. To ensure reliability and validity of instruments, survey questions were adapted from similar studies. Moreover, data collection instruments were pre-tested to confirm the clarity of questions, refine themes and validate their usefulness and performance in the actual data collection process. Furthermore, Cronbach's Alpha (α) was calculated to establish reliability and the internal validity of the questions.

Quantitative data collected was analyzed using descriptive statistics and Statistical Package for Social Science (SPSS) version 17. Regression analysis was used to determine the strength of the relationship between the constructs. Hypotheses were tested at 0.05 level of significance. Quantitative data was presented using tables with frequencies and percentages, pie charts and

bar charts. Qualitative data was analyzed through thematic content analysis and presented narratively.

The study complied with the research ethics protocol (Appendix 8) of the University of KwaZulu-Natal. Permission was sought from the authorities in U.I and FUNAAB before the study was conducted (Appendices 7 and 8). In addition, informed consent was obtained from all the participants in the study. Confidentiality of respondents was ensured by keeping the names anonymous.

1.9 Structure of the Dissertation

The thesis is divided into seven chapters as illustrated below.

Chapter 1: Introduction and Background to the Study

This chapter describes the background to the study and introduces the concept of Web 2.0 technologies use for TAL purposes from developed and developing country context. The chapter further covers statement of the problem, research objectives, research questions, research hypotheses, significance of the study, delimitation of the study, theories that guided the study, preliminary literature and methods.

Chapter 2: Theoretical Framework

This chapter discusses the theories and models that guide the study. The theories include the updated D&M model, MST, and TAM.

Chapter 3: Literature Review

This chapter provides a comprehensive review of existing theoretical and empirical literature in relation to the use of Web 2.0 technologies for academic purposes obtained in books, book chapters, journal articles, conference proceedings, technical papers, etc. The chapter further outlines gaps in literature and how this study helps address them.

Chapter 4: Research Methodology

This chapter describes the research methodology and methods used to conduct the study. It presents the research paradigm, research approach, research design, population of the study, sampling procedures, data collection procedures, data analysis strategies, validity and reliability of data collection instruments, and ethical considerations.

Chapter 5: Presentation of Findings

This chapter presents findings of both quantitative and qualitative data collected through survey questionnaires and the interview schedule. The quantitative data is analysed using SPSS, regression analysis and hypotheses while qualitative data is analysed thematically. The findings are presented using tables, charts and narrative technique.

Chapter 6: Interpretation and Discussion of Findings

This chapter interprets and discusses the findings of the study that were analysed and presented in Chapter five. Relevant literature and theories that underpinned the study are used to explain and interpret the results.

Chapter 7: Summary, Conclusion and Recommendations

This chapter details a summary of findings, conclusion of the study, and recommendations. The originality and contribution of the study is provided. In addition, suggestions for further studies are outlined.

1.10 Summary of the Chapter

This chapter introduces the phenomenon being investigated, namely the use of Web 2.0 technologies for TAL purposes in selected Nigerian universities. This chapter provides information on the background of the study, the research problem, research questions and hypotheses, significance of the study and delimitations of the study. The chapter further introduces the theories/models underpinning the study, preliminary literature methodology and methods employed, and ethical issues.

CHAPTER TWO

THEORETICAL FRAMEWORK

2.1 Introduction

Creswell (1994) states that the theoretical framework in research is the lens through which the hypothesis is examined to determine its validity. It shows that the synergy between a theoretical framework and research validity in a work of research is examined through the research hypothesis. Chinn and Kramer (1999) also describe theoretical framework as a structure that presents the theory which explains why the problem under study exists. Mertens (2005:2) averred that the "exact nature of the definition of research is influenced by the researcher's theoretical framework". This is to elucidate the problem which the study intends to address and to provide a guide to understanding how it can be resolved. The theoretical framework informs the organisation of the study and allows for results to be generalized to other groups and settings beyond those of the study (Polit and Beck 2009). Hence, for a study to be implicit, scientifically meaningful and contribute to knowledge, Pedhazur and Schmelkin (1991) suggest that all variables in the study should be part of a theoretical framework that defines the variable and specifies the relationships with other variables. Creswell (1994, 1998) argued that the theoretical framework should be separated from the literature review, because it provides direction on all aspects of the study ranging from assessing general philosophical ideas to data collection and analysis processes (Creswell 2003:3). The use of technologies such as Web 2.0 changes by the day; this necessitates investigating the use of technology especially in a TAL environment.

Theories and models are symbolic features of the theoretical lens that guides a study and appears to be used harmoniously because they help in describing the relationships that exists between variables of a study. A model provides a schematic representation of specific relationships among phenomena, using symbols or diagrams to represent an idea (Tarkang and Zotor 2015). Krishnaswami and Ranganatham (2010) described a conceptual or theoretical model as a simplified systematic conceptual structure of the interrelated elements of a body of knowledge in some schematic form such as a narrative statement or mathematical equation. A theory on the other hand is an interrelated set of constructs (variables) formed as propositions or hypotheses that specify the relationship among variables (Creswell 2009). Several theories

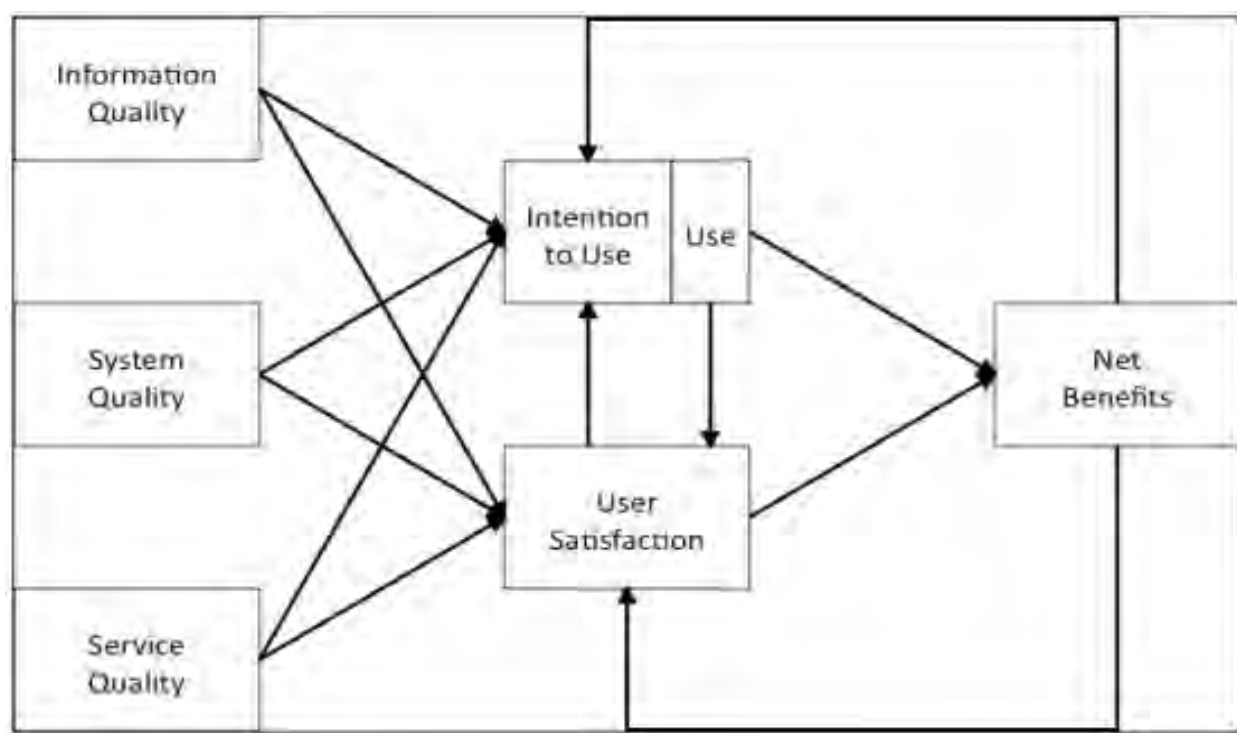
and models have been employed in the research of information technologies adoption, use, acceptance and success. Some of these theories are Innovation Diffusion Theory (IDT), TAM, Unified Theory of Acceptance and Use of Technology (UTAUT) and D&M model. Thus, many primary factors influencing people to Use or Not Use technologies in their activities have emerged. Researchers who have carried out empirical research using existing models usually select variables from these models to measure general acceptance or adjust existing models to fit the technology being queried (Teo, Luan and Sing 2008; and Thamer, Mohammad and Alqatawnah 2010).

The purpose of this study was to explore the extent of use of Web 2.0 technologies in TAL in selected federal universities of southwest, Nigeria. This study reviewed theoretical frameworks relevant to the independent and dependent variables on predictors of Web 2.0 technologies use by academics and students for TAL purposes. This study is underpinned by the DeLone and McLean (D&M) model developed by DeLone and McLean (2003). Other theories relevant to this study such as MST developed by Dennis, Fuller and Valacich (2008) and TAM developed by Davis, Bagozzi and Warshaw (1989) were also discussed. Previous studies that adopted similar models include DeLone and McLean (2008), Ryoo and Koo (2010), Phan and Daim (2011), Edlund and Lövquist (2012) and Ani (2013) among others. The models and their constructs are discussed in subsequent sections.

2.2 DeLone and McLean Model Information Success model

The DeLone and McLean (D&M) Information System (IS) success Model is noted to be crucial in measuring IS success. The model is commonly known as the DeLone and McLean IS success model, DeLone and McLean model of IS success or DeLone and McLean model for measuring IS success (DeLone and McLean 1992; DeLone and McLean 2003; Makokha 2011). Information systems such as Web 2.0 technologies comprise of software and hardware that is used by people and organizations to gather, process, generate and distribute or transmit information. The challenges associated with defining IS success, based on the difficulty in handling the complex, interdependent, and multi-dimensional nature of IS success led to the development of this model (Petter, DeLone and McLean 2008). The model indicates that the success of Information and Communication Technologies (ICTs) depend on several interrelated factors. DeLone and McLean (2003) presented an updated model of IS success

which is a modification of the original D&M model developed in 1992. The updated model has six dimensions which include information quality, system quality and service quality (an additional construct), (intention to) use, user satisfaction, and net benefits (replacing individual impact and organizational impact in the original theory) with arrows indicating relationships between IS success measures (DeLone and McLean, 2003). The updated D&M model is presented in Figure 2a



2002:2003)

Previous studies have utilized this model to examine use, user satisfaction and the success of IS or technologies (Rai, Lang, and Welker 2002; Loebbecke and Huyskens 2008; Kim, Oh, Shin and Chae 2009; Udo, Bagchi, and Kirs 2010 and Urbach and Muller 2011) as DeLone and McLean have claimed that their updated model could be used at any level of analysis (Petter, DeLone and McLean 2008). Examples of recent applications of this theory include Floropoulos, Spathis, Halvatzis, and Tsipouridou (2010), Edlund and Lövquist (2012) and Onyedimekwu and Oruan's (2013) studies. Dwivedi, Kapoor, Williams and Williams (2013) used the Model to investigate the use of Radio Frequency Identification (RFID) technology as

a substitute for barcode systems for item identification and tracking in the library. The researchers reported that the D&M model is one of the most established and frequently utilized theories that facilitate the examination of success and user satisfaction of an IS.

D&M model has been noted to be significant in explaining use, user satisfaction and IS success as evidenced by a number of existing articles that have tested the effect of its construct (Rai, Lang, and Welker 2002; Folorunso, Ogunseye, and Sharma 2006; Kim et al. 2009; Petter and McLean 2009; Riaz and Hussain 2010). Findings from literature also validated the D&M model in gauging e-learning systems success in different settings (Holsapple and Lee-Post 2006).

However, some studies argued that not all the constructs of D&M model are appropriately efficient in examining use of IS. Also, there were some situations where some measures of D&M IS success model showed insignificant results towards criterion variables (Iivari 2005). Gefen (2000) for example revealed that no significant association existed between system quality and use. Dwivedi et al. (2013) also in their study also provided empirical support to DeLone and McLean's (2003) arguments that service quality is a less appropriate construct for examining individual systems as its effect was found to be insignificant for explaining use. On the other hand, information quality and system quality have been noted to have significant positive influence on system use and user satisfaction (Kim et al. 2009; Petter and McLean 2009 and Dwivedi et al. 2013).

Petter, DeLone and McLean (2008) critique the D&M model as inconsistent regarding the „use“ construct with the implications of collective phenomena appending a multilevel nature for system usage (Hofmann 2002 in Laubie 2014). Petter, DeLone and McLean (2008) further stated that system use is a success construct that is often criticized and/or ignored and that the measure of system use has been over simplified. More often, the D&M model has been proved as the most convincing framework in IS spheres (Riaz and Hussain 2010). Based on this, the D&M model is considered suitable in explaining the use of Web 2.0 technologies for TAL. Therefore, this study considered the „intention to use“ construct to address the inconsistency regarding the „use“ construct, given that the use of Web 2.0 technologies in the Nigerian context is just gaining ground. The constructs of D&M model relate directly to this research's questions three and six (see section 1.3.1.1) which sought to investigate factors that influence

the use of Web 2.0 technologies for TAL. The constructs system quality, information quality and service quality served as independent variables while „Net benefits“ was a dependent variable. However, intention to use construct served as both dependent and independent variable in the study. The constructs are explained as follows:

2.2.1 System Quality

DeLone and McLean (1992) explained that system quality considers the characteristics desired for a system to produce information that is useful for decision making, adaptable to the TAL environment. Based on DeLone and McLean taxonomy, system quality belongs to the technical level (Rai, Lang, and Welker 2002) or perspective and is generally regarded as a measure that is concerned with how good a system is. According to Urbach and Muller (2011), system quality is made up of the desirable characteristics of an IS on accounts of IS measures to which service quality equates the discrepancy between the user's perception and their expectation. Seddon (1997) also noted that system quality is concerned with issues such as user interface and ease of use. DeLone and McLean (2003) suggested that system quality is an appropriate measure for the desired characteristics of an ICT system. Wu and Wang (2006) also highlighted that system quality is concerned with whether there are errors in the system, ease of use, stability, response time and flexibility to TAL. Petter, DeLone and McLean (2008) argued that system quality considers performance characteristics such as reliability, convenience, ease of use, and functionality. Commonly used measures for the system quality construct are reliability, stability, convenience of access, ease of use, flexibility, a user-friendly interface, (response time) usefulness and response time (DeLone and McLean 2003; Wu and Wang 2006; Trkman and Trkman 2009).

Earlier studies that used perceived ease of use to measure system quality revealed that no significant association existed between system quality and use (Adams, Nelson and Todd 1992 and Gefen 2000). Recent studies that obtained varying results include Iivari (2005) which established a significant association between system quality and use; while Kositanurit, Ngwenyama and Osei-Bryson (2006) found that the quality of a system measured using reliability did not affect the utilization of the system. Kim et al. (2009) also illustrated the significant influence of system quality on the use of ubiquitous computing in the internal audit profession. Petter and McLean (2009) reported that overall system quality had a strong and

significant influence on both use and user satisfaction constructs in their findings. Dwivedi et al. (2013) found that system quality has a significant effect on the use of RFID technology. Considering the above discussion, it can be argued that system quality is more likely to have significant influence on the use of Web 2.0 technologies in TAL. Thus, questionnaire items such as “I find Web 2.0 technologies easy to use; Web 2.0 technologies are reliable for teaching/learning”, “Web 2.0 technologies make it easy for me to collaborate with my colleagues/peers” and “Web 2.0 technologies help me accomplish my teaching tasks more quickly” were used to examine system quality of Web 2.0 technologies.

2.2.2 Information Quality

Information quality refers to the desirable characteristics of the output of an IS, which will positively influence use of an information systems and user satisfaction (DeLone and McLean 2003; Hildner 2006; Loebbecke and Huyskens 2008; Urbach and Muller 2011). This is regarded as the quality of information produced by an ICT system for the decision-making process as espoused by (Seddon 1997) that information quality is a vital factor for evaluating the success of systems, including Web 2.0 technologies. Information quality is often a key dimension of user satisfaction measurements (Petter, DeLone and McLean 2008) and it is crucial for both the use and the impact of any IS (Trkman and Trkman 2009). Based on the DeLone and McLean taxonomy, information quality belongs to the semantic level that looks at content, accuracy and format of the information generated by the system (Rai, Lang, and Welker 2002). This is even more the case for a Web 2.0 solution where users themselves create the content (Trkman and Trkman 2009). The common measures of the information quality construct include timeliness, accuracy, availability, completeness, consistency, precision, reliability, scope, relevance, and format of information generated by an IS (Seddon and Kiew 1996; DeLone & McLean 2003; Urbach and Muller 2011).

Rai, Lang, and Welker (2002) examined use and user satisfaction of student information systems and demonstrated a significant effect of information quality on perceived usefulness and user satisfaction. Petter and McLean (2009) studied the effect of information quality on use and found from their meta-analysis that, overall information quality had a strong and significant influence on use construct. Similar observations were reported by Kim et al. (2009) who demonstrated in their study that information quality significantly influences the use of

ubiquitous computing. Recently, the Dwivedi et al. (2013) study also confirms that information quality is an important factor for determining use of RFID-based library systems and user satisfaction. Considering the foregoing, it can be argued that the greater the information quality of Web 2.0 technologies, the more likely it is that it will be used in TAL. Questionnaire items such as “Web 2.0 technologies provide me with sufficient information for teaching/learning”, and “Information provided is clear and unambiguous” was used to determine information quality of Web 2.0.

2.2.3 Service Quality

Service quality refers to the desirable characteristics of the output of an information system, which will positively influence use and adoption of Web 2.0 technology as an information system by academics and students (DeLone and McLean 2003; Hildner 2006; Loebbecke and Huyskens 2008; Urbach and Muller 2011 and Dwivedi et al. 2013). Service quality was a late addition to the D&M model (Trkman and Trkman 2009) to measure the quality of the support system users receive from the IS department and IT support personnel (Delone and McLean 2003). Some popular measures of service quality are accuracy, reliability, prompt responsiveness of the support team, efficiency of the support team, availability of support services when needed technical competence, and empathy of the personnel staff (Pitt, Watson, and Kavan 1995; Delone and McLean 2003; Makokha 2011).

Service quality construct in the D&M model has been reported to be an insignificant predictor of system use (Halawi, McCarthy and Aronson 2007 and Dwivedi et al. 2013) except for notable studies such as Kim et al. (2009) and Udo, Bagchi, and Kirs (2010) where it was found to have significant influence on system use. Pitt, Watson, and Kavan (1995) concluded that service quality equates to the discrepancy between the users’ perception and their expectation. DeLone and McLean (2003, 2004) further argued that poor user support (which is based on the service quality) will result in lost customers and decreased sales. Therefore, it is persuasive to consider service quality as one of the factors that can influence the use of Web 2.0 technologies as adopted for this study. Questionnaire items such as “Web 2.0 technologies provide reliable and prompt support for teaching”, “Web 2.0 technologies have up-to-date hardware and software that help in delivering instructions” and “Information is sent/delivered securely using Web 2.0 technologies” were used to examine the service quality of Web 2.0 technologies.

2.2.4 Use / Intention to Use

Although DeLone and McLean (2003) argued that there is no accurate definition of the use construct, it is considered by some researchers as a measure of the spread of a technology (DeLone and McLean 2003; Urbach and Muller 2011 and Dwevidi et al. 2013). Seddon (1997) understood it to be the use of an ICT system for daily routine to perform tasks, while Urbach and Muller (2011) described “use” as the degree and manner in which an information system is employed in a particular task. It is also seen as the extent to which the capabilities of ICT systems are utilized by users in task performance (Makokha 2011). Empirical studies have adopted multiple measures of IS use, including intention to use, frequency of use, self-reported use and actual use (Petter, DeLone and McLean 2008).

Although, DeLone and McLean did distinguish between intention to use and system use in their updated model, intention to use is generally an individual level construct (Petter, DeLone and McLean 2008). DeLone and McLean (2003) contend that use and intention to use were alternatives in their model, and that intention to use may be worthwhile in the context of mandatory usage. However, where the use of the system is voluntary, use is regarded as an actual behavior preferred to “Intention to Use” as a success variable (DeLone and McLean 2003 and Makokha 2011). This study will consider both “Intention to Use” and other measures of system use as the same construct. Among the measures that have been used to measure system use are frequency of use, number of access, usage pattern, time of use, dependency and voluntariness (DeLone and McLean 2003 and Wang, Wang and She 2007; Makokha 2011). Questionnaire items such as “I intend to use Web 2.0 technologies for teaching/learning as frequently as possible” and “I will strongly recommend other academics/students to use Web 2.0 technologies for teaching/learning purposes” helped to elucidate data on participants’ intention to use Web 2.0 for TAL.

2.2.5 User Satisfaction

User satisfaction refers to the degree of pleasure or happiness obtained from the use of the technology in question (DeLone and McLean 2003; Urbach and Muller 2011; Dwevidi et al. 2013). Literature indicates that user satisfaction is the most widespread measure of the success of ICT systems (DeLone and McLean 1992, 2003; Seddon and Kiew 1996; Seddon 1997; Rai, Lang and Welker 2002 and Makokha 2011). In addition, DeLone and McLean (2003)

considered user satisfaction to be the most important means of capturing the users' view regarding the use of ICT systems. Common measures for user satisfaction are accuracy, reliability, timelines, relevancy, ease of use, and quality of content. Although user satisfaction construct has been found significant in IS success studies, this study is aimed at investigating use of Web 2.0 technologies and would exclude user satisfaction as the construct can only be tested after the adoption and use of the technology for tasks delivery.

2.2.6 Net Benefits

According to Petter, DeLone and McLean (2008), net benefit is involved with how ICT systems contribute to the overall success of individuals or organizations. Makokha (2011) posits that in using a system, benefits are achieved that are termed "net benefits". Delone and Mclean (2003) grouped all the "impact" measures into a single impact or benefit category called "net benefits". "Consequences", "net benefits" or "outcomes" are some of the key terms often used to depict the results obtained from the use of an information system. The construct helps in capturing the effect (both positive and negative) of information systems on their users. It is also evident that net benefits would be a result of system adoption and usage. Closed ended questions such as "the Web 2.0 helps me to acquire new knowledge and innovative ideas" and "teaching performance is enhanced with the use of Web 2.0" were used in the questionnaire to gather data on the net benefits of using Web 2.0 for TAL.

2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an information systems theory that models how users accept and use a technology (Davis 1989). The model originates from the Theory of Reasoned Action (TRA) (Ajzen and Fishbein 1980), which states that users' behavioural intentions determine their acceptance and attitude towards the use of technology (Davis, Bagozzi and Warshaw 1989). TAM proposed that a number of factors influence users' decision to use a new technology (Abukhzam and Lee 2010) and provides an explanation on users' behaviour towards new technologies across a wide scope of information technology users (Davis, Bagozzi and Warshaw 1989). TAM, although apparently used to explain the adoption of technology within organization, has constructs that are basically meant for general investigation of technology adoption and use (Phan and Daim 2011). The model includes six constructs namely external variables, perceived usefulness, perceived ease of use, attitude

towards use and behavioral intention. The two major variables of perceived usefulness (PU) and perceived ease of use (PEOU) determine the user's intention to use a technology (Saade, Nebede and Tan 2007 and Stephan, Haverkamp and Mahmood 2010). PU is referred to as the degree to which a person believes that using a particular system would enhance his or her job performance and PEOU refers to the degree to which a person believes that using a particular system would be free from effort (Davis 1989). Figure 2b shows TAM.

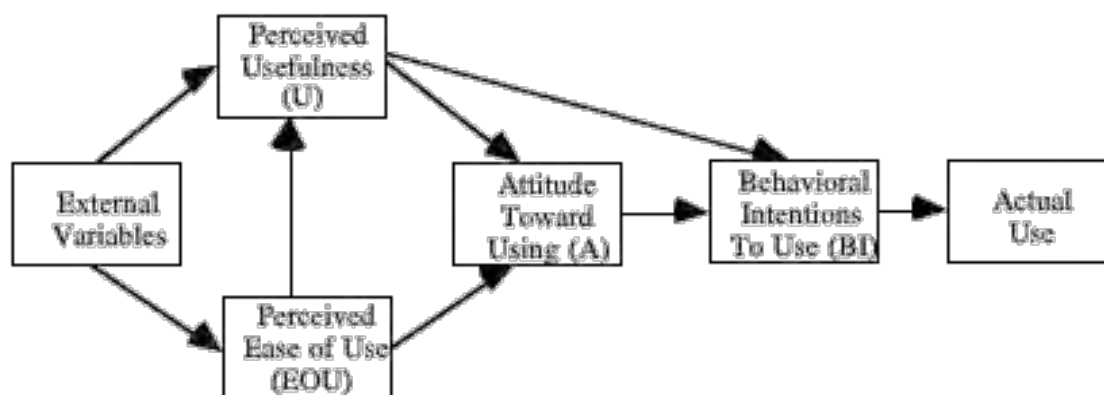


Figure 2b: Technology Acceptance Model (Source: Davis, Bogozzi and Warshaw 1989:985)

TAM suggests that the use of an IS is determined by behavioural intention (BI), but alternatively asserts that the BI is determined by the person's attitude towards the use of the system and also by his perception of its utility. Attitude may be described as an inward way of communicating one's perception of a behaviour although expressed through actions and inactions. According to Davis (1989), the attitude of an individual is not the only factor that determines his use of a system, but this is also based on the impact which it may have on his performance. TAM has become one of the most widely used models in IS research (Johnson 2005; Saade, Nebede and Tan 2007; Phan and Daim 2011; Liu, Chen, Sun, Wible, and Kuo 2010 and Ani 2013). This is because it is understandable and simple (King and He 2006). Many researchers have conducted empirical studies to examine the explanatory power of the TAM, which produced relatively consistent results on the acceptance behaviour of information technology users (Venkatesh and Davis 2000; Johnson 2005; Liu et al. 2010; Ayo, Adewoye and Oni 2011; Phan and Daim 2011; Ani 2013 and Adewole-Odesi 2014).

Technology Acceptance Model is well-known in explaining individuals' technology behaviours (Aharony 2014) and attitude to towards the behaviour. The model has been validated as an effective framework in describing users' adoption of Information Technology (IT) linking behaviors to attitudes and beliefs (Wixom and Todd 2005) and the components have been examined in relation to information systems attitudes, intentions, or usage criteria. Mathieson (1991) found that TAM explained over 69 per cent of the variance in college students' BI to use spreadsheets while Gentry and Calantone (2002) recounted that TAM was superior in its ability to explain students' intentions to use shop-bots in an internet purchasing activity. Mahmood, Hall and Swanberg (2001) in a meta-analysis of 57 studies related to information technology use, also noticed that the TAM components PEOU and PU exhibited the largest effect sizes on technology use among other identified factors. Echeng, Usoro and Majewski's (2013) finding also indicates that all variables of TAM co-vary with intention to use Web 2.0 in e-learning in Nigeria. These existing **evidences** indicate that TAM is a powerful predictor of users' technology acceptance (Fusilier and Durlabhji 2005).

Researchers have agreed that TAM is valid in predicting the individual acceptance of numerous systems (Chin and Todd 1995; Mahmood, Hall and Swanberg 2001; Fusilier and Durlabhji 2005; Echeng, Usoro and Majewski 2013 and Adewole-Odeshi 2014) and is proven to have high validity in many empirical studies (Chiou 2011). However, the model has been widely criticised, (despite its frequent use) leading to the original proposers attempting to redefine it several times (Bagozzi 2007). Foremost critique among studies reviewed came from McFarland and Hamilton (2006) who noted that although the initial TAM model was empirically validated, it explained only a fraction of the variance of the outcome variable with IT usage with 4% to 45%. Liu (2010) also echoed the point that the model consistently explains only a portion of the variance in technology usage intentions and behaviour. Venkatesh and Davis (2000) as cited in Chiou (2011) found it to be usually around 40%. TAM was also noted not to be valid across cultures (Teo, Luan and Sing 2008). Legris, Ingham and Colerette (2003) and Bagozzi (2007) also claimed that both the original TAM and TAM2 account for only 40% of a technological system's use. Again, Bagozzi (2007) and Chuttur (2009) maintained that TAM as a theory contains inadequate explanatory and predictive ability and lacks empirical and practical value. This signifies that TAM is limited in its capability to investigate and analyse technology use based on the limited measures of the model.

Similarly, Mathieson, Peacock and Chin (2001) were of the opinion that TAM does not put into consideration factors that can hinder a person's decision to use a particular system or technology. Dyba, Moe and Arisholm (2005) stated that TAM does not measure the benefit of using a technology and that it is important for technology adopters to measure the impact of technology on work performance, by using measures of effectiveness or productivity to assess the collective value of new technologies. Chuttur (2009) again pointed out that instead of measuring system usage with actual use data, TAM uses self-reported use data. Researchers including Legris, Ingham and Colerette (2003), Teo, Luan and Sing (2008) and Turner, Kitchenham, Brereton, Charters and Budgen (2010) have also found constructs of TAM such as PU and PEOU to be worse predictors of actual usage of a technology than BI, with PEOU being significantly worse than BI. TAM also assumes that only a single technology is available to users (Shin 2009) whereas there are numerous versatile technologies such as the Web 2.0, mobile phones, tablets, etc. which users can access.

Quite a number of empirical studies have recommended integrating TAM with other theories to improve its explanatory power and flow along with current changes in information systems use (Legris, Ingham and Colerette 2003; Carter and Be' langer 2005 and Lee, Hsieh and Hsu 2011). To obtain good results, certain past studies such as Chen, Gillenson and Sherrell (2002), Venkatesh, Morris, Davis, and Davis (2003), Fusilier and Durlabhji (2005), Lee, Hsieh and Hsu (2011), Kim (2012) and Echeng, Usoro and Majewski (2013) have either modified or integrated TAM with one or more theories. Considering the limitations of the constructs PU and PEOU in TAM on predicting use and in measuring benefits of a technology, applying this model only appeared inadequate for the current study. On the other hand, Ajzen and Fishbein (1980) and Kim, Chun and Song (2009) had emphasized that attitudes can be used to determine behaviour. Yang and Yoo (2003) also suggest that attitude may have significant effects on the use of information systems such as the Web 2.0 technologies. Hence, in order to obtain a better result, this study considered attitude towards use and BI (equivalent to intention to use construct in D&M model) variable in TAM which were employed as constructs of the current study. These variables formed the basis for Research Question Four of this study (see section 1.3.1.1). This will aid the current investigation on the perception of academics and students on utilizing Web 2.0 technologies for TAL purposes. The constructs „Attitude towards use“ and „intention to use“ served as both independent and dependent variables in this study.

2.4 Media Synchronicity Theory

Dennis, Fuller and Valacich (2008:581) defined Media Synchronicity as “the extent to which the capabilities of a communication medium enable individuals to achieve synchronicity”. Media synchronicity theory (MST) looks at media synchronicity as a predictor of communication performance and focuses on the ability of media to support synchronicity as shared pattern of co-ordinated behaviour among individuals as they work together. MST extends Information Richness Theory (IRT) Richard and Lengel (1986), which predicts that when users’ needs are concerned with the clarification of ambiguous information, rich media resolve the ambiguity faster than less rich media. Thus Pedro (2010) stated that media must be effectively tailored to maximize the rate of communication. Dennis and Valacich (1999) identified five capabilities of media that influence the development of synchronicity and thus the successful performance of conveyance and convergence communication processes. The capabilities include transmission velocity, parallelism, symbol sets, rehearsability and reprocessability (Dennis and Valacich 1999 and Dennis, Fuller and Valacich 2008). Figure 2c shows MST.

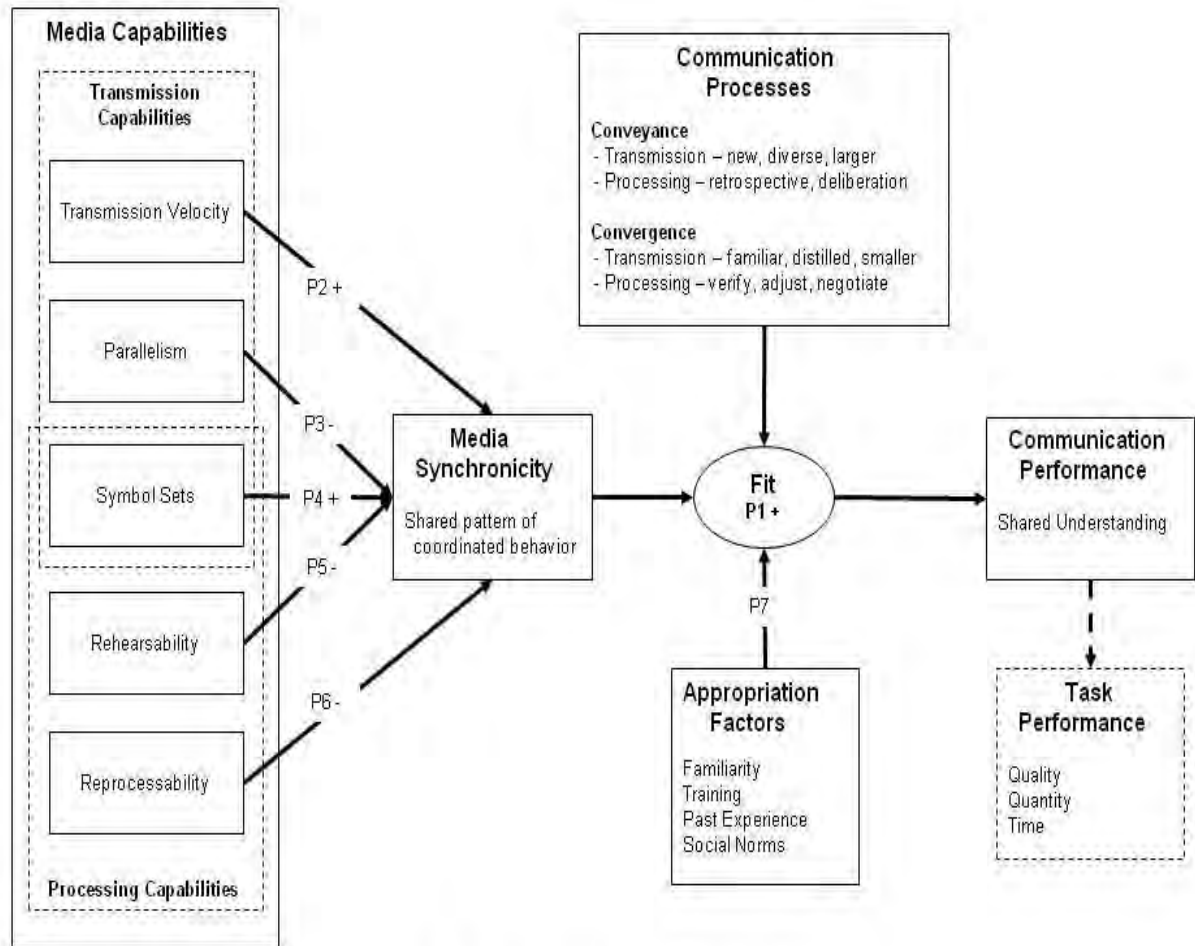


Figure 2c: Media Synchronicity Theory (Source: Dennis, Fuller and Valacich 2008)

MST distinguishes the following media capabilities namely Transmission velocity as the speed with which a medium can transmit a message; Parallelism as the number of simultaneous transmissions that can take place; Symbol sets as the number of ways in which information may be encoded in terms of multiple cues; Rehearsability as the extent to which a medium enables a message to be checked and edited before sending; and Reprocessability as the extent to which a message may be reviewed and re-examined after the message has been received (Schouten, Hooff and Feldberg 2010). Dennis and Valacich (1999) also noted that a set of five media dimensions namely immediacy of feedback, concurrency, rehearsability, persistence and symbol variety are key to understanding the effects of media use on an individual's ability to communicate and process information. Immediacy of feedback is the extent to which the

medium enables users to receive rapid feedback (Daft and Lengel 1986) or the ease with which the receiver can interrupt the sender to seek clarification, redirect or terminate the conversation (Rice, 1987). Concurrency is the number of simultaneous conversations that can exist effectively in the medium (Valacich, Paranka, George and Nunamaker 1993).

MST was primarily designed to explain the effects of media use better than theories of media richness (Dennis, Valacich, Speier, and Morris 1998) to enhance synchronicity and better communication performance. MST envisages that highly synchronous media are most advantageous when applied to tasks of information convergence; on the other hand, low synchronous media are most useful when applied to tasks of information conveyance (Dennis and Valacich 1999). Studies such as Voigt (2008); Dennis, Fuller and Valacich (2008); Schouten, Hooff and Feldberg (2010); Ryoo and Koo (2010) and North-Samardzic, Braccini, Spagnoletti, and Za (2014) have applied MST in investigating the use of IS in various organisations and among individuals. Voigt (2008) for instance, used MST as one of the underpinning theories to explore the extent to which case-based learning is being implemented electronically and found that the general concept was clearly insufficient to support online learning. Ryoo and Koo (2010) in another study investigated the impact of ICT on knowledge creation among company employees in Asia using MST. In their study, media synchronicity was found to moderate the relationship between characteristics of a given task, ICT usage and knowledge creation. North-Samardzic, Braccini, Spagnoletti, and Za (2014) used e-learning theory concurrently with MST to propose an explanatory design theory for distance-learning using 3D virtual world to address the problem of synchronicity.

Media capabilities are the potential structures provided by a medium which influence the manner in which individuals can transmit and process information (Rice and Steinfield 1994; Dennis, Fuller and Valacich 2008). Dennis and Valacich (1999) were of the opinion that communication effectiveness is influenced by matching the media capabilities to the needs of the fundamental communication processes. Therefore, it is assumed that media capabilities (synchronicity) would influence the use of Web 2.0 technologies in TAL. The construct „media synchronicity“ is an independent variable in this study and relates directly to research Question Five which sought to determine the influence of media synchronicity on academics“ and students“ intention to use Web 2.0 technologies for TAL. Some specific questions in the data collection tool (see Appendices 2 and 3) that addressed the research question are the use of

Web 2.0 technologies aid simultaneous (occurring at the same time) communication between sender and receiver; Web 2.0 technologies enable me to give and receive rapid feedback on the communications; and Web 2.0 technologies allow me to communicate using various symbols.

2.5 Gaps and Summary of the Chapter

The D&M model, TAM and MST present complementary perspectives for understanding technology use intention or actual use for at least two reasons. Firstly, TAM is theoretically a cross-sectional model in that it predicts IT usage based on user perceptions at any given point in time (Premkumar and Bhattacharjee 2008). However, the D&M model identifies factors that are critical to measuring the success of IS or technologies and most ICT systems are characterized by these factors especially system quality and information quality (DeLone and McLean 1992; 2003). MST is concerned with how media (technologies) can be designed appropriately to improve the rate of communication. Secondly, given that the D&M model delves into IS success, it includes post-usage constructs such as users' satisfaction, net benefits, resulting from users' direct experience with the technology, that are not included in TAM; while MST also provides capabilities of media (technologies) that influence the development of synchronicity and strengthen the performance of information systems (Dennis and Valacich 1999). Given their complementary nature, a model that integrates the key research constructs from D&M model; TAM and MST should explain more variance in user's intention to use technologies such as the Web 2.0 than one of the models alone. Hence, a conceptual model that integrates constructs of these models is depicted in Figure 2d.

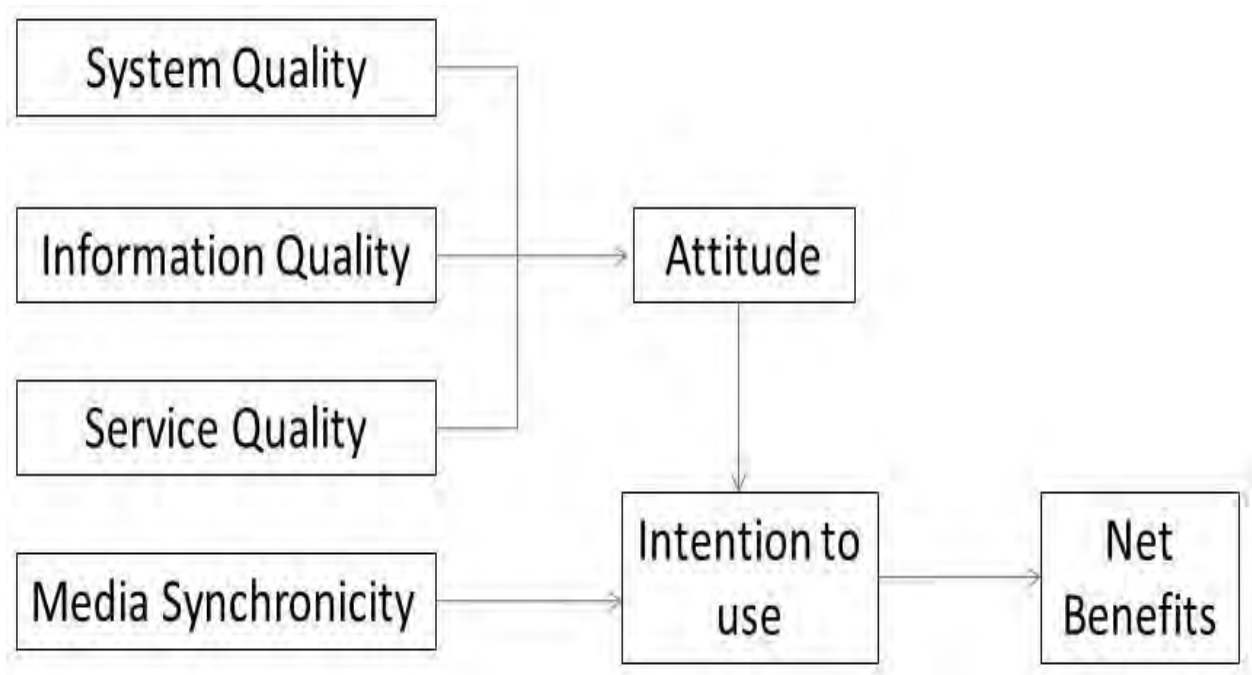


Figure 2d: Conceptual Framework for the Use of Web 2.0 Technologies for TAL

Selected constructs from the three models namely D&M model, TAM and MST were used in this study. The constructs of the D&M model namely system quality, information quality and service quality is directly related to the study's research Question Three which stated that "How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the federal universities?" (See appendices 1 and 2, section C) and also sought to answer research Question Six which stated that "What net benefits can be derived from the use of Web 2.0 technologies for TAL purposes?" (See appendices 1 and 2, section G). Attitude towards use construct in TAM also relates directly with the study's research Question Four that stated that "How does attitude influence intention to use Web 2.0 technologies for TAL in the federal universities?" (See appendices 1 and 2, sections E and F) Similarly, the constructs of MST relate to the study's research Question Five which stated that "How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the federal universities?" (See appendices 1 and 2, section D)

This study incorporated the D&M model as the main theory underpinning the research work due to its importance, usefulness and significance in explaining technology use (Petter,

DeLone and McLean 2008; Kim et al. 2009; Udo, Bagchi and Kirs 2010; Urbach and Muller 2011; Edlund and Lövquist 2012 and Onyedimekwu and Oruan 2013). Since this research is aimed at investigating the use of Web 2.0 technologies, selected constructs of the D&M model, TAM and MST were considered. The proposed conceptual model showed the relationships that exist between the variables of this study. The key variables of the study include System Quality, Service Quality, Information Quality, Intention to Use, Attitude towards Use and Net Benefits. Based on these constructs the research hypotheses (as indicated in section 1.3.3) were proposed for empirical testing.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

Literature review in research presents a critical synthesis and/or and evaluative report of previous research or studies found in the literature related to the study under investigation (Boote and Beile 2005). The review of literature provides a general overview of the topic of interest to enhance understanding of the topic under study. Hart (1998:13) highlights the purpose of literature review to include the “selection of available documents (both published and unpublished) on the topic” of interest, gathering “information, ideas and evidence written from a particular standpoint” and the “effective evaluation of these documents in relation to” proposed theme. Along this line, Baker (2000) stated that reviewing of existing literature relating to a topic is vital and should be the first step and foundation when undertaking a research project.

The purpose of this study is to investigate the extent of use of Web 2.0 technologies for TAL in selected federal universities in south-west Nigeria. The study addresses the following research questions: (1) What kinds of Web 2.0 technologies are used by academics and students, and for what purposes? (2) To what extent are Web 2.0 technologies integrated into TAL in Nigerian universities? (3) How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the selected federal universities? (4) How does attitude towards use influence intention to use Web 2.0 technologies for TAL in the selected federal universities? (5) How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the selected federal universities? (6) What net benefits can be derived from the use of Web 2.0 technologies for TAL?

This chapter is organized around themes of research questions, key variables of the underlying theory and broader issues on the research problem. Thematic areas from the research questions include Integration of Web 2.0 technologies into TAL in universities; Use of Web 2.0 technologies by academics and students; Influence of system quality, information quality and service quality on attitude towards use of Web 2.0 technologies; Attitude and intention to use of Web 2.0 for TAL; Media Synchronicity and Net benefits of using Web 2.0 technologies in TAL. Moreover, the broader issues around the research problem in this study include

technology acceptance and use; diffusion of innovations and applications; e-learning and Information and Communication Technologies (ICTs) in TAL. Within each theme, international context followed by African and Nigerian contexts were examined.

The empirical and theoretical literature was reviewed on the above thematic areas. Kothari (2004) pointed out that there were two types of literature – the conceptual literature concerning the concepts and theories; and the empirical literature which discusses studies related to the variables of the current study. The literature reviewed in this chapter was obtained from books, conference proceedings, databases (such as Google Scholar, EBSCOhost, ProQuest, Emerald Insight, WorldCat and Web of Science), scholarly journals, theses, etc., in both print and electronic resources from international and African sources.

3.2 Integration of Web 2.0 Technologies into TAL in Universities

Web 2.0 is becoming a ubiquitous concept and increasing research is emerging. Leh, Kremling and Nakayama (2012) noted that new media, especially emerging Web 2.0 technologies, are considerably changing the TAL environment, and has resulted in a variety related terms (Zimmer 2007; Alexander 2006). These related terms, including social media, E-learning, Education 2.0, Teaching 2.0 and Learning 2.0, describe the use of Web 2.0 in formal educational systems, e-learning, teaching or learning (Downes 2005; Selwyn, Crook, Noss and Laurillard 2008; Shawn 2011 and Emmanuel, Ebiere and Vera 2013). Richardson (2006) described Web 2.0 as second a generation web-based service which allows users to read, write, collaborate and share information content on the web. The first generation of web known as Web 1.0 only avails access to information content but does not permit editing or individual and group contribution. Examples of Web 1.0 are the email, static HTML webpages (containing personal or organisation profile) such as Britannica Online, shopping carts, WebQuest and ReadWriteThink.org's Comic Creator (Strickland 2007; Handsfield, Dean and Cielocha 2009; Hayes 2010 and Aghaei, Nematbakhsh and Farsani 2012). It is therefore referred to as a read-only, static or closed web.

Web 2.0 on the other hand permits users to read, and in addition write, edit and distribute information to whomever and wherever. This makes viable tools that can enrich the TAL environment in universities. An and Williams (2010) referred to Web 2.0 as internet applications that expedite interactive information creation, sharing and collaboration on the

World Wide Web (www). These technologies are used to create a virtual TAL community within the university environment (Xu, Ouyang and Chu 2009). With Web 2.0 technologies, communication and interactions (originally generated in the virtual environment) can be brought into the classroom (McCarthy 2010). This would help meet the expectations of today's students also called "digital natives" (Brown 2000 and Prensky 2001), "Net-generation" (Oblinger and Oblinger 2005) or "Generation C" (Leh, Kremling and Nakayama 2012) who use these technologies in their daily learning activities and expect that academics too will use them to communicate their knowledge (Thompson 2007). Web 2.0 therefore are dynamic web technologies that allow for users' involvement in adding, sharing, editing and retrieving information, such as that needed by academics and students to enhance their TAL practices in various disciplines.

Technological advances in recent years have dramatically impacted on the ways in which TAL are being carried out in and outside the classrooms (An, Alon and Fuentes 2014), especially with students who already possess technological skills with respect to electronic learning and communication. These students already have access to a wide range of technology tools (such as mobile phones, computers, and i-pads) and expect Web 2.0 technologies to be integrated into their learning practices (JISC 2007 cited in Leh, Kremling and Nakayama 2012). Blooms Taxonomy expects learning that results in acquisition of various skills such as remembering, understanding, applying, analysing, evaluation and creating (Anderson and Krathwohl 2001). These skill sets can be enhanced using such Web 2.0 applications such as Wikis, blogs, Facebook, podcast, RSS and SNSs (Lenhart and Madden 2007 and Hargadon 2008).

TAL practices in universities are being transformed with a paradigm shift from print media, such as books, to the internet and digital media (Mutula 2009). The Web 2.0 gives students and academics access to quick and global information useful for TAL practices. In response to this, efforts are being made (particularly by researchers) to understand the use of Web 2.0 in education and how it can enhance the quality of TAL (Caruso and Salaway 2008; Mohd, Jason and Sylvia 2010 and Leh, Kremling and Nakayama 2012). However, research in this area although proliferating in regions of Africa such as Tanzania, South Africa, Ghana, Zimbabwe and Nigeria (Munguatosha, Muyinda and Lubega 2011; Lwoga 2012; Usoro, Echeng and Majewski 2013; Ajise and Fagbola 2013 and Echeng and Usoro 2014), focused less on the integration of Web 2.0 technologies in TAL. To fill this gap, the second research question of

the present study examined the extent to which Web 2.0 technologies are integrated in TAL in selected Nigeria universities. Questions such as “which Web 2.0 technologies do you use for TAL purposes?” and “how frequently do you use Web 2.0 technologies for TAL purposes?” were used to assess the extent of integration of Web 2.0 into TAL in the Nigerian universities surveyed.

Kelly (2008) in a qualitative survey of 180 higher institutions of learning across five countries (that is South Africa, Australia, the Netherlands, the United Kingdom (UK) and the US) indicated that Web 2.0 is being employed across all areas in higher education. Wang (2013) in a study in Taiwan claimed that the use of Facebook (a popular Web 2.0 tool) in a course during the 2011-2012 academic year significantly and positively affected students’ learning engagement and their grades. Wang (2013) further indicated that using Web 2.0 applications (such as Facebook) would promote the level of learning engagement in the real world by helping students merge their social lives with academic life. Web 2.0 use had in certain ways led to better academic outcomes which were not limited to students as Ballard and Bates’ (2008) put it that academics ensure their students’ success. Likewise, Aduke (2008) argued that teaching cannot take place without the students, academics, curriculum, content and instructional materials. Web 2.0 technologies can therefore stimulate TAL practices from both inside and outside the classroom to allow for effective TAL practices.

Conole and Alevizou (2010) reported that Web 2.0 technologies are being deployed across university activities in the United Kingdom (UK) due to technical proficiency and availability of good infrastructure. However, some studies observed a limited use of certain Web 2.0 technologies, for example blogs, in TAL especially among academics in some parts of USA and Canada (Wyld 2008). Similarly, Rubio, Martin and Moran’s (2010) study among 46 academics in Spain revealed that there was a serious lack of knowledge regarding the use of Web 2.0 applications (such as blogs, wikis or podcasts) in teaching. Afifi (2011) noted that although most universities in Egypt had established the required infrastructure for e-learning, the application was still limited in use for academic purposes such as TAL, due to insufficient qualified academics. However, Wyld (2008) predicted that the utilization of these technologies would increase in the future as they became more common.

In the African higher education context, e-learning systems are becoming more common due in part to the emergence of Web 2.0 technologies. Studies such as Awodele et al. (2009), Munguatosha, Muyinda and Lubega (2011), Buabeng-Andoh (2012) and Lwoga (2012), indicate the proliferation of Web 2.0 technologies in the academic environments of African countries such as Uganda, Tanzania, Ghana, South Africa and Nigeria. Web 2.0 technologies (such as blogs) serve as a two-way communication tool that allow students and academics to participate in online forums, chatting, content sharing using RSS feeds and commenting (Awodele et al. 2009). Lwoga (2012) studied the extent to which Web 2.0 technologies were used to support TAL in Tanzania's public universities. The result of Lwoga's (2012) survey showed that the adoption and use of Web 2.0 for TAL process is still at an embryonic stage in Tanzania's public universities and generally very low in Africa universities; except for countries such as South Africa where the adoption has more rapid uptake and use of e-learning technologies for TAL is quite high. Yet, the study pointed out that academics and students have shown much enthusiasm for e-learning and Web 2.0 usage in their universities. Their eagerness to the use of these technologies for academic activities is an important step that could influence the successful integration of these technologies into TAL practices.

Buabeng-Andoh (2012) empirically investigated the adoption and integration of ICT in education in Ghana. The findings revealed certain barriers to adoption of technologies in TAL. These include lack of ICT skills, confidence, pedagogical training and suitable educational software limited access to technological tools, rigid structure of traditional education systems and restrictive curricula. The situation is also similar to the findings of Anunobi and Ogbonna (2012) and Echeng, Usoro and Majewski (2013) who noted that the adoption of Web 2.0 technologies is low for TAL in Nigeria Universities, due to lack of familiarity with the tool for pedagogical purposes. Ajise and Fagbola (2013) in a study conducted in Nigeria revealed a high level of awareness and use of Web 2.0 technologies for specific purposes such as engaging students in conversation, relating, communicating, and collaborating with colleagues, and sharing of educational materials for the purposes of TAL. As most students and academics are already using the Web 2.0 technologies for some academic practices, the situation with integrating these technologies in TAL practices is expected to improve through increasing the level of awareness and use of these tools.

To ensure effective integration of Web 2.0 into learning environments, Grosseck (2009) recommends that technologies must be introduced appropriately in the curriculum by first verifying their capability and efficiency, and selecting the ones suitable to the TAL activities. In addition, An and Williams (2010) suggested:

- (1) introducing few new technologies to students in one semester;
- (2) avoiding multiple technologies that do the same thing; and
- (3) employing a student-centred instructional method, when teaching with Web 2.0.

Academics must in addition employ Web 2.0 technologies and organize teaching materials and activities in parallel with various pedagogical strategies (Wang 2013). In integrating Web 2.0 technologies into TAL practices, especially in the Nigerian universities, essential changes such as developing a curriculum and policy that supports the use of new technologies should be made.

3.3 Use of Web 2.0 Technologies by Academics and Students

Web 2.0 technologies are increasingly being integrated into higher education around the world to support TAL activities (Mohammad 2011) and academics and students are increasingly gaining confidence in the use of such tools. Menkhoff, Gan, Woodard and Chay (2014) reported how Twitter was being used in teaching an undergraduate knowledge management course at the Singapore Management University. Their findings revealed that using Twitter as a discussion platform during class enhanced TAL. This implies that appropriate use of Web 2.0 technologies by academics and students would make them effective for pedagogies and also enrich the TAL process. An and Williams (2010) conducted a study in the US among “Web 2.0 experts”, a word they coined to mean university academics who are experienced in teaching with Web 2.0 technologies. Their study showed that 14 of them including male (35.71%) and female (64.29%) academics who participated in the study had substantial experience (average of 3.71 years) in teaching with Web 2.0. A larger survey conducted by Moran, Seaman and Tinti-Kane (2011:3) among 1,920 US faculty members revealed that “nearly two-thirds of all faculty have used social media during a class session, and 30% have posted content for students to view or read outside class. Over 40% of faculty has required their students to read or view social media as part of a course assignment and 20% have assigned students to comment on or post to social media sites”.

Web 2.0 technologies have not only aided effective teaching but also ensured efficient learning by students. Web 2.0 uses innovative technology that provides both academics and students with distinct benefits in their TAL processes. One of the benefits is that it allows for the use of blended TAL methods. Shih's (2011) survey of first year students' assessment on combining Facebook with face to face instruction for an English writing course in a university in Taiwan revealed that the students were greatly satisfied with the blended learning approach. Likewise, Poellhuber and Anderson and Roy's (2011) research on some Canadian schools showed that students were becoming more positive and inclined to using Web 2.0 technologies such as wikis, podcasting, video sharing, social networking, blogs and many others for academic purposes. Lee and McLoughlin (2007) maintain that students as members of the open culture of Web 2.0 are finding new ways to contribute, communicate, and collaborate, using a variety of accessible and easy-to-use tools that empower them to develop and share ideas. It can be inferred that students will be easily attracted to technologies that can help them produce, use and reproduce information needed for their academic activities. However, Ajjan and Hartshorne (2008) noted that while certain academics felt that some of these tools could improve students' learning, interaction with colleagues or peers, writing abilities and satisfaction with the course, some still chose not to use these tools in the classroom.

Mohammad's (2011) study revealed a low level of adoption of Web 2.0 among students at a school in Kuwait. Hartshorne and Ajjan (2009) in a study conducted in Florida, found that 56% and 71% of students did not use blogs and social bookmarking respectively in the educational context. Mohammad (2011) adduced the reasons for low level of adoption and use of Web 2.0 technologies to the novelty of the technology (as it is just emerging) and low awareness but felt that Web 2.0 in the near future will play a prominent role in the administration of knowledge, if its diffusion is widely spread. Kumar's (2009) study on undergraduates' perception of Web 2.0 usefulness in US higher education indicated that undergraduate students would appreciate the use of Web 2.0 in TAL only if it enriched their learning experience, added value to existing practice, and enhanced the learning process. Halonen, Acton, Golden and Conboy (2009) conducted a study to evaluate the success of the e-learning in a virtual learning environment in Galway, Ireland. The results showed that the students found Web 2.0 applications with learning software such as the Moodle, more useful. The inconsistencies in the results might be as a result of location of the studies. This suggested that the extent of use of these technologies

for TAL practices by academics and students may differ from one continent or country to another. Based on this, this study investigated the theme in the Nigerian context for better understanding.

From a study conducted in a South African university, Howe and Kwaletswe (2012) observed that the introduction of Web 2.0 has provided a wide-range of opportunities that support personalized learning. It was also noted that Web 2.0 technologies strengthened students' skills as they interact, share knowledge and team up with knowledgeable peers and academics that are not in the same location as them. As a result, universities were making serious efforts to use Web 2.0 technologies to cater for the information needs, demands and desires of academics and students (Makori 2012). Findings from Hough and Neuland's (2014) study revealed that more than 80 per cent of students assessed in South Africa and the United States (US) experienced a positive investment in their studies through the use of ICTs. Howe and Kwaletswe (2012) concluded that the appropriate use of Web 2.0 applications could provide personalized learning support for South African higher education through appropriate use of Web 2.0 applications. Lwoga (2012) assessed the extent to which Web 2.0 technologies were utilized to support TAL in Africa's higher learning institutions, with a focus on Tanzania's public universities. The study revealed some challenges facing Tanzanian universities in their adoption and use of Web 2.0 such as poor technological infrastructure, unawareness, reluctant attitude toward e-learning, and lack of local expertise in curriculum development for e-learning. These challenges equally affected the use of other technologies such as the Web 2.0 for academic purposes in developing countries.

Olasina (2011) observed that Nigerian information professionals, librarians and others (including academics and students) used Web 2.0 technologies and SNSs in their workplaces predominantly for the purpose of entertainment. Aramide and Akinade (2012) investigated the extent of awareness and use of Web 2.0 technologies among 210 university undergraduate and postgraduate students in Nigeria and discovered a low level of awareness (Mean = 1.42), general use of the tools (Mean = 1.28), use of tools for academic and research purposes (Mean = 1.15) and use for TAL purposes by the students. Findings further revealed a gender disparity with the use of Web 2.0 technologies for academic purposes as the tools were used more by male students than their female counterparts.

Ajise and Fagbola (2013) empirically investigated the level of awareness and usage of Web 2.0 technologies among lecturers in Nigerian universities. The survey method was employed and data was collected from randomly selected 144 lecturers from five federal government owned universities in southwest Nigeria using questionnaires. Study results revealed a high level of awareness and use of Web 2.0 technologies such as Facebook, Twitter, podcasting, YouTube, LinkedIn and wikis among academics. Findings further showed that academics used Web 2.0 technologies in communicating, relating and engaging students, and also for collaborating with colleagues. In addition, Web 2.0 technologies were used to share educational materials for TAL purposes. However, in agreement with Aramide and Akinade's (2012) finding, Ajise and Fagbola (2013) noted a significant difference between levels of awareness of Web 2.0 technologies. This study agrees with Ajise and Fagbola (2013) that the level of awareness is an important factor in determining use of Web 2.0 technologies for academic purposes. Though the present study is quite similar to Ajise and Fagbola's (2013), this study is different in terms of its objective which is to investigate the use of Web 2.0 technologies in TAL using the D&M model, TAM and MST as underpinning theories and particular focus on their use for TAL purposes. Selected constructs from TAM and MST are adapted to extend the D&M model and verify the relationship that exists between the constructs and intention to use to gain a better understanding of the research problem. This study also extends Ajise and Fagbola's (2013) research by examining the use of these technologies by academics as well as students who were not included in their study.

Recently, Echeng and Usoro (2014) conducted a comparative study on user acceptance and adoption of Web 2.0 technologies in learning in Nigeria and Scotland. To determine factors that influence adoption of Web 2.0 technologies, the study examined selected constructs from three technology acceptance models that support learning, namely, TRA, TAM and UTAUT. The study adopted the quantitative data analysis and used inferential statistical analysis in the form of correlation analysis to evaluate the relationships between variables. Descriptive analysis was also carried out using frequency tables and histograms to describe the general responses. Findings revealed that there was still low enthusiasm in Nigeria towards the use Web 2.0 technologies for academic purposes as compared to Scotland. These correspond with Aramide and Akinade (2012) and Ajise and Fagbola (2013) who reported a low level of Web 2.0 usage for TAL in Nigerian universities. Echeng and Usoro (2014) recommended that

infrastructural support should be provided by the university management and also advocated for the orientation of students and academics on the potentials of Web 2.0 for TAL.

The reviewed literature revealed that although students and academics are aware of Web 2.0 technologies, they are oblivious of its importance and use in TAL. In addition for most studies, there has not been much focus on how students and academics use these technologies for TAL practices. To address the problem of low enthusiasm, the present study examines factors that influence intention to use Web 2.0 technologies for TAL purposes. The study is expected to provide university authorities with useful information motivating academics and students to use Web 2.0 technologies for TAL. The present study focused on students and academics due to the fact that they are both key players in the TAL process. It also assumed that the results obtained from examining both students and academics would differ from investigating them separately. The study deemed it necessary to identify the Web 2.0 technologies that are used for TAL purposes in the Nigerian context. This is intended to provide information on how key players in education can give necessary attention to the need for integration and use of Web 2.0 technologies in TAL, especially in the Nigerian universities where its application appears to be penetrating slowly.

3.3.1 Types of Web 2.0 Technologies

With the increasing use of ICTs as learning tools, emerging technologies such as Web 2.0 applications have in recent times become ubiquitous in the academic setting. With reference to the use to which Web 2.0 technologies are applied, FAO (2009) e-learning package grouped them into social network, collaborating, internet contributing and aggregating tools. Hew and Cheung (2014) grouped Web 2.0 technologies based on their purpose of use as:

- online reflection,
- social spaces,
- online collaboration,
- social bookmarking, and
- repository.

Web 2.0 technologies and services that most students and academics are familiar with or at least aware of include social network sites, MySpace, Facebook, Twitter, wikis, podcasts, Youtube, LinkedIn, blogs and Bebo, (Alexander 2006 and Ajjan and Hartshorne 2008).

However, literature revealed some Web 2.0 technologies that have been very useful for learning across disciplines. These include online forums, blogs, class-capture in the form of video-casts, audio podcasts or SmartBoard capture, Google documents, Facebook, wikis (Wikipedia), MySpace, YouTube, Flickr, Delicious, Skype, Microsoft Network (MSN) Messenger, Twitter, RSS feeds, social bookmarking, multimedia sharing and Instant Messaging (Kumar 2009; Mohammad 2011 and Emmanuel, Ebiere and Vera 2013). Based on the argument that the use of Web 2.0 technologies as a TAL tool is still at an infancy stage in Nigerian universities, commonly used tools such as Blogs, wikis, RSS feeds, social networking (Facebook, Twitter, 2go, WhatsApp, Flickr and LinkedIn), newsgroups/online forums, podcasts (webcasts, video-casts, audio podcast), YouTube, Skype, and social bookmarking (Aramide and Akinade 2012; Lwoga 2012; Echeng and Uoro 2014 and Diyaolu and Rifqah 2015) are examined in this study.

3.3.2 Broader Issues on Use of Technologies for TAL

The broader concerns of this study encompassed technology acceptance and use, diffusion of innovations, e-learning and applications of ICTs in TAL. Their relevance to the study of Web 2.0 technologies" integration in TAL is discussed.

3.3.2.1 Technology Acceptance and Use

Technology acceptance has long been a challenging concern in IS research (Bélanger and Crossler 2011) and it is vital to understand the reason why people accept or reject technology so as to provide a guide for investors, manufacturers, institutions and their managers (Echeng and Uoro 2014). The success of an IS to a large extent depends on users" acceptance and use of the said system. User acceptance is demonstrated in the readiness of a user or group of users to employ information technology tools for the tasks designed (Echeng and Uoro 2014). One of the recently emerging technologies being examined by researchers is that of the Web 2.0 technologies and how they are integrated into different sectors. These technologies consist of computer applications, websites or user interfaces (Mohammad 2012), web-based technologies, and e-learning technologies among others.

Higher education institutions, as one of a number of organisations that influence information technology innovation (King et al. 1994), have gone through a dramatic change (Sibbet 1997) with the use of new technologies such as the Web 2.0, which is transforming the way in which academics and students teach and learn. This is seen as universities are gradually replacing traditional classrooms with digitized technology rooms (Weyant and Gardner 2010). Likewise, academics and students have begun to use technologies (such as Web 2.0) for content sharing (Barnatt 2008). This signifies an improvement in the acceptance of Web 2.0 technologies in higher institutions of learning. However, with technology doubling every 18 months (Sibbet 1997), it could be quite formidable to keep pace with it, let alone working out how best to integrate the technology into the institutions curriculum. Similarly, the technology being relatively young has a number of unresolved issues. According to Echeng, Usoro and Majewski's (2013) research, one of these issues is its acceptance and use in TAL (Franklin and Harmelen 2007). This and substantial other challenges are affecting the acceptance and use of technologies, and most especially Web 2.0, in universities.

3.3.2.2 Diffusion of Innovations

Diffusion is the “process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 2003:5). These channels could include new technologies (such as Web 2.0) used for TAL activities. Innovation may also refer to ideas, practices or objects that appear new to an individual (Rogers 2003). Diffusion of innovation (DOI) theory developed by Rogers (2003) analyzes how an innovation diffuses in a social system (Mazman and Usluel 2009). It also describes the process by which an invention is communicated through certain channels to reach and be adopted by many users (Bwisa and Gacuhi 1999). Diffusion can be regarded as the spread of a new technology in an organization.

DOI theory is a widely used in the studies of ICTs. The DOI theory comprises of four key elements which are innovation, communication channels, time and social system. The items that appear new to users but useful in particular context are called innovations. Bwisa and Gacuhi (1999) described innovation as the modification or adaptation of a product or service that is novel only to a given setting, irrespective of whether it has been used somewhere before or not. For instance, the use of Web 2.0 technologies in the TAL setting is quite an innovation to educational activities which are traditionally conducted through the face-to-face method. A

communication channel refers to a method by which information is transmitted from one person to another. For example, students can use the Facebook or e-mails to communicate with their peers. Time, which is the third component of DOI according to Rogers (2003), can be divided into three components, namely the innovation-decision process, the innovativeness of a person, and the adoption rate of the system. The social system can be described as a set of interconnected entities involved in common problem solving to achieve a goal (Rogers 2003). The university may be considered as a social system where interaction and communication takes place among students and academics in order to achieve a common goal. That is, academics teach effectively and students learn to achieve academic success. These four major features determine whether a person would adopt or reject an innovation (Mohammad 2011). In the context of this study, diffusion is a process by which TAL activities are accomplished through the use of Web 2.0 technologies over a period of time among academics and students.

Early instructional diffusion studies maintained that a substantial time lag is required for the widespread dissemination of new instructional ideas (Rogers 2003). This implies that before a technology could be said to have gained ground, there would be a time interval between the introduction of the innovation or technology and when it is been accepted and used. In academic environments, there has been a growing trend to incorporate technology to fulfill some of the technological expectations of students. As earlier revealed, today's students are considered as digital natives (Prensky 2001), and they use Web 2.0 applications on a regular basis (Madden and Fox 2006). Web 2.0 applications are expected to provide several benefits to these students and academics, given the ability of these applications to enable active participation of students, promote opportunities and environments for student participation and reflection, and foster a collaborative and active community of learners (Ferdig 2007). However, the perceived characteristics of the user (Rogers 2003) can affect the rate of adoption of these technologies. Rogers (2003) also suggested some other characteristics of an innovation that could influence its rate of adoption, these include: relative advantage, compatibility, complexity, trialability and observability. Moore and Benbasat (1991) added four other characteristics, namely ease of use, image, visibility and result demonstrability.

Mohammad (2011) employed Rogers' DOI theory to specify the factors that influence student perceptions of adopting Web 2.0 applications as learning tools. Data was obtained via a survey instrument from 350 students and was statistically analyzed. Results showed that the level of

awareness of Web 2.0 explained more than 32% of the variance in Web 2.0 adoption. This shows the power of awareness in predicting the diffusion and adoption of an innovation. The study result suggests that students with higher levels of awareness of Web 2.0 are more likely to use Web 2.0 as learning tools. Study findings further showed that Rogers' attributes of innovations, which were indicated as voluntariness, relative advantage, ease of use, compatibility, visibility, result demonstrability and trialability explained more than 9% of the variance on Web 2.0 adoption. Consistently with Almobarraz's (2007) research, these same attributes explained 33.2% on the rate of Internet adoption. Study results further revealed that obstacles which include skills, privacy, confidence and technical support explained more than 8% of the variance in Web 2.0 adoption as learning tools. It implies that the rate of diffusion of innovations can also be affected by problems foreseen in a technology. Thus in integrating Web 2.0 technologies in TAL, the impact of obstacles should be considered in order to allow for fast diffusion of the technologies in the university system.

Several other studies have been conducted on the diffusion of innovations in Africa such as that of Bwisa (1999) in Kenya; Van der Watt and Pretorius (2008) in South Africa; Conley and Udry (2001) in Ghana; and Oigiagbe, George and Owoyemi (2012) in Nigeria. Metseagharu (2010) investigated the factors that affect the diffusion of technology from research centres in industries in Nigeria. The study assessed the inventions of the Federal Institute for Industrial Research (FIIRO) and Project Development Agency (PRODA) which are composite flour and cassava pellet respectively. Findings show a low level of diffusion of innovations from the research centres in the industries in Nigeria. Moreover, the study identified that relevance of innovations either in terms of price or performance, inadequate manpower, inadequate policies, policies implementation and lack of funding as factors inhibiting the diffusion of technology. The study recommended among others that stakeholders of innovations be actively involved in the spread of an innovation and that government provide vital policies that would create the right environment for diffusion.

Unlike most studies, Twiss (1992) identified some factors that were critical to favouring the spread of an innovation. They can be summarized as being the relevance of the innovation to an organization's corporate goals, effective project selection and evaluation system, organisations' receptiveness to the innovation, individual commitment to the innovation, creativity of the innovation and orientation on the profitability of the innovation to users. The

present study aims at providing useful information that will help (1) the diffusion of Web 2.0 technologies into Nigerian university education; and (2) catalyse the development of national and institutional policy on integrating Web 2.0 technologies into TAL in the university environments in Nigeria. This study will elicit information through the use of questionnaires and interview schedule on what factors can encourage or be obstacles to the integration of Web 2.0 technologies in TAL in Nigeria universities.

3.3.3.3 E-learning and Applications of ICTs in TAL

Information and communication technologies (ICTs) have immensely transformed the way in which educational instructions are being delivered over the last few years. The application of ICTs is already changing the organization and delivery of higher education (Sife, Lwoga and Sanga 2007). Although traditional teaching methods such as face-to-face lectures, tutorials, and mentoring are still dominant in the educational sector; in order to facilitate TAL practices, universities are investing substantially in learning technologies (Cancannon, Flynn and Campbell 2005 and Mahdizadeha, Biemansa and Muldera 2008). Literature has shown that ICT, if in the right hands and appropriately used for specific purposes and context, can be an effective tool in enhancing TAL activities (Hennessy, Harrison and Wamakote 2010). Advanced and developing countries also agree with the fact that ICT is a central focus for education policies, hence its use and integration in school curricula (Adebayo 2008). Bamidele (2006) describes ICT as a technology that comprises of a collection of new technologies and their applications. These applications include all aspects of the use of computers, electronic devices, communication technology (Adebayo 2008), web-based systems and the internet.

When ICTs are applied to achieve or support the aim of tradition teaching methods, the resultant process is referred to as e-learning. Sife, Lwoga and Sanga (2007) defined e-learning as the use of ICTs to enhance and support TAL processes. It is the instructional content or learning experiences conveyed or facilitated by electronic technologies to provide students as well as academics with the tools that enable collaboration, akin to that provided by Web 2.0 technologies. It is also possible to state that e-learning is every learning mediated by technology. E-learning includes instructions delivered via all electronic media (Govindasamy 2001). E-learning comprises of a wide range of TAL applications, approaches, methods and technologies.

E-learning implemented using Web 2.0 applications is termed e-learning 2.0 (Downes, 2005). The most common tools used for e-learning 2.0 are blogs, wiki-based sites, shared media, social networks, social groups, bookmarking and others. E-learning ranges from applications such as PowerPoint, virtual learning environments (VLEs) to managed learning environments (MLEs) (Sife, Lwoga and Sanga 2007). E-learning can be used to achieve a blended form of learning using both ICTs and traditional face-to-face methods for TAL practices. Typical examples are the use of interactive boards and PowerPoint presentation slides in physical classrooms to support learning. Some components of e-learning technologies include video conferencing, mobile technologies, mobile learning, the web, web-based technologies (such as Web 2.0 technologies), electronic learning platforms (such as the learning management system), electronic media (such as television and radio, interactive television, compact discs (CDs) and digital versatile discs (DVDs) and the internet (Govindasamy 2001; Anderson 2007 and Sife, Lwoga and Sanga 2007). E-learning has served as important infrastructural features of universities that enable teachers to provide students with different representations of knowledge and to enhance interaction between teachers and students, and amongst students themselves (Mahdizadeha, Biemansa and Muldera 2008).

For most European countries, the use of ICT in TAL has become more prevalent. To this extent countries such as Canada, the US, Australia and New Zealand (Anderson and Elloumi 2004) provide ideas that serve as general guides for effective use of ICT in teaching practices. Indeed, a large percentage of universities in developed countries have achieved high levels of effective use of ICT to support and change the face of TAL (Govindasamy 2001; Galanouli, Murphy and Gardner 2004; Selwyn 2007; and Hernández-Ramos, Martínez-Abad, Peñalvo, García and Rodríguez-Conde 2014). Higgins (2002) noted that much has been invested in making ICT available for use by teachers and students in the UK. However, although these tools are physically present in schools, colleges and institutions, there is still an unanswered question of how many of these actually use the ICT tools for TAL.

Mahdizadeha, Biemansa and Muldera (2008) conducted a survey on 178 academics from a university in the Netherlands and identified five factors that shaped academics' opinions regarding the use of e-learning environments in higher education. The factors are knowledge construction, TAL approach, teachers' opinion about computer-assisted learning, teachers' opinion about web-based activities, ease of use (or perceived difficulty), and time. Study

findings showed that 43% of the total variance in academics' use of e-learning environments could be explained by their opinions about web-based activities, computer-assisted learning and the perceived added value of e-learning environments. This suggests that the perception or opinion of users of technologies could largely explain their usage practices. Blanskat, Blamire, Kefala (2006) conducted a study in national, international, and European schools to draw evidences regarding the advantages and benefits of ICT in schools' achievements. Study findings showed that ICT has a positive impact on students' performances. It was also discovered that schools with higher levels of e-maturity show a rapid increase in performances in scores compared to those with lower levels. In addition, the outcome of those with adequate ICT resources was better than those that were not well-equipped. It can be deduced from the findings that the provision of ICT resources such as Web 2.0 can result in improved students' performances.

African countries are also rising with the trend of the use of ICT in education. However, in many African countries, the most persistent and daunting challenge facing the education system and the integration of ICT in particular, is meeting the desperate need for more qualified, competent teachers (Afe 2002; Olakulehin 2007; Hennessy Harrison and Wamakote 2010). The literature reviewed by Hennessy, Harrison and Wamakote (2010) shows that the major barriers to the ICT classroom use are the lack of computer hardware (60%), software (56%) and reliable internet connections (52%), particularly in African countries such as Mauritania, Ghana and Zimbabwe.

Sife, Lwoga and Sanga (2007) studied the application of ICTs in TAL in Tanzanian universities by reviewing the e-learning context. The study revealed that despite the achievements of some Tanzanian universities in implementing ICT for TAL processes, the universities still faced a lot of challenges. Some of these challenges are the lack of systemic approach to ICT implementation, awareness and attitude towards ICTs, technical support, transforming higher education, staff development, lack of ownership and inadequate funding. Furthermore, it has been substantiated that ICTs provide great opportunity for universities in developing countries to improve their TAL processes. Sife, Lwoga and Sanga (2007) noted that most of the universities in developing countries possessed the basic ICT infrastructure such as Local Area Network (LAN), internet, computers, video, audio, CDs and DVDs, and mobile technology facilities which form the basis for the establishment of e-learning. They

recommended that pedagogical, technical and cost issues were considered for each specific technology when integrating ICTs in TAL practices in the universities in developing countries.

Adebayo (2008) examined the use and relevance of ICT in TAL in Nigeria. The study employed different research methods such as a descriptive survey, unstructured interview, observations, and participatory experience to obtain data on the challenges of ICT on learning process in Nigerian universities. It was revealed that ICT is an indispensable tool for evaluation and improvement of knowledge and skills in modern TAL process. Some of the challenges identified in the study are the teacher factor, digital divide, inadequate funding, inadequate internet connectivity and management's attitude. These problems affect the effective integration of ICTs as well as Web 2.0 technologies in the TAL process. And as such, high level of adoption by academics would enhance TAL process. This, as suggested by Adebayo (2008), will facilitate and achieve good course organisation, collaborative learning and effective class management. ICT was also noted to provide academics with the structured means for presenting past and present information gathered from various sources. These findings provide the evidence that ICT and e-learning tools, such as the Web 2.0 technologies investigated in the current study, are important for enhancing TAL practices, especially in universities.

3.4 Factors influencing Use of Web 2.0 for TAL

Getting students and academics to adopt Web 2.0 technologies for academic purposes has been one of the challenges of the education sector (Jucevičienė and Valinevičienė 2010). Mohammad (2011) identified the low rate of awareness and adoption by the students as a factor influencing adoption and use of Web 2.0 technologies for learning in Kuwait. Tibenderana, Ogao, Ikoja-Odongo and Wokadala (2010) also employed a cross-sectional survey in measuring levels of end-users' acceptance and use of hybrid library services in Ugandan and South African libraries. Their study findings show that „relevance“ and „social influence“ have significant effects on intentions to use e-library services. Results further showed that university communities in Uganda were inclined to use electronic library services due to social demands, relevancy of services, available facilitating conditions and the benefits which they expected from the services. These factors were paramount to the acceptance and

use of other forms of technologies. The users tend to be inclined to a technology that meets social demands, are relevant to their tasks, and provide some form of assistance to its users.

Kalema and Kekwaletswe (2010) in a survey investigated the factors that influence acceptance and use of online registration systems by students in South African universities. Results show that there is no significant correlation between the UTAUT constructs of performance expectancy, effort expectancy, social influence and behavioural intention. It was further stated that although UTAUT is a good model for predicting acceptance and use, modification of the constructs of UTAUT could provide a better prediction model. Davis, Bagozzi, and Warshaw (1989) and Selwyn (2009) argued that there is still the problem of acceptance and use for academic purposes by both students and educators which demands investigation on the factors that affect use and acceptance of technologies. Based on Kalema and Kekwaletswe's (2010) finding, it seems logical not to rely on the constructs of UTAUT in investigating use and acceptance of online systems such as the Web 2.0. Therefore this study employed constructs from other models which are related to the study research questions with a few consultations related to UTAUT constructs, for example performance expectancy in UTAUT and system quality in D&M model.

Some research also explained that the limited adoption results from lack of understanding of the behaviour of users by this means shifting focus from what users want to what is technologically realizable (Ennew and Fernandez-Young 2006). Recently, Echeng and Usoro (2014) in a comparative study examined user acceptance and adoption of Web 2.0 technologies for learning among populations in Nigeria and Scotland. The study identified factors that affect acceptance and use of Web 2.0 technologies in TAL. These factors include perceived usefulness, social factor, prior knowledge, facilitating conditions, performance expectancy, perceived ease of use and motivation. Study findings revealed that all these factors had a significant effect on behavioural intention to use in Scotland and Nigeria, except for motivation which was found not to be significant in the Nigerian context. The results substantiate the previous findings of Echeng, Usoro and Majewski's (2013) study where perceived usefulness and prior knowledge were validated to have significant influence on intention to use Web 2.0 in e-learning in Nigeria. The results are also consistent with TAM (Davis 1989) who proposed that perceived usefulness would influence intention to use and invariably adoption of a technology. It was concluded in the study that the low motivation for the use of these

technologies for academic purposes in Nigeria could be as a result of inadequate provision of learning management systems (LMS) with social media tools. It was suggested that a qualitative approach be used to compliment this findings. It is in this line that this study seeks to identify other factors that could influence intention to use Web 2.0 technologies in TAL in the Nigerian context, using both quantitative and qualitative approaches.

Davis, Bagozzi and Warshaw (1989) believe that the major enthusiasm for technology adoption and use is the internal psychological variables such as attitudes and behavioural intention. These variables can be influenced by the qualities of the technology. Studies support that quality factors (that is information, system and service quality) can influence attitude and behaviour in an IS context (Lwoga 2013). The third research question of this study seeks to investigate how system quality, information quality and service quality influence attitude towards use of Web 2.0 Technologies for TAL. The variables linked to this question are from the D&M model and include system quality, information quality and service quality. The constructs of the D&M model have been used to examine the factors affecting the use of different technological systems (Jennex and Olfman 2006 and Masoner, Lang and Melcher 2010).

3.4.1 System Quality of Web 2.0 Technologies

One of the major dimensions of an information system success based on the D&M model is the System quality, which DeLone and McLean (1992) described as the desired characteristics of the IS itself which produces the information. System quality is considered as a multidimensional construct (Bhatti, Baile and Yasin 2011) because it provides an explanation for the usability and performance characteristics of a system (Urbach and Muller 2011). In the Web 2.0 environment, system quality is the anticipated features of Web 2.0 technologies that will positively influence users' attitude and use/intention to use the system (Delone and Mclean 2003; Trkman and Trkman 2009 and Lwoga 2013). System quality measures the functionality and desired features of the Web 2.0 tool, such as ease of use, usability, availability, reliability, response time (for example, download time) and accessibility (Delone and Mclean 2003 and DeLone and McLean 2004). Since the system is assumed to be admired by its users (Ozkan and Koseler 2009), as academics and students interact with these Web 2.0 technologies by using them for academic purposes, they are able to identify certain features that make them

useful for TAL. The system quality construct is expected to provide an explanation for these features and how they influence use of Web 2.0 by academics and students.

System quality has been operationalized in countless ways to include convenience of access, functionality, perceived usefulness (PU), adaptability, data quality, portability, ease of access, ease of learning, flexibility and integration of system and service, ease of learning and privacy (Delone and Mclean 2003; DeLone and McLean 2004; Lawrence 2011; Bhatti, Baile and Yasin 2011; Chua et al. 2012 and Lwoga 2013). System quality captures the notions of PEOU and PU in TAM; complexity and reliability in Diffusion of Innovation theory (DOI); and performance expectancy and effort expectancy in UTAUT. Similarly, Urbach, Smolnik and Riempp (2010) describe system quality as the degree to which a system is easy to use to accomplish tasks. PEOU according to (Venkatesh and Davis (2000:187) is “the extent to which a person believes that using the system will be free of effort”. Davis (1989) defines PU as the extent to which a person believes that using the system will improve his or her job performance. System quality (measured in terms of PEOU) can be explained as the extent to which academics and students believe they will be free of effort by using Web 2.0 technologies for TAL purposes. In terms of PU, it refers to how well academics and students believe that using Web 2.0 technologies would enhance their TAL activities. PEOU, PU and reliability have been shown to be important factors in studies relating to the use of the internet, web and ICT acceptance (Legris, Ingham and Colletette 2003). Hence, academics and students are more likely to use Web 2.0 technologies for TAL if they develop a positive attitude to the use of the system.

System quality is critical because having an easy-to-use technology is a key enabler of the users’ engagement (Wagner and Majchrzak, 2006). Ease of use is the most valued characteristic of system quality (Hernandez, Martinez and De Hoyos 2006). Moreover, it is supposed that users will become more involved with the technology if it is easy and enjoyable (Waldrop 2008). Convenience of access is another measure of system quality (Trkman and Trkman 2009). If academics and students are able to conveniently access Web 2.0 applications or tools, this will give them better opportunities to access the education knowledge base for needed information on their academic tasks, especially from a global perspective. As implied from Trkman and Trkman's (2009) discussion, this will only happen if academics/colleagues and students/peers would work hard to create and maintain it as implied. In terms of system

quality, the two interrelated parts that should be considered (Trkman and Trkman 2009) are the software and the peripheral, that is, the hardware (Ozkan and Koseler 2009) quality. The software quality includes reliability, responsiveness, ease of use, stability, security, user-friendliness, well-organized design and personalization (Shee and Wang, 2008). The hardware quality (that is, the peripherals) comprises of the efficiency of microphones, earphones, electronic blackboards, electronic mail, online threaded discussion boards, synchronous chat, and desktop videoconferencing (Ozkan and Koseler 2009). The synchronous attribute was treated under media synchronicity.

The importance of system quality is related to the errors existing in a system, its ease of use, response time and flexibility (Wu and Wang, 2006). It is then apparent that the features expressed by these technologies play a vital part in evincing its competence to its users, thereby predicting attitude towards their use. Academics and students will see as indispensable a technology that brings fast results to their needs, obliquely influencing their attitude. These attributes are important to Web 2.0 integration in TAL since the higher the quality and reliability of used technology, the higher the learning effects will be (Hiltz 1993; Piccoli et al. 2001; Webster and Hackley 1997 cited in Sun et al. 2008).

System quality has been well-known to successfully explain user satisfaction and actual use of various technologies across several studies. For example, in the technology acceptance study (Motaghian, Hassanzadeh and Moghadam 2013), users behavior (Yoon 2009), ubiquitous computing (Kim et al. 2009), Greek taxation IS (Floropoulos, Spathis, Halvatzis and Tsipouridou 2010), use of the RFID integrated systems in libraries (Kapoor, Dwivedi and Lal 2013) and other studies, system quality was found to successfully explain users' attitude and actual use of technological systems. Dwivedi et al. (2013) in a study in the UK reported a significant influence of system quality ($\beta=0.328$, $p=0.000$) on actual use of RFID integrated systems. Petter, DeLone and McLean (2008) also recounted significant effects of system quality on system use in an analytical study of 18 different studies that used system quality construct. Kapoor, Dwivedi and Lal (2013) added that the greater the quality of a system, the greater the likelihood that the system would attract positive user intentions, and in turn be actually used. Ramayah and Lee's (2012) study on the use of the e-learning system among public universities students in Malaysia, indicated that system quality ($\beta = 0.18$, $p < 0.01$) is positively related to continuance intention to use the system. Trkman and Trkman (2009) also

found that system quality has a significant influence on use and user satisfaction. The result is similar to that of researchers such as DeLone and McLean (2003) and Holsapple and Lee-Post (2006).

A number of studies have supported the appropriateness of the system quality construct in explaining attitude and actual use of innovative technologies such as Web 2.0. A good system quality can help form positive user attitudes, and also support greater use of the technologies (Dwivedi et al. 2013). Studies such as Wang, Chou and Chang's (2009) who focused on the moderating role of utilitarian or hedonic user motivation on user behavior towards Web 2.0 applications in a university in Taiwan; Olatokun and Owoeye (2012) and Moon and Kim (2001), established a significant effect of system quality, perceived ease of use and perceived usefulness on users' attitude towards online technology usage. Ajjan and Hartshorne (2008) in their study on investigating academics' decisions to adopt Web 2.0 technologies, found that ease of use, usefulness, and compatibility of Web 2.0 are key determinants of academic's attitude toward the use of Web 2.0 technologies.

Hartshorne and Ajjan (2009) also examined factors that influence students' decisions to adopt Web 2.0 applications using the DTPB. It was shown that ease of use, usefulness and compatibility were key determinants of students' attitudes towards the use of Web 2.0 technologies. These findings suggest that system quality could also influence academics' and students' attitudes towards the use of technologies such as Web 2.0 in TAL. However, a contrary result was obtained in that Dwivedi et al. (2013) in their study discovered that perceived ease of use does not have a significant influence on users' attitude. Similarly, the outcome of Manojehri and Sharif's (2010) investigation on influence of classroom technology on a student's learning attitude in a university in Qatar shows that ease of use at an initial stage does not lead to increase in the use of classroom technologies. The study also noted that prior experience of ICT use does not impact on the students' attitude. The variability in results on the significance of service quality on users' attitude and satisfaction indicates that the application construct in different context could bring about different outcomes.

Anomalies in the quality of a system such as Web 2.0 technologies could affect academics and students' attitudes to use them for academic purposes. Trkman and Trkman (2009) had asserted that problems with system quality could reduce intention to use wikis even for advanced IT

users. This implies that challenges with system quality could interrupt academics' and students' decisions on using Web 2.0 technologies for TAL purposes. Essentially, there is a need to investigate on how system quality influences attitude towards use of Web 2.0 technologies for TAL practices especially in the university setting. In addition from the literature reviewed, system quality is understood to be a multidimensional construct with an embodiment of features that can affect use of technologies. Nevertheless, a critical review of literature revealed that studies involving the use of system quality construct tested its influence or effect on either use, intention to use or user's satisfaction as proposed in the original D&M model. Few researchers such as Petter and McLean (2009), Ajjan and Hartshorne (2008), Hartshorne and Ajjan(2009), Wang, Chou and Chang (2009), Floropoulos et al. (2010) and Kapoor, Dwivedi and Lal (2013) examined its influence on user's attitude with most of them using related attributes such as ease of use and PEOU to refer to System quality. To fill this gap, this study seeks to examine the influence of system quality on academics' and students' attitudes towards use of Web 2.0 technologies for TAL in Nigeria universities.

3.4.2 Information Quality of Web 2.0 Technologies

Information quality is the value credited to the results of an IS, or the quality of the information presently available or that will be generated (DeLone and McLean 1992; Livari 2005). It is one of the factors proposed by Delone and Mclean (1992; 2003 and 2004) to evaluate the success of ISs which in this study are the Web 2.0 technologies. Lwoga (2013) defined information quality in the Web 2.0 environment as measuring the users' perception of the content quality of Web 2.0 application. Information quality in this study refers to the quality of TAL resources and content delivered through the Web 2.0 technologies. The quality of TAL resources is dependent on how well it fits into the course content quality which Adeyinka and Mutula (2010) described as the degree to which course management systems are provided with valuable content, concerning the defined needs of the students. This judgment is not limited to students but also the ones made by academics to provide the Web 2.0 technologies with valuable information content, that will address the academic need of the students and academics.

Information quality could also be regarded as data quality or content quality. Ozkan and Koseler (2009) refer to information quality as content quality. They stated that students mostly

define quality content as whether the presentations or lecture notes are easily understandable, up-to-date, and rich in content. Quantitative results of their study further verifies the significance of interactive content in both blended and online learning ($r = 0.783$; $p = 0.01$). Researchers have focused on identifying important dimensions of information quality but have only reached agreement on the point that information quality is a multi-dimensional concept, for which a wide-range of studies have presented a number of indicator variables (Lee, Shin and Lee 2009). Information quality comprises of the content issues that are geared toward providing academics and students with personalized, complete, relevant, easy-to-understand, and secure information (Lwoga 2014a). Okechi and Kepeghom (2013) added that information quality is the desirable characteristics of the system outputs, that is, the results of Web 2.0 applications. It is assumed that academics and students would expect these information qualities in the Web 2.0 technologies to be used as TAL. Some of the characteristics or measures of information quality highlighted by Delone and Mclean (2004), Masrek et al. (2010), Okechi and Kepeghom (2013) and Lwoga (2014a) include availability, relevance, timeliness, usability, understandability, accuracy, precision, completeness, currency, personalization and security.

A large body of research also exists on information quality (Data quality) and its underlying dimensions. Some of the research includes Delone and Mclean (1992), Wang and Strong (1996), Lee, Strong, Kahn and Wang (2002), Delone and Mclean (2003), Delone and Mclean (2004), Lee, Shin and Lee (2009), Arazy and Kopak (2011), Yim and Shin (2013), Okechi and Kepeghom (2013) and Lwoga (2013). Masrek et al. (2010) found information quality to have a strong influence on user satisfaction in the context of academic library portal. This corroborates with the results of other IS studies such as Petter, DeLone and McLean (2008), Petter and McLean (2009) and Urbach and Müller (2012) which also discovered a significant influence of information quality on user satisfaction and net benefits.

A number of studies also considered the impact of information quality on Web 2.0 services or applications (Lin 2008; Kim et al. 2009; Lee, Shin and Lee 2009; Udo, Bagchi and Kirs 2010 and Lwoga 2013). Some of these have shown that information quality or other related attributes such as availability, relevance, timeliness, usability, understandability and accuracy have significant influence on use, user satisfaction, behavioural intention to use and attitude. Cheng's (2012) study revealed that information quality has significant positive impacts on

perceived usefulness of e-learning systems. Halonen, Acton, Golden and Conboy (2009) in a study in Ireland also indicated that information quality has a significant impact on use and user satisfaction, as observed by DeLone & McLean (2003), Holsapple and Lee-Post (2006) and Lin (2007). In addition, two thirds of the respondents agreed that the technology supported them in accomplishing the degrees (Halonen, Acton, Golden and Conboy (2009:13). Hence, they concluded that (the quality) of information is an important factor in the virtual learning environment. Findings from Ramayah and Lee's (2012) study on use of e-learning systems indicated that information quality ($\beta = 0.37$, $p < 0.01$) is positively related to user satisfaction. The quality of information produced by an IS (such as Web 2.0) especially in a learning environment is essential. This is also supported by the findings of Trkman and Trkman (2009) who maintained that while a wiki (Web 2.0 application) may bring significant benefits and transformation to an organization's information/knowledge management, the main challenges remain the same as with earlier technological solutions, such as the lack of control over quality (of information or data).

Lwoga (2013) in a survey on the adoption of library 2.0 technologies among undergraduate students in the African context, with a focus on Tanzania, investigated the effect of information quality on user satisfaction by evaluating four major indicators, namely information timeliness, relevancy, completeness and accuracy. Findings from the study revealed that information quality, when compared with system quality, had the largest effect on user satisfaction which substantiates the findings of previous IS studies such as Petter, DeLone and McLean (2008); Petter and McLean (2009); Masrek et al. (2010) and Urbach and Müller (2012). It could be assumed then that the quality of information existing or generated by Web 2.0 technologies may be important reason for students to develop a positive attitude towards its use for TAL purposes.

Although, results from several studies reveal and support that information quality is an indispensable factor in determining and explaining IS success, there has been an oversight on the impact of information quality on the attitude of IS. Davis, Bagozzi and Warshaw (1989) emphasized that attitude builds eagerness for a major technology adoption and use. Fishbein and Ajzen (1975) also pointed out that attitudes of individuals can greatly influence social behaviours (such as the use of Web 2.0 in TAL). Inherently, it is assumed that a relationship exists between information quality and attitude towards system use. This relates to the study's

research Question Three that examined the influence of information quality on attitude towards use of Web 2.0 for TAL purposes. Selected metrics that were used to measure information quality include Web 2.0 technologies ensures information availability; Web 2.0 technologies provides me with sufficient information for teaching/learning; information provided by Web 2.0 technologies are clear and unambiguous; and Web 2.0 technologies provide me with relevant information for my academic activities.

3.4.3 Service Quality of Web 2.0 Technologies

Service quality is the third quality dimension to measuring IS success in the extended D&M model (DeLone and McLean 2002; 2003; 2004). It was included well ahead of the initial D&M model and its primary aim is to reflect the importance of service and support in successful e-commerce systems (Delone and McLean 2003; Urbach and Muller 2011). However, the construct has been applied to studies beyond e-commerce to include those of IT use. Service quality measures the quality of the support system users receive from the IS department and IT support personnel (Delone and McLean 2003). In the case of Web 2.0 technologies in the education environment, service quality evaluates the quality of support which academics and students receive from the technical support team. Delone and Mclean (2002), Ozkan and Koseler (2009) and Tella (2011) also consider service quality to be the total support given by the service provider. Service quality is considered to be the overall support rendered by the Web 2.0 technologies service provider or support given to academics and students in the Web 2.0 environment. This is irrespective of whether the support is delivered by the IS department in the university, the Web 2.0 support team or outsourced to an Internet Service Provider (ISP) (Tella 2011). Based on the focus of this study, service quality could mean the general support provided by Web 2.0 administrators to enable a positive environment that would facilitate the use of these technologies in TAL.

Service quality considers the effectiveness of the system (such as Web 2.0) in delivering information that is useful for TAL practices especially in universities. Several researchers have proposed measurement items for service quality. However, the selections of measures used for service quality differ based on the type of study in question (DeLone & McLean, 2003). According to Lassar, Manolis and Winsor (2000), two most prevalent and widely accepted perspectives on service quality include the SERVQUAL model (Pitt, Watson and Kavan 1995),

and the Technical/Functional Quality framework. Other measures used to operationalize service quality include service responsiveness, assurance, flexibility, IS training, reliability, IT assurance, empathy, accuracy, technical competence and empathy of the technical support team (for example, training or helpdesk) (Pitt, Watson and Kavan 1995; Delone and McLean 2003; Urbach and Muller 2011; Kim 2012 and Lwoga 2013).

Studies have shown that technical guidance and support play a key role in improving students' technology acceptance (Wang and Chiu 2011; Cheng, 2012 and Ramayah and Lee 2012). Harshorne and Ajjan (2009) assert that the use of Web 2.0 technologies by students requires training and access to resources. According to Wang and Chiu (2011), learning is an interactive process between academics and students, not the interaction between IS (Web 2.0 technologies) and users (academics and students). Therefore, for effective communication to take place, students and academics require skills and technical support to contribute to management and monitoring of Web 2.0 technologies. For most Web 2.0 technologies (such as wikis, blogs and RSS), the users are basically in charge of providing service support to other users (Trkman and Trkman 2009). This means students and academics are mainly responsible for maintaining the service quality of Web 2.0 technologies in the TAL environment. More so, the attitude which they develop to its use will determine how they contribute, and what can and should be contributed (Trkman and Trkman 2009). Service quality is also important because it builds on all support that is presented to its users (Delone and Mclean 2003) and determines whether users of a system would retain its use or not.

Halonen, Acton, Golden and Conboy (2009) measured service quality by assessing interaction between the students and teachers (Holsapple and Lee-Post 2006). They pointed out that students were able to receive support, guidance and answers to their questions through interaction. From the TAL approach, we could infer that a weak interaction between academics and students and the Web 2.0 technologies could lead to lack of enthusiasm to study. It is therefore important to improve technology support services for TAL in universities to enhance academics and students' attitude and intentions to using Web 2.0 technologies.

Substantive literature is available about the impact of service quality in IS studies. However, most of the studies examined the impacts of service quality in system use, use intention or behaviour, and users' satisfaction. In agreement with Attia, Aziz and Friedman's (2012)

assertion that attitudes affect behaviours towards a particular product, service or information, this study presumes that there is a relationship between attitude and behaviour of users. Thus, findings from the studies seem relevant to this study as the results can be implied for the relationship between service quality and users attitude towards use of Web 2.0 technologies. For instance, Caldeira and Ward (2002), in their study on small and medium size enterprises (SMEs) in Portugal discovered that competency of support staff and vendor support affected system use. They further found that a positive association existed between service quality and system use.

Ham and Hayduk (2003) in a study in the US established that in the higher educational settings, there is a positive correlation between service quality and student satisfaction. Results from Hasan and Ilias (2008) confirmed that the service quality dimensions (tangibility, assurance, responsiveness, reliability and empathy) had a significant relationship with students' satisfaction in a two private universities in Malaysia. Lwoga (2013) emphasized the key role service quality plays in driving users' usage intention. Lwoga's (2013) study findings revealed that service quality (among other qualities such as information quality and system quality) had the strongest total effect on perceived net benefits and intention to reuse Library 2.0 (a Web 2.0 application used in libraries) among undergraduate university students in Tanzania. Ramayah and Lee (2012) in a study on the use of e-learning systems in Malaysia discovered that service quality ($\beta = 0.30$, $p < 0.01$) is positively related to continuance intention to use the system. Lwoga (2014a) in another study in Tanzania identified technical support as one of the factors that predict students' continual usage intention of web-based learning content management systems. It was further stated that technical support for ICT is important for enhancing service quality.

In Tella's (2011) study, service quality was one of the factors that determined the success of implementing the Blackboard course management system for TAL at the University of Botswana. Although, service quality had a lower reliability co-efficient ($r = 0.50$) when compared to other quality constructs. Makokha (2011) in a survey to evaluate the success of an enterprise resource planning (ERP) system from the users' perspective within Kenya found that service quality had a significant impact on use and user satisfaction. He further noted that wherever service quality is poor, the usage of the system is equally low and vice versa. Ndanusa, Harada and Abdullateef (2014) also in a recent study attempted to gain a better

insight of the dimensions that determined international students' perceptions of service quality in higher education (particularly Nigerian students in Malaysia Higher Education Institutions). They discovered that improved service quality led to increased student satisfaction, which is largely influenced by the moderating effect of perceived value.

Many studies in the literature reviewed have reported similar findings, indicating that service quality plays significant role in determining use of IS. Nevertheless, Kositanurit, Ngwenyama and Osei-Bryson (2006) while surveying the users of ERP systems, found no association between service quality and system use. Similarly, a study of knowledge management systems by Halawi, McCarthy and Aronson (2007) established that service quality did not predict intention to use or use of an ICT system. However, reliable technical support can encourage students and academics to use Web 2.0 technologies for TAL purposes.

A critical review of IS studies indicated that most studies did not consider the relationship between service quality construct and users' attitude in their investigations. One of the few studies that examined the effect of service quality construct on attitude is Olatokun and Owioye's (2012) study which found that service quality (β .127, p .003) significantly influenced the attitude of online banking users in Nigeria. It could be inferred that an enriched service quality would likewise stimulate users' attitude towards the system. It is assumed that service quality would play a significant role in motivating users' attitude towards use of Web 2.0 technologies in TAL. Hence, investigating on its influence is quite important to improve TAL practices. This study intend to fill this gap in literature and enrich the body of literature on factors that affect users' attitude by providing answers to research Question Three of this study (see section 1.2.2). One of the metrics used in measuring service quality is "Web 2.0 technologies provide reliable and prompt support for teaching/learning (responsiveness)".

3.5 Attitude and Intention to Use Web 2.0 for TAL

This section reviews existing literature on users' attitude and intention to use Web 2.0 or web-based technologies in TAL. Since behavioural intention is noted to be greatly influenced by an attitude towards the behaviour, and particularly to predict the use of IS (Ajzen and Fishbein 1980; Lin 2008), there is need to investigate the relationship between these constructs. The fourth research question of this study sought to examine the influence of attitude towards use on intention to use Web 2.0 technologies for TAL. The research Question Four was addressed

using attitude towards use and intention to use constructs in TAM. Intention to use construct in the D&M model is similar to behavioural intention in TAM. To show the importance of these variables, TAM hypothesised that “beliefs and attitudes are related to individuals’ intentions to perform” (Teo, Luan and Sing 2008:266). DeLone and Mclean (2004) also added a factor similar to „intention to use“ as an alternative measure of use because they observed attitude is worthwhile measuring in some contexts. TAM originally used behavioral intention (BI) as a dependent variable to test the validity of PU and PEOU, to predict the actual usage (Davis 1989; Turner et al. 2010). However, this study employed „intention to use“ as a dependent variable to test the validity of attitude towards use and media synchronicity, and as a predictor of net benefits of Web 2.0 in TAL.

There are several explanations to attitude and behavioral „intention to use“. Galy, Downeym and Johnson (2011) describe attitude towards behaviour as favourable or positive evaluation or unfavorable or negative evaluation of performing the behavior. Based on Fishbein and Ajzen’s (1975) definition, attitude is the extent to which academics and students possess positive feelings about using the Web 2.0 technologies. Attitudes are more or less unconscious evaluations that indicate what people think about a language, such as how it makes them feel, and what they think should be done (Dyers and Abongdia 2010). Understanding the feelings of academics and students towards Web 2.0 technologies would substantially contribute to existing literature on the integration of these technologies in TAL.

Utilising Urbach and Muller’s (2011) definition, the success dimension - use/intention to use in D&M model represents the degree and manner in which academics and students employ or intend to use Web 2.0 technologies in TAL practices. Owing to challenges in being able to adequately interpret the use, DeLone and McLean (2002, 2003) recommend „intention to use“ as an alternative measure for some contexts. Other typical measures of use include actual use, daily use, frequency of use, intention to (re)use, nature of use, navigation patterns or the connect time (Davis 1989; DeLone and McLean 2003; Wang 2008 and Urbach and Muller 2011).

Previous studies have argued that holding a positive attitude toward computers is beneficial for the integration of ICT tools and web-based systems in educational practice (Shapka and Ferrari 2003; Gong, Xu and Yu 2004; Mueller, Wood, Willoughby, Ross and Specht 2008 and Sang,

Valcke, van Braak, and Tondeur 2010). Castillo (2014) specifically assessed the influence of academics' attitude on the actual usage of Web 2.0 technologies in the classroom using a descriptive survey. The study used questionnaires to gather data from 106 natural science academics of different academic institutions in urbanized cities in Region XI, Mindanao. Correlation and multiple regression analysis were used to identify the indicators that best predicted academics' interest in using Web 2.0. Academics' attitude was found to strongly and positively influence ($\beta = 0.626$) the behavioural intention of academics to use Web 2.0 technologies in delivering instructions. The findings were the same as was reflected by Ajjan and Hartshorne (2008), where attitude best influenced the academics' decision to eventually adopt the use of Web 2.0 technology; and in Hartshorne and Ajjan's (2009) study where attitude was revealed to have significant effect on students' behavioural intention to adopt Web 2.0. The study concluded that attitude played a substantial role in influencing the academics' interest to adopt Web 2.0 technologies.

Many other factors have been reported to be responsible for determining „use“ or „intention to use“ IS. Teo (2011) identified attitude towards the behaviour, subjective norm, and perceived behavioural control as some of the factors that affected behavioural intention, but attitude seemed to be more prominent. Chiou (2011) conducted a survey to determine pre-service teachers' intention to use Web 2.0 applications in their future classrooms by assessing their perceptions towards the technology in the Midwestern US. The study employed the quantitative research method and data was obtained from 125 academics. Study findings revealed that computer attitude and other factors such as PU and experience in using Web 2.0 applications were significant predictors of behavioural intention to use Web 2.0 technologies by pre-service teachers. It was also discovered that the linear relationship between four independent variables accounted for approximately 71% of the variance in behavioural intention to use Web 2.0. It was concluded in the study that computer attitude is a critical factor in predicting academics' use of Web 2.0. Similarly, Thongmak's (2014) investigation on factors that determine learners' acceptance of Facebook revealed that “instructor characteristics” (a term the researcher used to refer to academics' attitudes) significantly drives students' intention to adopt Facebook in a higher education classroom in Thailand. Considering these findings on attitude, it is possible that attitude would predict future use of technologies such as the Web 2.0. The present study therefore examined the influence of academics and

students' attitudes on intention to integrate Web 2.0 technologies into TAL. The study by Ajjan and Hartshorne (2008) and Castillo (2014) focused majorly on academics, but the present study focused on both academics and students, precisely in universities in the southwest region of Nigeria, to validate the previous findings and add to the body of knowledge on the relationship that exist between attitude and intention to use technology.

In education, TAM was used to examine students' attitudes towards e-learning acceptance (Aharony 2014). Pynoo, Tondeur, Braak, Duyck, Sijnave and Duyck (2012) empirically examined teachers' acceptance and use of an educational portal in Belgium, based on data drawn from two sources, namely (1) objective usage data (which include number of logins, downloads, uploads, reactions and pages viewed); and (2) self-reported online questionnaire data, using the C-TAM-TPB (Combined Technology Acceptance Model and Theory of Planned Behavior). Using path analyses, the study revealed that all predictor variables in C-TAM-TPB (that is, perceived usefulness, perceived ease of use, perceived behavioural control, subjective norms, attitude, behavioural intention, self-reported frequency and self-reported intensity of use, and voluntariness of use) influenced teachers' acceptance of the portal, with attitude and perceived usefulness evolving as the strongest predictors of behavioural intention. This implies that a user's attitude by large determined intention to use a technology. Furthermore, the study recommended that school boards provide adequate number of computers that are connected to the internet to encourage portal use at school. It is inferred that the provision of internet access and other ICT tools (such as computers) in the university environment could facilitate the use of Web 2.0 technologies for TAL.

Aharony (2014) conducted a research in Israel using TAM and cognitive appraisal theory as theoretical bases to investigate factors that may influence information professionals and library and information science (LIS) students' intentions to use e-books. Questionnaires were used to gather data on computer competence, attitudes to e-books, motivation and cognitive appraisal. Study findings revealed that the reasons for adopting a specific behavior are actually associated with an individual's attitudes, goals, and needs which differ from one person to another. It was concluded in the study that it is likely that exposure to and experience with e-resources would change and improve students' attitudes resulting in higher level of computer skills, thereby improving information professionals' intentions to use e-resources. The implication is that academics' and students' intention to use Web 2.0 can result from attitude. This result

corroborates that of others IS studies in different parts of the world such as Teo (2011) in Singapore; Galy, Downeym and Johnson (2011) in USA; Chen, Chang, Chen, Huang and Chen (2012), Dwivedi et al. (2013) in UK; and Tella and Adesakin (2013) in Nigeria, who reported significant impact of attitude on intention to use or actual use of technologies.

Tella (2014) also in a survey modified TAM to examine various factors that can affect use and acceptance of online discussion forum. The study adopted a pure quantitative method; data was collected from 320 full time library and information science undergraduate students in selected universities in the South-West and North Central Nigeria using a self-designed questionnaire with adapted items from previous similar studies. The exploratory factor, correlation ($r = 0.533$), and regression analysis results revealed attitude as one of the major factors that determine the acceptance of online discussion forum. In addition, online discussion forum is one of the applications of the Web 2.0 technologies which is used to facilitate TAL because it expands students' knowledge about a subject.

Tella and Adesakin (2013) empirically studied the use and currency of information on the undergraduate students' web portal. This study adopted a survey design using a researcher-designed questionnaire to collect data from randomly selected sample of 240 undergraduate students in a federal university in Nigeria. The findings of this study revealed that, a positive attitude towards using the portal must be encouraged in order to increase user intentions to use the portal site. His findings corroborate those of previous researchers (Tojib, Sugianto and Sendjaya 2008; Tien 2011 and Al-Mudimigh, Ullah and Alsubaie 2011) which indicated that it is vital for users of portal (and other web-based systems) to develop positive attitudes towards its use from the outset. They further noted that IS (such as the Web 2.0) must be adequately built to meet the expectations of its users so as to validate their initially positive attitudes. In the same vein, Fishbein and Ajzen (1975 cited in Davis 1989) and Olatokun and Owoeye (2012) showed that attitude has a positive and significant effect on behavioural intentions. Ndanusa, Harada and Abdullateef (2014) concurred that attitudes are formed based on cumulative experiences which to a large extent determine the satisfaction level of users. In a similar way, Oliver (1981) argued that attitudes are developed over a fairly long period. Along these lines, Westbrook and Oliver (1981) argued that attitude is an emotional attachment for a product or service without any form of comparison. This implies that the attitude of individual users of a system may differ based on their experiences with its use. It is conceptualized along

this line of argument that the intention to use Web 2.0 technologies by Nigerian academics and students, result from attitude developed towards its use. This study used some questionnaire items such as “I prefer to use Web 2.0 for teaching/learning” and “I believe it is a good idea to use Web 2.0 for teaching/learning” (see section E of appendices 1 and 2) and interview question such as “How would you describe students/academics attitude towards the use of Web 2.0 technologies in your university?” to determine attitude towards use of Web 2.0 (see Appendix 3).

3.6 Net Benefits of Web 2.0 for TAL

Net Benefits is the sixth and final success dimension of the updated D&M model (Delone and Mclean 2003). Delone and Mclean (2002:22) grouped all the “impact” measures into a single impact or benefit category called “net benefits”. The construct was used in place of individual and organizational impacts to account for benefits at multiple levels of analysis and to allow researchers to apply the model to any intended level of analysis (Delone and Mclean 2003 and Petter, DeLone and McLean 2008). The variable “net benefits” addresses research Question Six of the present study which examines what net benefits can be derived from the use of Web 2.0 technologies for TAL.

Based on Petter, DeLone and McLean’s (2008) explanation, „net benefit“ is concerned with how Web 2.0 technologies contribute to the overall success of academics and students in their TAL activities. According to the updated D&M model (DeLone and McLean 2003), positive or negative intention to use a system would in turn positively or negatively affect net benefits. Thus, the construct is important because it will help to capture both the positive and negative effects (Makokha 2011) of using Web 2.0 technologies for TAL purposes. Delone and Mclean (2004) also suggest the need for researchers to clearly and sensibly define the participants and the context in which net benefits are to be measured. In the context of this study, net benefits refer to the positive impacts of Web 2.0 technologies in TAL, which may include awareness/recall, decision effectiveness, individual productivity, job effectiveness, job performance, job simplification, learning, productivity, task performance, usefulness and task innovation (Urbach and Muller 2012), time saving in accessing content, and enhanced learning and academic performance (Delone and Mclean 2004; Liu 2011 and Lwoga 2013). Net benefit was initially used by Delone and Mclean (2003) as a dependent variable to test the validity of

use/intention to use and user's satisfaction. They assumed that the "net benefits" are positive, therefore influencing and strengthening subsequent use of the system and user satisfaction. However, in this study, the net-benefit variable is only dependent on intention to use.

Usoro, Echeng and Majewski (2013) in an empirical study from Nigeria noted that Web 2.0 is a technology that provides very effective web-based collaborative systems. As such, an awareness of their use for academic (TAL) purposes is needed to gain benefits from them. They further emphasized that these technologies improved students' engagement by providing effective strategies for applying what has been learnt through other media. Web 2.0 technologies are also regarded as socializing tools which is one of the features that attract users or potential users to it.

Lupton (2013:1) added that Web 2.0 technologies offer various „pedagogical benefits“ and support the development of digital literacy skills as users engage in „editing/manipulating content, commenting, „liking“, curating and forwarding“. McLoughlin and Lee (2007) supported that social computing tools and application (such as Web 2.0) in education enhances participatory learning, collaboration, knowledge and information sharing. Furthermore, by updating blogs weekly, students improved their thinking levels, according to Xia and Sharma (2010 cited in Usoro, Echeng and Majewski 2013). However, Franklin and Van Harmalen (2007) were of the opinion that due to the technology being quite new, it has a number of uncertain issues- one of which is its acceptance and use in TAL. So as to achieve a learner-centered teaching approach, there is a need for universities to integrate Web 2.0 and other 21st-century technologies.

Petter, Delone and Mclean (2008) identified perceived usefulness or job impact as the most common measure of net benefits at the individual level; and at organizational level, profitability measurements is most preferred. An, Aworuwa, Ballard and Williams (2009) conducted a web-based survey to examine the best practices in teaching with Web 2.0 technologies as well as the benefits and barriers associated with their use. The study identified the main benefits of using Web 2.0 technologies in TAL as (1) interaction, communication and collaboration; (2) knowledge creation; (3) ease of use and flexibility; and (4) writing and technology skills. At the individual and organizational level of analysis, a number of empirical studies have provided reasonable support for the relationship between system use and benefits

(Petter, Delone and Mclean 2008). Several studies have found that use or intention to use is positively associated with improved decision making and job performance (Halawi, McCarthy and Aronson 2007 and Payne, Wharrad and Watts 2012). Other studies have confirmed the significant relationship that exists between system use and net benefits (Seddon and Kiew 1996; Igbaria and Tan 1997; Rai et al. 2002; Kositanurit et al. 2006).

However, some study findings suggest that there are no relationships between these variables. McGill et al. (2003) found that intended use is not significantly related to individual impact (task–technology fit and performance). Wu and Wang (2006) also found that there is no relationship between use and net benefits. Using perceived usefulness as a metric for measuring net benefits, many studies have found a relationship between behavioral intention and use of a system (Venkatesh and Morris 2000; Chau and Hu 2002; Wixom and Todd 2005; and Klein 2007). Meaning that, a proper utilization of Web 2.0 technologies for academic purposes is needed to gain benefits from them (Usoro, Echeng and Majewski 2013). However, Adams et al. (1992) argued that there are some complications with using perceived usefulness items to measure net benefits, as Segars and Grover (1993) found that items such as „works more quickly“, „job performance“ and „effectiveness“ did not fit well with perceived usefulness. It implies that perceived usefulness might not be a suitable measure of net benefits; therefore this study does not include it as part of the measures.

Thongmak (2014) adopted the D&M model to assess the achievement of the e-learning system based on its total benefits. Questionnaires were used to obtain information on the consequence of the intention to use networks on net benefits. The study results showed a positive significant relationship between the intention to use the course’s Facebook group and net benefits. In addition, intention to use was found to explain net benefits at the level of 46.2% ($R^2 = 0.462$). The forgoing study further revealed that 56% of students confirmed that Facebook was a useful tool for class-related collaboration activities; contacting their peers about questions and assignments; accessing course materials; setting up group meetings; and creating study groups. These advantages were also described by Selwyn (2007). It was also noted that students’ studying performance improved after using the course Facebook group. The foregoing study recommends that more factors concerned with academics and students be investigated to obtain a deeper understanding of other aspects of educators and learners. However, the study was limited to the constructs of D&M, responses from students, location of study and the

quantitative method of data collection and analysis. The present study extends Thongmak's (2014) investigation to the Nigerian context considering academics' use of Web 2.0 for TAL. This study also adopts a mixed method approach to data collection and analysis.

Coleman, Herselman and Coleman (2012) employed a case study approach to investigate how doctors in remote rural hospitals in South Africa used computer-mediated tools (CMT) to communicate with experienced and specialist doctors for professional advice to improve their clinical practices. Data was collected from ten purposively selected doctors in ten hospitals using semi-structured open ended interview questions. Study findings revealed that the use of CMT by doctors to review spellings improved their message structure and made communication more precise and efficient. Also, CMT helped doctors reduce the enormous pressure emanating from a multitude of tasks including sending e-mails and transmitting patient information simultaneously. However, findings revealed that the speed of internet connectivity was very slow and sometimes not available due to power outages and poor network infrastructure; thereby resulting in very slow transmission of information. The availability of internet connectivity is also important for the use of Web 2.0 technologies in TAL because the internet remains the bedrock of all web-based systems and services. Unreliable networks could adversely affect the decision of users about the Web 2.0 technologies.

To address the limitations in studies reviewed this present study investigated the factors that influenced the use of Web 2.0 technologies in TAL in Nigerian universities using selected constructs from D&M model, TAM and MST. Undergraduate students and academics formed the unit of analysis, while both quantitative and qualitative approaches were adopted. Some metrics of net benefits that were used in data collection instruments included "Web 2.0 technologies help me to acquire new knowledge and innovative ideas", "Teaching/learning performances are enhanced with the use of Web 2.0" (see section D of appendices 1 and 2) and "What has been the impact of Web 2.0 technologies on TAL?" (See Appendix 3).

3.7 Media Synchronicity and Use of Web 2.0 Technologies for TAL

The variable „media synchronicity“ addressed research Question Five in this study which examined the influence of media synchronicity on intention to use Web 2.0 technologies for TAL in the federal universities in Nigeria. The media synchronicity construct is adapted from

MST as an independent variable in this study to predict academics' and students' intention to use Web 2.0 technologies. MST developed by Dennis, Fuller and Valacich (2008) centered on the capability of media to support synchronicity, that is, a shared pattern of co-ordinated behaviour among individuals working together. The theory dwells on the new features of media and how they affect communication tasks. Dennis and Valacich (1999:5) defined synchronicity as "the extent to which individuals work together on the same activity at the same time; i.e. have a shared focus". Synchronicity can also be described as the capability of a medium (for example, Web 2.0) to generate the sense that all users are simultaneously communicating (Carlson and George 2004).

Dennis and Valacich (1999) asserted that a set of five media capabilities are important to group work, and that communication effectiveness is influenced by relating these capabilities to the requirements of the fundamental communication processes. Furner and George (2012) further maintained MST's argument that communication effectiveness is dependent on the information transmission capabilities of the media and the information transmission needs of the communication event. Dennis, Fuller and Valacich (2008) while expounding MST, identified five capabilities of media as being symbol sets, parallelism, transmission velocity, rehearsability, and reprocessability. These media capabilities are seen to influence the development of synchronicity. Among the media attributes identified, the ones that are most directly related to high synchronicity are speed of interaction (also called parallelism or speed of feedback), rehearsability, and reprocessability (Carlson and George 2004) because they have asynchronous characteristics (Ryoo and Koo 2010); while transmission velocity, parallelism and symbol variety affect information transmission and have positive impact on synchronous characteristics (Dennis, Fuller and Valacich 2008 and Ryoo and Koo 2010).

Parallelism is the extent to which signals from multiple senders can be transmitted simultaneously over a medium; symbol variety refers to the number of ways in which a medium allows information to be encoded for communication, for instance verbal, non-verbal, auditory and visual (Dennis, Fuller and Valacich 2008; Ryoo and Koo 2010). Carlson and George (2004) describe „speed of interaction“ as the amount of time delay between the time information is sent and the time it is received. „Rehearsability“ represents the availability of time during an on-going interaction, for participants to analyse and modify information before they are sent while „reprocessability“ refers to the capability of a media to permanently store

information and allow users to evaluate and analyse information content more than once and at subsequent points in time (Dennis and Valacich 1999 and Carlson and George 2004). Carlson and George (2004) added that all media (including Web 2.0 technologies) offer some degree of reprocessability. All these capabilities are measured under the media synchronicity variable in this study, in order to give room for some Web 2.0 applications that possess either synchronous or asynchronous characteristics. These attributes could directly or indirectly influence users' intention to use a technology. In this study, media synchronicity focuses on the competence of Web 2.0 technologies to support synchronicity and how they can generate high-quality communication among academics and students to enhance TAL practices.

Dennis, Fuller and Valacich (2008) illustrated that communication comprises of the conveyance and convergence process; and that for conveyance processes, using media that supports lower synchronicity would result in better communication performance. While for convergence processes, the use of media that supports higher synchronicity ought to result in better communication performance. Moreover, media with a high degree of synchronicity should allow face-to-face meetings, permit users to instantly observe the reactions and responses of others, offer participants the opportunity to communicate in real time and assist users to easily determine whether co-users are fully involved in the conversation (Carlson and George 2004). Similarly, Park, Choi and Rho (2014) evinced that social media has the feature of high synchronicity. Although MST has provided a conceptual basis to explore a technology's performance (Ou, Sia and Hui 2013), it will also be beneficial to empirically investigate its influence on users' intention to use a technology, particularly Web 2.0 technologies in TAL.

Studies appear to be uncommon on the applicability of media synchronicity in examining the use of IS. However, some scholars have investigated the moderating effect of media synchronicity in IS studies. Park, Choi and Rho (2014) for example, investigated citizens' patronage behaviour of government social media services using media synchronicity to moderate the perceived values (that is, utilitarian, hedonic and social values) and found that significant relationships exist between the three values and satisfaction. Furthermore, study results show that a high media synchronicity will positively function as a moderator for increasing users' satisfaction. Also, it was noted that citizens' perceived value does not have the same satisfactory impact under all media synchronicity. The researchers hence suggested

that careful consideration be given to media synchronicity when studying communication processes and performances in social media.

Ryoo and Koo (2010) also examined the moderating effect of media synchronicity in communication media use and knowledge creation in a survey of 248 company employees in Korea. Findings from the study indicated that media synchronicity moderates the relationship between the characteristics of a given task and ICT usage and the relationship between ICT usage and knowledge creation. These findings are similar to that of Yang, Lim, Lee, Lee and Lim (2008) who found that technology, communication and content factors each have a significant effect on use intentions of Interactive Video Services (IVS) and that the degree of effect is moderated by media synchronicity based on the differences between real-time and non-real-time. Considering the fact that high synchronicity media is suitable for convergence processes (Dennis, Fuller and Valacich 2008) and because convergence processes centred on shared understanding, people need to work together or synchronize for the convergence processes (Ryoo and Koo 2010). It is supposed that TAL practices will require a high synchronous media to improve the convergence processes in academic activities.

Carlson and George (2004) conducted a two-survey based study in the USA to investigate the role of media synchronicity and media richness on the particular communication context of deception from separate perspectives of the deceiver and the receiver. Their study results indicated a general preference for highly synchronous (and non-reprocessible) media. It was further revealed that when making media selections, synchronicity and media familiarity are relatively less important to receivers. The receivers can be likened to academics and students who receive and use information content from Web 2.0 applications. Thus, suggesting that their choice of which Web 2.0 tool to use for TAL purposes may not be influenced by media synchronicity. MST also posits that communication performance will be enhanced when a variety of media are used (Dennis, Fuller and Valacich 2008). According to Cao, Vogel, Guo, Liu, and Gu (2012:3940), “social media are exactly a combination of different media, providing the ideal combination of media capabilities for knowledge transfer”. It is assumed that Web 2.0 technologies which comprise of various social media would provide an ideal channel for communication that would enhance TAL.

Setlock, Fussell and Neuwirth (2004) also studied the effects of synchronous computer-facilitated communication on culture-based communication styles to understand how culture and media interact to shape perceptions of the quality of team work and task performance. Their study findings suggest that instant messaging reduces cultural differences in international collaboration and communication. Donabedian (2006) explains how users become indecisive when attempting to make a choice of the best media. Jung and Lyytinen (2014) observed that the choices which they made were dynamically influenced by a number of factors and that the effectiveness of the choices rose with changes in communication tasks and users' capabilities. Kock (2009) also stressed the significance of understanding users' new and evolving ICT capabilities. This means that the capabilities of users with regard to technologies should be considered when introducing new technologies. Similarly, Dennis, Fuller and Valacich (2008) and Ryoo and Koo (2010) were of the opinion that people who use high synchronous media are more likely to be motivated to use ICTs than those who do not use such media, because media synchronicity simplifies the process of gaining information that they need to manage.

Another aspect of media synchronicity is that it helps users to “maintain personal connections with friends while at work” (Charoensukmongkol 2014) which is essential to provide balance to academics’ and students’ work/life activities. Charoensukmongkol (2014) noted that personnel who are fully satisfied in their personal lives are more able to concentrate on their work. This can also transcend the academic environment, where academics and students also enjoy a balanced life style. Likewise, it has been observed that high synchronicity media users are more inclined to use ICTs to enhance their social relationships and increase the possibilities of gaining more information in an appropriate time (Ryoo and Koo, 2010). It then implies that academics and students would develop a positive attitude to the use of Web 2.0 technologies if it would help them gain time in accomplishing required tasks. It is also assumed that high media synchronicity is a quality of Web 2.0 technologies (Park, Choi and Rho 2014) and that it fits well with TAL activities in the universities.

From reviewed literature, there seemed to be a dearth of studies on the relationship between media synchronicity and intention to use. Thus this study adapted the construct to extend the D&M model and verify the relationship that exists between media synchronicity and intention to use to gain a better understanding of the research problem. Metrics used on research instruments to gather data on media synchronicity include “the use of Web 2.0 technologies aid

simultaneous communication between sender and receiver” and “Web 2.0 technologies enable me to give and receive rapid feedback on the communications”. A typical question from the interview guide is “Which Web 2.0 technologies are used for TAL in your university?” (See Appendix 3)

3.8 Summary of Literature Review

Literature has been reviewed extensively on service quality, system quality, information quality, perceived usefulness, perceive ease of use, attitude, media synchronicity, intention to use, system usage and net benefits, from the international, national and local context of Nigeria. These variables from literature have influenced users’ intention towards the use of technologies or IS in a broad sense. The literature review addressed parts of research Question One, Two and Six of the present study, by highlighting Web 2.0 technologies that are used by students and academics; the extent of integration of Web 2.0 in TAL in universities in Nigeria; and the net benefits of Web 2.0 technologies as TAL tools. Other outstanding aspects and research questions were addressed through the empirical study.

The researcher, having undertaken previous studies related to the use of Web 2.0 technologies in higher education, was able to identify gaps in the literature. The success of web-based learning in higher education requires support from the three major components, namely the systems, academics and students (Thongmak 2014). However, not any of the reviewed studies examined the use of Web 2.0 technologies in TAL from the perspective of both academics and students in universities in Nigeria. Previous studies in Nigeria focused on the use of Web 2.0 technologies for providing library services and use in teaching, learning or research activities either by academics, students, librarians or information professionals. Since Wang and Chiu (2011) emphasized that learning is an interactive process between academics and students, and not the interaction between IS and users. The implication of the limited discourse in the reviewed studies is that, findings may not be generalizable to the entire process of TAL which involves students, academics and the educational system itself. This study seeks to address this gap by looking specifically at the extent of integration of Web 2.0 in TAL practices and identifying factors that influence academics’ and students’ attitude and intention to use Web 2.0 technologies for TAL.

In terms of theories used, the review of empirical literature shows that most existing studies on Web 2.0 technologies' adoption and use examined the constructs of TAM and UTAUT that are related to constructs of the D&M model to determine the factors that affect use. For example, studies that used the D&M model (Wang, Wang and Shee 2007; Kim et al. 2009; Petter and McLean 2009; Urbach and Muller 2011; Kapoor, Dwivedi and Lal 2013 and Lwoga 2013) largely examined the impact of quality measures (System Quality, Information Quality and Service Quality) on users' satisfaction, use/intention to use and perceived net benefits. Thus, their findings were limited in some way to the relationships between these constructs, while the studies that employ the constructs showed inconsistencies in the findings. Since "attitude" has been noted to be a major determinant of use behaviour, there is need for more research to reveal the relationships among the variables and attitude, especially considering the Nigerian context.

This research aims to extend past investigations by employing a blend of theoretical frameworks which include the D&M model as the main underlying theory, complemented by MST and TAM to understand the use of Web 2.0 technologies in TAL in Nigerian Universities. Attitude construct in TAM was used as a dependent variable to test the validity of the quality dimensions, that is System, Information and Service Quality; and also as a predictor of Intention to Use. Media Synchronicity is a construct adapted from MST to expand the D&M model, it is used in this study as a predictor of intention to use. The results will help to identify factors that are paramount to the use of Web 2.0 and provide useful information to students, academics, stakeholders and policy makers on incorporating Web 2.0 technologies into Nigerian university education.

In terms of research methodology, the literature revealed that the commonly used method to determine the use of web-based technologies was the survey method and this was also employed for the present study. However, most of the studies reviewed employed a single approach which is predominantly quantitative. To address this gap, this study employed mixed method approach which comprised of both quantitative and qualitative methods of data collection and analysis. According to Creswell (1998), this method has the ability to elaborate on the findings of one method with another method thereby allowing for a better understanding of the research problem.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

Research methodology aims at systematically solving the research problem (Kothari 2004:8-9). Methodology according to Irny and Rose (2005) include concepts (such as paradigm, theoretical model, phases and quantitative or qualitative techniques) that are employed in the research process. Research method is an approach of enquiry which ranges from the underlying assumptions, research design to data collection (Myers 2009). The purpose of the research methodology chapter is to provide a guide on the approaches to solving a research problem. This includes the choice of research paradigm and research design, sampling methods, data collection, data analysis and ethical considerations.

The purpose of this study was to investigate the extent of use of Web 2.0 technologies in TAL in selected federal universities of southwest Nigeria. The study sought to address specific research questions (see section 1.2.2). The D&M model, TAM and MST were used as theoretical lens to underpin the study. This study was motivated by the need to improve TAL practices in Nigerian universities using Web 2.0 technologies.

This chapter is organized into ten thematic sections which includes research paradigm, research approach, research design, population of study, sampling procedures, data collection procedures, data analysis strategies, validity and reliability of data collection instruments, ethical considerations and summary of the chapter.

4.2 Research Paradigm

The concept of “paradigm” denotes a world view, belief or an understanding of a phenomenon. Saunders, Lewis and Thornhill (2009:118) defined paradigm as “a way of examining social phenomena from which particular understandings of these phenomena can be gained and explanations attempted”. The understanding is based on the “philosophical motivation” for the research (Cohen and Manion 1994:38) or on certain assumptions about how researchers will learn and what will be learnt in an investigation (Creswell 2003). A paradigm is also regarded

as an arrangement or design of scientific and academic ideas, values and assumptions (Thomas 2010). This arrangement specifies the techniques that will be used to collect and analyze data so as to enhance the understanding of the research problem. Portions from these philosophical assumptions, epistemologies, ontologies and methodologies (Neuman 2000 and Creswell 2003) are taken to explain a phenomenon.

Various theoretical paradigms exist such as positivist, post-positivist, constructivist, interpretive, transformative, pragmatism and de-constructivist (Creswell 2003; 2004; Mackenzie and Knipe 2006 and Gubrium, Holstein, Marvasti and McKinney, 2012). The choice of paradigm to be used in a study depends on the researcher's view of the nature of investigation. The paradigm chosen specifies the intent, motivation and expectations of the research (Mackenzie and Knipe 2006).

4.2.1 Post-positivism

This study takes the post-positivist stance as the most suited for the purpose of this research, which is to investigate the use of Web 2.0 technologies in TAL by academics and students. The aim of post-positivist enquiry is for better explanation, extrapolation and control. Post-positivism replaced positivism after World War II (Mertens 2005). Positivism argues that an objective and stable reality exists (Philimore and Goodson 2004). In contrast, post-positivism assumes that the nature of reality occurs in a particular form and "that flawed intellectual mechanisms" (Philimore and Goodson 2004:12) makes the actual form poorly captured. Thus, the reality can only be approximated (Denzin and Lincoln 2008).

Since many social realities exist due to the varying human experience including people's knowledge, views, interpretations and experiences (Cantrell 2001), Post-positivism acknowledges that the reliabilities of positivist approaches to research needed additional inquiry (Denzin and Lincoln 2008 and Dale 2010). The researcher in this current study therefore believes that the perception and attitude towards a phenomenon, which in this study is the use of Web 2.0 technologies in TAL, would differ from one person to another based on their knowledge or interpretation. This study therefore aims for objectivity by attempting to be non-manipulative and considering the collected views of study participants in making conclusions about the problem of interest.

Post-positivism is also based on a deterministic viewpoint, that “causes probably determine effects or outcomes” (Creswell 2003:7). The problems studied by post-positivists suggest a need to observe causes that influence outcomes (Creswell 2003). This study assumes that factors, such as system quality, information quality and service quality, would influence attitude of academics and students respectively toward the use of Web 2.0 technologies in TAL. The epistemological viewpoint associated with post-positivism as maintained by Cantrell (2001) and Mertens (2005) asserts that realities can be explored and constructed through human interactions. Consequently the practicalities of using Web 2.0 technologies as TAL tools can be better understood by examining academics’ and students’ views on experiences gained through interaction with the technologies. The post-positivist starts a research with a theory; collects data that either supports or refutes the theory; and then makes required modifications, after which further tests are conducted (Creswell 2003). The present study is underpinned by the D&M model, TAM and MST to gain better understanding and solution to the research problem. The independent variables (system quality, information quality, service quality, attitude, media synchronicity) and the dependent variable (intention to use and net benefits of using Web 2.0 technologies in TAL by academics and students), were tested to understand the relationship that exists between the variables.

4.3 Research Approach

Research approaches provides the intersection between the philosophical expectations, different procedures and methods of conducting a research. Creswell (2013 and 2014) identified three approaches to research, which include quantitative, qualitative and mixed methods. Research methods are commonly classified into qualitative and quantitative (Thomas 2010). VanderStoep and Johnston (2009) were of the opinion that the quantitative and qualitative when used separately have their shortcomings. They further noted that for studies that employ only a quantitative approach, research participants might give superficial answers because of the large number of participants. In a pure qualitative research, the findings may not generalizable to a greater population because the sample sizes are usually small and non-random (VanderStoep and Johnston 2009). Thus, it is not advisable to limit scope to a single approach to research methodology.

The mixed methods research approach, among others, is becoming common in studies, because it can help to shed light on a phenomenon by drawing findings from various methods. Other terms used to explain mixed methods include multimethods, quantitative and qualitative methods and mixed methodology (Creswell 2013). The notion of merging qualitative and quantitative methods into one methodology with different typologies is needed to extend the range of social science and health research (Creswell, Plano Clark, Gutmann and Hanson 2003 and Giddings 2006). The mixed methods approach allows for the combination of quantitative and qualitative approaches (Gray 2004; Leedy and Ormrod 2005, Creswell 2013 and Creswell 2014) and has helped to improve social science and education research (Gorard 2004 and Mertens 2014). This method is also recommended by VanderStoep and Johnston (2009) because it comprises of the best of both qualitative and quantitative approaches. Thus, the integration of both qualitative and quantitative aspects of research has gained immense popularity (Tashakkori and Teddlie 2010). This method allows data to be collected and analysed using both quantitative and qualitative methods, either concurrently or sequentially, so as to provide better understanding of the research problems (Johnson and Onwuegbuzie and Turner 2007; Creswell and Plano-Clark 2007 and Creswell 2014). Its ability to elaborate on the findings of one method with another method (Creswell 1998) and its capability to overcome the weakness and biases of single approaches (Elia 2013) allows for a better understanding of research problems.

Greene (2007) pointed out that it is helpful to specifically describe qualitative and quantitative research methods from broader philosophical perspectives so as not to intermingle methods and philosophy. Quantitative methods are predominantly used within the post-positivist paradigm along with qualitative methods (Mertens 2005). Creswell and Plano Clark (2007) were also of the opinion that qualitative methods are often used in the mixed methods approach in order to provide a supportive role for the quantitative methods. Qualitative research involves an in-depth understanding of human behaviour and the reasons that govern such behaviour. Hence there is the need for smaller but focused samples, rather than the large random samples used in quantitative method (Bryman 2012). This study employed the mixed method research approach using qualitative methods to support the quantitative methods, so as to enhance the understanding of the use of Web 2.0 technologies in TAL among students and academics. This approach seemed suitable for the current investigation as a larger quantity of data was obtained

and analysed quantitatively. Results from the quantitative approach helped to correctly reveal the overall population, while the results from the qualitative approach provided a richer and broad understanding of the population studied (VanderStoep and Johnston 2009). Quantitative method was required to capture and represent data solicited from undergraduate students and academics numerically through the use of questionnaires, while the qualitative method was required to solicit information from faculty heads and faculty librarians through the use of interview schedules.

Literature reveals similar studies on adoption and use of Web 2.0 technologies in education and TAL such as Neyland (2011); Zakaria, Watson and Edwards (2012); Che, Vaughan and Penelope (2013); and Holland and Howell (2013) adopted the mixed method approach to collect and analyse data in their research. Malhiwsky (2010) conducted a mixed method study to determine the effect of Web 2.0 technologies on Spanish college students. The study used the quantitative method to specifically examine students' achievements based on pre-test and post-test scores and also the level of classroom community, connectedness and learning. Likewise, the qualitative method was employed in investigating ways in which students used Web 2.0 technologies in their language learning and their perceptions. Neyland (2011) in a study on factors influencing the integration of online learning in high schools in Sydney, Australia used both quantitative and qualitative methods in data collection and analysis. Zakaria, Watson and Edwards' (2012) study recommends investigating the adoption of Web 2.0 in the classroom for learning by both academics and students using mixed methods for data collection and analysis.

Holland and Howell (2013) in a pilot study in the US adopted the mixed method research approach to examine Web 2.0 and e-learning tools and instructional implementation. Class observations and pilot study surveys were used to determine students' levels of satisfaction after using various Web 2.0 technologies and varying student work group sizes. Che, Vaughan and Penelope (2013) also examined the effect of Web 2.0 technologies on Malaysian university students' informal learning practices using a mixed-methods approach which combined multiple data sources (that is, on-line self-reported surveys and focus group interviews) and analytical methods. In their study, questionnaires were used to generate quantitative data from 400 university students through the online self-reported survey. The study result showed that a majority of the Malaysian university students surveyed found informal learning mediated by

Web 2.0 technologies to be a useful and motivating practice. From the aforementioned, it can be implied that use of a mixed method research or approach is very common when examining the use of Web 2.0 technologies for educational purposes. It was therefore adopted for this study.

4.4 Research Design

Research design refers to “procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis” (Creswell 2003:3). A convergent mixed method design was used in this study. This design allows quantitative and qualitative data to be collected and analyzed separately while findings from the two research approaches can be compared to have a clearer understanding of the research problem (Creswell and Plano Clark 2011, Creswell 2013 and 2014). This study also adopted a survey research design because it allows for many types of approaches. The choice of this research design is informed by the methodological approach to the study and the philosophical assumption underlying the study. Post-positivism allows reported experience from surveys (Gasson 2009) and Bryman (2006) observed that survey research can be conducted from both quantitative and qualitative perspectives. As this study adopted a mixed method research design that combined the quantitative and qualitative approaches, a survey design was used to achieve the research objectives on the use of Web 2.0 technologies for TAL in selected universities in south west Nigeria.

Studies such as Ajjan and Hartshorne (2008) in an investigation of faculty adoption of Web 2.0; Caruso and Salaway (2008) on the perception of students' usage of ICT and Web 2.0 in learning; and Hartshorne and Ajjan (2009) on students' adoption of Web 2.0 used the survey design. Similarly, Bolick, Berson, Coutts and Heinecke (2003) used a survey design to investigate how social studies teacher educators used new technologies in their teaching methods. Malhiwsky (2010) used survey design and online interview to gather data on the effects of Web 2.0 technologies on Spanish college students. Zakaria, Watson and Edwards (2010) also employed a survey design to investigate the use of Web 2.0 technology by Malaysian students. They further noted that most studies have used survey design to obtain empirical evidence about the use of Web 2.0 by the young people. These studies seem to

suggest the robust applicability of the survey design in investigating the use of Web 2.0 technologies in TAL.

The current study is exploratory and explanatory in nature due to the fact that not much is known about the use of Web 2.0 technologies in TAL by academics and students in selected Nigerian universities. Exploration helps in discovering new phenomena as well as developing and testing instruments (Fraenkel, Wallen and Hyun 2012). This is particularly useful when not much has been written about the theme, topic or the population being studied, and when the researcher seeks to hear the perception of participants to build an understanding of the subject matter (Creswell 2008). The low use or acceptance of Web 2.0 technologies in TAL in Nigeria universities as reported by Anunobi and Ogbonna (2012) and Echeng, Usoro and Majewski (2013), suggests that the technology is still at an early stage of adoption in Nigerian universities. Therefore the survey design seems suitable for understanding factors that influence the use or intention to use Web 2.0 technologies as TAL tools by students and academics respectively. Studies which are exploratory and/or explanatory in nature have been found beneficial in research. Barnes, Clear, Dyerson, Harindranath, Harris and Rae's (2012) exploratory study on how small businesses used Web 2.0 to work collaboratively with other small businesses in the UK, substantiated the potential of Web 2.0 for collaborations between small businesses.

4.5 Population of Study

The term "population" is the total group from or about which certain information is required to be ascertained (Banerjee and Chaudhury 2010). A research population consists of individuals or elements with similar characteristics. It also comprises of all the members of a particular group who are of interest to the researcher (Fraenkel and Wallen 2009). The sum of these elements formed the study population, which in this study includes academics, students and librarians within selected federal universities in Nigeria.

The study was conducted in two federal universities in southwest geo-political zone of Nigeria. Universities in Nigeria can be categorized on the basis of their year of establishment, as first generation (1948 – 1973), second generation (1974-1979), third generation (1980s to early 1990s), fourth generation (1991-1998) and fifth generation (1999 to date) (Nwagwu and Agarin 2008; Ekundayo and Ajayi 2009). The universities are also categorized as broad-based

(that is, those that provide education in a wide-range range of disciplines) or specialized (for example, technology or agriculture education) (Ekundayo and Ajayi 2009). The University of Ibadan (UI) (first generation/broad based) and the Federal University of Agriculture, Abeokuta (FUNAAB) (third generation/specialized university) were used for this study. The University of Ibadan was founded in 1948 and is the oldest university in Nigeria, while FUNAAB (which was founded in 1988) is one of the specialized universities in the southwest region of Nigeria (information posted at <http://universitiesofnigeria.com>). These universities were also selected based on the relative variance in their rating in research productivity (Okafor 2011). Recent global ranking of universities (4International Colleges & Universities 2014; Cybermetrics Lab CSIC 2014) placed UI and FUNAAB at 2nd and 11th positions respectively among Nigerian universities. The aforementioned informed their choice for this study.

Academic staff members and undergraduate students in the faculties of Technology, Sciences and Veterinary Medicine in UI and FUNAAB formed the units of analysis. These faculties are common to the two universities. Cant and Bothma (2010) remarked that the lecturer (academic staff) is vital in the effective delivery of information content in the university and that the successful integration of technology in education is influenced by educators' perceptions. It is therefore important to understand academics' views on the use of Web 2.0 technologies in TAL. Stutzman (2006) also stated that in comparing rates of Web 2.0 adoption, undergraduate students are true representation of the feeder of Web 2.0 application. Hence, undergraduate students in the third and fourth years of study were chosen as a study sample. The decision to limit the study to third and fourth year undergraduate students was based on the fact that these students would have spent enough time in the university and as such would be able to provide valid information on the extent of using Web 2.0 technologies for TAL practices.

The population of academics in the two universities is 409 in UI and 162 in FUNNAB respectively (U.I. 2013). On the other hand, the population of third and fourth year undergraduate students is 1188 in UI and 1639 in FUNNAB (FUNAAB 2013). Hence, the total population of the study is 517 academics and 2827 undergraduate students in both universities (University of Ibadan Annual Report, 2013; FUNNAB 2012/2013 Annual Report, 2013).

4.6 Sampling Procedures

Sampling is the process of selecting a number from a population that will be representative of the total population (Polit and Hungler 1999). A sample is any part of a population of individuals from whom information is selected (Fraenkel and Wallen 2009). It is the actual population from which the data are obtained. A representative sample according to Denscombe (2014:32) allows the researcher to draw valid conclusions about the total research population. Sampling helps to achieve greater precision in determining sample size and to avoid bias in selecting the sample (Kumar 2005). Babbie (2007) further described a sample as any ration of the population less than the total population.

Due to the nature and objectives of this research, a representative sample for this study was used based on recommended samples sizes on a published table of determining sample sizes by Israel (1992). Israel (1992) published the table of determining sample sizes as shown in Table 2. He suggested that for a population of 517 academics and 2827 undergraduate students, the sample sizes would be 240 and 353 respectively at $\pm 5\%$ precision and 95% confidence level. For this study, a sample of 240 academics and 353 undergraduate (third and fourth year) students was therefore selected out of the total population of students and academics in the faculties in the two universities.

Table 2. Sample Size confidence level is 95% and P=0.5 (Source: Israel 1992)

Size of population	Sample size (n) for precision (e) of:			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	A	222	145	83
600	a	240	152	86
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97

Where a = Assumption of normal population is poor. The entire population should be sampled.

The sample for this study was distributed among the population of academics and undergraduates in the two universities based on the strength of their population using a formula recommended by Krejcie oand Morgan (1970) represented below:

$$\frac{N \times S}{TP}$$

Where, N is the population of each faculty, S is the total sample size and TP is the total population. Based on this formula, the distribution of samples across the two selected universities were:

$$\text{University of Ibadan (Academics): } \frac{409}{571} \times 240 = 172$$

$$\text{University of Ibadan (Undergraduate Students): } \frac{1188}{2827} \times 353 = 148$$

$$\text{Federal University of Agriculture Abeokuta (Academics): } \frac{162}{571} \times 240 = 68$$

$$\text{Federal University of Agriculture Abeokuta (Undergraduate Students): } \frac{1639}{2827} \times 353 = 205$$

Thus, the sample size for the survey was 172 academics and 148 students from UI and 68 academics and 205 students from FUNAAB. Using the same formula as above, the distribution of samples across the selected faculties for the study was calculated as follows:

University of Ibadan:

$$\text{Faculty of Science (Academics): } \frac{225}{409} \times 172 = 95$$

$$\text{Faculty of Science (Undergraduate Students): } \frac{684}{1188} \times 148 = 85$$

The sample sizes for other faculties were based on a similar calculation as shown in Table 3a and Table 3b.

Table 3a: Sample distribution of University of Ibadan: Academics/students

Faculty/College	Academics		Undergraduate students	
	Population	Sample	Population	Sample
Science	225	95	684	85
Technology	100	42	420	52
Veterinary	84	35	84	11
Total	409	172	1188	148

**Table 3b: Sample distribution of Federal University of Agriculture Abeokuta:
Academics/students**

Faculty/ College	Academics		Undergraduate students	
	Population	Sample	Population	Sample
Science	108	45	1349	169
Technology	36	15	231	29
Veterinary	18	8	59	7
Total	162	68	1639	205

The two universities for the study were selected using the purposive sampling technique to ensure that one university is selected from each of the two strata (that is, first generation/broad-based and third generation/specialized universities. In systematic sampling, a random selection is made of the first element for the sample and then, using a fixed interval, consequent elements are selected until the desirable sample size is reached (Daniel 2012). Using the systematic sampling technique, sample units for the quantitative study were drawn from a list of academic staff until the sample size noted in Table 3a and Table 3b was reached. Third and fourth year undergraduate students were purposively selected for the quantitative study. Systematic sampling was further applied to include undergraduates in the study. With regard to student population, the researcher went to the lecture hall where third and fourth year students in each of the selected faculties receive lectures and the allotted number of questionnaires were administered to every 8th person until the sample size was reached. The procedure was followed for the three faculties surveyed.

In the case of the qualitative aspect of the study, Marshall, Cardon, Poddar and Fontenot (2013) recommend 15 to 30 interviews. Since the qualitative data was intended to be used to support findings from the quantitative study, a purposive sampling technique was employed in selecting participants. A total of 16 participants comprising of 8 faculty heads and 8 faculty librarians from the faculties of Science, Agriculture, Technology and Veterinary in UI and FUNAAB were selected to participate in the qualitative study.

4.7 Data Collection Instruments and Procedures

Data can be described as the various types of information which researchers gather on the subject matter (Fraenkel and Wallen 2009). Polit and Hungler (1999:267) defined data as “information obtained in a course of a study”. Instruments, on the other hand, are mechanisms

or tools used for gathering data needed for a study. Fraenkel and Wallen (2009) defined “instrument” as a device used to collect data. The practise of preparing and using instrument(s) to collect data in research is termed “instrumentation” (Fraenkel and Wallen 2009 and Fraenkel, Wallen and Hyun 2012). This practise provides suitable and relevant means of gathering data that can better explain a research problem. This section describes the instruments used to gather data and the nature of data collected from respondents.

There are several methods of collecting data in a survey research. Structured questionnaires and semi-structured interviews are often used in mixed method studies to confirm results that develop from different methods of data collection, analysis, and interpretation (Harris and Brown 2010). Semi-structured interviews are a qualitative method of inquiry that combines a pre-determined set of open questions with the opportunity for the interviewer to further explore specific themes or answers (Mammadova 2012 and Ekholm 2013). Responses are not limited in a semi-structured interview, unlike the structured questionnaire that contains questions with pre-defined answers. This study is situated in the mixed method approach, consequently the structured questionnaires and semi-structured interviews were considered reliable for obtaining quantitative and qualitative data respectively.

This study obtained quantitative data on the use of Web 2.0 technologies in TAL from academics and undergraduate students using a structured questionnaire. Qualitative data was gathered from faculty heads and librarians using a semi-structured interview schedule. A questionnaire was adopted to provide the behavioural patterns and general perception of Web 2.0 use among the large population (Harris and Brown 2010) of study participants. The interview was employed to obtain qualitative data on the use of Web 2.0 due to its suitability in gaining in-depth insights on participant thoughts, actions and attitude (Kendall 2008).

4.7.1 Questionnaire

Questionnaires are typically paper-and-pencil instruments that are completed by respondents (William 2006). Questionnaire allows for structured questions and responses that can be easily analysed to achieve the objectives of research. A questionnaire is considered adequate for obtaining data if it:

- (i) is designed to collect information which can be used subsequently as data analysis;
- (ii) consist of a written list of questions; and

(iii) collects information by asking people directly about the point concerned with the research (Denscombe 2007).

Quantitative data was obtained from both academics and undergraduate students using a structured questionnaire. The questionnaire investigated the use of Web 2.0 technologies for TAL purposes, factors that influenced Web 2.0 use for TAL, and the net benefits of Web 2.0 technologies for TAL. The questionnaire captured data on system quality, information quality, service quality, attitude towards use, media synchronicity, intention to use and net benefits of Web 2.0 for TAL as presented in Appendices 1 and 2. It also obtained data on the types of Web 2.0 technologies used for TAL purposes in the universities surveyed. Some of the questionnaire items were adapted from related studies such as that of Edlund (2012), Ryoo and Koo (2010), Dwivedi et al. (2013) and Lwoga (2013) which employed constructs of the D&M model, MST and TAM to examine IS success and communication media usage. The questionnaires were administered to undergraduate students at their classes and to the academics at their respective offices in UI and FUNAAB respectively.

A separate five-page structured questionnaire was designed for the academics and students to elicit richer information on the use of Web 2.0 technologies for TAL purposes. The questionnaire consisted of four sections. The first section (Section A) of the questionnaire was designed to collect general information on respondents regarding their demographic characteristics. The aim of this section was to help collect data on university, faculty, gender, age category, year of study (in case of students), educational qualification (in case of academics) and years of experience with Web 2.0. The second section (Section B) was designed to gather data to identify the Web 2.0 technologies with which academics and students are familiar with, what they are used for and which ones are used for TAL purposes. Data generated from this section is expected to shed light on the frequency of use of these technologies. A typical question asked was “How often do you use the following Web 2.0 technologies (such as blogs, Facebook, podcasts, wikis and instant messaging) as TAL tools?” A 5-point Likert scale was used for the questions ranging from 0-4 with 0= Never, 1=Rarely, 2= Occasionally, 3= Frequently and 4= Very frequently.

The third section (Section C) was concerned with collecting data on factors such as system quality, information quality and service quality, in order to test their influence on attitude

towards use of Web 2.0 technologies for TAL. Some of the options selected by respondents include I find Web 2.0 technologies easy to use (System Quality); Web 2.0 technologies provide me with sufficient information for teaching/learning (Information quality) and Web 2.0 technologies provide reliable and prompt support for teaching/learning (Service quality). The questions were close-ended, and required respondents to rate their responses on a 5-point Likert scale from 0-4 with 0= Undecided, 1=Strongly agree, 2=Agree, 3=Disagree and 4=Strongly disagree.

The fourth (Section D), fifth (Section E) and sixth (Section F) sections aimed at eliciting responses that would aid understanding on how attitude towards use and media synchronicity respectively influence intention to use Web 2.0 technologies for TAL. Some options selected by respondents included “Web 2.0 technologies enable me to give and receive rapid feedback on the communications” (Media Synchronicity), “I believe it is a good idea to use Web 2.0 technologies for teaching/learning” (Attitude towards use) and “I intend to use Web 2.0 technologies for learning/learning as frequently as possible” (Intention to use). The questions were also close-ended, and required respondents to rate their responses on a 5-point Likert scale from 0-4.

The final section (Section G) comprised of closed-ended questions that sought to understand the net benefits of using Web 2.0 technologies for TAL. Some of the options from which respondents made selection included “Web 2.0 technologies help me to acquire new knowledge and innovative ideas”, and “TAL performance is enhanced with the use of Web 2.0 technologies”. Responses were rated on a 5-point Likert scale from 0-4 with 0= Undecided, 1=Strongly agree, 2=Agree, 3=Disagree and 4=Strongly disagree).

4.7.2 Semi-structured Interview Schedule

Interviews are sometimes in structured, semi-structured or unstructured forms (Thomas 2010 and Denscombe 2014). Semi-structured interviews are best used when only a one-time chance is available to interview people and also when more than one person will be used as interviewers (Bernard (1988). This would help to achieve consistency in the interview process. The semi-structured interview is best used with an interview guide because it provides direction (Zwaenepoel, Bilo, De Boever, De Vos, Reyntens, Hoorens,... and Laekeman 2005) and gives a clear set of instructions that will help in gathering reliable qualitative data (Bernard

2012). Semi-structured interviews often contain open-ended questions (Cohen and Crabtree 2006) and are suitable “when the time to collect information is limited” (Creswell 2008:226). Open ended questions comprise of questions that call and allow for a wide range of responses which are most often textual. These responses are useful in obtaining a deep understanding of the respondents’ experiences, feelings, beliefs (Welman and Krugal 1999), and views about the use of Web 2.0 technologies in TAL. This instrument assists in identifying new approaches to the phenomenon being studied.

Since the qualitative aspect of this study involved a small number of respondents, it was considered best to use semi-structured interviews. This study employed the semi-structured interview because it provides a very flexible technique for small-scale research and helps to discover perspectives missing from questionnaires (Gorsuch 2002). The semi-structured interview schedule was administered on faculty heads and librarians in the selected universities (see semi-structured interview guide in Appendix 3) because they play significant roles in the conceptualisation, implementation and actualisation of educational policies, particularly those concerned with TAL in universities. Moreover, they help in the provision of Web 2.0 based information services for use in TAL by academics and students. The semi-structured interview was employed to complement the quantitative data obtained through the use of the questionnaire.

The semi-structured interview was completed by the interviewer based on the respondents’ replies. This provided an in-depth description (Sillitoe, Dixon and Barr 2005) of how Web 2.0 technologies were used in TAL. The interview schedule contained questions relating to the use of Web 2.0 technologies by university academics and students; Web 2.0 technologies policy framework in university education; attitude towards use of Web 2.0 technologies for TAL; availability and access to Web 2.0 tools for TAL such as blogs, wikis, etc., infrastructure and services available for integration of Web 2.0 technologies in TAL and benefits of Web 2.0 technologies (see Appendix 3).

4.7.3 Administration of Research Instruments

The questionnaire and semi-structured interview schedule were administered by the researcher, with the help of trained research assistants. Six research assistants were trained to assist in distributing the questionnaires to the sample of undergraduate students and academics. A total

of three hundred and fifty-three copies of the questionnaires were administered to purposively selected academics, and two hundred and forty copies of the questionnaires were administered to purposively selected undergraduate students who were in their third and fourth year of study in the selected faculties in UI and FUNAAB respectively. The respondents were required to complete the questionnaire and return immediately. However, where this was not practicable, the researcher or the research assistants and the respondents reached an agreement on when to collect the questionnaires. A total of five hundred and ninety-three questionnaires were administered in the two selected Nigerian federal universities.

The semi-structured interview schedule was administered to a total of sixteen participants comprising of eight faculty heads and eight faculty librarians from the Faculties of Science, Agriculture, Technology and Veterinary in UI and FUNAAB. Appointments were scheduled to collect data from purposively selected participants. Permission was sought from participants on whether they would prefer their responses to be audio-recorded or documented on paper. Questions in the interview schedule were followed sequentially but not rigidly. Field notes were taken by the researcher to capture other information which might not be captured by the interview schedule. The interviews were conducted majorly by the researcher except in cases where the researcher did not have direct access to the interviewees. Participants were permitted to withdraw from the interview session at any time.

4.7.4 Pretesting of Research Instruments

According to Babbie and Mouton (2001), pre-testing of research instruments before administering them is a pre-requisite to data collection process. The reason for this is that it is important that questionnaire items are clear, concise and unambiguous (Williams 2003), so that all respondents can read meaning into it the same way. Consequently, it was necessary to pre-test the two structured questionnaires for undergraduate students and academics respectively, as well as the semi-structured interview schedule. Face validity and the pre-test of data collection instruments was done to ensure the content validity, that is, validity of questions and the reliability of the data obtained. This also helped to confirm the clarity of questions, identify unclear and ambiguous questions, remove difficult questions, determine if relevant questions were included and gather remarks and comments from the respondents (Saunders, Lewis and Thornhill 2009).

Babbie and Mouton (2001) recommended that questionnaire be pre-tested on ten people who are found to be appropriate to answer the questions. Sheatsley (1983) also suggested that between 12 to 25 cases or people are sufficient to reveal the major difficulties and weaknesses in a pre-test questionnaire. The questionnaire was pre-tested on 25 respondents comprising of 16 undergraduates and 8 academics. The pre-test sample units were conveniently selected from the accessible population of students and academics at the Faculty of Science, Obafemi Awolowo University (OAU) Nigeria, since they have similar characteristics with the study population. OAU is one of the Federal Universities in the southwest region of Nigeria and also among the best ten Nigerian universities based on Webometric ranking (Cybermetrics 2014). This number is considered sufficient to provide relevant responses or answers to validate the questionnaire content. Moreover, pre-testing with experts is a way of ensuring content validity of instruments (Straub, Boudreau and Gefen 2004). As argued by Saunders, Lewis and Thornhill (2009) and Bernard (2012), the pre-test of the questionnaire helps in refining it in order to avoid difficulties in answering the questions. The results of the pre-test were useful in refining the questionnaire items and structure to collect relevant and reliable data.

The questionnaire items were subjected to Cronbach Alpha (α) test. Cronbach's Alpha (α) was used to test the reliability, internal consistency and the overall reliability of each of the variables of the study. Cronbach's alpha is a function of the average inter-correlations of items and the number of items in the scale (Kimberlin and Winterstein 2008). Only constructs with $\alpha \geq 0.7$ were retained, questionnaire items with $\alpha < 0.7$ for all items were re-formulated. The reliability of each of the variables as measured by Cronbach's Alpha was relatively high with 0.95 for system quality, 0.87 for information quality, 0.81 for service quality, 0.95 for media synchronicity, 0.87 for attitude towards use, 0.92 intention to use and 0.93 for net benefits.

For the pre-test of interview schedule, it is suggested that studies may utilize as few as 2 to 5 cases or people, depending on the study goals and resources (Babyak, Grower, Mulvihill and Zaroski 2000). The semi-structured interview schedule designed for collecting qualitative data was pre-tested on two faculty heads and three librarians from OAU. These pre-test sample units were conveniently selected from the accessible faculty heads and librarians at OAU, as they have related characteristics with the study population. Corrections noted were effected on the instrument before it was administered.

4.8 Data Analysis

Data analysis consists of a number of interconnected processes that help to summarize gathered data and also to organize them in such a manner that provide responses to the research questions (Kothari 2004). Due to the nature of the data collected in this study and in line with the post-positivist paradigm; a mixed method data analysis was required. This involved a combination of qualitative and quantitative data analysis method.

Descriptive statistics and Statistical Package for Social Science (SPSS) version 17 were used to analyse the quantitative data collected through the structured questionnaire, since it allowed for easy manipulation of statistical data analysis and interpretation of quantitative study findings (Babbie and Mouton 2001, and Peugh and Craig 2005). Before analysing the raw data, each completed questionnaire was evaluated to check for missing data, ambiguity and errors. After which the questionnaire responses were coded and keyed into the computer using the SPSS software. Regression analysis was employed in evaluating the relationships that existed between the variables of the study and also the predictive abilities of the study variables, as shown in Table 1. Research hypotheses (see section 1.2.3) were tested at $p= 0.05$ level of significance to determine if the relationships between the study variables were significant or not. The results generated from the quantitative data analysis were presented visually using frequency counts, tables and charts.

Qualitative data gathered through the use of semi-structured interview schedule was analysed through thematic content analysis. Semi-structured interviews allow for thematic analysis of the qualitative data (Alvarez and Urla 2002, cited in Anil and Charatdao 2012). It also involves gathering and analysing the content of the text in order to make sense out of them (Newman 2006). This helps to reduce data and makes interpretation easier. The recorded interviews were transcribed after which the transcripts and notes were prepared. Responses of participants were summarised to significant statements while the data were coded. This process is consistent with Kerlinger's (1973) definition of analysis as the categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions. Finally, themes relevant to the research objectives were developed and the responses of participants were combined and grouped under relevant themes.

Table 4 shows the relationship that exist between the study research questions, approach for data collection, sources of data and methods of data analysis.

Table 4: Research Questions, Sources of Data and Data Analysis

S/N	Research questions	Approach	Source of Data	Method of Data Analysis
1	What kinds of Web 2.0 technologies are used by academics and students, and for what purposes?	Quantitative and Qualitative	Survey questionnaire, interview, literature review	Descriptive statistics, Thematic content analysis
2	To what extent are Web 2.0 technologies integrated into TAL in Nigerian universities?	Quantitative and Qualitative	Survey questionnaire, interview, literature review	Descriptive statistics and Thematic content analysis
3	How does system quality, information quality and service quality influence attitude towards the use of Web 2.0 technologies for TAL in the federal universities?	Quantitative	Survey questionnaire and literature review	Descriptive statistics and Multiple Regression Analysis
4	How does attitude towards use influence intention to use Web 2.0 technologies for TAL in the federal universities?	Quantitative	Survey questionnaire, interview and literature review	Descriptive statistics, Regression Analysis and Thematic content analysis
5	How does media synchronicity influence intention to use Web 2.0 technologies for TAL in the federal universities?	Quantitative	Survey questionnaire and literature review	Descriptive statistics and Regression Analysis
6	What net benefits can be derived from the use of Web 2.0 technologies for TAL?	Quantitative and Qualitative	Survey questionnaire, interview and literature review	Descriptive statistics, Regression Analysis and Thematic content analysis

4.9 Ethical Considerations

Ethics for evaluation and research are "norms for conduct that distinguish between acceptable and unacceptable behaviour" (Resnik 2007:1). Ethical issues arise out of our interaction with other people, and the environment, especially where there is potential for, or where there exists a conflict of interest (Babbie and Mouton 2001). Therefore, research should be conducted in accordance with ethical guidelines and must be justifiable on the basis of scientific, educational, or applied value (American Psychological Association 1992). Research ethics help to promote

trust, mutual respect and accountability, so as to make the researcher accountable to the public (Resnik 2011). As it was necessary to obtain “permission from several individuals and groups” (Creswell 2008:157), the researcher sought permission from the authorities of the U.I and FUNAAB where the study was conducted. The study complied with the guidelines of the University of KwaZulu-Natal (UKZN) Ethics Policy. The data collection instruments were administered after the researcher had been granted ethical clearance by UKZN to conduct the study, gatekeepers” permission from the selected universities and the informed consent of participants. The permission documents and informed consent form was given to participants and the purpose of the research was explained to them. Participants were assured of confidentiality of information given and their right to withdraw at any point of the study. Anyone who desired not to participate in the survey was permitted to excuse himself from the process.

4.10 Summary of the Chapter

This chapter presented the methodology that was adopted for the study. Based on Mackenzie and Knipe’s (2006) opinion that the choice of paradigm often specifies the intent, motivation and expectations of research, the study employed a post-positivist paradigm. The post-positivist believes that the reality can only be approximated (Denzin and Lincoln 2008). This study aimed at collecting data from academics and students based on their varying experiences, knowledge and views on the use of Web 2.0 technologies as TAL tools. Post-positivism also assumes that causes influence outcomes (Creswell 2003). This study examined the influence of certain factors such as system quality, service quality, information quality, attitude, media synchronicity on the intention to use Web 2.0 technologies in TAL. The study employed the mixed methods approach. This methodological approach allows for the combination of quantitative and qualitative approaches (Gray 2004 and Leedy and Ormrod 2005) and integrates and exploits the strength of both qualitative and quantitative approaches thereby allowing for a better understanding of the research problem (Creswell 1998).

A convergent mixed method design alongside survey research design was adopted, which is consistent with the post-positivist paradigm (Gasson 2009, Creswell and Plano Clark 2011 and Creswell 2013), to explore the use of Web 2.0 in TAL in Nigerian universities. The sample population was 609 comprising of 240 academics and 353 undergraduate (third and fourth year) students for the quantitative study; and 8 faculty heads and 8 faculty librarians for the qualitative study. Sample units were taken from the Faculties of Science, Agriculture, Technology and

Veterinary in UI and FUNAAB respectively. Data was collected using a structured questionnaire and semi-structured interview schedule. Both quantitative and qualitative methods of data collection and analysis were employed. The ethical rules and guidelines laid down by UKZN were adhered to. Permission was sought to access the universities where the research was conducted. A pre-test of the questionnaire was conducted on 17 students and 8 academics, while that of the semi-structured interview schedule was pre-tested on 2 faculty heads and 3 faculty librarians. Data obtained was subjected to a Cronbach Alpha (α) to test for reliability and validity of the instrument. Results were presented using tables and charts.

CHAPTER FIVE

PRESENTATION OF FINDINGS

5.1 Introduction

The purpose of this study was to investigate the extent of use of Web 2.0 technologies for TAL in selected federal universities in southwest Nigeria. This chapter presents the study findings derived from the two questionnaires and the interview schedule. Questionnaires were administered to both academics and undergraduate students while the interview was administered to heads of faculties/colleges (also called Deans of Faculties) and faculty librarians in four faculties in two federal universities in south west Nigeria. These universities were the University of Ibadan (U.I.) and the Federal University of Agriculture Abeokuta (FUNAAB). Data collected through questionnaires was “cleaned”, edited and coded before being analyzed using descriptive statistics and the Statistical Package for Social Sciences (SPSS) version 17. A significance level of $p=0.05$ was used for all hypotheses tested. Findings of the survey are presented using tables with frequencies and percentages, pie charts and bar charts. In addition, data collected using an interview schedule was analyzed using thematic analysis.

This chapter is organised along the themes of the research questions, key variables of the theories adopted and the hypotheses that were tested.

A total of 240 academics and 353 undergraduate students in the faculties of Science, Technology or Engineering and Veterinary medicine were invited to participate in the survey, out of which 195 academics and 331 students duly completed and returned the questionnaires, giving a response rate of 81.3% for academics and 93.8% for students. Of the eight Heads (Deans) of Faculty or college and eight librarians who were key informants for the interviews, 14 were interviewed, giving a response rate of 87.5%. Some related studies consider the response rate of 50% as suitable, 60% as good and 70% and above as very good for analysis and reporting of the findings (Bailey, 2000; Babbie and Mouton, 2001 and Nyema 2014). Due to the fact that there is no statistical base for an adequate response rate to the questionnaire, the response rate (81.3% for academics and 93.7% for students) for this study was considered to be very good.

The high response rate was as a result of the support of the offices of the Directors of Research in the two universities. They were responsible for introducing the researcher to the academics and students and also for publicising the questionnaire. Six research assistants along with student departmental representatives, departmental secretaries and some lecturers in the three faculties/colleges assisted the researcher in following up on each student and academic in the completion of the survey. They achieved this by informing their colleagues (students or academics) to complete and return the questionnaires. Each questionnaire was accompanied by a copy of the approval letter to conduct the study, issued by the management of the research office and offices of the Vice-Chancellor (VC) of the universities. The approval from the VCs enabled the researcher to access the academics and students. In addition to the approval letter, some Heads of Departments (HoDs) requested academics to complete the questionnaire. The initial survey period, which was proposed for three months, was extended to six months to enable more academics and students to participate in the survey and to provide ample time to complete and return the questionnaires. The researcher had to personally follow up on the Heads of Faculties and librarians and also on some of the academics to ensure that the questionnaires were completed. The results are presented below, using both descriptive and inferential statistics.

5.2 Respondents' Demographic Profile

This section provides a summary of the demographic distribution of the academics and students of University of Ibadan (U.I) and Federal University of Agriculture Abeokuta (FUNAAB) that participated in the survey. The demographic information included issues such as name of university, faculty/college, gender, age, year of study (for students), academic qualification (for academics), department (for students), area of specialization (for academics) and years of use of Web 2.0. The demographic data about the respondents are presented in Tables 5-20 and Figures 6-13.

5.2.1 Distribution of Respondents (Academics and Students) by University

Data collected was analyzed to determine the distribution of academics and students in the two selected universities. The results are presented in Figures 6.

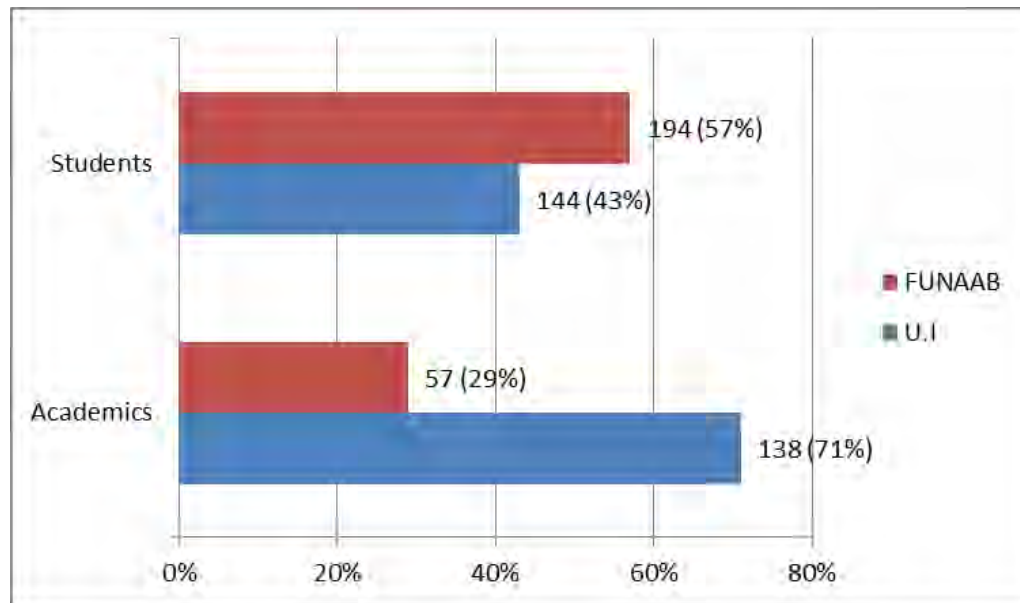


Figure 6: Distribution of Respondents by University

The distribution of respondents on the basis of their universities in Figure 6 showed that 71% and 43% of academics and students respectively were from University of Ibadan (U.I) while 29% and 57% of academics and students respectively were from Federal University of Agriculture Abeokuta (FUNAAB).

5.2.2 Distribution of Respondents (Academics and Students) by Faculty/College

Data collected was also analyzed to determine the distribution of academics and students based on faculty or college. The results are presented in Table 5a and 5b.

Table 5a: Distribution of Academics by Faculty/College

Faculty/College	U.I (N=138)		FUNAAB (N=57)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Science/Natural Science	86	62.3	38	66.7	124	64.0
Technology/Engineering	27	19.6	12	21.1	39	20.0
Veterinary Medicine	25	18.1	7	12.3	32	16.0
Total	138	100.0	57	100.0	195	100.0

Note: *N=195 is the total number of usable completed questionnaires out of 240 copies of questionnaires administered to academics in the two universities.

The results in Table 5a depict the faculty/college of academics in the study. The majority of respondents 124 (64%) were from the faculty/college of Science/Natural Science; this is followed by respondents from the faculties/colleges of Technology/Engineering 39(20%) and Veterinary Medicine 32(16%) respectively. The results correspond with the those from the

separate analysis of data collected from respondents from the two universities which indicated that the respondents were mostly academics from the Faculty of Science/Natural Science.

Table 5b: Distribution of Students by Faculty/College

Faculty/College	U.I (N= 140)		FUNAAB (N= 191)		Total (*N=331)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Science/Natural Science	78	55.7	162	84.8	240	72.5
Technology /Engineering	51	36.4	22	11.5	73	22.1
Veterinary Medicine	11	7.9	7	3.7	18	5.4
Total	140	100.0	191	100.0	331	100.0

Note: *N=331 is the total number of usable completed questionnaires out of 351copies of questionnaires administered to students in the two universities.

The distribution of students on the basis of faculty/college revealed that 240 (72.5%) were from the Faculty of Science/Natural Science, 73 (21.1%) Technology/Engineering and 18 (5.4%) were from Veterinary Medicine. Likewise, results of data collected from respondents in U.I showed that 55.7% were from Sciences/ Natural and Bio-sciences, 36.4% from Technology/Engineering and 7.9% from Veterinary Medicine. Similarly, results from FUNAAB revealed that 84.8% were from Sciences/Natural and Bio-sciences, 11.5% from Technology/Engineering and 3.7% from Veterinary Medicine. The results indicated that students from the Faculty of Science/College of Natural and Bio-Sciences mainly dominated the study.

5.2.3 Distribution of Respondents (Academics and Students) by Gender

This section presented the gender of academic and student respondents from the two universities involved in the study as shown in Figure 7.

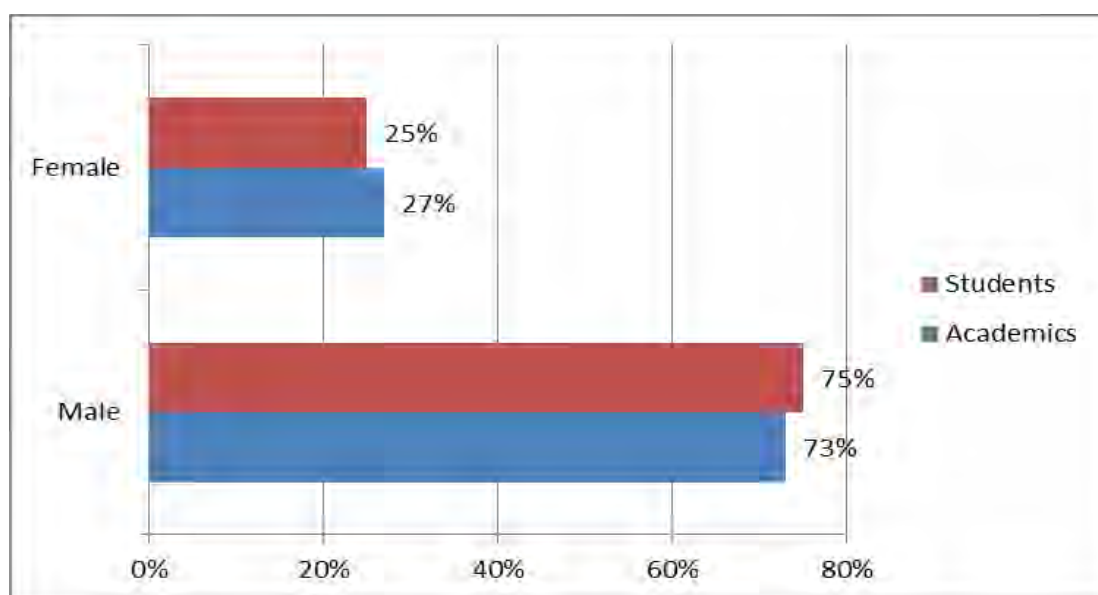


Figure 7: Distribution of Respondents by Gender (N= 195 for academics and 331 for students)

From Figure 7, results showed that of the 195 academic respondents 73% were male, while 27% were female. Similarly, the results also showed that 75% of student respondents were male while 25% were female. The results indicated the dominance of male students over females in the surveyed universities.

5.2.4 Distribution of Respondents (Academics and Students) by Age

The respondents were asked to indicate their age range on the questionnaire. The results are shown in Tables 6a and 6b for academics and students respectively.

Table 6a: Distribution of Academics by Age Group

Age group	U.I (N=138)		FUNAAB (N=57)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Below 30 years	16	11.6	9	15.8	25	12.8
31-40 years	45	32.6	25	43.9	70	35.9
41-50 years	58	42.0	18	31.6	76	39.0
50-60 years	15	10.9	4	7.0	19	9.7
60 years and above	4	2.9	1	1.8	5	2.6
Total	138	100.0	57	100.0	195	100.0

Note: *N=195 is the total number of usable completed questionnaires out of 240 copies of questionnaires administered to academics in the two universities.

The distribution of respondents shown in Table 6a indicated that 39% of academics were within the age bracket 41-50 years, 36% were between 31-40 years, 13% were below 30 years, 10% were between 50-60 years while 3% were 60 years and above. The highest population (39%) of the respondents was in the age range of 41-50 years and the least (3%) in the category of 60 years and above. Results further revealed that there were younger academics (40 years and below) in FUNAAB (about 60%) than in U.I (about 44%).

Table 6b: Distribution of Students by Age group

Age group (years)	U.I (N=138)		FUNAAB (N=57)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Below 16	1	0.7	8	4.2	9	2.7
16-19	29	20.7	23	12.0	52	15.7
20-22	58	41.4	96	50.3	154	46.5
23-25	32	22.9	43	22.5	75	22.7
26 and above	20	14.3	21	11.0	41	12.4
Total	140	100.0	191	100.0	331	100.0

Note: *N=331 is the total number of usable completed questionnaires out of 351 copies of questionnaires administered to academics in the two universities.

The distribution of students by age presented in Table 6b showed that about 47% were within the age bracket 20-22 years, 23% were 23-25 years, 16% were 16-19 years, 12% were 26 years and above, and about 3% were below 16 years. The majority of the respondents (about 47%) were in the age range of 20-22 years and very few (about 3%) were in the category of below 16 years and this received the least responses. This implied that most of the students in the study were above 16 years of age. Results further revealed that there were younger students (19 years and below) in U.I (21%) than in FUNAAB (16%).

5.2.5 Distribution of Respondents (Academics and Students) by Educational Qualification and Year of Study

The study also sought to know the status of respondents by their educational qualifications and current year of study and this is presented in Figure 9a for academics and 9b for students respectively.

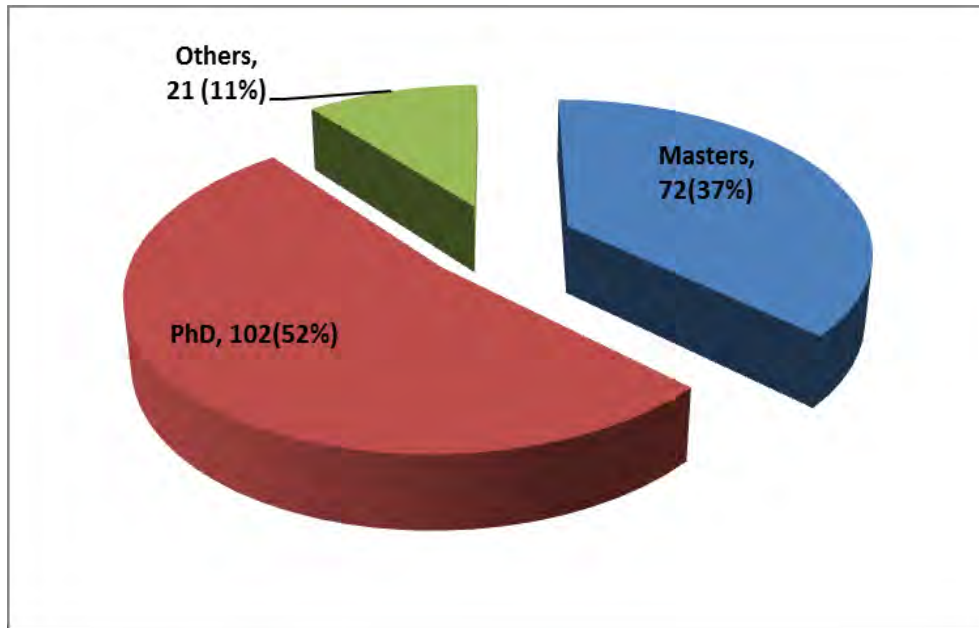


Figure 8a: Respondents (Academics) Highest Educational Qualification (N= 195)

The educational qualification of the academics in Figure 8a showed that 52% of them had Doctoral degrees, 37% had Masters Degrees, while 11% had other degrees. These results showed that the majority of academics that participated in the study had a Doctoral degree.

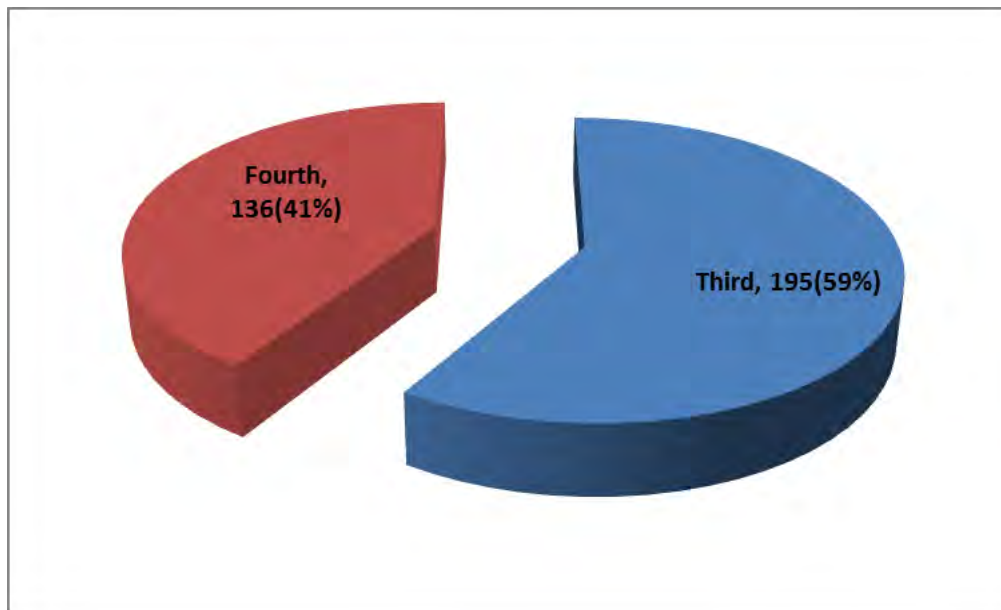


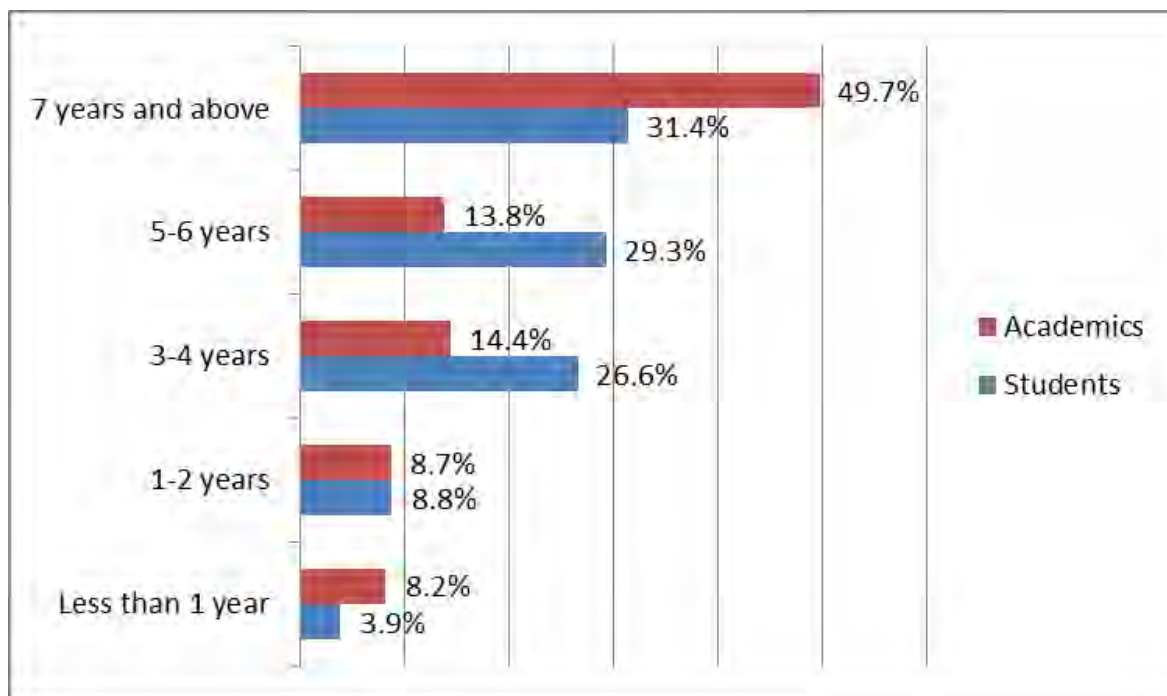
Figure 8b: Respondents (Students) Current Year of Study (N= 331)

Results in Figure 8b showed that out of the 331 respondents surveyed, the majority 195 (59%) were in their third year of study while 136 (41%) were in their fourth year of study. The results indicated the dominance of students in their third year of study over those in the fourth year of study in the universities that were surveyed.

5.2.6 Distribution of Respondents (Academics and Students) by Years of Use of Web 2.0 Technologies

Respondents were asked for how many years they had been using Web 2.0 technologies. The purpose of the question was to help the researcher know how familiar respondents were with the use of these technologies. Results in Figures 9 below showed the responses of the academics and students from the two universities involved in the study.

Figure 9: Distribution of Respondents by Years of use of Web 2.0 Technologies



(N= 195 for academics and 331 for students)

The results in Figure 9 showed that the majority (50%) of the academic respondents indicated that they had been using Web 2.0 technologies for 7 years and above; 14% for 5-6 years and 3-4 years; 9% for 1-2 years and only few (8%) of the respondents claimed to have used the technologies for less than one year. The results signified that most of the academics in the study were familiar with Web 2.0 technologies.

The results indicated that 31% of the student respondents had been using Web 2.0 technologies for 7 years and above, 30% for 5-6 years, 27% for 3-4years, 9% for 1-2years and 4% for less than one year. The remaining 40% of the student respondents have been using the Web 2.0 technologies for four years or less. As garnered from the responses, most of the students have been using Web 2.0 technologies for over 7 years, while less than 13% of the respondents have been using the technologies for two years or less.

5.3 Findings Based on Research Questions

This section presents the results of survey conducted to determine respondents' awareness and use of Web 2.0 technologies; determine the extent of use of Web 2.0 technologies by students and academics, and for what purposes; examine the extent to which Web 2.0 technologies were integrated in TAL and the factors influencing the use of Web 2.0 technologies for TAL.

5.3.1 Academics and Students' Use of Web 2.0 Technologies

The first research question sought to determine the extent and purpose of use of Web 2.0 technologies by academics and students in the selected universities. This was measured in terms of their familiarity with the technologies and for what purposes they used the technologies for. Results are shown as listed in Tables 6 and 7 respectively.

5.3.1.1 Academics Awareness of Web 2.0 Technologies

Respondents were asked to indicate the various Web 2.0 technologies they were familiar with. The results are given in Table 7a.

Table 7a: Academics Awareness of Web 2.0 Technologies

Web 2.0 Technologies	U.I (N=138)		FUNAAB (N=57)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Blogs	56	40.6	24	42.1	80	41.0
Instant messaging	113	81.9	54	94.7	167	85.6
Newsgroups/Online forums	55	39.9	31	54.4	86	44.1
Podcasts/Webcasts/Vodcasts	30	21.7	17	29.8	47	24.1
RSS feeds	27	19.6	13	22.8	40	20.5
Skype	107	77.5	36	63.2	143	73.3
Social Networking Sites	123	89.1	55	96.5	178	91.3
Facebook	118	85.5	52	91.2	170	87.2
MySpace	22	15.9	7	12.3	29	14.9
Twitter	74	53.6	38	66.7	112	57.4
WhatsApp	89	64.5	48	84.2	137	70.3
2go	35	25.4	26	45.6	61	31.3
Flickr	15	10.9	5	8.8	20	10.3
Badoo	29	21.0	14	24.6	43	22.1
Bebo	5	3.6	2	3.5	7	3.6
LinkedIn	106	76.8	33	57.9	139	71.3
Social bookmarking	6	4.3	4	7.0	10	5.1
E-Portfolios	10	7.2	5	8.8	15	7.7
YouTube	108	78.3	48	84.2	156	80.0
Teacher Tube	10	7.2	3	5.3	13	6.7
Wikis	125	90.6	49	86.0	173	88.7
Wikipedia	124	89.9	49	86.0	173	88.7
Wiki-how	22	15.9	13	22.8	35	17.9

Note: *N=195 is the total number of usable completed questionnaires out of 240 copies of questionnaires administered to academics in the two universities.

The results presented in Table 7a on academics awareness of Web 2.0 technologies revealed that majority (where N=195) were acquainted with SNSs (91%), wikis (89%), Instant messaging (86%), YouTube (80%) and Skype (73%), newsgroups/online forums (44%) and blogs (41%). Among the SNSs, academics were mostly familiar with Facebook (87%), LinkedIn (71%), WhatsApp (70%), Twitter (57%) and 2go (31%). The least number of respondents were conversant with Flickr (10%) and Bebo (4%). Wikipedia (89%) was the most common among wikis. The Web 2.0 applications that received very low responses included My Space (15%), E-Portfolio (8%), Teacher Tube (7%) and Social Bookmarking (5%). It can therefore be concluded that most of the academics were well familiar with the use of SNSs (most especially Facebook, LinkedIn, WhatsApp and Twitter), Wikipedia, Instant messaging, YouTube and Skype.

Analysis of the results by university as shown in Table 7a revealed that the level of awareness of each of the Web 2.0 technologies varied between the two universities in the study. For example, 90.6% of the respondents from U.I. reported that they were familiar with wikis compared to 86% respondents from the FUNAAB. In addition, 78.3% of U.I. respondents were acquainted with YouTube compared with 84.2% from FUNAAB; 76.8% with LinkedIn from U.I. compared to 57.9% from FUNAAB; 84.2% with WhatsApp from FUNAAB compared to 64.5% from U.I. and 45.6% of the respondents from FUNAAB indicated familiarity with 2go, which is almost twice the responses (25.4%) from the U.I. However, respondents from U.I. mostly used wikis and social networking tools while those from FUNAAB were well acquainted with social networking tools and Instant messaging. The results therefore suggest that social networking tools were major Web 2.0 technologies used by academics.

5.3.1.2 Students' Awareness of Web 2.0 Technologies

Respondents were asked to indicate the various Web 2.0 technologies within which they were familiar. The results are given in Table 7b.

Table 7b: Students Awareness of Web 2.0 Technologies

Web 2.0 Technologies	U.I (N=138)		FUNAAB (N=195)		Total (*N=331)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Blogs	106	75.7	113	59.2	219	66.2
Instant messaging	123	87.9	141	73.8	264	79.8
Newsgroups/Online forums	81	57.9	93	48.7	174	52.6
Podcasts/Webcasts/Vodcasts	46	32.9	43	22.5	89	26.9
RSS feeds	53	37.9	60	31.4	113	34.1
Skype	94	67.1	101	52.9	195	58.9
Social Networking Sites	139	99.3	191	97.9	330	99.7
Facebook	135	96.4	178	93.2	313	94.6
MySpace	58	41.4	66	34.6	124	37.5
Twitter	112	80.0	149	78.0	261	78.9
WhatsApp	135	96.4	176	92.1	311	94.0
2go	113	80.7	157	82.2	270	81.6
Flickr	39	27.9	37	19.4	76	23.0
Badoo	59	42.1	70	36.6	129	39.0
Bebo	15	10.7	15	7.9	30	9.1
LinkedIn	63	45.0	64	33.5	127	38.4
Social bookmarking	22	15.7	27	14.1	49	14.8
E-Portfolios	16	11.4	26	13.6	42	12.7
YouTube	120	85.7	149	78.0	269	81.3
Teacher Tube	16	11.4	17	8.9	33	10.0
Wikis	133	95.0	149	78.0	282	85.2
Wikipedia	130	92.9	146	76.4	276	83.4
Wiki-how	53	37.9	32	16.8	85	25.7

Note: *N=331 is the total number of usable completed questionnaires out of 351copies of questionnaires administered to students in the two universities.

The results presented in Table 7b on students' awareness of Web 2.0 technologies revealed that majority (where N=331) were acquainted with SNSs (99.7%), wikis (85.2%), YouTube (81%), Instant messaging (80%), blogs (66%), Skype (59%), newsgroups/online forums (53%) and RSS feed (34%). Among the SNSs, students were mostly familiar with Facebook (95%), WhatsApp (94%), 2go (82%), Twitter (79%), Badoo (39%) and LinkedIn (38.4%). Bebo (9%) received the least responses. Wikipedia (83.4%) was the most commonly used among the wikis. Those Web 2.0 applications that received very low responses included podcasts/webcasts/vodcasts (27%), Social Bookmarking (15%), E-Portfolios (13%) and Teacher Tube (10%). The results seem to suggest that most of the students were well familiar with the use of SNSs (most especially Facebook, WhatsApp, 2go and Twitter), YouTube and Instant messaging while Social Bookmarking, E-Portfolios and Teacher Tube were not well known and used by the respondents.

Further analysis of the results by university as shown in Table 7b revealed that the level of awareness of each of the Web 2.0 technologies varied between students in the two universities under the study. For example, 95% of the respondents from U.I. reported that they were familiar with wikis compared with 78% of respondents from FUNAAB; 82.2% of respondents from FUNAAB reported that they were familiar with 2go compared to 80.7% from U.I; 85.7% of U.I. respondents were acquainted with YouTube compared to 78.0% from FUNAAB and 45% with LinkedIn from U.I. compared to 33.5% from FUNAAB. The results seem to suggest that students from both universities surveyed were well acquainted with the use of social networking tools, wikis and YouTube among other Web 2.0 technologies.

5.3.1.3 Academics' Use of Web 2.0 Technologies

Respondents were asked to indicate what they used Web 2.0 technologies for and were permitted to make multiple responses as applicable. Results are shown in Table 8a

Table 8a: Academics' Use of Web 2.0 Technologies

Academics' Use of Web 2.0 technologies	U.I (N=138)		FUNAAB (N=57)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Communicating with friends or colleagues	128	92.8	56	98.2	184	94.4
Searching for information	130	94.2	51	89.5	181	92.8
Personal activities	94	68.1	45	78.9	139	71.3
Research activities	126	91.3	55	96.5	181	92.8
Online group discussion (collaboration)	74	53.6	29	50.9	103	52.8
To access and prepare lecture notes/materials	118	85.5	42	73.7	160	82.1
To give/receive assignments/tests	62	44.9	29	50.9	91	46.7
Student assessment and evaluation	38	27.5	16	28.1	54	27.7
Sharing educational materials	93	67.4	42	73.7	135	69.2
Academic related activities	115	83.3	48	84.2	163	83.6
Social based activities	92	66.7	34	59.6	126	64.6
Fashion related activities	19	13.8	11	19.3	30	15.4
News update	98	71.0	46	80.7	144	73.8
To communicate with students	77	55.8	28	49.1	105	53.8
To share general knowledge	86	62.3	41	71.9	127	65.1
To share specific knowledge (relating to teaching)	64	46.4	29	50.9	93	47.7
To access teaching resources	113	81.9	44	77.2	103	52.8

Note: *N=195 is the total number of usable completed questionnaires out of 240 copies of questionnaires administered to academics in the two universities.

The results in Table 8a revealed that the majority, approximately ninety-four percent (94.4%) of the respondents, reported that they used Web 2.0 technologies for communicating with friends, while about 93% stated they used Web 2.0 for searching for needed information and research activities. Next were those who used Web 2.0 technologies for academic related activities (84%), accessing and preparing lecture notes/materials (82%), accessing teaching resources (81%), personal activities (71%), sharing educational materials (69%), sharing general knowledge (65%), social based activities (65%), communicating with students (54%), online group discussion (53%). Almost an average number of respondents used Web 2.0 technologies for sharing specific knowledge related to teaching (48%) and giving/receiving assignments/tests (47%). Only 28% of respondents reported that they used Web 2.0 technologies for student assessment and evaluation, and 15% for fashion-related activities. Analysis of the results by university revealed that the purpose of use of the Web 2.0 technologies varied between the two universities in the study. For example, 67.4% of the respondents from U.I. reported that they used Web 2.0 technologies for sharing educational materials compared to 73.7% from FUNAAB; 91.3% from U.I. used them for research activities compared to 96.5% from FUNAAB. Likewise, 85.5% from U.I. used the technologies to access and prepare lecture notes/materials compared to 73.7% from FUNAAB. Nevertheless, the results showed that an equal percentage of respondents (about 84%) from U.I. and FUNAAB used Web 2.0 for academic-related activities. The results suggest that academics in both universities surveyed used Web 2.0 technologies mostly for communicating with friends or colleagues, searching for information, personal activities, research activities and academic-related activities.

5.3.1.4 Students' Use of Web 2.0 Technologies

Respondents were asked to indicate what they used Web 2.0 technologies for and were permitted to make multiple responses as applicable. Results are shown Table 8b.

Table 8b: Students' Use of Web 2.0 Technologies

Use Web 2.0 technologies	U.I (N=138)		FUNAAB (N=195)		Total (*N=331)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Communicating with friends	136	97.1	177	92.7	313	94.6
Searching for needed information	134	95.7	154	80.6	288	87.0
Personal activities	120	85.7	126	66.0	246	74.3
Research activities	118	84.3	137	71.7	255	77.0
Online group discussion (collaboration)	97	69.3	121	63.4	218	65.9
To access lecture notes or materials	111	79.3	132	69.1	243	73.4
To submit assignments or tests	91	65.0	90	47.1	181	54.7
To write examinations	55	39.3	77	40.3	132	39.9
Sharing educational materials	84	60.0	89	46.6	173	52.3
Academic related activities	113	80.7	118	61.8	231	69.8
Social based activities	112	80.0	118	61.8	230	69.5
Fashion related activities	58	41.4	73	38.2	131	39.6
News update	113	80.7	142	74.3	255	77.0
To communicate with lecturers	51	36.4	63	33.0	114	34.4
To share general knowledge	101	72.1	110	57.6	211	63.7
To share specific knowledge (relating to learning)	91	65.0	103	53.9	194	58.6
To access learning resources	113	80.7	130	68.1	243	73.4

Note: *N=331 is the total number of usable completed questionnaires out of 351 copies of questionnaires administered to students in the two universities.

Results shown in Table 8b indicated that the highest responses came from those who reported to use Web 2.0 technologies for communicating with friends (94.6%). Next were those who used Web 2.0 technologies for searching for needed information (87%), research activities (77%), news update (77%), personal activities (74%), accessing lecture notes or materials (73%), accessing learning resources (73%), academic-related activities (70%), social based activities (70%), online group discussion (66%), sharing specific knowledge relating to learning (59%), submitting assignments or tests (54.7%) and sharing educational materials (52.3%). Those who used Web 2.0 to communicate with their lecturers (34.4%) received the least response. Likewise, analysis of the results by university revealed that the purpose of use of the Web 2.0 technologies varied between the two universities in the study. For example, 95.7% of respondents from U.I. reported that they used Web 2.0 for searching for information compared to 80.6% from FUNAAB. About 85.7% of respondents from U.I. used Web 2.0 for personal

activities compared to 66% from FUNAAB. The results on the whole reveal that students mostly used Web 2.0 technologies for communicating with friends or colleagues.

The first research question was also addressed by the qualitative aspect of the data analysis which was achieved using thematic content analysis. Results showed that academics and students utilized Web 2.0 Technologies for academic, personal, research and educational purposes (see Section 5.4.1). However, further analysis revealed a low use of Web 2.0 among academics compared to high use reported among students.

5.3.2 Use of Web 2.0 Technologies for TAL Purposes

The study sought to examine the extent to which Web 2.0 technologies were used for TAL purposes in the selected universities. The second research question was addressed by both the quantitative and qualitative aspects of the data analysis – questionnaire and interview analyses. Thus, the respondents were asked to indicate the Web 2.0 technologies which they used for **TAL** purposes and how frequently they used them. Results from the questionnaire are presented in Tables 9a and 9b respectively.

5.3.2.1 Academics' Use of Web 2.0 Technologies for Teaching Purposes

Respondents were asked to indicate which Web 2.0 technologies they used for teaching purpose and were permitted to make multiple responses as applicable. Results are presented in Table 9a.

Table 9a: Academics' Use of Web 2.0 Technologies for Teaching Purposes

Web 2.0 Technologies	U.I (N=138)		FUNAAB (N=195)		Total (*N=195)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Blogs	23	16.7	18	31.6	41	21.0
Instant messaging	49	35.5	34	59.6	83	42.6
Newsgroups/Online forums	25	18.1	21	36.8	46	23.6
Podcasts/Webcasts/Vodcasts	7	5.1	7	12.3	14	7.2
RSS feeds	8	5.8	9	15.8	17	8.7
Skype	39	28.3	19	33.3	58	29.7
SNSs	80	58.0	43	75.4	123	63.1
Facebook	51	37.0	27	47.4	78	40.0
MySpace	3	2.2	3	5.3	6	3.1
Twitter	13	9.4	19	33.3	32	16.4
WhatsApp	40	29.0	32	56.1	72	36.9
2go	2	1.4	9	15.8	11	5.6
Flickr	2	1.4	2	3.5	4	2.1
Badoo	4	2.9	3	5.3	7	3.6
Bebo	1	0.7	0	0.0	1	0.5
LinkedIn	43	31.2	14	24.6	57	29.2
Social bookmarking	2	1.4	1	1.8	3	3.2
E-Portfolios	4	2.9	5	8.8	9	11.7
YouTube	48	34.8	32	56.1	80	41.0
Teacher Tube	5	3.6	1	1.8	6	3.1
Wikis	73	52.9	39	68.4	112	57.4
Wikipedia	72	52.2	39	68.4	111	56.9
Wiki-how	9	6.5	7	12.3	16	8.2
Others (Please Specify)	5	3.6	4	7.0	9	4.6

Note: *N=195 is the total number of usable completed questionnaires out of 240 copies of questionnaires administered to academics in the two universities.

Results presented in Table 9a indicated that SNSs (63%) were by far the most used Web 2.0 technologies for teaching, followed by Wikipedia (57%), Instant messaging (43%), YouTube (41%), Skype (30%), newsgroups / online Forums (24%), Moodle and Blogs (21% each). E-Portfolios was used by 12% of the respondents followed by RSS Feeds (9%), Wiki-how (8%), podcasts/webcasts/vodcasts (7%), 2 go (6%), Social bookmarking (4%), Badoo (4%), Teacher Tube and My Space (3% each) and Bebo (1%). Other Web 2.0 technologies that were not specified in the study were used by 5% of the respondents. Among the SNSs, Facebook (40%), WhatsApp (37%) and LinkedIn (29%) received higher responses for use in teaching. There was however higher use of these tools by academics for teaching at FUNAAB than at U.I. For instance, 35.5% indicated they used Instant messaging for teaching practices at U.I compared to 59.6% from FUNAAB, 58% from U.I used SNSs compared to 75.4% from FUNAAB and 34.8% from U.I used YouTube compared to 56.1% from U.I.

5.3.2.2 Types of Web 2.0 Technologies used by Students for Learning Purpose

Respondents were asked to indicate which Web 2.0 technologies they used for learning purpose and were permitted to make multiple responses as applicable. Results are shown in Table 9b

Table 9b: Students' Use of Web 2.0 Technologies for Learning Purposes

Web 2.0 Technologies	U.I (N=138)		FUNAAB (N=195)		Total (*N=331)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Blogs	62	44.3	82	42.9	144	43.5
Instant messaging	58	41.4	86	45.0	144	43.5
Newsgroups/Online forums	55	39.3	75	39.3	130	39.3
Podcasts/Webcasts/Vodcasts	20	14.3	29	15.2	49	14.8
RSS feeds	20	14.3	36	18.8	56	16.9
Skype	25	17.9	49	25.7	74	22.4
Social Networking Sites	111	79.3	179	93.7	290	87.6
Facebook	85	60.7	136	71.2	221	66.8
MySpace	14	10.0	35	18.3	49	14.8
Twitter	51	36.4	79	41.4	130	39.3
WhatsApp	88	62.9	135	70.7	223	67.4
2go	29	20.7	72	37.7	101	30.5
Flickr	9	6.4	16	8.4	25	7.6
Badoo	15	10.7	20	10.5	35	10.6
Bebo	4	2.9	7	3.7	11	3.3
LinkedIn	20	14.3	42	22.0	62	18.7
Social bookmarking	9	6.4	17	8.9	26	7.9
E-Portfolios	7	5.0	17	8.9	24	7.3
YouTube	96	68.6	127	66.5	223	67.4
Teacher Tube	16	11.4	10	5.2	26	7.9
Wikis	131	93.6	146	76.4	277	83.7
Wikipedia	131	93.6	144	75.4	275	83.1
Wiki-how	48	34.3	24	12.6	72	21.8
Others (Please Specify)	6	4.3	10	5.2	16	4.8

Note: *N=331 is the total number of usable completed questionnaires out of 351 copies of questionnaires administered to students in the two universities.

Results in Table 9b showed that SNSs were the most used for learning purposes (88%), followed closely by Wikipedia (83%); then YouTube (67%); blogs and Instant messaging (44% each); newsgroups/online forums (40%); Skype (22%); Wiki-how (22%); LinkedIn (19%); RSS Feeds (17%); Podcasts/Webcasts/Vodcasts and My Space (15% each); Badoo and Moodle (11% each); Social Bookmarking, Teacher Tube and Flickr (8% each); and Bebo (3%). Other Web 2.0 technologies not specified in the study were used by the 5% of the student respondents. Among the SNSs, WhatsApp (67%) Facebook (67%) and Twitter (39%) received

higher responses for use in learning. The results further showed variation in the use of some of these tools by students for learning purposes at the surveyed universities. For instance, 93.7% from FUNAAB indicated they used SNSs for learning purposes compared to 79.3% from U.I. while 93.6% from U.I. used wikis compared to 76.4% from FUNAAB.

5.3.2.3 Frequency of Use of Web 2.0 Technologies for Teaching Purposes

Academics were asked to indicate their frequency of use of Web 2.0 technologies for teaching purposes within the last three months (which is the usual calendar for a semester). The results are presented Table 10a below.

Table 10a: Frequency of Use of Web 2.0 Technologies within the Last Three (3) Months for Teaching Purposes (N=195)

Web 2.0 technologies	Never (%)	Rarely(%)	Occasionally (%)	Frequently (%)	Very Frequently (%)
Blogs	78.5	6.2	6.7	6.2	2.6
Instant messaging	52.3	5.6	9.7	11.3	21.0
Newsgroups/Online forums	72.8	8.2	6.2	6.2	6.7
Podcasts/Webcasts/Vodcasts	91.3	4.6	3.1	0.0	1.0
RSS feeds	89.2	3.6	5.1	1.0	1.0
Skype	68.7	13.3	6.2	7.2	4.6
Social Networking Sites	38.5	44.1	16.4	0.5	0.5
Facebook	56.9	3.6	6.7	14.9	17.9
MySpace	94.4	1.5	2.6	1.5	0.0
Twitter	80.0	3.6	5.1	6.2	5.1
WhatsApp	60.5	3.6	6.2	11.3	18.5
2go	91.8	3.6	1.5	1.5	1.5
Flickr	95.9	1.5	2.1	0.5	0.0
Badoo	95.4	1.5	1.5	1.0	0.5
Bebo	97.4	1.0	0.5	1.0	0
LinkedIn	69.2	5.6	9.7	7.7	7.7
Social bookmarking	97.4	1.5	0.5	0.5	0.0
E-Portfolios	94.4	0.5	2.1	2.1	1.0
YouTube	65.1	10.3	7.2	10.8	6.7
Teacher Tube	96.9	1.0	1.0	0.5	0.5
Wikipedia	42.1	9.2	11.3	17.4	20.0
Wiki-how	89.7	3.6	2.6	1.0	3.1
Others	0.0	1.5	1.0	0.0	1.5

The results presented in Table 10a showed that academics used the following Web 2.0 technologies for teaching very frequently (more than 10 times in three months): Instant messaging (21%), Wikipedia (20.0%), WhatsApp (18.5%) and Facebook (17.9%). Further

analysis showed 17.5% used YouTube and 15.5% used LinkedIn frequently or very frequently for teaching purposes compared to 13.4% that occasionally or frequently used Skype and Moodle (11.3%) for teaching purposes. Nevertheless, results also revealed that most academics had never used or at least not used the following Web 2.0 technologies for teaching purposes within the last three months: Social bookmarking (97.4%), Bebo (97.5%), Teachertube (96.9%), Flickr (95.9%), Badoo (95.4%), E-portfolio (94.4%), MySpace (94.4%), 2go (91.8%), podcasts/webcasts/vodcasts (91.3%), Wiki-how (89.7%), RSS feeds (89.2%), Twitter (80.0%), blogs(78.5%) and Moodle (76.9%). The results suggest that academics used only a few of the Web 2.0 technologies for teaching purposes and the commonly used were e-mails, SNSs (basically Facebook and WhatsApp), Wikipedia, Instant messaging, YouTube and Skype.

5.3.2.4 Frequency of Use of Web 2.0 Technologies for Learning Purposes

Students were asked to indicate their frequency of use of Web 2.0 Technologies for teaching within the last three months (the usual calendar for a semester). The results are presented in Table 10b.

Table 10b: Frequency of Use of Web 2.0 technologies within the last three (3) months for Learning Purposes (N=331)

Web 2.0 Technologies	Never (%)	Rarely (%)	Occasionally (%)	Frequently (%)	Very Frequently(%)
Blogs	48.3	13.6	13.6	13.3	11.2
Instant messaging	43.5	8.8	14.8	14.5	18.4
Moodle	85.2	4.5	6.3	2.1	1.8
Newsgroups/Online forums	58.3	9.1	14.8	8.5	9.4
Podcasts/Webcasts/Vodcasts	80.1	6.9	8.5	1.8	2.7
RSS feeds	76.4	7.3	6.6	5.1	4.5
Skype	69.2	12.1	9.1	4.8	4.8
Facebook	25.4	9.4	9.4	16.0	39.9
MySpace	76.1	8.2	6.6	4.2	4.8
Twitter	50.5	9.1	10.3	10.9	19.3
WhatsApp	24.5	3.9	10.6	12.4	48.6
2go	63.1	12.1	7.3	7.6	10.0
Flickr	87.9	4.2	3.3	1.8	2.7
Badoo	84.3	5.7	4.2	3.6	2.1
Bebo	95.5	2.1	0.9	1.5	0
LinkedIn	76.1	6.0	7.6	5.4	4.8
Social bookmarking	87.9	4.5	3.3	2.4	1.8
E-Portfolios	91.2	3.0	3.3	1.8	0.6
YouTube	32.6	15.7	19.3	14.5	17.8
Teacher Tube	91.8	2.7	2.1	1.2	2.1
Wikipedia	18.7	6.3	13.6	24.2	37.2
Wiki-how	74.6	4.8	5.1	7.9	7.6

The results presented in Table 10b showed that students mostly used the following Web 2.0 technologies for learning purposes very frequently (more than 10 times in three months): Whatsapp (48.6%), Facebook (39.9%) and Wikipedia (37.2%). Further analysis showed that the following Web 2.0 technologies were used occasionally (3-5 times within 3 months): YouTube (19.3%) and instant messaging (14.8%). Of the respondents, 12.1% rarely used Skype and 2go within the last 3 months. The results also revealed that most students had never or not used the following Web 2.0 technologies within the last three months: Bebo (95.5%), TeacherTube (91.8%), E-portfolio (91.2%), Flickr (87.9%), Social bookmarking (87.9%) and Badoo (84.3%). The results suggest that the most commonly used Web 2.0 technologies were Whatsapp, Facebook, Wikipedia, YouTube, Instant Messaging and blogs.

Results of the qualitative aspect of the data analysis (see Section 5.4.2) showed that Web 2.0 technologies such as Wikipedia, YouTube, Facebook, blogs and Google+ together with Learning Management System (LMS) were popularly used among others in the surveyed universities for

TAL purposes. The results further suggested that the selection of the technologies used depended on users' interest and usefulness of the tools to them.

5.3.3 Factors Influencing Use of Web 2.0 Technologies for TAL Purposes

The study sought to investigate the factors influencing the use of Web 2.0 technologies for TAL purposes by academics and students respectively in the selected Federal Universities. The major factors (System Quality, Information Quality, Service Quality, Attitude, Intention to Use, Media Synchronicity and Net Benefits) were selected from the theories guiding the study. Research questions 3, 4, 5 and 6 were addressed by the quantitative data and responses to the interview schedule. Results are presented in Tables 10-12 respectively.

5.3.3.1 System quality, Information quality and Service quality in the Use of Web 2.0 Technologies for TAL Purposes

The second research question was to determine how system quality, information quality, and service quality influenced attitude towards use of Web 2.0 technologies for TAL purposes. To answer this research question, the researcher relied on the responses of various statements presented in Tables 11, 12 and 13 respectively.

Table 11: Influence of System Quality on Attitude towards Use of Web 2.0 Technologies for TAL Purposes

System Quality	Academics (N= 195)			Students (N =331)		
	Undecided	Strongly agree, Agree	Disagree, Strongly disagree	Undecided	Strongly agree, Agree	Disagree, Strongly disagree
I find Web 2.0 technologies easy to use	17(8.7%)	173(88.7%)	5(2.6%)	27(8.2%)	284(85.8%)	20(6%)
Web 2.0 technologies are reliable for teaching/learning	21(10.8%)	166(85.1%)	8(4.1%)	13(3.9%)	284(85.8%)	34(10.3%)
Web 2.0 technologies make it easy for me collaborate to with my colleagues/peers	22(11.3%)	166(85.1%)	7(3.6%)	21(6.3%)	282(85.2%)	28(8.5%)
Web 2.0 technologies make teaching/learning easy	27(13.8%)	161(82.6%)	7(3.6%)	17(5.1%)	271(81.9%)	43(13%)
Web 2.0 technologies help me accomplish my teaching/academic tasks more quickly	29(14.9%)	158(81.0)	8(4.1%)	15(4.5%)	282(85.2%)	34(10.3%)
I find Web 2.0 technologies useful in teaching/learning	24(12.3%)	165(84.6%)	6(3.1%)	9(2.7%)	289(87.3%)	33(10%)

Results in Table 11 revealed that 88.7% of the respondents strongly agreed or agreed that they find Web 2.0 technologies easy to use, 85.1% were of the opinion that Web 2.0 technologies make it easy for them to collaborate with colleagues and that they are reliable for teaching. About 84.6% strongly agreed or agreed that they found Web 2.0 technologies useful in teaching, while 82.6% noted that the technologies make teaching easy and 81% strongly agreed or agreed that Web 2.0 technologies enabled them to accomplish teaching tasks more quickly. Notably, the majority of the respondents were of the opinion that all the measures of system quality have positive influence on the use of Web 2.0 technologies for teaching purposes while very few (less than 5%) disagreed or strongly disagreed on this. However, few (less than 15%) were not sure of their responses.

Similarly, results in Table 12 showed that the majority of students (87.3%) agreed or strongly agreed with the statement that I find Web 2.0 technologies useful in learning; I find Web 2.0 technologies easy to use (85.8%) and that Web 2.0 technologies are reliable for learning purposes (85.8%); 85.2% each agreed or strongly agreed that Web 2.0 technologies make it easy to collaborate with their peers and accomplish academic tasks more quickly; and 81.9% of the respondents agreed/strongly agreed that Web 2.0 technologies made learning easy.

Table 12: Influence of Information Quality on Attitude to Use of Web 2.0 Technologies for TAL

Information Quality (IQ)	Academics (N= 195)			Students (N =331)		
	Undecided	Strongly agree, Agree	Disagree, Strongly disagree	Undecided	Strongly agree, Agree	Disagree, Strongly disagree
Web 2.0 technologies make it easy for me to prepare/obtain teaching/learning materials	15(7.7%)	170(87.2%)	10(5.1%)	13(3.9%)	283(85.5%)	35(10.6%)
Web 2.0 technologies provide me with sufficient information for teaching/learning	21(10.8%)	146(74.9%)	28(14.4%)	16(4.8%)	266(80.4%)	49(14.8%)
Web 2.0 technologies allow information to be accurately presented	30(15.4%)	145(74.4%)	20(10.3%)	38(11.5%)	258(77.9%)	35(10.6%)
Information provided are clear and unambiguous	28(14.4%)	150(76.9%)	17(8.7%)	39(11.8%)	227(68.6%)	65(19.6%)
Information transferred/received using Web 2.0 technologies are timely	27(13.8%)	160(82.1%)	8(4.1%)	38(11.5%)	244(73.7%)	49(14.8%)
Web 2.0 technologies provide up-to-date information	22(11.3%)	165(84.6%)	8(4.1%)	30(9.1%)	260(78.5%)	41(12.4%)
Information provided by Web 2.0 technologies are meaningful	27(13.8%)	160(82.1%)	8(4.1%)	32(9.7%)	264(79.8%)	35(10.6%)

Results in Table 12 revealed that the majority of academics strongly agreed or agreed that Web 2.0 technologies made it easy for them to obtain and prepare teaching materials (87.2%); Web 2.0 technologies provided up-to-date information (84.6%); 82.1% were in agreement with the statement that information transferred or received using Web 2.0 technologies was timely and information provided by Web 2.0 technologies was meaningful; 76.9% strongly agreed or

agreed that information provided was clear and unambiguous, 74.9% said that Web 2.0 technologies provided sufficient information for teaching, and 74.4% that Web 2.0 technologies allowed information to be accurately presented. Interestingly, a major percentage of academics who participated in the study were in agreement with all of the statements. On the whole, the results showed that information quality influenced use of Web 2.0 technologies for teaching purposes.

Furthermore, results in Table 12 also showed the response of students to the statements. The results revealed the majority of student-respondents supported the statement that information quality had positive influence on use of Web 2.0 technologies for learning purposes. For instance, the majority of students (85.5%) agreed or strongly agreed with the statement that “Web 2.0 technologies make it easy for me to prepare/obtain learning materials”; 80.4%, “Web 2.0 technologies provide me with sufficient information for learning”; 79.8%, “Information provided by Web 2.0 technologies is meaningful” and 73.7%, “Information transferred/received using Web 2.0 technologies is timely”. The results suggest that information quality had a positive influence on use of Web 2.0 technologies for learning.

Table 13: Influence of Service Quality on Attitude to Use of Web 2.0 Technologies for TAL

Service Quality (SQ)	Academics (N= 195)			Students (N =331)		
	Undecided	Strongly agree, Agree	Disagree, Strongly disagree	Undecided	Strongly agree, Agree	Disagree, Strongly disagree
Web 2.0 technologies provide reliable and prompt support for teaching/learning	21 (10.8%)	164 (84.1%)	10(5.1%)	18(5.4%)	273(82.5%)	40(12.1%)
Web 2.0 technologies have up-to-date hardware and software that help in delivering/receiving instructional materials	35 (17.9%)	139 (71.3%)	21(10.8%)	25(7.6%)	277(83.7%)	29(8.8%)
I have sufficient understanding about the use of Web 2.0 technologies for teaching/learning purposes	24 (12.3%)	135 (69.2%)	36(18.5%)	21(6.3%)	269(81.3%)	41(12.4%)
Information are sent/delivered securely using Web 2.0 technologies	38 (19.5%)	121 (62.1%)	36(18.5%)	27(8.2%)	225(68%)	79(23.9%)

Results in Table 13 revealed that the majority of academics strongly agreed or agreed that Web 2.0 technologies provide reliable and prompt support for teaching (84.1%); Web 2.0 technologies have up-to-date hardware and software that help in delivering instructional materials (71.3%); academics had sufficient understanding about the use of Web 2.0 technologies for teaching purposes (69.2%) and information was sent and delivered securely using Web 2.0 technologies (62.1%). Results showed that majority of the academics were in agreement with the statements that stated that service quality had positive influence on use of Web 2.0 technologies for teaching purposes.

The results further revealed that majority of students strongly agreed or agreed that Web 2.0 technologies have up-to-date hardware and software that help in delivering instructional materials (83.7%); Web 2.0 technologies provide reliable and prompt support for teaching purposes (82.5%); students had sufficient understanding about the use of Web 2.0 technologies for learning purposes (81.3%); and information was sent and delivered securely using Web 2.0 technologies (68%). The results seem to suggest that service quality has an important influence on use of Web 2.0 technologies for learning purposes.

5.3.3.2 Attitude Towards Use of Web 2.0 Technologies for TAL Purposes

The fourth research question sought to determine the attitude of academics and students towards the use of Web 2.0 technologies for TAL purposes. To answer this research question, the researcher relied on the responses to various statements presented in Figures 10a and 10b respectively.

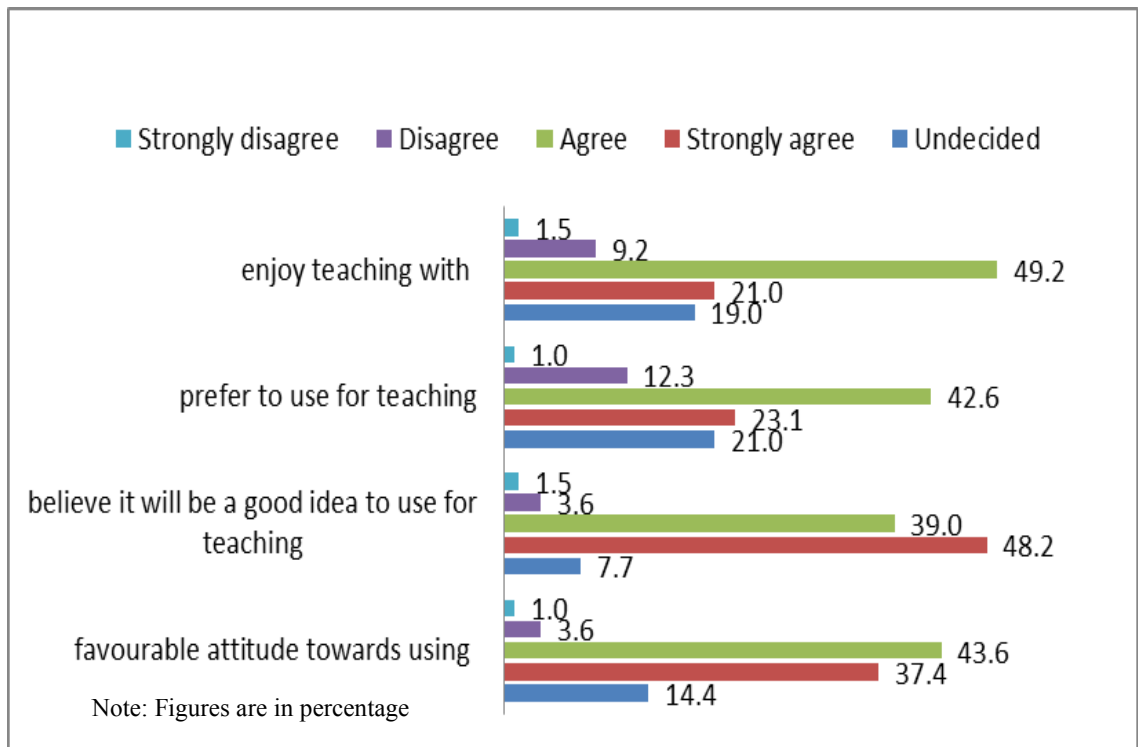


Figure 10a: Academics' Attitude towards Use of Web 2.0 Technologies for Teaching Purposes (N= 195)

Results from the academic respondents (Figure 10a) showed that the majority strongly agreed or agreed with the following statements namely “I believe it is be a good idea to use Web 2.0 technologies for teaching” (87%); “I have a favourable attitude towards using Web 2.0 technologies for teaching purposes” (81%); “I enjoy teaching with Web 2.0 technologies” (71%) and” I prefer using Web 2.0 technologies for teaching purposes” (66%). The results suggest that most of the academics had a positive attitude towards the use of Web 2.0 technologies for teaching purposes, while few of them did not support the use of Web 2.0 for teaching purposes.

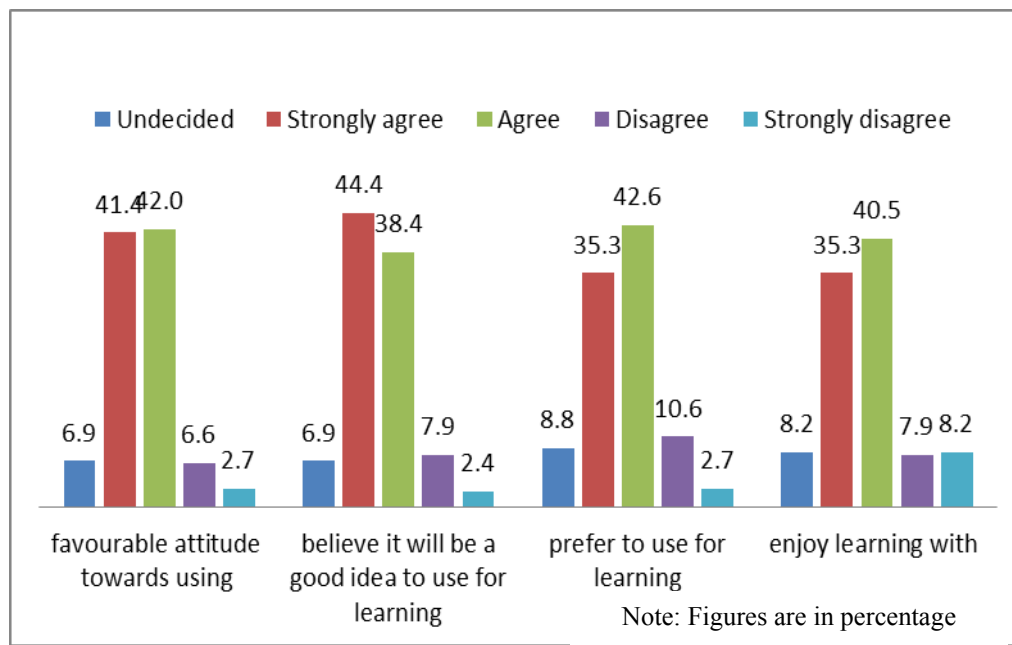


Figure 10b: Students' Attitude towards Use of Web 2.0 Technologies for Learning Purposes (N=331)

Similarly, results presented in Figure 10b revealed that the majority of students were in agreement with all the statements. For example, the majority strongly agreed or agreed that they “have a favourable attitude towards using Web 2.0 technologies for learning purposes” (83%); “believe it is be a good idea to use Web 2.0 technologies for learning purposes” (83%); “prefer using Web 2.0 technologies for learning purposes” (78%); and “enjoy learning with Web 2.0 technologies” (76%). Overall, the results suggest that most of the students have positive attitude toward the use of Web 2.0 technologies for learning purposes.

Results of the qualitative data analysis also revealed that students and academics have varied attitudes towards the use of Web 2.0 technologies for TAL purposes respectively. It was noted that students exhibited a positive attitude by being very enthusiastic about the use of Web 2.0 technologies for learning activities. Academics on the other hand, were reported to have a mixed attitude which showed that they were positive, negative or indifferent about the use of these technologies for teaching practices. The results suggest that academics’ attitudes towards Web 2.0 were influenced by their attachment to the traditional methods of teaching.

5.3.3.3 Media synchronicity and Use of Web 2.0 Technologies for TAL Purposes

The fifth research question was to determine how media synchronicity influences intention to use Web2.0 technologies for TAL purposes. To answer this research questions the researcher relied on the responses of various statements presented in Figures 11a and 11b respectively.

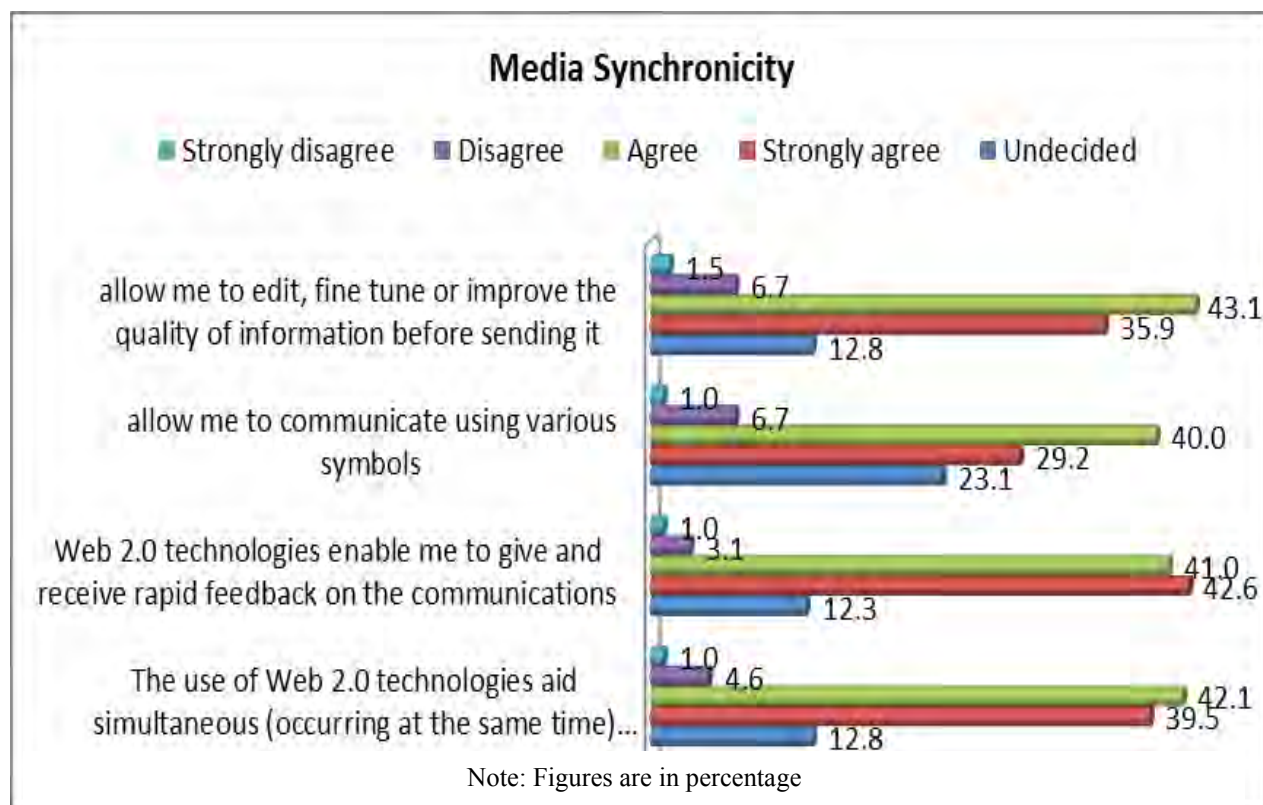


Figure 11a: Respondents' (Academics) Responses on Media synchronicity (N= 195)

Results from academic respondents in Figure 11a showed that 83.6% agreed or strongly agreed that Web 2.0 technologies enabled them to give and receive rapid feedback on the communication; 82% agreed or strongly agreed that the use of Web 2.0 technologies aided simultaneous communication between sender and receiver; 79% agreed or strongly agreed that Web 2.0 technologies allowed them to edit, fine tune or improve the quality of information before sending it; while 69% agreed or strongly agreed that Web 2.0 technologies allowed them to communicate using various symbols. It can be concluded from the results that the majority of academics support and agree that media synchronicity has influence on the use of Web 2.0 technologies for teaching purposes.

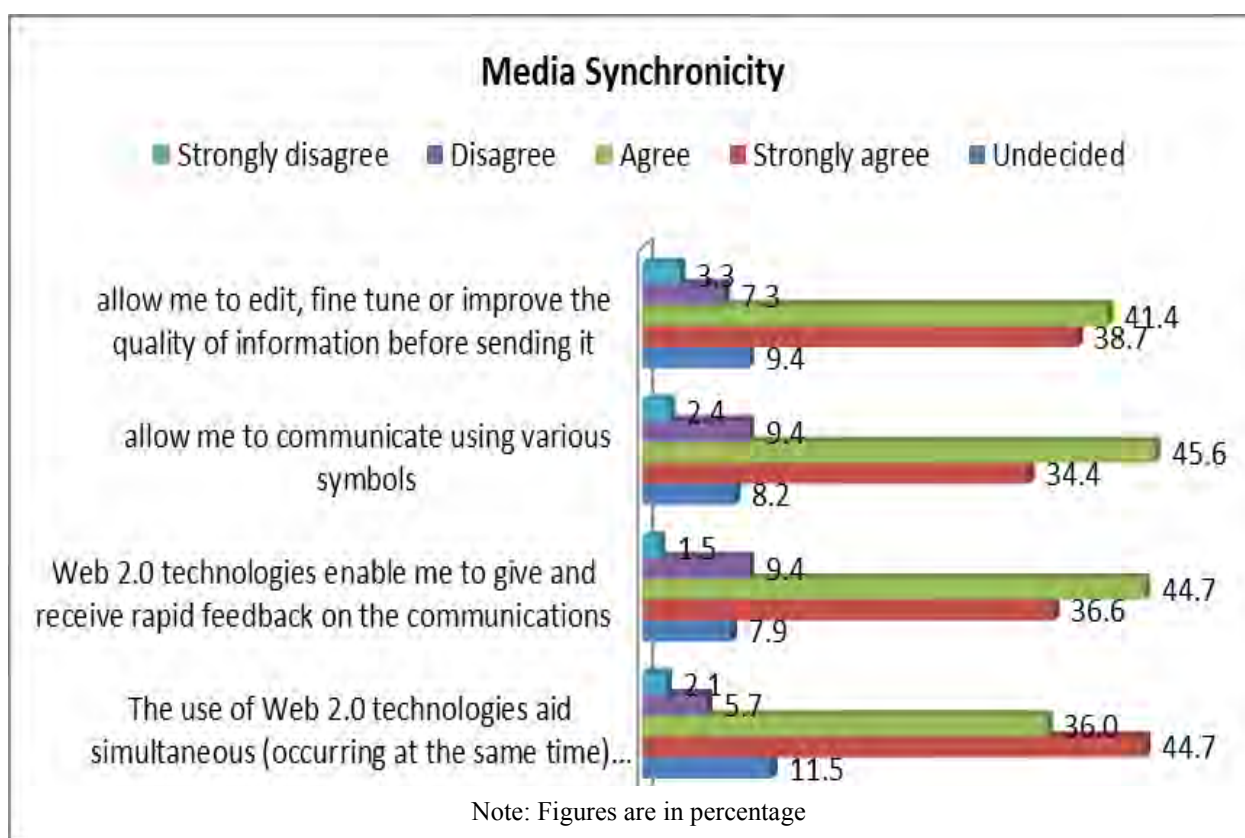


Figure 11b: Distribution of Respondents' (Students) Responses on Media synchronicity (N= 331)

Results from student respondents in Figure 11b showed that about 81% agreed or strongly agreed that Web 2.0 technologies enabled them to give and receive rapid feedback on communication; while about 80% each agreed or strongly agreed that the use of Web 2.0 technologies aided simultaneous communication between sender and receiver; Web 2.0 technologies allowed them to edit, fine tune or improve the quality of information before sending it; and that Web 2.0 technologies allowed them to communicate using various symbols. It can be concluded from the results that the majority of students supported the statement that media synchronicity has influence on the use of Web 2.0 technologies for learning purposes.

5.3.3.3 Academics and Students' Intention to Use Web 2.0 Technologies for TAL Purposes

Responses of academics and students on various statements on Intention to use Web 2.0 technologies for TAL purposes are shown in Table 14 below.

Table 14: Intention to Use Web 2.0 Technologies for TAL Purposes

Intention to Use	Academics (N= 195)			Students (N=331)		
	Undecided	Strongly agree, Agree	Disagree, Strongly disagree	Undecided	Strongly agree, Agree	Disagree, Strongly disagree
I intend to use Web 2.0 technologies for teaching/learning as frequently as possible.	26(13.3%)	151(77.4%)	18(9.2%)	27(8.2%)	274(82.8%)	30(9.1%)
I intend to use Web 2.0 technologies whenever possible for teaching/my coursework	17(8.7%)	161(82.6%)	17(8.7%)	16(4.8%)	276(83.4%)	39(11.8%)
I will use Web 2.0 technologies to communicate with my students/ colleagues	31(15.9%)	154(79%)	10(5.1%)	23(6.9%)	281(84.9%)	27(8.2%)
I will use Web 2.0 technologies for my teaching/learning activities on a regular basis	28(14.4%)	143(73.3%)	24(12.3%)	26(7.6%)	270(81.6%)	36(10.9%)
I will use Web 2.0 technologies to access teaching/learning materials	21(10.8%)	166(85.1%)	8(4.1%)	17(5.1%)	279(84.3%)	35(10.6%)
I will strongly recommend other academics/students to use Web 2.0 technologies for teaching/learning	20(10.3%)	161(82.6%)	14(7.2%)	24(7.3%)	266(80.4%)	41(12.4%)

Results in Table 14 revealed that the majority of academics strongly agreed or agreed with the statements that “I will use Web 2.0 technologies to access teaching materials” (85.1%); “I intend to use Web 2.0 technologies whenever possible for teaching purposes” (82.6%); “I will strongly recommend other academics to use Web 2.0 technologies for teaching purposes” (82.6%); “I will use Web 2.0 technologies to communicate with my students” (79%); “I intend to use Web 2.0 technologies for teaching purposes as frequently as possible” (77.4%) and “I will use Web 2.0 technologies for my teaching activities on a regular basis” (73.3%). Results

showed that the majority of the academics had the intention of using Web 2.0 technologies for teaching purposes.

The results also showed that the majority of students strongly agreed or agreed that they “will use Web 2.0 technologies to communicate with colleagues” (84.9%); “will use Web 2.0 technologies to access learning materials” (84.3%); “intend to use Web 2.0 technologies whenever possible for coursework” (83.4%); “intend to use Web 2.0 technologies for learning purposes as frequently as possible” (82.8%); “will use Web 2.0 technologies for learning activities on a regular basis” (81.6%) and “will strongly recommend other students to use Web 2.0 technologies for learning purposes” (80.4%). Results suggest that the majority of the students have the intention to use Web 2.0 technologies for learning purposes.

5.3.3.4 Net Benefits of Using of Web 2.0 Technologies for TAL Purposes

The sixth research question was to determine the net benefits that can be derived from the use of Web 2.0 for TAL purposes. To answer this research question, the researcher relied on the responses of various statements presented in Figures 12a and 12b respectively.

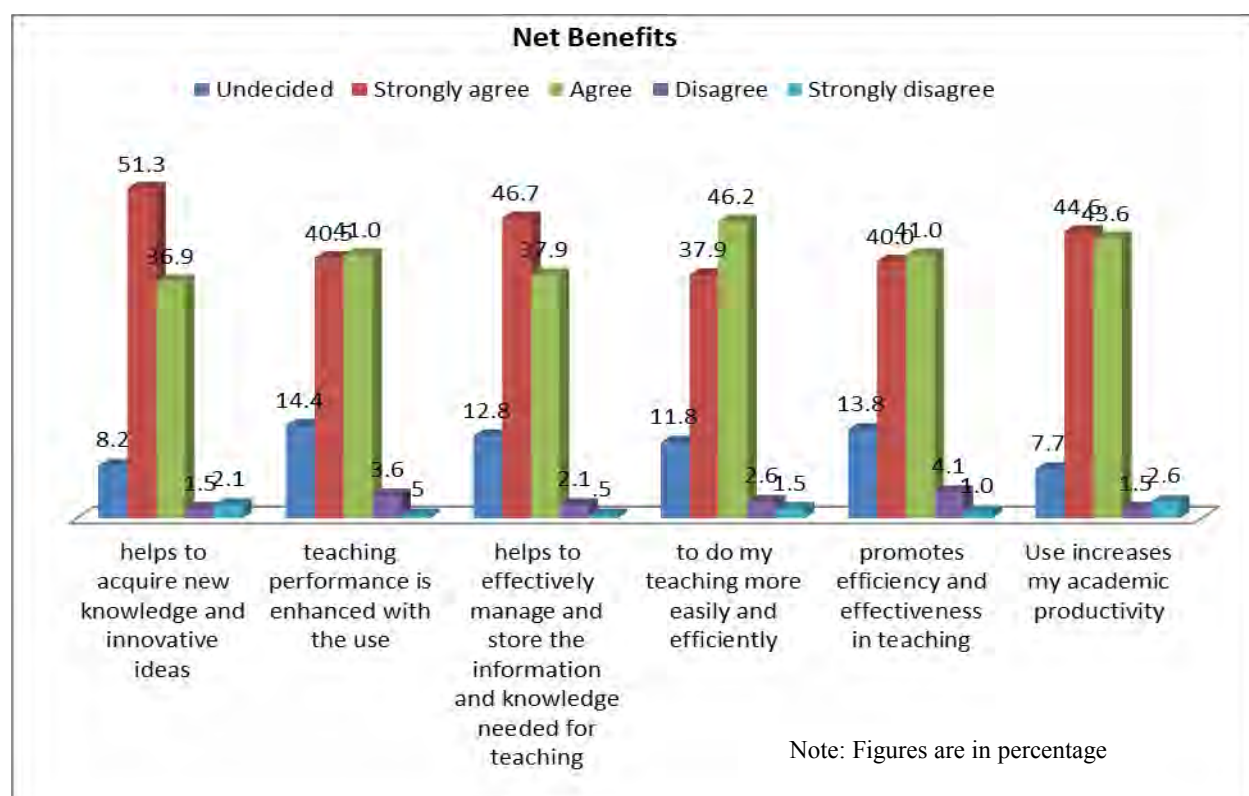


Figure 12a: Academics' Responses on the Net Benefits of using Web 2.0 Technologies for Teaching Purposes (N= 195)

Results presented in Figure 12a revealed that the majority of respondents strongly agreed or agreed that “Web 2.0 technologies help them to acquire new knowledge and innovative ideas” (88%); “the use of Web technologies increases their academic productivity” (88%); “Web 2.0 technologies help to effectively manage and store the information and knowledge needed for teaching purposes” (85%); “Web 2.0 technologies help them to teach more easily and efficiently” (84%), “teaching performance is enhanced with the use of Web 2.0 technologies” (82%) and “Web 2.0 technologies promote efficiency and effectiveness in teaching” (81%). The results suggest that academics find Web 2.0 technologies very beneficial for teaching purposes.

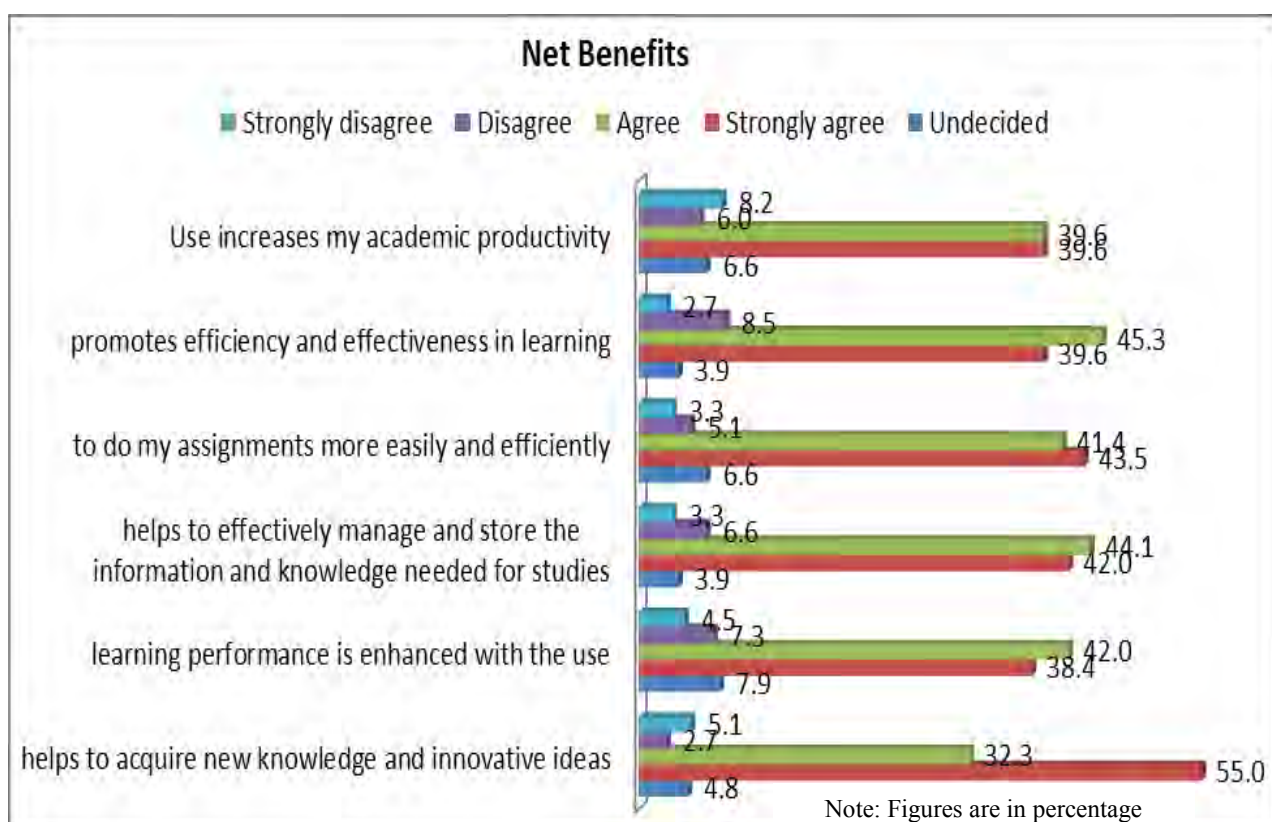


Figure 12b: Students’ Responses on the Net Benefits of using Web 2.0 Technologies for Learning Purposes (N= 331)

Results in Figure 12b revealed that the majority of students strongly agreed or agreed that “Web 2.0 technologies help them to acquire new knowledge and innovative ideas” (87%); “Web 2.0 technologies help to effectively manage and store the information and knowledge

needed for their studies” (86%); “Web 2.0 technologies help them to do their assignments more easily and efficiently” (85%); “Web 2.0 technologies promote efficiency and effectiveness in learning” (85%); “learning performance is enhanced with the use of Web 2.0 technologies” (80%) and that “the use of Web 2.0 technologies for learning purposes increases academic productivity” (79%). The results suggest that students find Web 2.0 technologies beneficial for learning purposes.

Results of the qualitative data analysis presented in Section 5.4.2 revealed Web 2.0 technologies as an asset for TAL purposes. Web 2.0 technologies were described as being useful in various TAL activities such as improving teacher-student relationship; information and knowledge sharing; easy and improved communication; enhanced academic output; collaboration and providing up-to-date information.

5.3.4 Hypothesis Testing

This section presents the results of the hypotheses to establish how the independent variables in this study influence the use of Web 2.0 technologies by academics and students for TAL purposes. The study had four hypotheses, as outlined below.

5.3.4.1 Research Hypothesis 1: There is no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies for TAL purposes

To test this hypothesis, a multiple regression analysis was carried out, as shown in Tables 15a, 15b, 16a and 16b respectively.

Table 15a: Regression Analysis of relationship between Service Quality, System Quality, Information Quality and Academics Attitude towards Use of Web 2.0 Technologies

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	29.663	3	9.888	26.457	0.000 ^a
Residual	71.383	191	0.374		
Total	101.046	194			

R = 0.542

R² = 0.294

Adjusted R² = 0.282

Std Error of the Estimate = 0.282

Predictors: (Constant), Service quality, System Quality, Information Quality

Dependent variable: Attitude towards use of Web 2.0 for Teaching

The results in Table 15a of regression analysis revealed a joint significant relationship between the independent variables (service quality, system quality, information quality) and dependent variable (Attitude towards use of Web 2.0 technologies) (F-ratio= 26.457, $p < 0.05$). The results revealed that the independent variables (service quality, system quality, information quality) have a strong positive relationship ($r = 0.542$) and were found to have jointly accounted for 28.2% of the total variance in academics attitude towards the use of Web 2.0 technologies for teaching (Adjusted $R^2 = 0.282$). Thus the null hypothesis was rejected indicating that there is a significant relationship between service quality, system quality, information quality and academics' attitude towards use of Web 2.0 technologies.

Table 16a: Relative Contribution of Service quality, System Quality and Information Quality on Attitude of Academics towards the Use of Web 2.0 Technologies for Teaching

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Attitude towards use of Web 2.0 technologies for learning	0.634	0.133		4.760	0.000
System Quality	0.101	0.091	0.093	1.111	0.268
Information Quality	0.223	0.081	0.224	2.739	0.007
Service quality	0.276	0.075	0.305	3.669	0.000

The results in Table 16a showed the relative contribution of each of independent variables (service quality, system quality, information quality) to the dependent variable (attitude towards use of Web 2.0 technologies for learning). Results revealed that service quality ($B = 0.305$, $t = 3.669$, $p < 0.05$) and information quality ($B = 0.224$, $t = 2.739$, $p < 0.05$) were factors that significantly contributed to academics' attitude towards use of Web 2.0 technologies for teaching purposes.

Table 15b: Regression Analysis of relationship between Service Quality, System Quality, Information Quality and Students' Attitude towards Use of Web 2.0 Technologies

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	76.586	3	25.529	69.671	0.000
Residual	119.819	327	0.366		
Total	196.405	330			

$R = 0.624$

$R^2 = 0.390$

Adj $R^2 = 0.384$

Std Error of the Estimate = 0.605

Predictors: (Constant), Service quality, System Quality, Information Quality

Dependent variable: Attitude towards use of Web 2.0 for Learning

The results in Table 15b showed a regression analysis of the relationship of service quality, system quality, information quality and attitude towards the use of Web 2.0 technologies for learning purposes. The results suggest a joint significant relationship between the independent variables (service quality, system quality, information quality) and dependent variable (attitude towards use of Web 2.0 technologies) (F-ratio= 66.671, $p < 0.05$). The results revealed that the independent variables (service quality, system quality, information quality) have a strong positive relationship ($r = 0.624$) and were found to have jointly accounted for only 38.4% of the total variance in students' attitude towards use of Web 2.0 technologies for learning (Adjusted $R^2 = 0.384$). Therefore, the null hypothesis (H01) is rejected.

Table 16b: Relative Contribution of Service quality, System Quality and Information Quality on Attitude of Students towards the use of Web 2.0 Technologies for Learning

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Attitude towards use of Web 2.0 technologies for learning	0.453	0.107		4.250	0.000
System Quality	0.048	0.068	0.044	.700	0.485
Information Quality	0.293	0.068	0.284	4.330	0.000
Service quality	0.376	0.060	0.369	6.326	0.000

The results in Table 16b showed the relative contribution of each of the independent variables (service quality, system quality, information quality) to the dependent variable (attitude towards use of Web 2.0 technologies for learning) showed that service quality ($B = 0.369$, $t = 6.326$, $p < 0.05$) and information quality ($B = 0.284$, $t = 4.330$, $p < 0.05$) were factors that significantly contributed to students' attitude towards the use of Web 2.0 technologies for learning purposes.

5.3.4.2 Research Hypothesis 2: There is no significant relationship between attitude towards use and intention to use Web 2.0 technologies for TAL purposes

To test this hypothesis, a linear regression analysis was carried out, as shown in Tables 17a and 17b.

Table 17a: Regression analysis of Relationship between Academics' Attitude and Intention to Use Web 2.0 Technologies for Teaching

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Intention to use	0.873	0.118		7.428	0.000
Attitude towards use of Web 2.0 technologies	0.520	0.063	0.511	8.259	0.000

R= 0.511

R²= 0.261

Adjusted R Square = 0.257

Std. Error of the Estimate = 0.633

Predictors: (Constant), Attitude towards use of Web 2.0

Dependent variable: Intention to use Web 2.0

The results in Table 17a show a regression analysis of the relationship between the independent variable (attitude towards use of Web 2.0 technologies) and the dependent variable (intention to use Web 2.0 technologies for teaching). The results revealed that attitude towards use (B= 0.511, t= 8.259, p < 0.05) significantly contributed to academics' intention to use Web 2.0 technologies for teaching purposes. The results also revealed a positive relationship (r=0.511) between attitude and intention to use Web 2.0 technologies and that attitude towards use accounted for only 25.7% variation on academics' intention to use Web 2.0 technologies for teaching (Adjusted R² = 0.257). Therefore, the null hypothesis (H02) is rejected.

Table 17b: Regression Analysis of Relationship between Students' Attitude and Intention to use Web 2.0 Technologies for Learning

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Intention to use	0.806	0.082		9.833	0.000
Attitude towards use of Web 2.0 technologies	0.605	0.040	0.638	15.011	0.000

R= 0.638

R² = 0.406

Adjusted R Square = 0.405

Std. Error of the Estimate = 0.565

Predictors: (Constant), Attitude towards use of Web 2.0

Dependent variable: Intention to use Web 2.0

The results in Table 17b represent a regression analysis of the relationship between the independent variable (attitude towards use of Web 2.0 technologies) and the dependent variable (intention to use Web 2.0 technologies for learning purposes). The results revealed

that attitude towards use ($B = 0.638$, $t = 15.011$, $p < 0.05$) significantly contributed to students' intention to use Web 2.0 technologies for learning purposes. The results also revealed a strong positive relationship ($r = 0.638$) between attitude and intention to use Web 2.0 technologies and that attitude towards use accounted for only 40.5% variation on students' intention to use Web 2.0 technologies for Learning (Adjusted $R^2 = 0.405$). Therefore, the null hypothesis (H02) is rejected.

5.3.4.3 Research Hypothesis 3: There is no significant relationship between media synchronicity and intention to use Web 2.0 technologies for TAL

To test this hypothesis, a linear regression analysis was carried out, as shown in Tables 18a and 18b respectively.

Table 18a: Regression Analysis of Relationship between Media Synchronicity and Intention to Use Web 2.0 Technologies for Teaching

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Intention to use	1.135	0.119		9.572	0.000
Media Synchronicity	0.385	0.066	0.389	5.866	0.000

$R = 0.389$

$R^2 = 0.151$

Adjusted R Square = 0.147

Std. Error of the Estimate = 0.678

Predictors: Media Synchronicity

Dependent variable: Intention to use Web 2.0 technologies

The results in Table 18a present a regression analysis of the relationship between the independent variable (media synchronicity) and the dependent variable (intention to use Web 2.0 technologies for teaching purposes). The results showed that media synchronicity ($B = 0.389$, $t = 5.866$, $p < 0.05$) significantly contributed to academics' intention to use Web 2.0 technologies for learning purposes. The results revealed that media synchronicity and intention to use Web 2.0 technologies were positively related ($r = 0.389$) although the relationship is weak. Also, media synchronicity accounted for only 14.7% variation on academics' intention to use Web 2.0 technologies for teaching (Adjusted $R^2 = 0.147$). Therefore, the null hypothesis (H02) is rejected.

Table 18b: Regression Analysis of Relationship between Media Synchronicity and Intention to Use Web 2.0 Technologies for Learning

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Intention to use	0.841	0.084		9.961	0.000
Media Synchronicity	0.593	0.042	0.614	14.112	0.000

R= 0.614

R²= 0.377

Adjusted R Square = 0.375

Std. Error of the Estimate = 0.579

Predictors: Media Synchronicity

Dependent variable: Intention to use Web 2.0 technologies

The results in Table 18b present a regression analysis of the relationship between the independent variable (media synchronicity) and the dependent variable (intention to use Web 2.0 technologies for learning). The results revealed that media synchronicity (B= 0.614, t= 14.112, $p < 0.05$) significantly contributed to students' intention to use Web 2.0 technologies for learning purposes. The results also revealed a strong positive correlation ($r=0.614$) between variables and that media synchronicity accounted for only 37.5% variation on students' intention to use Web 2.0 technologies for learning purposes (Adjusted R² = 0.375). Therefore, the null hypothesis (H02) is rejected.

5.3.4.4 Research Hypothesis 4: There is no significant relationship between intention to use and net benefits of using Web 2.0 technologies for TAL

To test this hypothesis, a linear regression analysis was carried out, as shown in Table 19a and 19b respectively.

Table 19a: Regression Analysis of Relationship between Academics' Intention to Use and Net Benefits of Web 2.0 Technologies for Teaching

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Net benefits	0.539	0.105		5.131	0.000
Intention to use	0.611	0.055	0.625	11.130	0.000

R = 0.625

R² = 0.391

Adjusted R Square = 0.388

Std. Error of the Estimate = 0.562

Predictors: Intention to use

Dependent variable: Net benefits of Web 2.0 technologies

The results in Table 19a present a regression analysis of the relationship between the independent variable (intention to use) and the dependent variable (net benefits) of Web 2.0

technologies for teaching purposes. The results revealed that intention to use ($B = 0.625$, $t = 11.130$, $p < 0.05$) significantly contributed to the net benefits which academics derive from the use of Web 2.0 technologies for teaching purposes. The results also revealed a strong positive relationship ($r = 0.625$) between net benefits and intention to use Web 2.0 technologies and that intention to use accounted for only 38.8% variation on the net benefits of using Web 2.0 technologies for teaching purposes (Adjusted $R^2 = 0.388$). Therefore, null hypothesis (H_0) is rejected.

Table 19b: Regression Analysis of Relationship between Students' Intention to Use and Net benefits of Web 2.0 Technologies for Learning

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Net benefits	0.464	0.084		5.540	0.000
Intention to use	0.749	0.040	0.716	18.579	0.000

$R = 0.716$

$R^2 = 0.512$

Adjusted R Square = 0.511

Std. Error of the Estimate = 0.536

Predictors: Intention to use

Dependent variable: Net benefits of Web 2.0 technologies

The results in Table 19b present a regression analysis of the relationship between the independent variable (intention to use) and the dependent variable (net benefits of Web 2.0 technologies for learning purposes). The results showed that intention to use ($B = 0.716$, $t = 18.579$, $p < 0.05$) significantly contributed to the net benefits which students will derive from the use of Web 2.0 technologies for learning purposes. The results also revealed a strong positive relationship ($r = 0.716$) between net benefits and intention to use Web 2.0 technologies, and that intention to use accounted for 51.1% variation on the net benefits of using Web 2.0 technologies for learning purposes (Adjusted $R^2 = 0.511$). Therefore, null hypothesis (H_0) is rejected.

The results in Table 20 are the summary of the overall results of testing of the hypotheses. The „Conclusion“ column indicates whether that null hypothesis (H_0) was rejected or accepted, based on the result coefficients“ beta or significant value (p); where $p < 0.05$, H_0 was rejected,

indicating that there is a significant relationship between the independent variable(s) and the dependent variable (s).

Table 20: Summary of Overall Hypothesis Testing Results

H0	Academics (Teaching)		Students (Learning)	
	Finding	Conclusion	Finding	Conclusion
1. There is no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies for TAL	(i) F-ratio= 26.457, $p < 0.05$ (ii) Joint significant relationship between independent variables and dependent variable (iii) $r = 0.542$ (iv) Strong positive relationship between the variables (v) Independent variables jointly accounted for 28.2% of the total variance on dependent variable(Adj $R^2 = 0.282$)	HO₁ is Rejected	(i) F-ratio= 66.671, $p < 0.05$ (ii) Joint significant relationship between independent variables and dependent variable (iii) $r = 0.624$ (iv) Strong positive relationship between the variables (v) Independent variables jointly accounted for 38.4% of the total variance on dependent variable(Adj $R^2 = 0.384$)	HO₁ is Rejected
2. There is no significant relationship between attitude towards use and intention to use Web 2.0 technologies for TAL purposes	(i) $p < 0.05$ (ii) Significant relationship between independent variable and dependent variable (iii) $r = 0.511$ (iv) Strong positive relationship between the variables (v) Independent variable accounted for 25.7% of the total variance on dependent variable(Adj $R^2 = 0.257$)	HO₂ is Rejected	(i) $p < 0.05$ (ii) Significant relationship between independent variable and dependent variable (iii) $r = 0.638$ (iv) Strong positive relationship between the variables (v) Independent variable accounted for 40.5% of the total variance on dependent variable(Adj $R^2 = 0.405$)	HO₂ is Rejected
3. There is no significant relationship between media synchronicity	(i) $p < 0.05$ (ii) Significant relationship between independent variable	HO₃ is Rejected	(i) $p < 0.05$ (ii) Significant relationship between independent variable	HO₃ is Rejected

and intention to use Web 2.0 technologies for TAL purposes	and dependent variable (iii) $r = 0.389$ (iv) Weak positive relationship between the variables (v) Independent variable accounted for 14.7% of the total variance on dependent variable (Adj $R^2 = 0.147$)		and dependent variable (iii) $r = 0.614$ (iv) Strong positive relationship between the variables (v) Independent variable accounted for 37.5% of the total variance on dependent variable (Adj $R^2 = 0.375$)	
4. There is no significant relationship between intention to use and net benefits of using Web 2.0 technologies for TAL purposes	(i) $p < 0.05$ (ii) Significant relationship between independent variable and dependent variable (iii) $r = 0.625$ (iv) Strong positive relationship between the variables (v) Independent variable accounted for 38.8% of the total variance on dependent variable (Adj $R^2 = 0.388$)	HO ₄ is Rejected	(i) $p < 0.05$ (ii) Significant relationship between independent variable and dependent variable (iii) $r = 0.716$ (iv) Strong positive relationship between the variables (v) Independent variable accounted for 51.1% of the total variance on dependent variable (Adj $R^2 = 0.511$)	HO ₄ is Rejected

Based on the results of the hypotheses tested, the research framework resulted in the model presented in Figure 13 below.

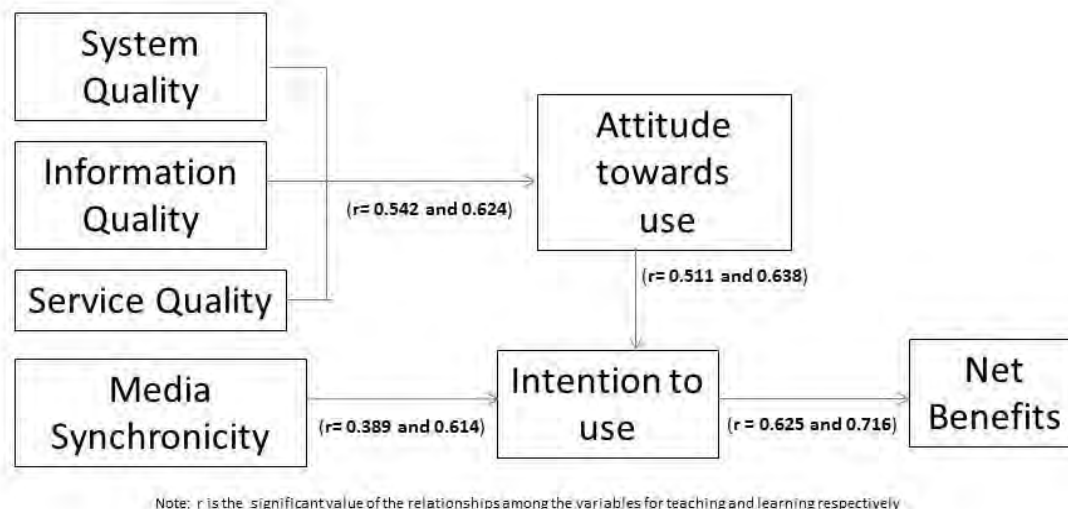


Figure 13: Resultant Model for the Use of Web 2.0 for TAL (Source: Field Data 2015)

5.4 Interview Report

As indicated in Chapter Four of the study, a combination of methods was used to collect data. Though the quantitative method was prevalent, the qualitative method was used as a complementary method to illuminate the quantitative findings. The interview schedule that was administered is presented as Appendix 3. The respondents who were reached for the interview were seven Heads of Faculties and Colleges and seven faculty librarians in the two selected federal universities. The results of the interview are reported under the themes below.

5.4.1 Web 2.0 Technologies and Purpose of Use by Academics and Students

Respondents understood Web 2.0 technologies to be new, advanced or a two-way electronic interactive system that gives room for the collaboration of researchers and global communication among colleagues, students and academics. Web 2.0 technologies were also

considered to be electronic tools that were used for social, educational, research and various other purposes. The participants were well familiar with Web 2.0 technologies such as blogs, Wikipedia, Facebook and YouTube, Learning Management Systems (LMS), Skype and some other social networking tools. These were similar to the results from the quantitative study which pointed out that academics and students were familiar with Web 2.0 technologies such as Facebook, LinkedIn and WhatsApp, Wikipedia, Instant messaging, YouTube and Skype. These results suggest a high level of awareness of Web 2.0 technologies among academics and students.

Furthermore, the results revealed that Web 2.0 technologies were used as teaching materials; to give assignment to students; in project supervision; for distant learning courses for part-time students; for giving information on school academic calendar and activities; group discussion, file sharing; searching for academic related materials such as books and journals; and to share experience with others including those outside the institution. Results of the qualitative study corroborated that of the quantitative study which revealed that academics and students use Web 2.0 technologies for communicating with friends or colleagues, information search, personal activities, research activities and academic-related activities.

5.4.2 Web 2.0 Technologies Utilization in TAL

Responses from the interview showed that most of the respondents agreed that Web 2.0 technologies were being utilized for TAL purposes in their universities. However, it was pointed out that although the technologies had gained relevance more among students than academics, their use was relatively low. As one of the respondents stated:

We are just coming up as far as Web 2.0 technologies are concerned.

Some respondents however felt that the use of Web 2.0 technologies had improved significantly within the last 5-6 years of introducing them in the universities as students and lecturers were engaging with these tools. One of the respondents noted that:

To me, most of the efforts on using Web 2.0 technologies for TAL purposes can be said to be on individual basis. There is no official provision for their use. Hence, lecturers have been taking time to work with different groups of people with these tools based on their interests and which ones they find useful. For instance, I

sometimes make use of YouTube, Facebook, Blogs and emails for interacting with my students.

Another respondent mentioned that:

Web 2.0 technologies have been very useful for our teaching activities. Some that are used in our university for delivering teaching instructions include: Blogs, Facebook, YouTube, Twitter, and WhatsApp. Some of these technologies are used with learning software such as: Teaching Essential Electronic Agricultural Library (TEEAL) which is on the university database, basically prepare for agricultural science courses; HINARI which is an online TAL software for medical science and AGORA (written in full as Access to Online Research in Agriculture).

The researcher asked how these technologies were used. Responses demonstrated that students sometimes submitted tests and assignments online and could also check their results through the same means. In addition the technologies were used to conduct exams for new intakes (students) and for courses with a larger population of students. Submission and reverting of test or exam scores or corrections to exercises were also done using some of these tools. It was also stated that Web 2.0 technologies were used in TAL for specific purposes that included uploading course materials and lecture notes; distant learning; giving assignments to students; project supervision; group discussion on topics learnt or to be treated in class; file, photo and video sharing; and downloading teaching and reading materials. Some of the Web 2.0 technologies mentioned as used for TAL in the surveyed universities were Wikipedia, YouTube, Facebook, blogs and Google+ along with the Learning Management System (LMS). However, the results suggested that the selection of which Web 2.0 technologies to use hinged on individuals' interest and usefulness of the tools to them.

On the other hand, some respondents did not use Web 2.0 technologies because they believed they were not necessary for TAL purposes. Similarly, it seems that some academics still preferred the traditional mode of teaching, thus they did not encourage or support the use of Web 2.0 technologies for TAL purposes in the university.

5.4.3 Attitude of Academics and Students towards Utilizing Web 2.0 for TAL Purposes

Results showed that academics and students in the surveyed universities had diverse attitudes towards the use of Web 2.0 technologies for TAL purposes. Students were noted to have positive attitudes towards the use of Web 2.0 technologies for TAL purposes because they embraced new technologies easily and faster. For instance, it was reported that they were very enthusiastic about the use of these technologies for TAL purposes because they had the necessary skills essential for their use. One of the respondents mentioned that:

These students are so much attached to these technologies that trying to separate them from them look quite unrealistic. With the knowledge that they can also carry out their academic activities with the same set of tools they use for socializing makes them more interested and focused on their studies.

On the other hand, academics were reported to have mixed attitudes, that is, some positive, some negative towards Web 2.0, while some were indifferent. It was mentioned that some academics, especially the younger ones, embraced Web 2.0 because of the benefits they offered while some older ones preferred doing their teaching the traditional way (that is, face to face classroom learning with paper and ink). Another respondent noted that:

Students are catching up faster with the use of Web 2.0 and other new technologies than academics. This is because some academics are just technophobic and prefer doing things the old way, but generally I can say majority are hungry for the use of Web 2.0 tools especially for educational purposes but if we want to use these tools in teaching the university has to start it formally by initiating a policy that encourages its use.

Academics with positive attitudes towards use of Web 2.0 technologies believed that these technologies increased their speed of delivering instructions, made lecturing easier and provided more time for research. The Web 2.0 technologies also helped students to learn faster and better. However, those with negative or indifferent attitudes towards Web 2.0 argued that these tools were deteriorating the quality of education, and that some students (and also academics) could misuse the opportunity in order to become lazy and truant. It can be inferred from the responses that most academics were of the opinion that Web 2.0 technologies were not necessary for TAL purposes as it seems most lecturers still preferred the traditional mode

of teaching. Thus, they did not encourage or support their use for TAL purposes in the universities.

5.4.4 Net benefits of Using Web 2.0 for TAL Purposes

Web 2.0 technologies seem really beneficial for TAL purposes. Respondents indicated that Web 2.0 technologies were necessary to enhance TAL. They mentioned that the Web 2.0 technologies improved teacher-student interaction and relationships; allowed for quick sharing of knowledge and information; allowed easier and cheaper access to information tools; kept people updated; disseminated information to a well-populated class; improved academic output and productivity; enhanced user friendliness, collaboration, facilitated group discussion; improved learning skills, brought students up to date with academic information and learning materials; and sharing of ideas on subject matters were some of the benefits of using Web 2.0 technologies for TAL purposes.

Additionally, findings showed that there were no formal institutional policies that supported the integration of Web 2.0 technologies in TAL at the U.I. In contrast, the Federal university of Agriculture Abeokuta had policies that supported the use of these technologies. For instance, it was reported that there are rules that lecturers must submit their lecture notes and course outlines to the committee that inspects them before they are uploaded to the internet (via the university website). It was however also revealed that plans were being made to formally incorporate the use of Web 2.0 technologies into the academic curriculum at U.I as soon as possible. The findings also indicated the availability of infrastructure including ICTs, power generating plants, internet facilities and computer laboratories that support the use of Web 2.0 technologies for TAL in these universities.

Furthermore, major factors such as support from the university authorities, academics and students' attitude to use, provision of ICT facilities, internet connectivity, erratic power supply, availability of internet resources, technological know-how, funds to install modern and essential gadgets, institutional policies that support the use of the technologies, training of academics and students, and creating awareness on importance of these technologies were identified as factors that affected the use of Web 2.0 technologies for TAL purposes. Likewise, some respondents complained about the lack of the following, namely encouragement; Web

2.0 use policy; reliable power supply; internet connectivity; technical support and training; funds; readiness; ICT personnel or technical support team and electricity back-up as affecting Web 2.0 uptake. They also reported that the library as the core support for academic activities in the university is better positioned to provide academics and students with information and training on effective use of Web 2.0 technologies for TAL purposes.

5.5 Summary of Findings

The results presented in this chapter are based on a survey on the use of Web 2.0 technologies for TAL by academics and students. The results of the study revealed that undergraduate students and academics in the selected federal universities in Nigeria had positive attitudes towards the use of Web 2.0 technologies for TAL. However, the results also indicated that among the academics, some resist the use of these technologies, basically because they are used to their old methods of teaching and also because they consider them as socializing tools more than educational tools. Again, results revealed that most of the academics and students had been using the Web 2.0 technologies for more than seven years while Wikipedia, YouTube, WhatsApp and Facebook were used for the purpose of TAL in the surveyed universities. The results further revealed that the use of Web 2.0 technologies enhanced TAL by providing quick means of communicating and sharing information, and also improving academic and research productivity of academics and students especially through easier and cheaper access to information and educational tools.

The findings showed a positive correlation between the independent variables and the dependent variables. For instance, service quality, system quality, information quality had strong positive correlation with attitude towards use of Web 2.0 technologies for TAL purposes. Likewise, academics and students' attitude towards Web 2.0 and media synchronicity were positively correlated with intention to use. Correspondingly, intention to use also had a strong positive correlation with net benefits.

Results obtained from the test of the hypotheses in the study showed a significant relationship between the independent variables and the dependent variables. The findings indicated there was a joint significant relationship ($p < 0.05$) between the independent variables (service quality, system quality, information quality) and the dependent variable (attitude towards use of Web 2.0 technologies). Similarly, it was also revealed that a significant relationship

($p < 0.05$) existed between the independent variables (attitude and media synchronicity) and the dependent variable (attitude towards use of Web 2.0 technologies) and likewise between intention to use and net benefits. Nevertheless, although these relationships were reported to be significant, a multiple regression analysis that showed the effect of each of the variables indicated that system quality does not have a significant relationship with the attitude of academics and students to use of Web 2.0 technologies for TAL.

The results revealed that factors that inhibit the use of Web 2.0 technologies in TAL included erratic power supply; slow or no internet connectivity; lack of technical support and training; lack of financial support; insufficient funds to maintain power generating plant; lack of support from the university management; lack of enthusiasm of academics; and lack of Web 2.0 use policy. Some of the solutions suggested were the provision of ICT and facilities; power supply to be addressed; improved access to internet for students and academics; technical support; training of academics and students; creating awareness on importance and use of Web 2.0; and the provision of funds and institutional policies that support the use of the technologies for TAL purposes.

CHAPTER SIX

INTERPRETATION AND DISCUSSION OF FINDINGS

6.1 Introduction

This chapter interprets and discusses the findings of the study that were analysed and presented in Chapter Five. The study sought to determine the extent of use of Web 2.0 technologies for TAL in selected federal universities in southwest Nigeria. The respondents were academics and undergraduate students in three comparable faculties in two universities. The universities studied were U.I and FUNAAB. The study was guided by the D&M model, TAM and MST. The study addressed the research questions presented in Section 1.3.2. Furthermore, hypotheses were tested to examine if there were significant relationships between system quality, information quality, service quality and attitude towards the use of Web 2.0 technologies; attitude and intention to use; media synchronicity and intention to use; intention to use and net benefits of using Web 2.0 technologies for TAL purposes (see Section 1.3.3).

Miller and Brewer (2003) describes interpretation of the results as the process of assigning meaning to data suggesting that data might not be understood unless meanings are assigned to them. Interpretation is influenced by the researchers' initiative and perception of the subject matter and the opinion of other like-minded researchers. Daniel and Sam (2011:198) emphasized that in interpreting data, the results of a given study are related with those of other studies. This aids the establishment of some theories and also supports research continuity. The interpretation and discussion of findings in this chapter are organized around themes of research questions, research hypothesis and broader issues around the research problem that include awareness of emerging technologies such as Web 2.0; diffusion of technological innovations in TAL; applications of Information and Communication Technologies (ICTs) in TAL; and e-learning using Web 2.0 and other emerging technologies.

6.2 Demographic Information of Respondents

Data was collected on respondents' demography in order to gain a better understanding of their status and perspectives about the phenomenon being studied.

6.2.1 Distribution of Respondents (Academics and Students) by University and Faculty/College

The results of the study revealed that more academics from U.I (71%) than FUNAAB (29%) participated in the study. This may be explained by the disparity in the population of academics in the two universities as explained in Section 4.6. In addition, U.I. as the leading postgraduate school in Nigeria (Onyeka 2011) has more academic staff than FUNAAB. As explained in Section 4.5, sample units from Faculties/Colleges of Science, Technology and Veterinary Medicine were purposively selected for this study because these faculties were common to the two universities surveyed. The findings basically revealed that most of the academics (64%) were from the Faculty/College of Science/Natural Science, followed by 20% from Technology/Engineering and another 16% from the Faculty of Veterinary Medicine (see results in Table 5a). This implies that there were more academics in the Faculty/College of Sciences than the two other faculties/colleges surveyed. This finding corroborates existing literatures on the dominance of academics from science-based disciplines in Nigerian Universities (Ani, Edem and Ottong 2010; Adegun 2012; Obiora and Ogbomo 2013; and Ani, Ngulube and Onyancha 2014).

On the other hand, findings revealed that more students from FUNAAB (57%) than their counterparts in U.I (43%) participated in the survey. This may be explained by the disparity in the population of undergraduate students in the two universities as explained in Section 4.6. Also, Ikuomola (2014) pointed out that U.I has become more of a postgraduate school and therefore it is expected to have less undergraduate students than FUNNAB. The current study also revealed that these students were predominately from the Faculty/College of Science/Natural Science (72.5%); followed by 22% from Technology/Engineering and another 5% from the faculty of Veterinary Medicine (see results in Table 5b). This finding implies that there were more students in the Faculty/College of Sciences than other faculties/colleges surveyed. This may be due to the nature of universities (Salaam and Aderibigbe Selwyn 2010) as research-oriented and the interest of the students in science-related courses. The findings from existing literature on the dominance of students from science-based disciplines agree with the current study (Nwagwu, Adekannbi and Bello 2009; Salman, Yahaya and Adewara, 2011 and Adegun 2012).

6.2.2 Distribution of Respondents (Academics and Students) by Gender

The results on gender distribution indicate a disparity between male and female academic staff in the Faculties/Colleges of Science, Technology and Veterinary Medicine in the selected Nigeria federal universities. The current finding showed that 73% of academics were male, while only 27% were female. The foregoing affirms the dominance of male academics in the surveyed universities. Similar findings have been reported in literature in previous related studies (Al-Ansari, 2006; Ani, Edem and Ottong, 2010; Salaam and Aderibigbe 2010; Adegun 2012; Satope and Akintunde 2013; Ani 2013; Fehintola 2014 and Ani, Ngulube and Onyancha 2014). This finding was also substantiated by Okonedo, Azubuike and Adeyoyin (2013) who in their study on use of Web 2.0 technologies by library and information professionals in Southwest Nigeria found that the population of male respondents (53.3%, 120) surpassed that of their female counterparts (46.7%, 105). In a related survey by Satope and Akintunde (2013), the majority (71.4%) of respondents were male academics from universities in Southwest Nigeria. Okafor (2001), Plummer (2002) and Archer and Yamashita (2003) identified ethnicity, sexuality, social class, health problems, high rate of infant and maternal mortality, and stressful conditions associated with developing countries such as Nigeria as factors that contribute to the low participation of females in science and technology disciplines.

The results of the study showed that 75% of students were male and 25% were female. The finding indicates that there were more male students than female in the Faculties/Colleges Of Science, Technology And Veterinary Medicine in the surveyed Nigerian federal universities. This finding may be explained by the low enrolment and participation of female students in science-based courses as reported by Oke (2000) and Olawoye and Salman (2008). Similar findings have been reported in previous related studies (Adeyemi and Akpotu 2004; Al-Ansari, 2006; Salman, Yahaya and Adewara 2011 and Adegun 2012). This finding was also substantiated by Okebukola (2002) whose study on Nigerian universities' enrolment data showing that only 34% (178,995) of the total population of 526,780 were female. Likewise, Salman, Yahaya and Adewara (2011) in their study on identifying appropriate strategies in TAL of mathematics education in Nigeria observed that more females did not enroll for sciences, mathematics, engineering and medicine related courses. The study noted that about 72% of undergraduate enrolments in mathematics were male while only 28.4% were female. The reason inferred for low enrolment from the above studies for female students in core

science courses was based on their belief that sciences and technology-related disciplines were intended for males and the outstanding female students (Oke 2000; Olawoye and Salman 2008 and Adegun 2012).

Extant studies on Web 2.0 reveal different population distribution between male and female students. Garoufallou and Charitopoulou (2011) in an investigation into the use of Web 2.0 technologies by 240 library science and information studies students (LSIS) in Greece through a web-based questionnaire found that the majority of the respondents were female. Although this former study was conducted in a developed country, the findings are still relevant to the present study because they are both focused on students' use of Web 2.0. Similarly, a study by Diyaolu and Rifqah (2015) who recently investigated the educational use of Web 2.0 among undergraduates in Nigerian private universities found that the majority of respondents were female (60.1%) while only 39.8% were male. The study differs from the present study in that it was conducted among students in private universities, and the students were mainly from the College of Social and Management Sciences. This may explain the variation in findings on gender distribution with the current study.

6.2.3 Distribution of Respondents (Academics and Students) by Age, Educational Qualification and Year of Study

The findings revealed that most academics, 75(39%) were aged 41-50 years while only 4 (3%) were 60 years or above. The majority of the academics staff 102 (52%) had PhDs while only 72 (37%) had Master's Degrees. It can be inferred from the findings that an average academic staff from the universities surveyed (especially those above 40 years) is likely to hold a PhD. This finding on academics corroborates Ani (2013) who reported in a survey on accessibility and utilization of electronic information resources for research and its effect on productivity of academic staff in selected Nigerian universities between 2005 and 2012, that most (71.3%) respondents already possessed a PhD. This may be due to the employment criteria set by the National University Commission (NUC) (Salaam and Aderibigbe 2010) on academic staff being a PhD holder and also because U.I has more professors who would naturally hold PhD degree (Kenny 2007). This corroborated Al-Shanbari and Meadows' (1995) finding in a survey of the productivity of academic staff in British and Nigerian universities, that the majority (80%) of the academics possessed a PhD degree. The survey by Satope and Akintunde (2013) on factors affecting labour mobility in Nigerian universities revealed that more (57.1%)

academic staff from universities in Southwest Nigeria had Doctorate degrees (PhD) and were between 41-50 years. These findings on academics possession of a PhD can be explained by the fact that international practice requires possession of a PhD or being in the process of completing one before one can be hired as an academic in most universities around the world (Salaam and Onifade 2009; and Ameen and Ullah 2013).

The findings also revealed that most undergraduate students, 154 (47%) were aged 20-22 years and only 9 (3%) were below 16 years. In addition, most of the students 195 (59%) were in their third year while 136 (41%) were in their fourth year of study. The results of the current study reveal the dominance of students in their third year of study over those in fourth year of study in the universities that were surveyed. This may be explained by the fact that the academic performance of the students in their third year determines their migration to the fourth year of study which is usually the graduating class. Thus students who do not attain the necessary academic requirements to proceed to the fourth year may remain in the third level. It can also be inferred from the findings that an average undergraduate student between 20-22 years is likely to be in his or her third year of study in the university. This may be due to the benchmark on minimum age of 18 years for entry into Nigerian universities as set by the National University Commission (NUC).

6.2.4 Distribution of Academics and Students by Years of Use of Web 2.0 Technologies

Respondents were asked how long they had been using Web 2.0 technologies. The study revealed that a good number (up to 49.7%) of the academics had used the technologies for 7 years or more, while 28% had used them for 3 to 6 years. Few (up to 9%) claimed to have used them for 1-2 years and only 8% had used the technologies for less than one year as indicated in Figure 9. The results indicated that most of the academics were familiar with Web 2.0 technologies as up to 80% had used the technologies for more than 3 years. This may be explained by the fact that academics are rising to the challenge of exploring the use of Web 2.0 in enhancing communication and collaboration for effective formal education considering the widespread of these technologies among students (Bennett, Bishop, Dalgarno, Waycott and Kennedy 2012).

Furthermore, the results of the study revealed that 31.4% of the students had used Web 2.0 technologies for 7 years or more while 60% had used them for 3 to 6 years. A few (about 9%)

claimed to have used them for 1-2 years and only 4% had used the technologies for less than one year as shown in Figure 9. The results suggest that most students were acquainted with Web 2.0 technologies as the majority (87.3%) had used them for more than 3 years. This finding also indicates an early responsiveness of students to the use of Web 2.0 technologies. Contrary to the current result, the finding of Diyaolu and Rifqah (2015) on the use of Web 2.0 by students in two Nigerian private universities revealed that only 43% of students in the study were familiar with Web 2.0. This was similar to the findings of Kennedy et al. (2007) in a survey on the use of new technologies by 2588 first year students at three public universities in Australia (the University of Melbourne, the University of Wollongong and Charles Sturt University). The authors found that a lesser number of students surveyed were very frequent users of Web 2.0 technologies. The findings of this study contrast previous studies suggesting that students are increasingly becoming more acquainted with Web 2.0 technologies.

Generally, the current findings revealed that more students (up to 87.3%) than academics (up to 80 %) had used Web 2.0 technologies for more than three years. It can be inferred that Web 2.0 technologies are more common among students than academics in the surveyed universities. This could be supported by the fact that students easily interact with technologies because they grew up using them. However, academics (especially the older ones) were regarded as “digital immigrants” because they often held negative attitudes and were reluctant, skeptical and unwilling to use new technologies for teaching (Bahr, Shaha, Fransworth, Lewis and Benson 2004 and Lei 2009). Since academics sometimes have to be trained to use these technologies, their use of Web 2.0 technologies may not match that of students.

6.3 Utilization of Web 2.0 Technologies among Academics and Students

This section presents the finding on academics and students’ and academics use of various Web 2.0 technologies and what they were used for. Web 2.0 (although often thought of as social networking tools) also comprise of other technologies. These technologies are used either uniquely or collectively for knowledge sharing, online collaboration, social bookmarking, aggregation and/or repository as indicated in Section 3.3.1 of Chapter 3. Specific technologies used by academics and students were considered in this study (Ajjan and Hartshorne 2008; Kumar 2009; Mohammad 2011; Lwoga 2012; Usoro, Echeng and Majweski 2013; Emmanuel, Ebiere and Vera 2013; Aramide and Akinade 2012; and Echeng and Usoro

2014). They include Facebook, MySpace, Twitter, WhatsApp, LinkedIn, 2go, Flickr, Badoo, Bebo which are typical examples of social networking tools (Xu, Ouyang and Chu 2009; Awodele et al. 2009 and Annunobi and Ogbonna 2012). Other Web 2.0 technologies are blogs and Delicious which are knowledge sharing tools (Guo, Tan, Chen, Zhang and Zhao 2009), Social Bookmarking, wikis (e.g. Wikipedia and Wikis), YouTube, TeacherTube, Instant Messaging, Skype, newsgroups/online forums, podcasts/webcasts/vodcasts and E-Portfolios (see Appendices 1 and 2). The discussion of findings on the theme Utilization of Web 2.0 technologies among academics and students is presented under the following headings namely: Awareness of Web 2.0 technologies among academics and students; and purpose of academics and students' use of Web 2.0 technologies.

6.3.1 Awareness of Web 2.0 Technologies among Academics and Students

Findings on awareness and use of Web 2.0 technologies revealed that both academics and students were acquainted with a variety of Web 2.0 technologies.

Result showed that Web 2.0 technologies such as SNSs (particularly, Facebook, LinkedIn, WhatsApp, Twitter and 2go), Wikipedia, YouTube, Instant Messaging, Blogs, Skype, newsgroups/online forums, podcasts/webcasts/vodcasts and Social Bookmarking were widely used among academics. Moreover, it was revealed that 91.3% of academics used social networking tools while 73-88% were aware of Wikis (specifically Wikipedia), Instant messaging, YouTube and Skype; and 40-44% had used newsgroups/or online forums and blogs. This finding indicates high awareness among respondents of Web 2.0 technologies among academics and the fact that they were more acquainted with SNSs. In addition, Facebook (87.2%), instant messaging (85.6%) and YouTube (80%) were found to be the most popular Web 2.0 technologies among academics. These findings are in line with previous related studies (Atulomah and Onuoha 2011; Ajise and Fagbola, 2013; Okonedo, Azubuike and Adeyoyin, 2013 and Okereke 2014). Okonedo, Azubuike and Adeyoyin (2013) examined the awareness and use of Web 2.0 technologies in Southwest Nigeria with special focus on social networking tools (Facebook, Twitter, Hi5, and LinkedIn), instant messaging, blogs and wikis. The foregoing study was in contrast with the current study in that a descriptive survey method was adopted and data was gathered from 230 library and information professionals using questionnaires. The study however agrees with the present study on the high level of

awareness of the existence of Web 2.0 technologies with instant messaging and SNSs having the highest use acceptance rate of 88.9% and 84.0% respectively. The findings of the present study established a higher usage of social networking tools by academics than was reported by Okonedo, Azubuike and Adeyoyin (2013). This suggests an increase in the levels of awareness and use of social networking tools among academics between the year 2013 and 2015.

Similarly, Ajise and Fagbola (2013) conducted an empirical study on the levels of awareness and usage of Web 2.0 technologies among academics in five federal universities in the Southwest region of Nigeria. These universities were namely University of Lagos (UNILAG), Obafemi Awolowo University (OAU), Federal University of Technology Akure (FUTA), U.I and FUNAAB. The study revealed a high awareness of Facebook, LinkedIn, wikis, Twitter, YouTube and podcasting, with Facebook, LinkedIn, and Wikis as the most predominantly used Web 2.0 technologies among academics. Ajise and Fagbola's (2013) study is different from the present study in that the findings were limited to data obtained from 121 lecturers in the five universities, this may be insufficient to generalize results on the use of Web 2.0 technologies for TAL in the universities. In addition questionnaire was the only data collection tool, while lecturers alone were considered as respondents. This is likely to bring about a biased report as students as part of the TAL process were not included. The present study sought to fill these gaps by constricting the investigation to two universities while data analysis was based on 195 copies of questionnaires duly completed by academics to provide good understanding of the phenomenon being studied. In the same way, this study covered a wider range of departments and faculties not covered in the previous study. Qualitative method of data collection and analysis was employed to support findings from the quantitative study so as to enhance understanding on the use of Web 2.0 technologies in teaching. The current study also extended the investigation to students to gain a better understanding on the use of Web 2.0 technologies for learning purposes.

The current study identified more Web 2.0 technologies that are widely used by academics, especially in the surveyed universities. These technologies include SNSs (such as WhatsApp), YouTube, Instant Messaging, blogs, Skype, newsgroups/online forums, Social Bookmarking and E-Portfolios. The current study in contrast with that of Ajise and Fagbola (2013) found Instant messaging as one of the most popular Web 2.0 technologies among academics. Likewise, the present finding revealed more awareness of Facebook (94.6%) than other social

networking tools among academics. This is in concordance with Atulomah and Onuoha (2011) whose investigation on the use of Facebook, Twitter and LinkedIn affirmed that there is more awareness of Facebook than Twitter and LinkedIn among academics in private universities in Ogun State in Nigeria. The finding of the foregoing study was however limited to investigation on three specific Web 2.0 technologies which were Facebook, Twitter and LinkedIn.

Nevertheless, the findings of the current study showed that Flickr, Bebo, Social Bookmarking, E-Portfolio and Teacher Tube were used by 5- 10% of the academic respondents. This signifies a general low awareness and use of these aforementioned tools by academics and in contrast a wide usage of Facebook, LinkedIn and WhatsApp (See results presented in Tables 7a). Generally, the study indicates a general wide usage of various Web 2.0 technologies among academics in U.I and FUNAAB. Studies on the use of Web 2.0 among academics were limited to specific tools for instance, Atulomah and Onuoha (2011) narrowed their study to the use of online social networks such as Facebook, Twitter and LinkedIn by academic librarians; while Ajise and Fagbola (2013) focused on specific Web 2.0 technologies such as Facebook, LinkedIn, wikis, Twitter, YouTube and podcasting. Also, the aforementioned studies employed only quantitative methods for data collection and analysis. The present study intends to fill these gaps by examining and including a wide range of Web 2.0 technologies used by academics not considered in previous studies. Also, this study adopted the mixed method approach using results from the interview to support findings gathered through the use of questionnaires. The current study therefore contributes to existing literature by revealing a range of new Web 2.0 technologies that are used by academics in the surveyed universities. The present study also indicates an increased awareness and use of a range of new Web 2.0 technologies such as WhatsApp, Twitter, 2go, Wikipedia, Instant messaging, Skype, newsgroups or online forums and blogs among academics.

Furthermore, findings revealed that social networking tools (particularly, Facebook, WhatsApp, 2go, Twitter, Badoo, LinkedIn, MySpace and Flickr), wikis, YouTube, Instant Messaging, blogs, Skype, newsgroups/online forums and RSS feed were widely used by undergraduate students. It was revealed that Web 2.0 such as social networking (99.7%), wikis (85.2%), YouTube (81%), Instant Messaging (80%), Blogs (66%), Skype (59%) and newsgroups/online forums (53%) were popularly used among students. The result however indicates that the majority of students were more acquainted with SNSs and that Facebook

(94.6%), WhatsApp (94%), 2go (81.6%) and Twitter (78.9%) were most widely used. Generally, it can be inferred from the results that there is a high level of awareness of Web 2.0 technologies among students. Similarly, Facebook, WhatsApp, 2go, Wikipedia, YouTube and Instant Messaging were found to be the most popular Web 2.0 technologies used by students. Some of these findings are in line with previous related studies (Usoro, Echeng and Majewski 2013; Diyaolu and Rifqah, 2015 and Echenique, Molías and Bullen 2015).

Studies conducted in developed countries on the use of Web 2.0 technologies and social networking tools also support findings of the current study on the high level of awareness and use of SNSs and other Web 2.0 technologies by students in the surveyed Nigerian universities. For instance, Sandars and Schroter (2007) conducted a semi-structured online questionnaire survey on 637 medical students and 601 qualified doctors on the British Medical Association's membership database. The study focused on identifying familiarity with Web 2.0 technologies and barriers to use for medical education. The results of their study indicated a high use of instant messaging, media sharing and social networking tools by young medical students below 24 years of age. Similarly, the students were reported to be familiar with all the Web 2.0 options particularly instant messaging, blogs and social networking. More recently, Echenique, Molías and Bullen (2015) presented an in-depth interview on how 20 second-year education students at a public university in Catalonia, Spain employed digital technologies in their social and academic lives. Homogeneous data was collected using the convenience sampling method. It was reported that social networks and WhatsApp were the most important applications used by students. Similarly, Garoufallou and Charitopoulou (2011) in a study on the use of Web 2.0 technologies by students in Greece found that Facebook, YouTube and Flickr were the most used Web 2.0 technologies by students. The forgoing study also revealed that most of the students were quite familiar with the term "Web 2.0", but required further knowledge on how to use the related applications. The familiarity of social networking tools by students is not unexpected as they are familiar with new technologies and that is why they are commonly referred to as „digital natives" or „Net generation" (Prensky 2001; Oblinger and Oblinger 2005, Lei 2009; Jones, Ramanau, Cross and Healing 2010; and Karnad 2013).

Diyaolu and Rifqah (2015) in a more recent study examined the use of Web 2.0 among undergraduate students in selected Nigerian private universities. Questionnaires were used to gather data from 240 students with a return rate of 71.6% for Crescent University, Abeokuta

and 62.5% for Caleb University, Lagos. The finding of their study reported a generally low awareness of Web 2.0 among students. However, the study further revealed that 61-91% of Crescent students and 53-85% of Caleb students used podcasts, Facebook and Twitter. The authors noted that the low awareness was due to less familiarity with the term “Web 2.0” which did not determine students’ usage of the tools. Aramide and Akinade (2012) investigated the extent of awareness and use of Web 2.0 technologies among 210 university undergraduate and postgraduate students in Nigeria and discovered a low level of awareness and general use of the technologies. Likewise, Usoro, Echeng and Majewski (2013), Echeng and Usoro (2014a) and Echeng and Usoro (2014b) reported a low level of awareness and use of Web 2.0 technologies by academic and students in Nigeria when compared with their counterparts in the United Kingdom (UK). Studies on Web 2.0 by Mazman and Usluel (2009 and 2010), Onat (2010), Hough and Neuland (2013), Ajise and Fagboola (2013), Yavuz (2014) and Celik, Yurt and Sahin (2015), have revealed social networking tools such as Facebook and Twitter as important for educational communication, social communication, resource sharing and collaboration.

Despite the fact that students from both universities surveyed were well acquainted with most of the Web 2.0 technologies, the study indicates a general low awareness and use of Social Bookmarking, Bebo, E-portfolio and Teacher Tube as less than 15% of the student respondents used them (see results presented in Table 7b). In addition, findings of the study indicate that students were familiar with a wider range of Web 2.0 technologies than the academics, although there was high usage of social networking tools especially Facebook, by both. This result may suggest that the gap between the use of technologies among the digital natives (students) and the digital immigrants (academics) seems to be narrowing. Guo, Dobson, and Petrina (2008) in a study conducted in Canada reported no significant digital divide or differences between digital natives (students) and immigrant users (academics). This led Lei (2009:88) to suggest that “there might not be such a distinct boundary between the digital natives and the digital immigrants in terms of technology use”. The findings of the current study similarly suggest that there may be no significant digital divide between academics and students in the use of specific Web 2.0 technologies.

6.3.2 Purpose of Academics and Students' Use of Web 2.0 Technologies

The purposes for which academics and students use Web 2.0 technologies have increased considerably in prominence over the years. The current study revealed that Web 2.0 technologies were used by academics for communication (94.4%), searching for needed information (92.8%), research activities (71.3%), academic related activities (83.6%), preparing lecture notes and materials (82.1%), accessing teaching resources (52.8%), sharing educational materials (69.2%), sharing specific knowledge related to teaching (47.7%), personal activities (71.3%), news updates (73.8%), fashion-related information (15.4%), social based activities (64.6%), online group discussion (52.8%) and giving assignments or tests to students (46.7%), among others. The current finding indicates that academics in the universities surveyed mostly (67% to 97%) used Web 2.0 technologies for communication, searching for needed information, academic-related activities, personal activities and research activities. The findings of the current study is in tandem with Ajise and Fagbola's (2013) finding that academics (who were referred to as "lecturers" in their study) commonly used Web 2.0 in engaging the students in conversation, communicating, relating and collaborating with colleagues and also for sharing of educational materials. Okereke (2014) in a study on awareness, competence and use of social media in teaching by lecturers in universities in the Southeast of Nigeria found that about 86.2% academics used social networking tools for social activities and disseminating information about day-to-day events. Additionally, Chawinga (2014) in an investigation on the Web 2.0 technologies to undertake TAL activities at Mzuzu University in Malawi found that most academics (up to 76.5%) used Web 2.0 technologies to upload lecture notes or teaching materials, search for content, store lecture notes, hand out assignments to students and receive feedback from them, as well as to carry out collaborative educational activities. These findings are in line with those obtained in the current study which demonstrates that Web 2.0 technologies are useful for teaching purposes.

The ongoing study, unlike some previous related studies, revealed the resourcefulness of Web 2.0 technologies such as Wikipedia, Facebook, WhatsApp, YouTube, Twitter, Instant messaging, Skype, newsgroups or online forums and blogs as academics have a tendency to use them more than other Web 2.0 technologies. In a qualitative study conducted by Duboff (2005) at Yale University in the United States, it was found that academics' use of Facebook had helped them break the barriers that existed between them and the students. Morin (2007) in

a similar tone noted that Facebook was building other educational platforms that would guarantee more dynamic ways of creating, connecting and collaboration to enhance TAL in the classroom. In recent times, Facebook has made greater achievements and has become irresistible to many academics and other members of the academic community so much that some envisage this might lead to addiction (Zaremohzzabieh, Samah, Omar, Bolong and Kamarudin (2014:11), if not properly managed. Findings from studies by Ajise and Fagbola (2013) and Okereke (2014) have revealed a high level of awareness about Web 2.0 technologies among academics in Nigeria. In contrast, Mbatha (2013) argues that academics have not fully embraced the use of Web 2.0 technologies for educational purposes. This corresponds with the findings of Aramide and Akinade (2012) and Echeng and Usoro (2014) who noted that the passion for the use of Web 2.0 technologies for academic purposes in Nigeria among academics was still low. However, the authors in agreement with Olasina (2011) found that wikis and newsgroups/online forums were mostly used by academics for research purposes in Nigeria.

The current study also revealed that undergraduate students used Web 2.0 technologies for communication (94.6%), searching for needed information (87%), research activities (77%), academic-related activities (69.8%), accessing learning resources, lecture notes and materials (73.4%), sharing educational materials (52.3%), sharing specific knowledge related to learning (58.6%), personal activities (74.3%) and social based activities (69.5%), news updates (77%), fashion-related information (39.6%), online group discussion (65.9%), and submitting assignments or tests (54.6%), among others. The current finding indicates that students (70% to 95%) in the universities surveyed mostly used Web 2.0 technologies for communication, searching for needed information, research and personal activities and academic-related activities. The findings of the current study are in agreement with existing literature on the usefulness of Web 2.0 to students. Chawinga's (2014) study on Web 2.0 technologies use for TAL activities at Mzuzu University in Malawi found that a substantial number of students, between 50.7% and 94.1%, used Web 2.0 technologies to search for information, to communicate with lecturers, to submit assignments, to communicate with friends on academic work and to share content with fellow students. Maloney (2007) emphasized that Web 2.0 technologies assist students to create and share information with others. These findings are in

tandem with the ones found in the current study which explain that Web 2.0 technologies are useful for learning purposes.

The ongoing study revealed the versatility of Wikipedia, Facebook and social networking tools as students tended to use them more than others tools. Kanelechi, Nwangwa, Yonlonfoun and Omotere (2014) examined the influence of social media usage on the research skills of undergraduates at six different universities from the six geo-political zones in Nigeria. The study found that undergraduates relied on, and frequently used Wikipedia as a major source of information. They also found that the students used Facebook more to either generate ideas from colleagues about their research focus than they used Wordpress or Blogger to develop creative writing skills. Other studies ranked Facebook as the most used SNS among university students (Ophus and Abbitt, 2009 and Shanaz 2010). Similarly, Kuss and Griffiths (2011) found that about 57% of students used SNSs while more than 68.5% of young adults and teenagers used Facebook on a regular basis. Those students that used Facebook did so specifically because it helped them to stay in touch with friends not regularly seen. In the same way, Mack, Behler, Roberts and Rimland (2007) in an earlier study identified Facebook as an excellent tool for communicating with students, while Kosik (2007) found that some students at Pennsylvania State University used Facebook to contact classmates about information on assignments. Findings on Facebook's usefulness in enhancing education are consistent with the discovery of recent studies. For instance, Zaremohzzabieh et al. (2014) found that Facebook was one of the most significant and extensively used means of communication. Facebook has also made numerous accomplishments and is desired by many students and other members of the academic community so much that some anticipate that its overuse this might lead to addiction (Zaremohzzabieh et al. 2014:11) among students, if not properly managed. More recently, Diyaolu and Rifqah (2015) in a study conducted in Nigeria confirmed that students commonly used Web 2.0 technologies especially Google docs, Wikipedia, blogs and social networking tools (including Facebook and Twitter) for sharing school assignments, school information and friendship. Downes (2007) argued that Facebook is unique among other SNSs and that its use is deep-seated among members of the academic environment.

However, the current study results as presented in Section 5.3.1.3 indicates variation in the purpose of usage of these Web 2.0 technologies among academics and students. For instance, while up to 83.6% of academics employed Web 2.0 for academic related activities, only 69.8%

of students did. Again, more students (up to 65.9%) than academics (up to 52.8%) used Web 2.0 for online group discussion. The variation in what academics and students used Web 2.0 technologies for may be attributed to factors such as knowledge of the technologies' functionality and individual tasks and responsibilities. Findings gathered from Heads of Faculties and librarians also support the findings from the qualitative study, indicating that academics and students utilized Web 2.0 technologies for academic, personal, research and educational purposes. The current study contributes to the body of knowledge discussed by identifying a number of activities for which academics and students used Web 2.0 technologies.

6.4 Use of Web 2.0 Technologies for TAL Purposes

The use of Web 2.0 technologies for TAL purposes in Nigerian universities seems to be taking a new and positive dimension towards greater educational achievements. This section presents findings on the extent to which Web 2.0 technologies have been integrated in TAL.

6.4.1 Academics and Students' Use of Web 2.0 Technologies for TAL Purposes

Findings on academics' use of Web 2.0 technologies for teaching purposes identified SNSs (especially Facebook, WhatsApp and LinkedIn), Wikipedia, Instant messaging, YouTube and Skype as the most widely used Web 2.0 technologies. It was found that academics (up to 24%) used newsgroups or online forums and blogs for teaching purposes. However, the use of RSS Feeds, Wiki-how, podcasts/webcasts/vodcasts, E-Portfolios, Teacher Tube, My Space and other social networking tools such as 2go, Badoo and Bebo for teaching purposes was limited (see results presented in Table 9a). The minimal use of these tools may be attributed to the lack of awareness, familiarity, interest, necessary skills, and unavailability of resources or facilities to help facilitate their use for teaching. Majhi and Maharana (2011) studied the familiarity of academics, students and researchers at Utkal and Sambalpur Universities in India with Web 2.0 technologies using a close-ended structured questionnaire. The study found a very high level of awareness and knowledge of certain Web 2.0 technologies, particularly Facebook, Wikis and Twitter which were used by 98%, 95% and 91% respectively. However, the authors stated that lecturers lacked the necessary knowledge and skills to use some of these Web 2.0 technologies, such as RSS Feeds, blogs, and social bookmarking for TAL. This finding also corresponds with those of other researchers such as Ajjan and Hartshorne (2008), Azab, Abdelsalam and

Gamal (2013) and Chawinga (2014) who found that academics rarely used these tools for TAL purposes. Ugwuogo (2013) observed that even though institutions in developed countries have advanced the use of new technologies (such as the Web 2.0) in classrooms, developing countries (including Nigeria) were yet to begin.

The findings of the current study however, indicates a high use (up to 63%) of some Web 2.0 technologies such as Facebook, WhatsApp, LinkedIn, Wikipedia, Instant messaging, YouTube and Skype, for teaching purposes in the surveyed universities. These findings seem to conform with Ajise and Fagbola's (2013) who found that academics in Nigerian universities mostly used Web 2.0 technologies such as Facebook, YouTube, LinkedIn, Twitter, wikis, and podcasting for TAL purposes. However, the current study refutes the finding of Ajise and Fagbola on high use of Twitter and podcasting for teaching purposes. Okoreke (2014) in a survey on the use of social media in teaching by academics in Southeast Nigeria found that academics mostly used Facebook 50(86.20%) and blogs 8(12.06%) for TAL purposes. According to Junco, Heiberger and Loken (2010) academics used social media and some other Web 2.0 technologies in education to support collaboration, sharing of information, participation and community building.

Furthermore, the current study revealed that the overall usage of Web 2.0 for teaching purposes by academics in FUNAAB was higher than it was at U.I. This may be explained by the age difference recorded between academics in the two universities. As discussed in Section 5.2.4, there were younger academics (40 years and below) in FUNAAB (59.7%) than in U.I (44.2%). Given this, it can be inferred that younger academics (who can be grouped as digital natives) were more likely to adopt and use technologies faster than the older counterparts (digital immigrants). Similarly, Mbatha (2013) argued that some academics did not adopt the use Web 2.0 in their teaching because they believed that these technologies did not have any relative advantage in improving the way they taught and they also found them not to be user-friendly. From a broad perspective, academics who have long been involved with the traditional methods of teaching may be difficult to be influenced into using Web 2.0 and other new technologies for teaching purposes. In this regard, evidence from Korte and Husing's (2006) study revealed that it was a great challenge to motivate teachers who had longer teaching experience to use ICTs in class in some countries such as Germany. Nevertheless, the foregoing study found that the vast majority of European academics considered the use of ICT

in classes as greatly beneficial. This result may suggest that older academics with a long history of teaching have started developing interest in the use of technologies for academic and teaching purposes.

Findings on students' use of Web 2.0 technologies presented in Table 9b show SNSs (particularly, WhatsApp, Facebook and Twitter), Wikipedia, YouTube, blogs, Instant messaging, newsgroups or online forums as the most widely used Web 2.0 technologies for learning purposes. The current study indicates a high use of some Web 2.0 such as Wikipedia (83%), WhatsApp (67%), Facebook (67%) and YouTube (67%) for learning purposes in the surveyed universities. Likewise, the use of blogs (44%), Instant messaging (44%) and newsgroups/online forums (40%) and Twitter (39%) were found less common among the students. These findings contradict Tunde-Awe (2015) who, in a survey on the relevance of online social networking media in English as a Second Language among students in a Nigerian University, found that only 32% of the respondents used Facebook for academic purposes. Likewise, Diyaolu and Rifqah (2015) reported that students found Wiki/Wikipedia (up to 95.4%), YouTube (up to 65.3%), Facebook/Twitter (up to 54.7%) and blogs (up to 50%) useful for learning purposes in selected Nigerian private universities.

However, the finding of the ongoing study showed that students (below 25%) scarcely used Skype, Wiki-how, LinkedIn, RSS Feeds, podcasts/webcasts/vodcasts, My Space and Badoo. In addition, Social Bookmarking, Teacher Tube, Flickr and Bebo were hardly used for learning purposes. This low usage of other tools may be attributed to lack of awareness about the use of those tools for learning purposes; lack of required skills; and inadequate resources or infrastructures to help facilitate their use for learning purposes. The current findings seem to suggest that although students enjoyed using SNSs, Wikipedia, YouTube, blogs, Instant messaging and newsgroups/online forums among others Web 2.0 technologies for learning purposes; they lacked the understanding of the usefulness of other Web 2.0 technologies. This is line with Kennedy et al. (2007) in a study in Australia which found that more than 80% of students surveyed in their study had never used podcast and wiki, while more than 50% had never used a SNS for TAL purposes. According to Garoufallou and Charitopoulou (2011), most students lacked knowledge on the importance and use of Web 2.0 technologies for academic purposes.

Kabilan, Ahmad and Abidin (2010) in a study on the use of Facebook for learning among students in a Malaysian university found that students engaged in meaningful language-based activities and interaction. Kosik (2007) in a related study found that some students used Web 2.0 technologies such as Facebook for academic reasons, particularly to connect with their classmates to get information about assignments. The author noted that these students used Facebook because it helped them in delivering information and responses faster. Zakaria, Watson, and Edwards's (2010) survey of 250 undergraduate students in a Malaysian university discovered that students were well familiar with social technologies and therefore felt contented using them for educational and learning purposes. The findings also agreed with Irwin, Ball, Desbrow and Leveritt (2012) study among students in an Australian university which found that 85% of the students used Facebook and the majority also agreed to use Facebook in future for learning purposes. The propensity and inclination of students towards using Web 2.0 could be attributed to the perceived value which they derived from using them. Richards (2004:342) discovered from a study that young students tended to be more rapid in the uptake of ICT than older academics (teachers), and challenged academics to „go beyond the traditional separation between top-down theory and content“ and the „mere procedural skills“ to a more innovative method of teaching.

The findings in the current study also revealed some variations in the use of certain Web 2.0 technologies by students in the surveyed universities. For instance, more students from FUNAAB (93.7%) used SNSs for learning purposes than their counterparts from U.I (79.3%). Furthermore, students from U.I. used wikis for learning purposes more than those in FUNAAB (see results in Table 9b). This indicates that the use of various Web 2.0 technologies for learning purposes may vary from one university to another. Findings from the interview report suggest that these Web 2.0 technologies are used by students based on their applicability to their course work. Availability and access to the internet may also contribute to the variation reported in students' use of these technologies for learning purposes. Korte and Husing (2006) in a related finding revealed that most students (86%) were more motivated to learn when internet facilities were available and used for TAL purposes in class. The finding in the current study established that FUNAAB made internet access freely available to staff and students compared to U.I where access to the internet was self-funded. The findings from Bola and

Ogunlade (2012) and Salaam (2003) also substantiates the argument that students do not have as much access to the internet service as the staff in Nigerian Universities.

Web 2.0 technologies have enormous potential to enhance the TAL experience. However, several issues in the Nigerian universities seem to affect usage of some of these technologies (that is, Skype, Wiki-how, LinkedIn, RSS Feeds, podcasts/webcasts/vodcasts, My Space and Badoo, Social Bookmarking, Teacher Tube, Flickr and Bebo) for TAL purposes. The issues affecting usage of Web 2.0 include (among others) lack of funding, exposure, technical support, institutional policies, inadequate internet facilities and bandwidths problems (Wright, Dhanarajan and Reju 2009; Sulaiman, Embi and Hamat 2011; Emmanuel, Ebiere and Vera 2013; and Mohamad, Salleh, and Salam 2015). The problem affecting Web 2.0 access in public universities seems to be a “non-issue” in private universities where Salaam and Adegboire (2010) found that internet facilities are available without restriction. Fasae and Aladeniyi (2012) are also of the view that a number of universities in Nigeria are taking significant steps to improve information and communication policies and consequently that this will have positive impact on the uptake of Web 2.0 for TAL purposes.

6.4.2 Frequency of Web 2.0 Technologies Utilization for TAL Purposes

Respondents were asked how frequently they used various itemized Web 2.0 technologies for TAL purposes within the last three months. About „three months“ is the ideal duration of coursework or study for one semester in Nigerian Universities (Hassan, Khan and Lalitha 2016:260) before examinations start. The general findings revealed that most of the Web 2.0 technologies were occasionally used for TAL purposes. Similarly, Echeng, Usoro and Majewski (2013), Echeng and Usoro (2014), Usoro and Echeng (2015) and Diyaolu and Rifquah (2015) established a general low usage of Web 2.0 technologies for TAL in Nigerian universities. The finding of the current study revealed that some Web 2.0 technologies were more frequently used than others, while some had never been used for TAL purposes (See results in Tables 10a and 10b).

The findings further revealed that most academics (up to 98%) had never used Social bookmarking, Bebo, Teachertube, Flickr, Badoo, E-portfolio, MySpace, 2go, podcasts/webcasts/vodcasts, Wiki-how, RSS feeds, Twitter and Blogs for teaching purposes in the previous three months. The finding is anticipated due to the low awareness and use of these

tools that had been reported in the results presented (see Section 6.3). This finding may suggest that these technologies were not accepted or recognized as teaching tools by the academics. However, Instant messaging, Wikipedia, WhatsApp, YouTube, LinkedIn, Facebook were identified as being frequently used for teaching purposes by up to 21% of the academics. Further findings showed that only 13.4% and 11.3% of academics occasionally used Skype for teaching purposes. It can therefore be inferred from the findings that the few academics who used Web 2.0 technologies frequently used only tools such as Instant messaging, Wikipedia, YouTube, WhatsApp, LinkedIn and Facebook.

The findings of Ajjan and Hartshorne's (2008) in the context of Florida State in the United States revealed low faculty intention to adopt Web 2.0 technologies for teaching purposes. The study found that 55%, 62.2%, 74% and 80% of academics had never used wikis, blogs social networking and Social Bookmarking respectively; neither did they plan to use them in the near future. In addition, only 19.6%, 9%, 6% and 4% of academics occasionally used wikis, blogs, social networking and Social Bookmarking respectively to supplement their in-class lectures. However, Ajjan and Hartshorne's findings may not be consistent with recent studies on the use of Web 2.0 because these facts were reported when the use of these tools were just starting to gain ground. Dansarki, Ayub and Kadir (2015) in this regard averred that there is advancement in the use of new and emerging technologies such as the Web 2.0 for TAL in classrooms, in developed countries. Although the overall findings of the current study indicated that academics had not frequently used Web 2.0 technologies for the purpose of teaching, academics are gradually becoming familiar with these tools.

On the other hand, findings on students' frequency of use of Web 2.0 technologies for learning purposes revealed that WhatsApp, Facebook and Wikipedia were the tools that were very frequently or frequently used by 38% to 49% respectively of the students for learning purposes. In addition, it was revealed that a population of students of between 20% and 35% used YouTube, Instant messaging, blogs, Skype and 2go occasionally or rarely for learning purposes. The current finding corresponds with that of Guarino, Leopardi, Sorrenti, De Antoni, Catania and Alagaratnam (2014) whose study compared the preferences of medical students' use of internet-based methods with the traditional TAL method using an online questionnaire.

The study found that Wikipedia was one of the most frequently used website by students to gain information on their learning activities.

Similarly, Demirbilek (2015) employed a combination of quantitative and qualitative methods to examine the use of wikis and Facebook for providing peer feedback on students' instructional material and projects in Turkey. The study found that students used wiki and Facebook more frequently as these aided the peer feedback process. WhatsApp also as a social networking tool has in recent times gained much popularity among students and academics and is generally used by members of the community for communication purposes. The current finding revealed WhatsApp as one of the main and frequently used Web 2.0 technologies for learning purposes. This result is consistent with the findings from Yeboah and Ewur (2014) which revealed a high level of WhatsApp usage and other social networking tools among students in tertiary institutions in Ghana. However, the study found that the use of WhatsApp had negative impact on the students' academic performances. Similarly, Lam (2015) studied students' experiences in collaborative learning using social media tools in a blended learning course, which referred to a course that involved the use of both traditional and web-based methods of learning. Lam (2015) found that students used WhatsApp, Skype and Facebook to engage in learning activities. These tools were further found to have helped the students in sharing, transferring and creating knowledge among their peers in either asynchronous or synchronous communication modes. Thus it can be deduced that WhatsApp, as with some other Web 2.0 tools such as Facebook, Wikipedia, YouTube, Instant messaging, 2go, blogs and Skype possesses features that can facilitate learning and can therefore be beneficial to the learning environment.

The finding in the current study further revealed that most students (84.3%) had never or not used the following Web 2.0 technologies within the last three months: Bebo, TeacherTube, E-portfolio, Flickr, Social Bookmarking and Badoo for learning purposes. The finding is not surprising as low awareness and use of these tools for general activities had been reported in the results presented (See Section 6.3). This finding is consistent with Hartshorne and Ajjan's (2009) study that found a good number of students did not use Social Bookmarking and blogs (71% and 56% respectively) in the educational context, but rather preferred them for social activities. Echeng and Uroso (2014) also found very low weekly use of Web 2.0 for learning purposes by students in Nigeria. The current study found that students did not use some Web

2.0 technologies which included Bebo, TeacherTube, E-portfolio, Flickr, Social Bookmarking and Badoo for various reasons including lack of awareness and skills. The findings also revealed that a majority of students (up to 98%) had never used Bebo, TeacherTube, E-portfolio, Flickr, Social bookmarking and Badoo for TAL purposes. This finding may suggest that these tools were not accepted or recognized as learning tools by the students.

The results on the use of YouTube and Instant messaging for learning purposes among the students were very low and occasional (used between three to five times in three months). However, the use of Skype and Moodle for teaching purposes and Skype and 2go for learning purposes in the universities was found to be sporadic. This result affirms the supposition of Anunobi and Ogbonna (2012) and that of Echeng, Usoro and Majewski (2013) that Nigerians are not acquainted with using Web 2.0 technologies for TAL purposes. Similarly, Lwoga (2012) explained that the adoption and use of Web 2.0 for TAL purposes is still generally very low in African universities; except for countries such as South Africa. Okonedo, Azubuike and Adeyoyin (2013) in a study on the frequency of use of Web 2.0 technologies found that among the Web 2.0 technologies, Instant messaging and Wikis were frequently used while webcasts and podcasts were reported to be used on a monthly basis. The results suggest the need to create awareness and promote the use of other Web 2.0 technologies for TAL purposes in Nigeria universities.

Although the current study revealed a higher frequency of use of Web 2.0 by students for learning purposes than by academics for teaching purposes; there was frequency of use of specific Web 2.0 technologies by academics and students respectively. For instance, it was revealed that about 37% of students had used “2go” for learning purposes while about 92% of academics had never or not used it for three months for teaching purposes. Yet, it was interesting to find that about 31% of academics had used “LinkedIn” for teaching purposes either once or more times while only 24% of students used it during the same period for learning purposes. This result corroborates the finding on low use of Web 2.0 technologies for teaching than for learning purposes in the surveyed universities (see results presented in Section 6.4.1). Similarly, a high and significant use of YouTube and LinkedIn for teaching purposes was noted, though among very few of the academics (up to 18%). However, the 18% of academics who used YouTube did so very frequently.

Correspondingly, it was discovered from the qualitative findings of this study (see Section 5.4.2) that the use of Web 2.0 technologies had improved significantly within the last 5-6 years of their use within the university community in the two universities surveyed. Findings also revealed that Web 2.0 technologies such as Wikipedia, YouTube, Facebook, blogs and Google+ were the ones popularly used for TAL purposes. The general use of the common Web 2.0 technologies may be attributed to easy access through mobile phones, tablets, laptop and any other portable devices connected to the internet.

6.5 Factors Influencing Use of Web 2.0 Technologies for TAL

In the bid to investigate the factors that influence the use of Web 2.0 Technologies for the purpose of TAL among academics and undergraduate students in the federal universities, research questions 3, 4, 5 and 6 were formulated as presented in Section 1.3.2. The major factors (System Quality, Information Quality, and Service Quality, Attitude, Intention to Use, Media Synchronicity and Net Benefits) were highlighted from the theories (that is, the D&M model, TAM and MST) that guided the study. Discussion from the findings from respondents' reaction to the various statements made in the questionnaire, consultations with the Heads of faculties/colleges, librarians and hypothetical statements (as stated in Section 1.3.3) are presented in this section.

6.5.1 System Quality, Information Quality and Service Quality

This sub-section is focused at answering the key question that investigated how system quality, information quality and service quality influenced attitude towards use of Web 2.0 technologies for TAL purposes in the federal universities in Nigeria. The corresponding hypothesis stated that there was no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies for TAL. Responses were analyzed to determine how system quality, information quality and service quality (independent variables) influenced attitude towards use of Web 2.0 technologies for TAL (dependent variable). The hypothesis was tested using regression analysis and stepwise regression analysis.

System quality, information quality and service quality variables in the D&M model were three major measurements of IS or technology success. Findings of the study revealed that the

variables of service quality, system quality and information quality have a joint significant influence ($p < 0.05$) on academics' attitude towards the use of Web 2.0 for teaching purposes. According to Davis, Bagozzi and Warshaw (1989), attitude entices adoption and use of technological tools. Lwoga (2013) found that the quality factors did influence attitude and behaviour of academics (specifically librarians) towards the use of Web 2.0 technologies. However, findings of the study showed that system quality did not significantly ($p > 0.05$) influence academics' attitude towards the use of Web 2.0 technologies for teaching purposes. This suggests that only the two quality factors of the D&M model service quality and information quality majorly influenced academics' attitude to the use of Web 2.0 technologies for teaching purposes.

Similarly, findings of the study revealed that service quality, system quality and information quality have a joint significant influence ($p < 0.05$) on students' attitude towards the use of Web 2.0 for teaching purposes. However, the current findings showed that system quality did not significantly ($p > 0.05$) influence students' attitude towards use of Web 2.0 technologies for teaching purposes. This again suggests that only the two quality factors of the D&M model (information quality and service quality) majorly influenced students' attitude to the use of Web 2.0 technologies for teaching purposes. The hypothesis corresponding research Question Three is therefore rejected. This indicates that a significant relationship exists between system quality, information quality, service quality and attitude towards the use of Web 2.0 technologies for TAL purposes respectively.

Existing literature reveals that service quality and information quality variables of the D&M model are important factors in delivering technology-based services to users (Cheng 2012; Lee and Yang 2013; Kallweit, Spreer and Toporowski 2014 and Demirci and Kara 2014). For instance, Kallweit, Spreer and Toporowski (2014) found that attitude had a significant and positive impact ($\beta_4 = 0.669$; $p < 0.001$) on the perceived service quality of self-service information technologies in retail business. Similarly, service quality was found by Lee and Yang (2013) to be a predictor of the intention to use self-service information technologies. In addition Ellahi and Bokhari (2013) evaluated the quality factors of SNSs from users' perspective and examined their influence on influencing users' perceptions. The study found that perceived quality had a direct and intense effect on the degree of the user's perception about website quality.

Likewise, previous studies such as Petter, DeLone and McLean (2008), Petter and McLean (2009), Halonen, Acton, Golden and Conboy (2009), Masrek, Jamaludin and Mukhtar (2010), Urbach and Müller (2012), Cheng (2012) and Lwoga (2013) (discussed in Section 3.4.2) revealed that information quality had significant positive impacts on perceived usefulness and use and user satisfaction. In the same vein, Butler (2001) had previously pointed out that a higher quality (be it information, service or system quality) will increase users' positive attitudes. Lin (2008) found that higher system and information quality actually increased user satisfaction. User satisfaction generally has been found to lead to increased positive attitude towards the use of information technologies such as the Web 2.0. Zheng, Zhao and Stylianou (2013) in an investigation on the influence of information quality and system quality on users' continuance intention to participate in "Virtual Communities" found that user satisfaction ($R^2 = 69.6\%$) essentially depended on information quality, system quality and individual benefits. User satisfaction was identified by Zheng, Zhao and Stylianou (2013) as one of the noticeable factors that measured user's attitude. Liu, Arnett and Litecky (2000) found that a well-designed website would generate favorable attitude toward the website and its products. Evidently, IS and Web 2.0 technologies with good service quality and information quality will attract favourable attitude from users.

The findings of the current study showed that information quality and service quality had considerable influence on academics and students' attitude to use of Web 2.0 technologies, particularly for TAL purposes. This result is perhaps due to the benefits that can be derived from the use of Web 2.0 technologies such as Wikipedia, Facebook and YouTube in education. Another reason could be attributed to the popularity of the tools as they were found to be more commonly used by academics and students than some other Web 2.0 technologies. This affirmed the findings of Butler (2001), Olatokun and Owoeye (2012), Zheng, Zhao and Stylianou (2013), Lwoga (2013) and Ellahi and Bokhari (2013) that service quality and information quality are important predictors of attitude to use technologies.

Again, Lwoga (2013) emphasized the key role service quality played on users' usage intention by revealing that service quality (among other qualities such as information quality and system quality) had the strongest effect on intention to reuse Library 2.0 among undergraduate university students in Tanzania. Makokha and Ochieng (2014) in a study in Kenya found that service quality in the D&M model has a significant impact on use and user satisfaction. Further

findings from Ramayah and Lee (2012) showed the positive impact of service quality ($\beta = 0.30, p < 0.01$) on continuance intention to use the e-learning systems in Malaysia. Although Olatokun and Owoeye (2012) focused on users of online banking, the present study is similar in terms of the finding on the location of study which is Nigeria. Both studies found positive and significant influence of service quality construct on users' attitude towards use of ISs (specifically online technologies). Thus, it can be deduced from the findings that the more users gain understanding and support on the use of Web 2.0 technologies and other ISs, the more a positive attitude is developed towards using these tools.

In addition, the findings showed that most academics and students concurred that information quality had a positive influence on the use of Web 2.0 technologies for TAL purposes. For instance, the majority of academics (up to 87%) strongly agreed or agreed that Web 2.0 technologies made it easy for them to prepare teaching materials; provided them with sufficient information for teaching; provided meaningful and up-to-date information; allowed information to be accurately presented; and enabled timely transfer and reception of information. Similarly, the findings showed that the majority of students (up to 86%) strongly agreed or agreed that Web 2.0 technologies: made it easy for them to obtain learning materials; provided them with sufficient information for learning; provided meaningful and up-to-date information; allowed information to be accurately presented; and enabled timely transfer and reception of information. This indicates that most students agreed that information quality had a positive influence on use the of Web 2.0 technologies for learning purposes. The results suggest that information quality has a positive influence on use of Web 2.0 technologies for TAL. Likewise these findings imply that information quality factors such as availability, relevance, timeliness, usability, information reliability, understandability, accuracy, precision, completeness, currency, personalization and security (Delone and Mclean 2004; Masrek, Jamaludin and Mukhtar 2010; Okechi and Kepeghom 2013; and Lwoga 2014) and measures of service quality such as efficiency, ease of use, system functionality, security, responsiveness, assurance, reliability, empathy and user friendliness (DeLone and McLean 2003; Hasan and Ilias 2008; Ozkan and Koseler 2009; and Ellahi and Bokhari (2013) influenced academics and students' attitude towards the use of Web 2.0 technologies for TAL. These results suggest that proper awareness of ICTs will encourage the use of Web 2.0 for TAL purposes.

A number of previous studies (DeLone and McLean 2003; Holsapple and Lee-Post 2006; Lin 2008; Butler 2001; Olatokun and Owoeye 2012; Zeng, Zhao and Stylianou 2013; Lwoga 2013; and Ellahi and Bokhari 2013) arrived at the conclusion that information quality is an indispensable factor in determining use and success of IS. However, the effect of information quality on the attitude towards use of IS was not considered in many of the previous studies. Similarly, much existing literature on service quality mostly focuses on effect or impact of attitude towards system use; use intention or behaviour, net benefits and users satisfaction (Ham and Hayduk 2003; Hasan and Ilias 2008; Tella 2011; Ramayah and Lee 2012; Lwoga 2013; and Ndanusa, Harada and Abdullateef 2014). The findings of the present study in respect of service quality confirm the findings of Olatokun and Owoeye (2012) and Lwoga's (2014b) on the significance of service quality constructs on users attitude. They found that technical guidance and support (one of the matrix for measuring service quality) enhanced service quality and students' technology acceptance (Lwoga 2014a and Harshorne and Ajjan 2009). Findings on service quality also showed that the majority of the academics and students agreed that service quality had a positive influence on the use of Web 2.0 technologies for TAL respectively. This may indicate that academics and students have developed strong interest in the use of Web 2.0 technologies.

System quality is regarded as a multidimensional construct that offers explanation for the usability and performance characteristics of a system, including Web 2.0 technologies (Bhatti, Baile and Yasin 2011 and Urbach and Muller 2011). The current study, as in several previous studies, considered system quality to include among other things ease of use, perceived usefulness, usability, convenience of access, availability, reliability, response time and accessibility (DeLone and Mclean 2003; DeLone and McLean 2004; Trkman and Trkman 2009; Wang and Wang 2010; Lin 2010; Lawrence 2011; Bhatti, Baile and Yasin 2011; Chua, Goh and Ang 2012 and Lwoga 2013). The findings in the current study revealed that the majority of academics (up to 89%) strongly agreed or agreed that they found Web 2.0 technologies easy to use; easy to collaborate with colleagues; reliable and useful for teaching; and helped to accomplish teaching tasks more quickly. Likewise, the current study revealed that most students (up to 88%) strongly agreed or agreed that Web 2.0 technologies were easy to use, easy to collaborate with colleagues; reliable and useful for learning; and helped them to accomplish learning tasks more quickly. Notably, responses from the majority of the

respondents suggested that all the measures of system quality would have positive influence on use of Web 2.0 technologies for TAL purposes.

Surprisingly, the findings from the regression analysis presented in Tables 15a and 15b revealed that the system quality variable in the D&M model had no significant influence on users' attitude towards use of Web 2.0 for TAL purposes respectively. This is in sharp contrast with previous studies (Delone and Mclean 2003; Trkman and Trkman 2009; Urbach and Muller 2011; Dwivedi et al. 2013, Lwoga 2013 and Makokha and Ochieng 2014) which found that system quality positively influenced users' attitude towards use or intention to use the system. Congruently, Petter, DeLone and McLean (2008) found that system quality in the D&M model had significant effects on system use in an analytical study of 18 different studies that used system quality construct. Dwivedi et al. (2013) in another study in the UK reported a significant influence of system quality ($\beta=0.328$, $p=0.000$) on actual use of RFID integrated systems. Kapoor, Dwivedi and Lal (2013) also concurred that a higher system quality would attract greater positive user intentions and use. Although these studies did not examine the direct effect of system quality on attitude, Dwivedi et al. (2013) stated that a good system quality would help form a positive user attitude, and also support more use of the technologies.

In other related studies, Olatokun and Owoeye (2012) and Moon and Kim (2001) found a significant effect of system quality, perceived ease of use and perceived usefulness on users attitude towards online technology usage. Ajjan and Hartshorne (2008) and Hartshorne and Ajjan (2009) also found that ease of use, usefulness, and compatibility (dimensions of system quality) were major determining factors of academics and students' attitude towards the use of Web 2.0 technologies. However, the present finding on the insignificance of system quality on users' attitude corroborates the finding of Zhang (2010) who observed that although information quality played a significant role in developing sense of community which could enhance the use of social networks, system quality did not in his study. Kositanurit, Ngwenyama and Osei-Bryson (2006) also found that system quality measured using reliability did not affect the utilization of system. The use of „reliability“ to measure system quality in the current study, may have led to the insignificant relationship between system quality and intention to use Web 2.0 technologies for TAL purposes respectively. In the same way, Manochehri and Sharif's (2010) investigation on the influence of classroom technology on student's learning attitude in a Qatar university showed that ease of use (another measure of

system quality) at an initial stage of technology use does not lead to increase in their use in the classroom. This variability in results on system quality could be as a result of the different context, theories, population, methodology, locations and groups of people considered in the studies.

Nevertheless, the relationships between service quality, information quality, system quality (variables of the D&M model) and attitude towards the use (variable of TAM) of Web 2.0 technologies for TAL respectively were positive in the present study. Thus, it may be inferred that the more academics and students find Web 2.0 technologies easy to use, the more they will develop a promising attitude towards using the tools for TAL purposes. This may also imply that, the better the quality of the information generated and delivered through the Web 2.0, the more positive the attitude of academics and students will be to using them for TAL purposes. Current findings on information quality suggest that academics and students will be encouraged to only use Web 2.0 technologies that can help them easily obtain and prepare TAL materials; provide sufficient and updated information; allow timely and accurate presentation; transfer and deliver information. It can therefore be inferred that the quality of information existing or generated by Web 2.0 technologies is an important determinant of attitude towards their use for TAL purposes.

Students in Halonen, Acton, Golden and Conboy's (2009:13) study agreed that the information obtained from the virtual learning environment supported them in accomplishing their degrees. Thus, the quality of information produced by an IS (such as Web 2.0) especially in a learning environment is essential for effective TAL activities. The findings of the current study suggest „attitude towards use“ as a significant factor that could be used to extend the D&M model. Likewise, the joint influence of SQ, IQ and SEQ is important when determining use of new technologies such as the Web 2.0. However, the study indicates that the service quality variable of D&M does not independently influence attitude. Based on the current findings, it would be a good idea to extend the D&M model with „attitude towards use“ variable from TAM. Besides, system quality in D&M may be disregarded when independently examining the influence of the three quality factors of D&M model on attitude towards use of Web 2.0 technologies.

6.5.2 Attitude towards Use of Web 2.0 Technologies for TAL

This sub-section focused at answering the key question, “how does attitude influence academics and students’ intention towards use of Web 2.0 technologies for TAL?” The corresponding hypothesis stated that there was no significant relationship between attitude and intention to use Web 2.0 technologies for TAL. Responses from the quantitative and qualitative data collected were analyzed to determine how attitude (independent variable) influenced intention to use of Web 2.0 technologies for TAL (dependent variable). The hypothesis was tested using regression analysis.

Attitude towards use and intention to use are major variables from TAM that were adopted in the current study. Attitude is the inner expression and perception that can give or suppress the passion for use of Web 2.0 technologies. Attitude may be in a positive or negative form. Behavioural intention on the other hand is greatly influenced by an attitude towards the behaviour, and especially in predicting the use of IS (Davis 1993; Ajzen and Fishbein 2005; and Lin 2008). Thus, TAM hypothesized that “beliefs and attitudes are related to individuals’ intentions to perform” (Teo, Luan and Sing 2008:266) activities. The overall results of the current study on attitude to use Web 2.0 technologies revealed that the attitude of academics significantly ($p < 0.05$) influenced their intention to use Web 2.0 technologies for teaching purposes. The relationship was also positive with the majority of academics in the surveyed universities conceding that they enjoyed using Web 2.0 technologies for teaching purposes. Moreover, attitude accounted for only 25.7% of the total variance on academics’ intention to use Web 2.0 technologies for teaching purposes. Similarly, the attitude of students significantly ($p < 0.05$) influenced their intention to use Web 2.0 technologies for learning purposes and the relationship was positive. The majority of students in the surveyed universities agreed that they enjoyed using Web 2.0 technologies for learning purposes. In addition attitude accounted for 40.5% of the total variation on students’ intention to use Web 2.0 technologies for learning purposes. These results suggest that „attitude towards use” had greater influence on students’ intention to use Web 2.0 for learning purposes than it did on academics’ intention to use Web 2.0 for teaching purposes. The result also suggests that certain other factors may be responsible for influencing academics and students’ intention to use Web 2.0 technologies for TAL purposes respectively. Attitude towards use is one of such factors. Thus, the study found the willingness of academics and students to use Web 2.0 technologies for TAL purposes. The

hypothesis corresponding research Question Four is therefore rejected. This indicates that a significant relationship exists between attitude towards use and intention to use Web 2.0 technologies for TAL purposes respectively.

Ajjan and Hartshorne (2008) similarly found that attitude (in TAM) best influenced academics' decision to adopt the use of Web 2.0 technology. Likewise, Hartshorne and Ajjan (2009) found that attitude significantly and positively affected students' behavioural intention to adopt Web 2.0. The studies of Ajjan and Hartshorne (2008) and Hartshorne and Ajjan (2009) also ascertained that attitude plays a substantial role in influencing the academics' and students' interest in adopting Web 2.0 technologies. Chiou (2011) conducted a survey in the Midwestern US using quantitative research methods to determine pre-service teachers' intention to use Web 2.0 applications in their future classrooms by assessing their perceptions towards the technology. Data were gathered from 125 academics and findings revealed computer attitude as a significant predictor of behavioural intention to use Web 2.0 technologies. Chiou (2011) also substantiated the current findings that attitude towards use of computer (one of the devices used to access Web 2.0 technologies) is a critical factor that predicts academics' use of Web 2.0.

Furthermore, Castillo (2012) in a descriptive survey explicitly assessed whether attitude, capability and workplace influenced academics' actual usage of Web 2.0 technologies in the classroom. Questionnaires were used to collect data from the 106 academics from the Natural Science College of different academic institutions in the urban areas of Mindanao. Academics' attitude was found to strongly and positively influence ($B = 0.626$) the behavioural intention of academics to use Web 2.0 technologies in delivering instructions, that is teaching. Thongmak (2014) in a recent investigation on factors that determine learners' acceptance of Facebook in Thailand revealed that instructor characteristics (a term the researcher used to refer to academics' attitudes) significantly drove students' intention to adopt Facebook in a higher education classroom. The finding of the current study validates those of previous studies that attitude would strongly predict the future use of technologies such as the Web 2.0 especially for TAL purposes. While previous studies of Ajjan and Hartshorne (2008), Hartshorne and Ajjan (2009) and Castillo (2012) focused separately on either students or academics' use of Web 2.0, the present study focuses on both academics and students' use of Web 2.0 technologies for TAL purposes. The studies by Ajjan and Hartshorne (2008), Hartshorne and

Ajjan (2009) and Castillo (2012) were based on the Decomposed Theory of Planned Behaviour while the current study adopted attitude construct in TAM and was conducted in different context.

The present study showed that attitude of academics and students in their intention to use Web 2.0 technologies for TAL purposes was significant. The findings revealed that most of the students and academics have developed a positive attitude toward the use of Web 2.0 technologies for TAL purposes respectively while few of them do not support their use for TAL. The majority of students (up to 6-83%) and academics (66-87%) strongly agreed or agreed respectively that it would be a good idea to use Web 2.0 technologies for TAL. They also have a favourable attitude towards using Web 2.0 technologies, enjoyed and preferred using them for TAL purposes. The overall results suggested that most of the students and academics have a positive attitude toward the use of Web 2.0 technologies for TAL purposes, while just few of them seem not to support the use of these tools. However, current findings reported in Section 6.4 suggest that more students than academics have developed a positive attitude towards the use of Web 2.0 technologies for TAL purposes.

Further findings from the qualitative data analysis (see Section 5.4.3) revealed that students and academics respectively have varied attitudes towards the use of Web 2.0 technologies for TAL purposes. Findings showed that students were very enthusiastic about the use of Web 2.0 technologies and had positive attitudes towards using these technologies for learning purposes. This could be attributed to the fact that they embraced new technologies easily and faster as they belong to the digital generation, as explained by Prensky (2001), Oblinger and Oblinger (2005), Jones et al. (2010) and Karnad (2013). This result could also be explained by the fact that they had the necessary skills for the use of these tools. Academics on the other hand, were reported to have mixed attitudes that were positive, negative or indifferent towards the use of these technologies for teaching purposes. Some academics who demonstrated positive attitudes towards Web 2.0 were in the younger age category. This cohort of users believed that the use of these tools increased their speed of delivering instructions, made teaching easier, gave more time for research, and helped students to learn faster and better.

The much older academics and those who had negative or indifferent attitudes towards the use of Web 2.0 were reported to prefer the traditional teaching method (that is, face to face classroom TAL with board, paper and ink). The reasons given were varied. Some were

technophobic or conservative and believed that using Web 2.0 for TAL purposes would reduce the quality of education. Others were of the view that some students (and also academics) could misuse the opportunity and become lazy and truant. This finding is similar to that of Zaremohzzabie et al. (2014) which found that Facebook (or any other technology) may bring unintended negative effects on users. Likewise Yeboah and Ewur (2014) in a study conducted in Ghana found that the use of WhatsApp for learning had negative impact on the students' academic performances. Findings from the qualitative study indicate that most academics perceived the use of Web 2.0 technologies in TAL as unnecessary due to the unplanned effect they may have on TAL. The findings suggest that academics' attitudes towards the use of Web 2.0 were influenced by their preference for the traditional methods of teaching.

6.5.3 Media Synchronicity and Intention to Use Web 2.0 Technologies for TAL

This sub-section focused on answering the key question on how media synchronicity influenced academics and students' intention to use Web 2.0 technologies for TAL purposes. The corresponding hypothesis stated that there was no significant relationship between media synchronicity and intention to use Web 2.0 technologies for TAL purposes. Responses were analyzed to determine how media synchronicity (independent variable) influenced intention to use of Web 2.0 technologies (dependent variable). The hypothesis was tested using regression analysis.

The construct media synchronicity variable from MST was adopted in the current study to examine its direct influence on intention to use Web 2.0 technologies. Synchronicity in the current study referred to the degree to which academics and students pursue similar interest (that is, TAL activities) at the same time using the Web 2.0 technologies. Synchronicity was also considered as the ability of Web 2.0 technologies to generate the sensation that all users are simultaneously communicating as explained by Carlson and George (2004). The five media capabilities symbol sets, parallelism, transmission velocity, rehearsability, and reprocessability identified by Dennis, Fuller and Valacich (2008) were used to evaluate media synchronicity. The findings revealed that media synchronicity had a positive significant ($p < 0.05$) influence on academics and students' intention to use Web 2.0 technologies for TAL purposes respectively (see results in Tables 17a and 17b). This finding is similar to that of previous studies that tested the positive significance of the media synchronicity construct on use of IS and technologies. For example, Park, Choi and Rho's (2014) study found that social media

tools had high synchronicity. Moreover, Carlson and George (2004) noted that media with high degree of synchronicity would allow users to communicate in real time. It can therefore be deduced that Web 2.0 technologies significantly influenced users' intention because of their high synchronicity feature and their ability to provide real time communication, especially among academics and students, to ensure effective TAL.

In addition, Ryoo and Koo (2010) surveyed 248 company employees in Korea and found that media synchronicity moderated the relationship between the characteristics of a given task and the use of ICT by the employees. The study also found that high synchronicity media users are more likely to use ICTs to gain necessary information while they save time. Charoensukmongkol (2014) was of the opinion that persons who are fully content in their personal (and social) lives are more able to focus on their work. Consequently, it could be surmised that academics and students enjoy their use of Web 2.0 as they find the tools more useful for academic purposes. Park, Choi and Rho (2014) in their investigation about citizens' patronage behaviour of government social media services found that a significant relationship existed between media synchronicity and the perceived values (that is, utilitarian, hedonic and social values) and satisfaction. It was also revealed in their study that media with high synchronicity positively served as a moderator for enhancing users' satisfaction. Media synchronicity therefore positively and significantly influences users' intention to use new and emerging technologies like the Web 2.0. The hypothesis matching research Question Five is therefore rejected indicating that a significant relationship exists between media synchronicity and intention to use Web 2.0 technologies for TAL purposes respectively.

Furthermore, the findings revealed that about 80% of academics and students respectively indicated that Web 2.0 technologies had enabled them to give and receive rapid feedback, edit, fine-tune or improve the quality of information and also helped them in communication. About 70% of the academics who responded indicated they were able to communicate using Web 2.0, while about 80% of the students conceded that they communicated well using Web 2.0 technologies. It may be construed from the findings that media synchronicity influenced the use of Web 2.0 technologies for TAL purposes. Further, the relationship between the independent and dependent variables was found weak ($r = 0.389$) for teaching purposes. While, media synchronicity explained only 14.7% of the variation on academics' intention to use Web 2.0 technologies for teaching; the relationship was found to be strong for the use of Web 2.0

for learning and media synchronicity as explained by 37.5% of the variation on students' intention to use Web 2.0 technologies. These results suggest that some other factors may be responsible for influencing academics and students' intention to use Web 2.0 technologies for TAL purposes. Media synchronicity is one such factor. In addition, „media synchronicity“ had greater influence on students' intention to use Web 2.0 for learning purposes than it did on academics' intention to use Web 2.0 for teaching purposes. Moreover, Web 2.0 technologies (particularly Facebook, Instant messaging WhatsApp, Wikipedia, YouTube, LinkedIn, blogs and Skype) had high priority for use among academics and students as evidenced by high synchronicity which was valued for TAL purposes.

Dennis et al. (2008) previously pointed out that combining different media in the communication process would facilitate both the conveyance and the convergence processes. Unlike some previous researches on the use of social networking tools (Kosik 2007; Downes 2007 and Bosch 2009) that gave more attention to specific Web 2.0 technologies, Wong, Davison, Ou and Cheng (2014) focused on multiple-use of various Web 2.0 technologies/media in the same way as the present study. Wong et al. (2014) employed MST to conceptualize their investigation of the use of Web 2.0 technologies at work and how it affected users' performance in workplaces in China. The study found that the use of Web 2.0 technologies had significant influence on communication performance with respect to facilitating effectiveness, quality and timeliness. However, when they conducted a mediation test, they found no significant impact between the use of Web 2.0 and work performance. The low direct impact of these variables may be due to the level of accessibility of individual employees to the Web 2.0 technologies.

6.5.4 Net Benefits and Intention to Use Web 2.0 Technologies for TAL

This sub-section is focused at answering the key questions, which sought to determine the net benefits that could be derived from the use of Web 2.0 for TAL purposes. The corresponding hypothesis stated that there was no significant relationship between intention to use and net benefits of using Web 2.0 technologies for TAL. Responses were analyzed to determine how intention to use (independent variable) influenced net benefits of Web 2.0 technologies for TAL (dependent variable). The hypothesis was tested using regression analysis and qualitative data was analyzed using thematic content analysis.

The construct “net benefit” variable in the D&M model and intention to use (a construct from TAM) were adopted in the current study to examine the relationship that exists between both variables in relation to the use of Web 2.0 technologies. The findings revealed that the majority of academics and undergraduate students agreed that Web 2.0 technologies were beneficial for TAL purposes. For instance, most academics (up to 88%) concurred that Web 2.0 technologies (especially Wikipedia, Instant messaging, Facebook and WhatsApp) helped them to acquire new knowledge and innovative ideas; promote efficiency and effectiveness in teaching; increased their academic productivity; enabled them to effectively manage and store information and knowledge needed; enabled them to teach more easily and efficiently and enhanced their teaching performances. Likewise, most students (up to 87%) agreed that Web 2.0 technologies (especially Wikipedia, WhatsApp, Facebook, YouTube, Instant messaging, Twitter and blogs) helped them to acquire new knowledge and innovative ideas; promote efficiency and effectiveness in learning; increased their academic productivity; helped to effectively manage and store information and knowledge needed; enabled them to teach or do their assignments more easily and efficiently and enhanced their learning performances. The results suggest that academics and students found Web 2.0 technologies very resourceful for the purpose of TAL. Similarly, findings from the qualitative study showed that librarians and faculty heads regarded Web 2.0 technologies as an asset that ensured effective communication and collaboration in the academe. Thus, Web 2.0 technologies may be seen as viable tools for use among academics and students for TAL purposes accrues. Hence, it may be assumed that tools with potential for greater benefits will increase users’ intention to use or continue to use the Web 2.0 technologies.

Findings from previous studies conducted in developed and developing countries indicated that the use of Web 2.0 technologies and particularly social networking tools had gained ground and were increasingly being used to benefit the academic environment. Echenique, Molías and Bullen (2015) in a study among Spanish students indicated that social networks and WhatsApp were the most important applications used by the students. The reasons for their common use were attributed to the ability of the tools to enable them to network and communicate with others over long distances and stay in touch with people with common interests remotely. Facebook also was found to be a common social networking tool used in the academic environment where the present study was conducted. Bosch (2009) investigated students’ use

of Facebook and academics' engagement with students via social media at the University of Cape Town, South Africa. The study depended on results from a virtual ethnography and qualitative interviews. Bosch found that Facebook allowed the students to form groups for specific academic courses and discuss elements of the selected courses by posting them on the group's wall. The study further identified the development of educational micro-communities as a potential benefit of using Facebook for TAL purposes. The benefits of Facebook as identified in the foregoing study suggests that Web 2.0 technologies, if properly channeled and integrated within the right courses, can aid TAL activities outside the classroom.

Other popularly used tools by academics and students identified in the current study were Instant messaging and Twitter. Setlock et al. (2004) were of the opinion that the Instant messenger helped to lessen cultural variances in international collaboration and communication. The benefit of being able to communicate and collaborate with colleagues, peers and other information professionals and users with similar interest around the world may have influenced academics' preference for the Instant messaging tool in the current study. These tools are also of advantage to the students as they allow for effective communication without distance being a barrier.

Andrade, Castro and Ferreira (2012) in an exploratory study used PowerPoint presentation with the integration of Twitter as a micro blogging tool to address the characteristics of cognitive Communication 2.0. The study found that the integration of Twitter in the Power Point presentation allowed the teacher and students to read each other's views while they both contributed to the topic being discussed. The study also found that the integration of Twitter in the Power Point presentation gave the audience access to multiple choice questions and answers. Furthermore, the integration of Web 2.0 tool that is, Twitter (a dynamic communication tool) and Power Point (which is a static communication tool) for TAL was perceived to have helped in achieving cognitive communication.

Recently in Nigeria, Omosekejimi, Eghworo and Ogo (2015) examined the usage of electronic information resources by undergraduate students at the Federal University of Petroleum Resources Effurun's library, Warri, Nigeria. The study adopted the survey research method using questionnaires to collect data from 267 students in their second year and above levels of study. The study found that the use of electronic resources had remarkable benefits on the

academic performances of the undergraduate students. However, it was suggested in the study that students should be encouraged to acquire more skills in the use of electronic resources. Ukachi (2015) also conducted a study to determine the relationship between undergraduate students' information literacy skills and their use of electronic resources. Questionnaires and oral interviews were used to collect data from 1806 students and 12 librarians in charge of the electronic resources sections in 12 purposively selected university libraries in the Southwest geopolitical zone of Nigeria. The study revealed that the universities had internet access and also subscribe to electronic resources. Since access to internet is essential and also pre-requisite for the use of Web 2.0 technologies, it may be deduced that the universities under study were prepared for the benefits and transformation that Web-based technologies could bring to their TAL activities.

Nevertheless, findings from Ukachi (2015) also revealed that electronic resources (ER) were not adequately utilized because the undergraduate students did not possess adequate information literacy skills. The study also found that a strong positive correlation existed between the level of undergraduate students' information literacy skill and the use of ERs provided in the library. Ukachi's (2015) findings suggest underutilization of available electronic resources is in part caused by low use of Web 2.0 technologies for TAL purposes. Thus there is need to enlighten academics and students in Nigeria on the educational use and importance of the various Web 2.0 technologies and electronic resources. This will help the academics and students to engage in active and participatory TAL activities in and outside the classroom.

Further findings from the regression analysis result presented in Tables 18a and 18b of Chapter 5 revealed that „intention to use“ significantly ($p < 0.05$) contributed to the net benefits which academics and students derived from the use of Web 2.0 technologies for TAL purposes. The relationship between these two variables was found to be positive and strong ($r=0.625$ and $r=0.716$ for TAL respectively). While „intention to use“ explained only 38.8% of the variation on the net benefits derived from the use of Web 2.0 for teaching purposes, it accounted for 51.1% variation on the net benefits derived from the use of Web 2.0 technologies for learning purposes. This result suggests that „intention to use“ variable from TAM had greater influence on the „net benefits“ (variable from the D&M model) derived from the use of Web 2.0 for learning purposes than it did for teaching purposes. The implication is that students can be

easily swayed into using Web 2.0 technologies for TAL purposes due to the gains they can derive from their use. However, it can be inferred that academics may have other factors which they consider above the derivable benefits before they consent to use Web 2.0 technologies for teaching purposes. Furthermore, findings on respondents' intention to use Web 2.0 technologies showed that the majority of academics and students strongly agreed or agreed with the statements that signified that they intended or have decided to use Web 2.0 technologies for TAL purposes. The hypothesis matching research Question Six is therefore rejected, indicating that a significant relationship exists between intention to use and the net benefits of Web 2.0 technologies in TAL respectively. The findings suggest that the intention to use construct from TAM may be used to extend the D&M model so as to effectively understand use of technologies such as Web 2.0 in education.

Bosch (2009) argues that the current generation of young people who are commonly referred to as "Digital Natives" or "Net generation", may be resistant to traditional methods of TAL. Consequently, such young people would gladly accommodate new technologies that present significant benefits for learning purposes. Although the influence of net benefits goes a long way in determining users' intention, present findings indicate that some other factors exist that contribute to users' intention to use Web 2.0 technologies for the purpose of TAL. Wong et al. (2014) in this regard say that performance benefits of using of Web 2.0 technologies cannot be automatically realized but in order to achieve and enjoy greater benefits there is a need to enhance the available infrastructures (including internet connectivity) that can provide an enabling environment and condition for their use for TAL purposes. Therefore, awareness on the use of these tools for academic purposes (particularly in TAL) is needed to derive benefits from them. Echeng, Uoro and Majewski (2013) advised that the establishment of a Learning Management System (LMS) would allow students and academics to use Web 2.0 technologies. Discussions with the respondents also revealed that the universities surveyed were making plans to ensure the integration of Web 2.0 technologies into TAL in the near future.

Lemke, Coughlin, Garcia, Reifsneider and Baas (2009) supported by Pan and Franklin (2011) noted that the use of Web 2.0 technologies offered students the opportunity to interact with information of high quality and depth. Kan (2011) cited in Mbatha (2013) observed that the use of Web 2.0 technologies facilitates collaboration and interaction, offers possibilities for immediate feedback, stimulates social connections and communities, and harnesses collective

intelligence with no associated costs. The other benefits of using Web 2.0 technologies for TAL purposes include easy and quick access to information knowledge sharing; easy and improved communication; enhanced academic output; collaboration and providing up-to-date information; improved teacher-student interaction and relationship; group discussion; improved learning skills, bringing students up to date with academic information and learning materials; and sharing of ideas on subject matters.

The findings established that major factors such as support from the university authorities; academics and students' attitude towards use; provision of ICT facilities; internet connectivity; continuous power supply; availability of internet resources; technological know-how; funding to install modern and essential gadgets; institutional policies; training of academics and students, and creating awareness were factors that positively affected academics and students' decisions to use Web 2.0 technologies for TAL purposes.

6.5.5 Other Issues on Adoption and Use of Web 2.0 Technologies for TAL

Atulomah and Onuoha (2011), Olasina (2011) and Okonedo, Azubuike and Adeyoyin (2013) outlined several hinderances confronting the use of Web 2.0 technologies for TAL purposes in Nigerian universities that included bandwidth challenges, inadequate power supply, inadequate training and support for staff and students, time constraint, lack of funding and support for training on the use of new technologies, inadequate technological skills and professional skills required for managing and integrating knowledge with social networks. Sandars and Schroter (2007:760) in their study on British medical students identified the need for extensive training to enhance their usage of Web 2.0 technologies.

In a study conducted in South Africa, Bosch (2009) highlighted ICT literacy and uneven access to the technology as significant factors that affected the use of Facebook in TAL. There is therefore need for adequate awareness and training on the use of Web 2.0 and how these can be integrated into TAL activities. Zaremohzzabie et al. (2014) in a study among university students in Malaysia, were of the opinion that despite all the benefits of Facebook, it may still have unintended negative effects on users. The unpremeditated effects of overuse of these technologies such as time mismanagement by students; procrastination of relevant responsibilities; distraction with assignments completion; lack of concentration during TAL sessions; and weak ability to spell words or construct sentences correctly (Yeboah and Ewur

2014); may be major concerns of academics on the use of Web 2.0 technologies for TAL purposes in Nigeria universities.

The findings also revealed that the library had contributed little or no effort in ensuring the integration of Web 2.0 technologies in TAL activities at the universities. Some reasons given to explain this scenario included lack of adequate knowledge by librarians about the importance and usefulness of these technologies for TAL purposes; misunderstanding by the librarians that only the ICT and support unit were responsible for training staff and students on use of technologies such as Web 2.0; poor power supply; unreliable internet access; and inadequate funds to organize trainings or workshops. Busari, Taoffik and Sunday (2013) found that librarians could not access the majority of the ICT facilities that were available in the universities except for multimedia projectors, internet facilities, and office equipment. This situation had affected librarians' effective use of ICT and Web 2.0 technologies. Hart and Nassimbemi (2013) points out that, there was a need for academic librarians to educate academic staff and students on basic information skills, such as the appropriate skills required for the use of Web 2.0 technologies for teaching, learning and research activities.

6.6 Summary of Discussion of Findings

This chapter discussed and interpreted the findings presented in Chapter Five on a survey on the use of Web 2.0 technologies for TAL purposes by academics and students. Meanings were given to the findings and the implications for the study were also offered. The chapter discussed and interpreted the findings of the study based on the research questions and hypotheses underpinned by the D&M model, TAM and MST. The discussion of the findings of the study suggests a significant relationship between the variables of D&M model namely, system quality, service quality and information quality; attitude towards use and intention to use from TAM; Media Synchronicity from MST model and Net Benefits (from D&M model) of Web 2.0 technologies for TAL purposes in selected Nigerian universities. The study demonstrated that there are variables, besides those of the D&M model, such as attitude towards use, media synchronicity and intention to use that can be used to extend and strengthen the D&M model in order to efficiently determine the use and success of IS and technologies.

In general, the study revealed that there were more male academics and undergraduate students (73% and 75%) than their females counterparts (27% and 25%) respectively; and they were

from science-based disciplines in the universities as also affirmed by different scholars (Edem and Ottong, 2010; Salman, Yahaya and Adewara, 2011; Obiora and Ogbomo 2013; Satope and Akintunde 2013; and Ani, Ngulube and Onyancha 2014). The result also showed that most academics (39%) were aged 41-50 years and about 47% of the students were between 20-22 years. In addition a greater population (52%) of academic staff had PhDs, whereas only (37%) had Master's Degrees. For undergraduate students, most (about 59%) were in their third year while other students (41%) that participated in the study were in their fourth year of study. It was further established that the respondents were well acquainted with Web 2.0 technologies and that more students (up to 87.3%) than academics (up to 80%) had used Web 2.0 technologies for more than three years.

This chapter demonstrated that there is a high level of awareness and use of Web 2.0 technologies (with preference for SNSs) by academics and undergraduate students as confirmed by findings of previous studies (Atulomah and Onuoha 2011; Ajise and Fagbola, 2013; Okonedo, Azubuike and Adeyoyin, 2013; Usoro, Echeng and Majewski 2013; Diyaolu and Rifqah, 2015; and Celik, Yurt and Sahin 2015). Likewise, social networking tools (especially, Facebook, WhatsApp, 2go, Twitter), Wikipedia, YouTube and Instant messaging were popularly used by students. In contrast academics were inclined more towards use of SNSs (particularly, Facebook and LinkedIn), Wikipedia, Instant messaging and YouTube among other Web 2.0 technologies. The high use of these technologies was attributed to their use in educational communication, social communication, information and resource sharing, and collaboration. The results of the study suggest that new and emerging technologies were fast evolving and this augured well for bridging the digital divide between academics and students.

The discussion of findings further revealed that academics and students' purpose of use of Web 2.0 technologies had grown considerably over the years especially in communication; searching for needed information; research activities; personal activities; sharing general knowledge; social based activities; and academic-related activities which included giving or submitting assignments or tests, accessing and sharing TAL resources, communicating with students and lecturers and sharing specific knowledge related to TAL.

The chapter also established that the use of Web 2.0 technologies for TAL purposes was still low in the universities surveyed compared with developing countries such as South Africa and other developed countries. The study showed that Web 2.0 technologies such as Wikipedia, Instant messaging, YouTube, WhatsApp, LinkedIn and Facebook were more frequently used for TAL purposes by some of the academics than other technologies. In addition, WhatsApp, Facebook, Wikipedia, YouTube, Instant messaging, 2go, blogs and Skype were used either frequently or occasionally by a few of the students while some had never been used for TAL purposes. These technologies were popularly used because they possessed features that could facilitate TAL. The study further established that academics and students did not use Bebo, TeacherTube, E-portfolio, Flickr, Social bookmarking and Badoo because of a lack of understanding of how they could be used for TAL purposes.

The discussion showed that the variables of D&M model namely information, system and service quality, were positively correlated with academics and students' attitude towards use Web 2.0 for TAL purposes. Therefore the variables of information and service quality were important to academics and students' attitude towards the use of Web 2.0 technologies.

The study revealed that most students and academics had positive attitudes toward the use of Web 2.0 technologies for TAL purposes, while only few of them did not support this. Findings showed further that attitude had positive and significant influence on their intention to use Web 2.0 technologies for TAL purposes. The study found that intention to use (Adjusted $R^2 = 40.5\%$) essentially depended on students' attitude to use Web 2.0 technologies for learning and also on academics' attitude (Adjusted $R^2 = 25.7\%$) to use of Web 2.0 technologies for teaching purposes. This indicates that the influence of users' attitude on their intention to use Web 2.0 technologies was significant. Likewise, interviews with the faculty heads and librarians supported the findings that academics had mixed attitudes in that some were positive, negative or indifferent about the use of these technologies for teaching purposes. Findings revealed that academics that are positive who were of the younger age category and were encouraged by the increased speed for delivery of instructions, easy teaching techniques, and time for research and personal activities. In contrast, academics with negative or indifferent attitudes towards Web 2.0 were reported to be either technophobic, conservative or concerned about the unprecedented negative influence the use of these tools might have on their academic responsibilities or students' academic performances.

The discussion of findings showed that media synchronicity positively and significantly influenced academics and students' intention to use Web 2.0 technologies for TAL purposes. Although previous studies did not examine the direct influence of media synchronicity on use (Ryoo and Koo 2010; Park, Choi and Rho 2014; and Charoensukmongkol 2014), they confirmed that media with high synchronicity attracted more use than those with low synchronicity. The study also revealed that Web 2.0 technologies were considered resourceful and beneficial for TAL purposes because they helped academics and students to acquire new knowledge and innovative ideas; promoted efficiency and effectiveness in TAL; increased academic productivity and enhanced TAL performances. Findings established a significant relationship between net benefits and intention to use Web 2.0 technologies. Findings from the interviews showed that librarians and faculty heads regarded these technologies as assets that could ensure effective communication and collaboration in the academic environment. The findings of the study established Web 2.0 technologies as viable tools for use among academics and students for TAL purposes.

For the net benefits to be realized in full, a number of challenges needed to be resolved including but were not limited to lack of support; inadequate bandwidth; poor internet connectivity; paucity of institutional policies; erratic power supply; lack of funding; infrastructures; and willingness of some academics and students. The university library being the learning hub of any institution was expected to ensure that these tools were properly integrated into its resources for the purpose of TAL.

The next chapter provides the summary of the findings, conclusions, recommendations, and implications of the study. Further research areas will also be identified.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter presents the summary of findings, conclusion, and recommendations of the study based on the interpretation of findings given in Chapter Six. The concluding chapter of a PhD provides answers to the set of research questions formulated at the preliminary stage of the study. The concluding chapter provides a clear picture of the research problem and how it has been solved. The concluding chapter also provides the summary of key findings of the study and suggests future research direction.

The purpose of this study was to investigate the extent of use of Web 2.0 technologies in TAL in selected federal universities in Southwest Nigeria. The study which the research objectives investigated was how Web 2.0 technologies are used by academics and students; the extent to which Web 2.0 technologies have been integrated for TAL purposes; how system quality, information quality and service quality influenced attitude towards use of Web 2.0 technologies for TAL; how attitude towards use influenced intention to use Web 2.0 technologies for TAL; how media synchronicity influenced intention to use Web 2.0 technologies for TAL; and what net benefits derived from the use of Web 2.0 for TAL.

The following four hypotheses were tested in this study: 1) There is no significant relationship between system quality, information quality, service quality and attitude towards use of Web 2.0 technologies; 2) There is no significant relationship between attitude towards use and intention to use Web 2.0 technologies; 3) There is no significant relationship between media synchronicity and intention to use Web 2.0 technologies; 4) There is no significant relationship between intention to use and net benefits of using Web 2.0 technologies.

The study was guided by the theoretical frames namely the D&M model, TAM and MST. The post-positivist paradigm was used to address the research problem. The study employed the mixed method approach with quantitative method predominating over qualitative method. The study adopted a convergent mixed method and survey design in the two federal universities (U.I and FUNAAB) that were studied. Data was collected from 195 academic staff and 331 undergraduate students respectively using survey questionnaires. In addition, interview

schedules were used to collect data from eight faculty heads and eight faculty librarians respectively. The overall response rates were 81.3% for academics, 93.8% for undergraduate students and 87.5% for the faculty heads and librarians respectively. Quantitative data was analysed using descriptive statistics and SPSS, while qualitative data was analysed thematically.

This chapter covers a summary of the main findings of the study; conclusion; recommendations on theory; policy and practical perspectives; and further areas of study. This is organized around the research questions, research hypotheses, and broader issues around the research problem.

7.2 Summary of Research Findings

The summary of findings covers the following themes around the research questions: demographic information of respondents; utilization of Web 2.0 technologies among students and academics; use of Web 2.0 technologies for TAL purposes; influence of system quality, information quality, service quality, attitude, media synchronicity, net benefits and intention to use of Web 2.0 technologies for TAL purposes; and factors influencing the use Web 2.0 technologies for TAL purposes.

7.2.1 Summary of Demographic Information of Respondents

This section summarizes findings on respondents' demography. This information provided better understanding of the respondents' status and perception of the phenomenon that was studied.

7.2.1.1 Distribution of Academics and Students by Faculty/College

The study established that a considerable proportion of respondents (64% academics and 72.5% students) were from purely science-based disciplines (particularly the Faculty/College of Science). This finding corroborates similar studies where the dominance of academics and students (Obiora and Ogbomo 2013 and Ani, Ngulube and Onyancha 2014) and students (Salman, Yahaya and Adewara 2011 and Adegun 2012) from science-based disciplines in Nigerian Universities was reported.

7.2.1.2 Distribution of Respondents (Academics and Students) by Gender

The results indicated the dominance of males over females among academics and students respectively, particularly from the Faculties/Colleges of Science, Technology and Veterinary Medicine in the surveyed Nigerian federal universities. The study revealed that the majority of academics were male (73%) compared to females (27%). Similarly, there were more male undergraduate students (75%) in the study than females (25%). The reasons for low participation of female students was attributed to the low enrolment of female students in science-based courses (such as sciences, technology and veterinary medicine) (Olawoye and Salman 2008; Ukpai 2010; and Nwajiuba 2011). Extant related studies have isolated factors such as ethnicity, social class, cultural biases, sexuality, health problems, high infant and mortality rate and other demanding conditions in developing countries such as Nigeria to be major causes of low participation of females in science and technology disciplines respectively (Okafor 2001; Ekpo, Orok, Ekukinam and Okon 2003; Archer and Yamashita 2003 and Agu and Omenyi 2013).

7.2.1.3 Distribution of Respondents (Academics and Students) by Age, Educational Qualification and Year of Study

The research findings revealed that most of the academics who participated in the study were below 50 years of age. For example, 75 (39%) of academics were aged 41-50 years while a few, 4 (3%) were 60 years of age or above. The findings also revealed younger academics (40 years and below) in FUNAAB (59.7%) than in U.I (44.2%). The findings also revealed that most undergraduate students, 154 (47%) were aged 20-22 years.

The study revealed that most of the academics in the surveyed universities held Doctoral degrees. Findings further revealed that among the academics, 102 (52%) held PhD degrees while 72 (37%) were holders of Master's Degree. This finding was in agreement with Al-Shanbari and Meadows (1995), Ani (2013) and Satope and Akintunde (2013) who in a similar study found the majority of academics with Doctoral degrees. They attributed this finding to the fact that internationally universities emphasize possession of a PhD for appointment into an academic position (Salaam and Onifade 2009; and Ameen and Ullah 2013). It was inferred from these findings that, on average, academics from the universities surveyed (especially those above 40 years) are likely to hold a PhD.

The findings also revealed the dominance of students in their third year of study over those in the fourth year of study in the universities surveyed. There were 195 (59%) students in their third year while only 136 (41%) were in their fourth year of study. This finding was attributed to the fact that the academic performances of the students in their third year usually determined their migration to the fourth year of study. Thus, students who did not possess or attain the necessary academic achievement to proceed to the fourth year, were left behind.

7.2.1.4 Distribution of Respondents (Academics and Students) by Years of Use of Web 2.0 Technologies

The findings revealed that a good number (up to 49.7%) of the academics had used Web 2.0 technologies for 7 years or more, while 28% had used the technologies for 3 to 6 years. Very few respondents (up to 9%) maintained that they had used the Web 2.0 technologies for 1-2 years, and only 8% had used the technologies for less than one year. This finding suggests that academics were well acquainted with Web 2.0 technologies and up to 80% had used the technologies for more than 3 years. This finding seems to indicate that academics were rising to the challenge of exploring the use of Web 2.0 to enhance their teaching (Bennett, Bishop, Dalgarno, Waycott and Kennedy (2012).

The findings also revealed that up to 31.4% of the students had used the Web 2.0 technologies for 7 years or more, while 60% had used them for 3 to 6 years. Only a few had used the technologies for less than one year. The findings also established that undergraduate students were well acquainted with Web 2.0 technologies and that up to 87.3% had used the technologies for more than 3 years. This result indicates early adoption by students of Web 2.0 technologies. The findings further revealed that more students (up to 87.3%) than academics (up to 80%) had used Web 2.0 technologies for more than three years. From these findings, it was deduced that Web 2.0 technologies' use was more common among students than academics in the surveyed universities.

7.2.2 Utilization of Web 2.0 Technologies among Academics and Students

The first research question sought to explore the Web 2.0 technologies that were used by academics and students and what they were used for. This section summarises the findings on this research question.

7.2.2.1 Level of Awareness of Web 2.0 Technologies among Academics and Students

The findings revealed a wide variety of Web 2.0 technologies used by academics in the surveyed universities. The technologies include SNSs (particularly Facebook, LinkedIn, WhatsApp, Twitter and 2go), Wikipedia, YouTube, Instant Messaging, blogs, Skype, newsgroups/online forums, podcasts/webcasts/vodcasts and Social Bookmarking. Moreover, academics were found to be more acquainted with social networking tools (especially Facebook which was used by about 94.6% of academics), Wikipedia, Instant messaging, YouTube and Skype. These findings indicate high levels of awareness among academics regarding Web 2.0 technologies. However, unlike previous studies (Atulomah and Onuoha 2011; Ajise and Fagbola 2013; Okonedo, Azubuike and Adeyoyin 2013 and Okereke 2014), the findings revealed that Facebook, Instant messaging, LinkedIn, YouTube and WhatsApp were the most popular Web 2.0 technologies among academics. The findings also confirmed low levels of awareness and use of Flickr, Bebo, Social Bookmarking, E-portfolio and Teacher tube among academics at U.I and FUNAAB.

The findings revealed Facebook, WhatsApp, 2go, Wikipedia, YouTube and Instant Messaging as the most popular Web 2.0 technologies among students. The findings however indicated that the majority of students were more familiar with SNSs. Generally, the findings revealed that there was a high level of awareness of Web 2.0 technologies among students. This finding is in line with results from related studies such as that of Garoufallou and Charitopoulou (2011) which identified Facebook and YouTube as the most used Web 2.0 technologies by students in Greece; and Echenique, Molías and Bullen (2015) which found WhatsApp to be one of the most important applications used by students at a public university in Catalonia, Spain. However, the present study findings seem to contradict some results of previous studies which showed low levels of awareness and general use of these Web 2.0 technologies among students in Nigerian universities (Diyaolu and Rifqah 2015; Echeng and Usoro 2014a; Echeng and Usoro 2014b; Usoro, Echeng and Majewski 2013 and Aramide and Akinade 2012).

Although findings indicate that students were well familiar with Web 2.0 and used a wider range of these technologies than the academics, there was generally a high usage of social networking tools (especially Facebook) by both groups of respondents. This finding according to Guo, Dobson, and Petrina (2008) and Lei (2009:88) suggests that the gap between the use of

these technologies among the students (digital natives) and the academics (digital immigrants) is narrowing. The findings suggest that there may be no significant difference in the digital divide between academics and students in the use of specific Web 2.0 technologies.

7.2.2.2 Purpose for which Academics and Students Used Web 2.0 Technologies

The findings revealed that academics and students used Web 2.0 technologies for a variety of purposes. About 97% of academics used Web 2.0 technologies for communication, searching information, academic-related activities, personal activities and research activities. The finding demonstrated that Web 2.0 technologies were useful for many reasons not limited to personal, social and academic activities. This finding corroborated the findings of Ajise and Fagbola (2013), Okereke (2014) and Chawinga (2014) on similar subject matter. However, the findings in this study, unlike in some related studies, revealed the usefulness of Web 2.0 technologies such as Wikipedia, Facebook, WhatsApp, YouTube, Twitter, Instant messaging, Skype, newsgroups or online forums and blogs to academics for their teaching.

Furthermore, about 95% of the students used Web 2.0 technologies for communication, searching for information, research, personal activities, and academic-related activities. These findings are consistent with existing literature on the usefulness of Web 2.0 technologies to students as far as creating and sharing information is concerned (Maloney 2007; Diyaolu and Rifqah 2015; Chawinga 2014 and Kanelechi, Nwangwa, Yonlonfoun and Omotere 2014). Extant studies have revealed that Web 2.0 technologies (especially Facebook) have made significant impact in TAL. This finding was corroborated by responses that were received from interviews administered to faculty heads and librarians. However, there was variation in what academics and students used Web 2.0 technologies for. For example, 83.6% of academics used Web 2.0 for academic-related activities compared to 69.8% of students. Again, 65.9% of students used Web 2.0 technologies for online group discussion, compared to only 52.8% of academics.

7.2.3 Use of Web 2.0 Technologies for TAL Practices

This section presents answers to research Question Two which sought to determine the extent to which Web 2.0 technologies were used in TAL and how frequently each of the tools was used within a space of three months.

7.2.3.1 Academics and Students' Use of Web 2.0 Technologies for TAL Purposes

The findings revealed that SNSs (especially Facebook, WhatsApp and LinkedIn) Wikipedia, Instant messaging, YouTube and Skype were the most widely used Web 2.0 technologies for teaching purposes, and were used by about 63% of the academics. The study also showed that 24% of academics used newsgroups or online forums and blogs for teaching purposes. The findings signify that academics had significantly embraced the use of Web 2.0 technologies for the purpose of teaching. These findings were similar to the observation by Ajise and Fagbola (2013) on the predominant use of Facebook, LinkedIn, and wikis for TAL by academics in Nigerian universities. The findings in the current study revealed that the overall usage of Web 2.0 for teaching purposes by academics in FUNAAB was higher than at U.I. This difference was attributed to the fact that younger academics (being digital natives) were more likely to use Web 2.0 technologies than their older counterparts (the digital immigrants) and FUNAAB was more populated with academics of 40 years and below than U.I. However, the use of E-portfolio, RSS Feeds, Wiki-how, podcasts/webcasts/vodcasts, E-Portfolios, Social bookmarking, Teacher Tube, MySpace, 2go, Badoo and Bebo for teaching purposes was limited. Ajjan and Hartshorne (2008) similarly found that academics rarely used Social bookmarking for TAL purposes.

The findings further revealed that some Web 2.0 technologies such as SNSs, Wikipedia, YouTube, blogs, instant messaging, newsgroups/online forums were widely used for learning purposes. The findings of the current study also indicate a high usage (up to 83%) of some Web 2.0 technologies such as Wikipedia, WhatsApp, Facebook and YouTube for learning purposes in the surveyed universities. However the use of blogs, Instant messaging and newsgroups/online forums and Twitter was less common. The findings from studies by Kosik (2007), Irwin et al. (2012) and Diyaolu and Rifqah (2015) seem to corroborate the findings in this study with regard to the high usage of Wikipedia, Facebook and YouTube by students for learning purposes. Tunde-Awe (2015) in contrast found that only 32% of the students used Facebook for academic purposes, compared to findings of this study which revealed high usage of Facebook for learning purposes. The findings of the current study however revealed that Skype, Wiki-how, LinkedIn, RSS Feeds, podcasts/webcasts/vodcasts, MySpace and Badoo, Bookmarking, Teacher Tube, Flickr and Bebo were scarcely used for learning purposes. This

may be as a result of lack of awareness about these technologies for learning purposes (Kennedy et al. 2007 and Garoufallou and Charitopoulou 2011).

The findings from the current study also revealed a variation in the use of Web 2.0 technologies for learning purposes, as more students from U.I seemed to use more of some Web 2.0 technologies than their counterparts at FUNAAB. Findings from the interview suggest that Web 2.0 technologies were used by students based on their applicability to course work, availability and access to the internet. The findings revealed that students used more types of Web 2.0 technologies for learning than academics did for teaching purposes. Ugwuogo (2013) argued that developing countries (including Nigeria), unlike developed countries, were yet to begin using new technologies (such as the Web 2.0) in classrooms. The findings of the current study, contrary to Ugwuogo's (2013) claim, revealed high uptake of Web 2.0 technologies for TAL purposes in the surveyed universities.

7.2.3.2 Frequency of Utilisation of Web 2.0 Technologies for TAL Purposes

The overall findings showed that few academics (up to 21%) used Instant messaging, Wikipedia, WhatsApp, YouTube, LinkedIn and Facebook frequently while only 13.4% occasionally used Skype for teaching purposes. However, the study established that most academics (up to 98%) had never used Social bookmarking, Bebo, Teacher Tube, Flickr, Badoo, E-portfolio, MySpace, 2go, podcasts/webcasts/vodcasts, Wiki-how, RSS feeds, Twitter and blogs for teaching purposes in the last three months. This finding was anticipated due to the low level of awareness among academics with regard to these technologies.

The findings further revealed that Web 2.0 technologies such as WhatsApp, Facebook and Wikipedia were frequently used by up to 49% of students for learning purposes. Between 20% and 35% of students used YouTube, Instant messaging, blogs, Skype and 2go occasionally or rarely for learning purposes. The current finding concur with Guarino, Leopardi, Sorrenti, De Antoni, Catania and Alagaratnam (2014), Yeboah and Ewur (2014), and Demirbilek (2015) in related studies found Wikipedia, Facebook and WhatsApp to be frequently used tools for learning purposes. The findings also revealed that most students (84.3%) had never or not used Bebo, TeacherTube, E-portfolio, Flickr, Social bookmarking and Badoo within the last three months for learning purposes. Echeng and Uroso (2014) similarly found a very low weekly use of some Web 2.0 technologies for learning purposes by students in Nigeria. This finding

suggests that these technologies were not accepted or recognized as learning tools. The present study also revealed a higher frequency of use of Web 2.0 technologies by students for learning purposes than it was used by academics for teaching purposes; YouTube and LinkedIn were found to be frequently used for teaching purposes. Findings from interviews administered to faculty heads and librarians also confirmed the general low usage of Web 2.0 technologies for TAL in Nigerian universities although a significant improvement within the last 5-6 years was reported.

7.2.4 Factors Influencing Use of Web 2.0 Technologies for TAL

This section summarizes findings to research Questions 3, 4, 5 and 6 which sought to provide answers on the factors that influenced the use of Web 2.0 Technologies for TAL purposes. The questions were addressed through the literature review and empirical part of the study on academics, students, faculty heads and librarians. The study integrated constructs from the theories that underpinned the study (that is, D&M model, TAM and MST) to formulate four null hypotheses in relation to four of the research questions. Summary of the findings are provided in Sections 7.2.4.1 to 7.2.4.4.

7.2.4.1 System quality, Information quality and Service quality

The third research question sought to determine the influence of D&M model variables that is, system quality, information quality and service quality, on academics and students' attitudes (TAM variable) towards the use of Web 2.0 technologies for TAL purposes. The study tested the first null hypothesis (see H_{01} in section 1.2.3). The corresponding finding revealed that service quality, system quality and information quality has joint significant ($p < 0.05$) influence on academics' and students' attitudes towards use of Web 2.0 for TAL purposes respectively. The relationship was moderately positive ($r = 0.542$) while system quality, information quality and service quality accounted for only 28.2% of the total variance on academics' attitudes towards the use of Web 2.0 technologies for teaching. On the other hand, the relationship was strong and positive ($r = 0.624$) for learning purposes while the system quality, information quality and service quality jointly accounted for 38.4% of the total variance on students' attitudes to the use of Web 2.0 technologies. The null hypothesis (H_{01}) was therefore rejected.

The results on the relative contribution of independent variables revealed that service quality, system quality and information quality jointly influenced attitude towards the use of Web 2.0 technologies for TAL purposes. However, the study revealed that system quality variable in D&M model did not independently influence ($p > 0.05$) academics and students' attitudes towards the use of Web 2.0 technologies for TAL. These findings suggest that information quality and service quality independently had significant influence on academics and students' attitudes towards use of Web 2.0 technologies, particularly for TAL purposes. The findings implied that awareness of the appropriate use of technologies would encourage academics and students with the use of Web 2.0 for TAL purposes.

The findings on quality factors such as service, information and system quality as being essential determinants of technology users' attitude and users satisfaction (Butler 2001; Olatokun and Owoeye 2012; Ellahi and Bokhari 2012; Cheng 2012; Lwoga 2013; Zheng, Zhao and Stylianou 2013; Lee and Yang 2013; Kallweit, Spreer and Toporowski 2014 and Demirci and Kara 2014) are consistent with similar studies in extant literature. Although the findings of the study revealed the importance of system quality on the use of Web 2.0 technologies for TAL purposes as agreed by the majority (about 89%) of respondents, the influence of system quality on attitude towards the use of Web 2.0 technologies for both TAL purposes was insignificant. The variables such as „reliability“ and „ease of use“ as measurements for system quality in the current study may have led to the insignificant results obtained (Kositanurit, Ngwenyama and Osei-Bryson 2006; Manochehri and Sharif 2010 and Zhang 2010) especially because the use of these technologies for TAL is new in developing countries such as Nigeria. Thus, the findings ascertained that only the two quality factors of the D&M model namely, service quality and information quality independently influenced academics' and students' attitudes towards the use of Web 2.0 technologies for TAL. The findings suggest that the combined influence of service quality, information quality and system quality was important when determining use of new technologies such as the Web 2.0.

7.2.4.2 Attitude towards Use of Web 2.0 Technologies for TAL

The fourth research question in this study sought to examine the influence of academics' and students' attitudes on intention to use Web 2.0 technologies (variables obtained from TAM) for TAL purposes. The study tested the second null hypothesis (see H_{02} in Section 1.2.3) in

relation to the fourth research question. The corresponding finding revealed that the attitude of academics and students significantly ($p < 0.05$) influenced their intention to use the Web 2.0 technologies for TAL purposes. The relationship was moderately positive ($r = 0.511$) for teaching purposes and strongly positive ($r = 0.638$) for learning purposes. Besides, attitude towards use of Web 2.0 technologies accounted for only 25.7% and 40.5% respectively of the total variance on academics and students' intention to use Web 2.0 technologies for TAL respectively. The findings suggest that some other factors may be responsible for influencing academics' and students' intentions to use Web 2.0 technologies for TAL purposes respectively, and that attitude towards use is one of such factors. The second null hypothesis (H_{02}) is therefore rejected. The overall findings also showed that most of the participants (up to 87%) had developed a positive and favorable attitude towards the use of Web 2.0 technologies for TAL purposes. This was apparent in the respondents' agreement with the statements that they enjoyed and preferred using Web 2.0 for TAL purposes and that it will be a good idea to use Web 2.0 technologies for TAL. The findings demonstrated that attitude is an important factor that influences both academics' and students' intentions to use Web 2.0 technologies for TAL.

This findings corroborate those of previous studies on the significant and positive influence of attitude of academics and students' behavioural intention or decision towards adopting and using Web 2.0 technologies for TAL in developing and developed countries (Ajjan and Hartshorne 2008; Hartshorne and Ajjan 2009; Chiou 2011; Castillo 2012; Lwoga 2013 and Thongmak 2014). The findings suggested that more students had developed a positive attitude towards the use of Web 2.0 technologies for learning purposes because they embraced new technologies easily and faster as a digital generation (Prensky 2001; Oblinger and Oblinger 2005; Jones et al. 2010 and Karnad 2013). Academics, on the other hand, were reported to have a mixed attitude that was positive, negative or indifferent towards the use of Web 2.0 technologies for teaching purposes. However, academics in the younger age category showed a positive attitude towards Web 2.0 for TAL. The findings established the willingness of academics and students to use Web 2.0 technologies for TAL. The findings also affirmed the TAM variables (attitude towards use and intention to use) as factors that determine use of Web 2.0 for TAL.

7.2.4.3 Media Synchronicity and Intention to Use Web 2.0 Technologies for TAL Purposes

The study examined the relationship between the media synchronicity (in MST) and academics and students' intention to use (variable in TAM) Web 2.0 for TAL. The findings revealed that media synchronicity had to some extent influenced the use Web 2.0 technologies for TAL, as about 80% of respondents agreed that such technologies enabled simultaneous communication among academics and students and helped to improve quality of information and getting feedback. The findings also revealed that the Web 2.0 technologies with high priority usage among academics and students provided high synchronicity which was valued for TAL purposes.

The study tested the third null hypothesis (see H_{03} in Section 1.2.3) in relation to the fifth research question. The corresponding finding revealed that media synchronicity significantly ($p < 0.05$) influenced academics' and students' intention to use the Web 2.0 technologies for TAL purposes. The relationships were both positive, although weak ($r = 0.389$) for teaching purposes and strong ($r = 0.614$) for learning purposes. Besides, media synchronicity accounted for only 14.7% and 37.5% respectively of the total variance on intention to use Web 2.0 technologies for TAL purposes. These findings suggest that some other factors may be responsible for influencing academics' and students' intention to use Web 2.0 technologies for TAL purposes, and that media synchronicity was one such factor. The findings also established that „media synchronicity“ had a greater influence on intention to use Web 2.0 for learning than teaching purposes. The null hypothesis (H_{03}) was therefore rejected. Most studies including Ryoo and Koo (2010), Wong et al. (2014) and Charoensukmongkol (2014) have examined media synchronicity mainly as a mediating variable compared to the current study, which examined the direct influence of media synchronicity on users' intention to use technologies such as Web 2.0 technologies.

7.2.4.4 Net Benefits and Intention to Use Web 2.0 Technologies for TAL

The sixth research question sought to examine the relationship between Net benefits (D&M model construct) and intention to use (TAM construct) Web 2.0 technologies for TAL purposes. The findings revealed that most (up to 88%) academics and students agreed that Web 2.0 technologies helped them to acquire new knowledge and innovative ideas, promoted

efficiency and effectiveness in TAL, assisted in performing TAL tasks more easily and increased academic performances and productivity. Reviewed literature showed that Web 2.0 technologies such as Wikipedia, LinkedIn, Instant messaging, Facebook, WhatsApp and Twitter and electronic resources in general were increasingly benefitting the university environment by facilitating networking and communication among academics and students (Bosch 2009; Andrade, Castro and Ferreira 2012; Echeng, Usoro and Majewski 2013; Mbatha 2013; Okonedo, Azubuike and Adeyoyin 2013; Ajise and Fagbola 2013; Echenique, Molías and Bullen 2015; and Omosekejimi, Eghworo and Ogo 2015).

The study tested the fourth null hypothesis (see H_{04} in section 1.2.3) in relation to the sixth research question. The corresponding finding revealed that intention to use significantly ($p < 0.05$) contributed to the net benefits of Web 2.0 technologies, and the relationship was strong and positive ($r = 0.625$ and 0.716) respectively for TAL purposes. However, intention to use accounted for 38.8% variation on the net benefits of using Web 2.0 technologies for teaching and 51.1% variation on the net benefits for learning purposes. These findings suggest that intention to use Web 2.0 had a greater influence on the benefits derived for learning than for teaching purposes. This finding implies that academics were not essentially influenced by the benefits which they derived from Web 2.0 use, but rather on other factors such as uneasiness in changing from the conventional (traditional) methods of TAL. Similarly, interview with faculty heads and librarians confirmed the findings that Web 2.0 technologies were indispensable for TAL purposes because of the technologies' ability to support effective communication and collaboration in the academic world. Hence, it may be surmised that Web 2.0 technologies with great potential benefits were likely to increase users' intention to use the Web 2.0 technologies. Thus, the null hypothesis (H_{04}) is rejected. The findings suggest that intention to use (construct from TAM) is useful in understanding the use of technologies such as Web 2.0 in education.

7.3 Conclusions

This conclusion follows findings on the research questions and the interpretation given to them.

7.3.1 Conclusion on Demographic Information of Respondents

The study established that a sizeable number of academics and undergraduate students in the surveyed Nigerian universities were male. More academics were of middle age (41-50 years) and more students were aged between 21-22 years. Majority of respondents were from purely science-based disciplines (specifically the Faculty/College of Science). Moreover, most of the academics were in possession of PhD degrees in alignment with international standards for academics (Salaam and Onifade 2009 and Ameen and Ullah 2013). Most students were in their third year of study. The findings suggest that most respondents had used Web 2.0 technologies for not less than three years. It was concluded that a high level of awareness of Web 2.0 technologies existed among academics and students in the Nigerian Universities surveyed. Likewise, Web 2.0 technologies were more common among students than academics.

7.3.2 Awareness and Purpose of Using Web 2.0 Technologies among Academics and Students

The study findings revealed the uptake of Web 2.0 technologies among academics and students in the surveyed universities was high. Web 2.0 technologies such Facebook, Instant messaging, Wikipedia, YouTube, Skype, WhatsApp, Twitter, 2go, Newsgroups or Online forums and Blogs were found to be widely used by academics. Furthermore, there was a high level of awareness of Facebook, WhatsApp, 2go and Twitter, Wikis, YouTube, Instant Messaging, blogs, Skype and newsgroups/online forums among undergraduate students. It was concluded that the usefulness of the Web 2.0 technologies in educational activities, communication, collaboration and sharing of information and their suitability for regular tasks essentially contributed to the high level of awareness and use among academics and students. However, the study revealed a low level awareness and use of Flickr, Bebo, Social Bookmarking, E-portfolio and Teacher Tube among academics. Low levels of awareness and use of Social Bookmarking, Bebo, E-portfolio and Teacher Tube was reported among students. The findings also revealed that students were more acquainted with more Web 2.0 technologies than the academics. Thus, it is concluded that the digital divide between academics and students in the use of specific Web 2.0 technologies such as Facebook is negligible. The study further revealed that the purposes for which academics and students used Web 2.0 technologies had increased substantially over the years. This was particularly in communication, searching for information, research and personal activities, sharing general knowledge, social based activities

and academic-related activities. It was concluded that there has been an increase in the levels of awareness and use of Web 2.0 technologies among academics and students between 2013 and 2015 in the universities surveyed.

7.3.3 Frequency of Web 2.0 Technologies' Usage for TAL Purposes

The findings established that Web 2.0 technologies usage for TAL purposes was still low in the universities surveyed comparable to South Africa and developed countries. The findings generally revealed that there was a low level of Web 2.0 technologies usage for teaching purposes. This finding was attributed to the limited use of RSS Feeds, Wiki-how, podcasts/webcasts/vodcasts, E-Portfolios, Teacher Tube, MySpace, 2go, Badoo and Bebo. However, there was high usage of a few specific Web 2.0 technologies, including Facebook, WhatsApp, LinkedIn, Wikipedia, Instant messaging, YouTube and Skype for teaching purposes. It was found though that only 21% of academics had often used Instant messaging, Wikipedia, WhatsApp, YouTube, LinkedIn and Facebook for teaching purposes within the last three months. Also, academics at FUNAAB were found to have used these tools more than their counterparts at U.I. due to the higher population of younger academics in FUNAAB. It can be concluded that younger academics (digital natives) were more inclined to embrace the use of Web 2.0 technologies than their older counterparts (digital immigrants).

The findings showed a general low-level use of Web 2.0 technologies for learning purposes, although the usage of Wikipedia, WhatsApp, Facebook and YouTube was higher than blogs, Instant messaging, newsgroups or online forums and Twitter. In addition, 49% of students had frequently used WhatsApp, Facebook and Wikipedia for learning purposes within the last three months. However, Social Bookmarking, Teacher Tube, Flickr and Bebo were hardly used for learning purposes. The low usage of some Web 2.0 technologies for TAL purposes was attributed to lack of awareness and skills, and inadequate infrastructures. The low usage reported on these technologies and the difference in the levels of awareness may constrain their use for academic purposes. It is concluded that in general students enjoyed using Wikipedia, WhatsApp, Facebook and YouTube for learning purposes, although the levels of use varied from one university to another. The ease of access through mobile phones, laptops, tablets and other portable devices contributed to the significant use of these technologies by students.

7.3.4 Factors Influencing Use of Web 2.0 Technologies for TAL

The findings revealed the factors influencing the use of Web 2.0 for TAL basing on the D&M model, TAM, and MST. The conclusion presented in this section is based on the findings on research Questions 3-6 and the corresponding hypotheses.

7.3.4.1 System quality, Information quality, Service quality and Attitude towards Use of Web 2.0 Technologies.

The findings revealed that system quality, information quality and service quality (in the D&M model) had significant influence on attitude towards the use of Web 2.0 technologies for TAL purposes. The relationship between the quality variables and attitude was moderate and positive respectively for teaching, and strong and positive for learning purposes. The findings showed that Web 2.0 technologies provided easy, reliable and prompt support for TAL purposes and ensured accurate and timely presentation and transfer of information. The findings further indicated that system quality did not independently influence attitude towards use of Web 2.0 technologies for TAL and that only two quality factors of the D&M model, namely service quality and information quality, independently influenced academics' and students' attitudes towards the use of Web 2.0 technologies for TAL purposes. The first null hypothesis related to the third research question was rejected. From the findings, it is concluded that system quality, information quality and service quality altogether have a significant influence on attitude towards the use of Web 2.0 technologies for TAL. This established that the quality variables of D&M model are important in determining attitude towards use technologies such as Web 2.0.

7.3.4.2 Attitude towards Use of Web 2.0 Technologies for TAL

The fourth research question examined the influence of academics' and students' attitudes on intention to use Web 2.0 technologies for TAL purposes. The findings revealed that the attitude of both academics and undergraduate students was positively and significantly related to their intention to use Web 2.0 technologies for TAL purposes. However, the relationship between the variables was moderately strong for teaching and stronger for learning purposes. The findings established a significant influence of attitude towards use on intention to use Web 2.0 technologies for TAL. The findings further revealed that attitude explained more of the total variation on intention to use Web 2.0 technologies for learning than teaching purposes, and that

students enjoyed communicating with colleagues using Web 2.0 technologies and also preferred to use them for TAL purposes than academics. This finding suggested that students had a more positive attitude towards use of Web 2.0 technologies for learning than academics for teaching purposes. The study, therefore, establishes attitude towards use (a TAM variable), as one of the factors responsible for influencing academics and students' intention to use Web 2.0 technologies for TAL. The study, on the whole, showed a strong enthusiasm among students and academics towards use of Web 2.0. Moreover attitude would strongly predict the future use of Web 2.0, especially for TAL purposes. The corresponding null hypothesis was rejected, suggesting that a positive and significant relationship existed between attitude towards use and intention to use Web 2.0 technologies for TAL.

7.3.4.3 Media Synchronicity and Intention to Use Web 2.0 Technologies for TAL

The fifth research question sought to explain the influence of media synchronicity (a variable from MST) on academics and students' intention to use (a TAM variable) Web 2.0 technologies for TAL purposes. The study revealed that academics and students mainly used Web 2.0 technologies for TAL because such technologies improved information quality, possessed feedback mechanisms and allowed simultaneous communication. These synchronous attributes of Web 2.0 had to some extent influenced academics' and students' decision to use them for TAL purposes. The findings also revealed that media synchronicity had a positive and significant influence on academics' and students' intention to use the Web 2.0 technologies. However, the relationship was weak for teaching, but strong for learning purposes respectively. In addition, media synchronicity explained more of the total variance on intention to use Web 2.0 technologies for learning than teaching. This finding seems to suggest that academics were not easily swayed into using technologies such as Web 2.0 for TAL purposes, based on their synchronous attributes. The findings seem to demonstrate that media synchronicity (a variable in MST) is one of the factors influencing academics' and students' intention to use Web 2.0 technologies for TAL purposes. It can be concluded that Web 2.0 technologies that are synchronous attributes are more valued for TAL purposes by academics and students. This study established a significant influence of media synchronicity on intention to use Web 2.0 technologies which was not found in the literature reviewed. The corresponding null hypothesis was rejected. It is therefore concluded a significant relationship between media synchronicity and intention to use Web 2.0 technologies for TAL purposes exists.

7.3.4.4 Net Benefits and Intention to Use of Web 2.0 Technologies for TAL

The sixth research question examined the relationship between intention to use (variable in TAM) and the net benefits (variable in D&M model) of using Web 2.0 technologies for TAL purposes. The findings revealed Web 2.0 technologies were resourceful tools particularly for TAL purposes. The findings indicated that academics and students alike had benefited substantially from the use of Web 2.0 (especially Wikipedia, Instant messaging, Facebook and WhatsApp) as far as TAL was concerned. These benefits include among others, easy and quick information sharing and increased academic performances. The findings revealed that intention to use strongly and positively contributed to the net benefits which academics and students derived from the use of Web 2.0 technologies for TAL purposes. However, intention to use Web 2.0 had greater influence on the benefits derived for learning than for teaching purposes. It is therefore inferred that students would prefer to use Web 2.0 and other similar technologies based on the benefits which such tools are able to offer. However, academics, especially the older ones who are digital immigrants, are not really affected by the derivable benefits as they are more conservative. It is also inferred that the net benefits would be realized and enjoyed for TAL purposes if the necessary facilitating factors were in place. The corresponding null hypothesis was rejected, implying that a significant relationship existed between intention to use Web 2.0 and net benefits of using Web 2.0 technologies for TAL purposes. It is also concluded that tools with the potential to offer greater benefits would increase users' intention to use them. The implication is that integration of Web 2.0 technologies with greater benefits would strengthen academics and students' intention to use them for TAL purposes in the surveyed universities.

7.3.5 Overall Conclusion

Overall, the study generally demonstrated a high level of awareness and use of Web 2.0 technologies by academics and students in such areas as communication, collaboration, academic, research, social and personal activities, news update and sharing of general information. However, the study revealed that the use of Web 2.0 technologies for TAL purposes was still low in the Nigeria universities surveyed. A number of issues such as low levels of awareness, poor internet connectivity, unsupportive institutional rules, irregular power supply, inadequate training and funding, unwillingness and puny infrastructures limit the use of Web 2.0 for TAL purposes in the surveyed universities. However, the frequent or occasional

use of Wikipedia, Instant messaging, Facebook, WhatsApp, YouTube, LinkedIn, Skype and blogs suggested an increasing integration of Web 2.0 into TAL. The study also revealed that although students were more enthusiastic about the use of these technologies for TAL than academics, the technology use gap was insignificant.

The study findings revealed that service quality, information quality, and system quality jointly influenced attitude towards the use of Web 2.0 technologies for TAL. However, system quality did not independently influence attitude towards the use of Web 2.0. This implies that academics and students' attitude to the use of Web 2.0 may not be affected by ease of use or how reliable the technologies are. Furthermore, a significant positive relationship existed between attitude, media synchronicity and intention to use; and also between intention to use Web 2.0 and net benefits of using Web 2.0 technologies for TAL purposes. The findings established the quality factors of D&M model, that is, system, information and service quality and net benefits; attitude and intention to use from TAM; and media synchronicity from MST as major factors that influenced academics' and students' use of Web 2.0 technologies in the Nigerian federal universities surveyed.

Overall it was concluded that attitude would strongly determine the future use of Web 2.0 and that academics' and students' use of some of the technologies with high synchronous features would facilitate their use for TAL purposes. In addition, integrating Web 2.0 that has greater benefits for TAL activities would aid academics and students' intention to use the technologies. The null hypotheses 1, 2, 3 and 4 (see Section 1.2.3) related to research Questions 3, 4, 5 and 6 (see Section 1.2.2) were rejected.

7.4 Recommendations

Based on the results of the empirical study, the underpinning theories, reviewed literature and conclusion of the study, the researcher provides a number of recommendations. These are discussed in Sections 7.4.1 – 7.4.3 below.

7.4.1 Recommendation 1: Awareness and Purpose of Using Web 2.0 Technologies among Academics and Students

The study established there was a higher level of awareness of Web 2.0 technologies (especially the SNSs) among students than academics in the Nigerian Universities surveyed.

The study also demonstrated a low awareness and use of Web 2.0 technologies such as Social Bookmarking, Bebo, E-portfolio and Teacher Tube among students and Flickr, Bebo, Social Bookmarking, E-portfolio and Teacher Tube among academics.

The university authorities should consider creating awareness on the different types of Web 2.0 technologies for TAL purposes and also for communication and collaboration between academics and students through training. This would address the issue of non-use and give students and academics the opportunity to identify and choose the tools that are suitable for specific tasks related to personal, academic or general activities. The libraries should put in a place a programme of user education for academics and students to encourage them and also learn how to use Web 2.0 technologies for academic and other purposes.

7.4.2 Recommendation 2: Use of Web 2.0 for TAL Purposes

The findings established a generally low usage of Web 2.0 technologies for TAL purposes in the Nigerian federal universities surveyed. The study also revealed lack of policy on the use of Web 2.0 in the universities studied. There is therefore a need for institutional policy on the integration of Web 2.0 in TAL activities. In addition, an e-readiness environment is needed consisting of infrastructure, capacity building plans, and financial resources to institutionalize use of Web 2.0 for TAL endeavours. Liu (2010) averred that readiness is warranted before deployment of technologies.

The TAL policies would, for example, aim at ensuring that academics uploaded their course outlines, lecture notes and other relevant TAL materials onto designated and authorized websites where students could easily assess such using Web 2.0 technologies. Similarly, such policies would ensure guidelines to govern how Web 2.0 was deployed and used ethically by both academic and students in order to discourage abuse in the use of such technologies. The universities could encourage uptake of Web 2.0 by academics and students through providing free or subsidized access to the internet, especially within the university environment. They should also provide funds to develop basic infrastructures that would offer back-up electricity supply which is erratic in universities in Nigeria and indeed the whole country. This should be buttressed through continuous capacity training on the use of Web 2.0 technologies for TAL purposes. Hart and Nassimbemi (2013) indicated the need for academic librarians to step in to educate academic staff and students on basic information skills for teaching, learning and

research activities. The study recommends that librarians should provide academics and students with required information on how Web 2.0 technologies and other emerging technologies can be positively appropriated for academic tasks. Continuous training is also essential to ensure the development of technological skills among academics and students and to keep them abreast of improvements on these technologies.

7.4.3 Recommendation 3: Factors Influencing Use of Web 2.0 Technologies for TAL

The study established the number of factors that influence the use of Web 2.0 technologies for TAL purposes in the surveyed universities. These factors are service quality, information quality, and system quality; attitude towards use; media synchronicity; intention to use and net benefits. It is recommended that Web 2.0 technologies that fit specific TAL tasks, and are easy to use within the Nigerian academic environment, should be deployed for TAL purposes.

7.5 Contributions of the Study

This study contributes to theory by laying a foundation to guide the design of models on information technology utilization, especially the Web 2.0 and particularly for studies conducted in developing countries. This study has identified new variables, such as attitude towards use from TAM, intention to use from TAM and the media synchronicity variable from MST to further extend the D&M model for it to better determine Web 2.0 use for TAL by academics and students in Nigerian federal universities. In addition, the study revealed the insignificance of system quality in influencing attitude towards use of Web 2.0. This finding may need to be further validated in the D&M model in subsequent studies. The evidence from the study on the factors that significantly influence attitude towards use and intention to use Web 2.0 for TAL provided a strong foundation for better understanding of the relationships amongst selected constructs of the D&M model, TAM and MST. The study resultant model as presented in Figure 13 (see Section 5.3.4) demonstrates the need to extend the D&M model in studying technology integration for TAL purposes in the context of developing countries such as Nigeria. Thus, the resultant model (See Figures 2d and 13) is proposed as a framework to improve the use of Web 2.0 in TAL in the universities.

With relation regard to practice, this study contributes to the understanding of the factors that influence technology integration particularly for TAL purposes in the Nigeria context. Factors

such as service quality, information quality, attitude towards use, media synchronicity, intention to use and net benefits were identified as having significant influence on the use of Web 2.0 technologies for TAL purposes by academics and students. However, the study found that system quality although commonly used for determining use, adoption and success of IS and technology in existing literature does not significantly influence academics and students' attitudes towards the use of Web 2.0 technologies for TAL purposes in Nigerian universities. This provides the librarians, ICT and information professionals with information on specific factors to be considered when integrating technologies such as the Web 2.0 into TAL in the Nigerian context.

In terms of policy, the study provides university authorities with the necessary information to design policies that will support the integration and use of Web 2.0 technologies for TAL. The study also contributes to the academic community by providing the academics and students with various types of Web 2.0 options and thereby creating awareness on their usefulness for TAL purposes.

7.6 Originality of the Study

Web 2.0 technologies are increasingly transforming the academic environment and a significant number of studies are emerging to understand the use of these technologies, particularly for research, TAL. However, the literature reviewed revealed that although there is high awareness of Web 2.0 technologies among academics and students, their use for TAL purposes in Nigerian universities is still low (Ajise and Fagbola 2013; Usoro, Echeng and Majewski 2013; and Diyaolu and Rifqah 2015) when compared to similar developing countries such as South Africa. This study demonstrated an increase in the level of awareness and use of Web 2.0 technologies among academics and students in selected Nigerian Federal universities which is contrary to previous studies. This study is unique in that it explored a wide range of Web 2.0 technologies not covered in previous studies, enhancing understanding on their usage for TAL purposes and comparing use among academics and students. The study also established the significance of the three quality factors of the D&M model on attitude towards use of Web 2.0 technologies. It was demonstrated that system quality as an independent factor does not significantly influence attitude towards use. The study identified other factors, apart from the D&M model quality variables and net benefits, which influence

the use of Web 2.0 technologies. These factors include attitude towards use, intention to use and media synchronicity. This study provides a framework for investigating the use of Web 2.0 TAL (See Figures 2d and 13) particularly for developing countries. Moreover, few empirical studies on the use of Web 2.0 technologies for TAL purposes by academics and students have been undertaken in Africa, especially Nigeria. The current study is therefore significant in contributing to the scholarly research and literature on the use of Web 2.0 technologies for TAL purposes in developing countries such as Nigeria.

7.7 Suggestions for Further Study

This study investigated the use of Web 2.0 technologies for TAL purposes among academics and students in two federal universities in Nigeria using a blend of theoretical frameworks including the D&M model, TAM and MST. The findings of this study provide a foundation for future research seeking to examine more specific factors that facilitate academics and students' use of Web 2.0 technologies, as well as methods of fostering the use of these technologies for TAL purposes. This study contains some limitations that form the basis for future research.

First, while this study focused on the general purposes for which academics and students use Web 2.0 Technologies, there was no investigation on the specific Web 2.0 technologies. For instance, the research did not consider questions such as specific purposes for which academics and students used Facebook, Wikipedia, Blogs or YouTube. As there are quite a lot of Web 2.0 technologies, it will be beneficial for further studies to examine the specific use of different types of Web 2.0 technologies by academics and students, as well as their influence on particular TAL tasks.

Secondly, this study revealed that certain other factors such as attitude towards use and intention to use for TAM and media synchronicity from MST, apart from the quality factors of the D&M model (that is, service, information and system quality) are significant in determining use of Web 2.0 technologies for TAL by academics and students in Nigerian universities. The understanding of these factors may serve as a guide for developing theories on technology usage and in creating new constructs or modifying existing theories like TAM and D&M model. This will help to enhance theories or models of technology adoption and use in TAL environments. It is recommended that studies on ISs further examine the relationships between variables of the D&M model, TAM and MST, with a view to integrating elements

such as attitude towards use, intention to use and media synchronicity. This will enhance better understanding on factors that affect the use of technologies akin to Web 2.0.

Thirdly, factors that influence academics and students' attitude, intention to use Web 2.0 technologies for TAL as well as the net benefits derivable from the use of these tools were explored. However, these factors were limited to selected variables of the D&M model, TAM and MST. Further research is required to identify other factors that facilitate the use of these technologies. This may be achieved by employing other technology use theories such as DOI, UTAUT and DTPB. Further study is also required to discover the most effective methods of integrating Web 2.0 technologies into TAL activities so as to improve communication, collaboration, and productivity to support active learning environments.

The fourth limitation of this study was that academics and students were from only three faculties/colleges and in two federal universities. Future research work could obtain data from other faculties/colleges not considered in this study and also from multiple universities which may include federal, state and private universities. In addition, undergraduate students were the focus of this study; further studies may include postgraduate students. Likewise, this study may be extended by comparing the use of Web 2.0 technologies for TAL purposes by undergraduate and postgraduate students. It would also be interesting to extend this study by comparing the use of Web 2.0 technologies in federal, state and private universities, to examine the differences which exist in the use of these technologies by academics and students, and the factors that influence Web 2.0 usage for TAL purposes.

This study employed a mixed method approach with quantitative methods dominating over qualitative. Thus, insufficient qualitative data were obtained from faculty heads and librarians using the interview schedule. To gain an in-depth understanding of the phenomenon being studied, the fifth suggestion is that future studies may conduct a purely qualitative study with the use of other data collection tools such as focused group discussion, in addition to the interview. In addition, a larger population of faculty heads and librarians could be sampled as they are in better position to facilitate the use of Web 2.0 technologies for TAL purposes at the universities.

A different future research idea which is the sixth suggestion would be to apply the same blend of theories such as the D&M model, TAM and MST, to predict academics and student's

attitude and intentions to use Web 2.0 technologies for TAL purposes in universities in other regions of Nigeria, for instance, the South-South, Eastern and Northern geopolitical zones. From data obtained in other geopolitical zones, findings can be compared to understand whether or not the same factors influence the use of these technologies by academics and students. This could help to comprehend the present state of Web 2.0 integration in TAL activities across Nigerian Federal universities. In addition, academics' and students' expectations on the use of Web 2.0 for TAL purposes could be compared with an attempt to understand the gap in the use of these technologies in different federal universities in Nigeria.

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APPENDIX 1: Questionnaire for Undergraduate Students

QUESTIONNAIRE ON USE OF WEB 2.0 TECHNOLOGIES IN TEACHING AND LEARNING IN SELECTED FEDERAL UNIVERSITIES IN THE SOUTHWEST, NIGERIA

Dear respondent,

Thank you for participating in this survey for a PhD study on *Use of Web 2.0 Technologies in Teaching and Learning in Selected Federal Universities in the Southwest, Nigeria*. I solicit your support in the completion of the questionnaire. All information provided will be treated with utmost confidentiality and used only for the purpose of the research.

Section A: Demographic data of respondents (Please tick (✓) one of the options that best applies to you)

1. **Institution:**
University of Ibadan, Ibadan (UI) []
Federal University of Agriculture, Abeokuta (FUNAAB) []
2. **Faculty:**
Science/ Natural Science [] Technology/Engineering [] Veterinary []
3. **Gender:** Male [] Female []
4. **Age:** Below 16 [] 16-19 [] 20- 22 [] 23-25 [] 26 and above []
5. **Current year of study:** Third [] Fourth []
6. **State your course of study:**
7. **How long have you been using Web 2.0 technologies and tools?**
Less than a year [] 1-2 years [] 3-4 years [] 5-6 years [] 7 years and above []

Section B: Awareness and Use of Web 2.0 technologies

8a. The Table below contains a list of Web 2.0 technologies. Please tick (✓) any of these technologies you are familiar with.

	Web 2.0 Technologies	(✓)
1	Blogs	
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)	
3	Newsgroups/Online forums	
4	Podcasts/Webcasts/Vodcasts	
5	RSS feeds	
6	Skype	
7	Facebook	
8	MySpace	
9	Twitter	
10	WhatsApp	
11	2go	
12	Flickr	
13	Badoo	
14	Bebo	
15	LinkedIn	
16	Social bookmarking (e.g. Delicious)	
17	E-Portfolios	
18	YouTube	
19	Teacher Tube	
20	Wikis	

21	Wikipedia	
22	Wiki-how	
23	Others (Please Specify)	

8b. **What do you use Web 2.0 technologies for? Please tick (v) appropriately, those that apply to you**

	Web 2.0 technologies	(√)
1.	Communicating with friends	
2.	Searching for needed information	
3.	Personal activities	
4.	Research activities	
5.	Online group discussion (collaboration)	
6.	To access lecture notes or materials	
7.	To submit assignments or tests	
8.	To write examinations	
9.	Sharing educational materials	
10.	Academic related activities	
11.	Social based activities	
12.	Fashion related activities	
13.	News update	
14.	To communicate with lecturers	
15.	To share general knowledge	
16.	To share specific knowledge (relating to learning)	
17.	To access learning resources	
18.	Others (Please Specify)	

8c. **Which of the following Web 2.0 technologies do you use for learning purpose?**

	Web 2.0 Technologies	(√)
1	Blogs	
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)	
3	Newsgroups/Online forums	
4	Podcasts/Webcasts/Vodcasts	
5	RSS feeds	
6	Skype	
7	Facebook	
8	MySpace	
9	Twitter	
10	WhatsApp	
11	2go	
12	Flickr	
13	Badoo	
14	Bebo	
15	LinkedIn	
16	Social bookmarking (e.g. Delicious)	
17	E-Portfolios	
18	YouTube	
19	Teacher Tube	
20	Wikis	

21	Wikipedia	
22	Wiki-how	
23	Others (Please Specify)	

9. Frequency of use of Web 2.0 technologies

In the last three (3) months, how frequently have you used the following Web 2.0 technologies for learning?

Web 2.0 Technologies		Never (0)	Rarely <i>1 – 2 times</i> (1)	Occasionally <i>3 – 5 Times</i> (2)	Frequently <i>6 - 10 times</i> (3)	Very Frequently <i>More than 10 times</i> (4)
1	Blogs					
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)					
3	Newsgroups/Online forums					
4	Podcasts/Webcasts/Vodcasts					
5	RSS feeds					
6	Skype					
7	Facebook					
8	MySpace					
9	Twitter					
10	WhatsApp					
11	2go					
12	Flickr					
13	Badoo					
14	Bebo					
15	LinkedIn					
16	Social bookmarking (e.g. Delicious)					
17	E-Portfolios					
18	YouTube					
19	Teacher Tube					
20	Wikis					
21	Wikipedia					
22	Wiki-how					
23	Others (Please Specify)					

Kindly respond to the items (under section C, D, E and F) below by indicating your level of agreement with the statements. Please check as follows: 0= Undecided (U), 1=Strongly Agree (SA), 2=Agree (A), 3=Disagree (D) and 4=Strongly Disagree (SD)

SECTION C: Indicate how system quality, information quality and service quality influence the use Web 2.0 technologies for teaching practices.

Items	System Quality (SQ)	U	SA	A	D	SD
		0	1	2	3	4
SQ1	I find Web 2.0 technologies easy to use					
SQ2	Web 2.0 technologies are reliable for learning					
SQ3	Web 2.0 technologies make it easy for me to collaborate with my peers					
SQ4	Web 2.0 technologies make learning easy					
SQ5	Web 2.0 technologies help me accomplish my academic tasks more quickly					
SQ6	I find Web 2.0 technologies useful for my academic work					

Items	Information Quality (IQ)	0	1	2	3	4
IQ1	Web 2.0 technologies make it easy for me to obtain learning materials					
IQ2	Web 2.0 technologies provide me with sufficient information for learning					
IQ3	Web 2.0 technologies help information to be accurately presented					
IQ4	Information provided are clear and unambiguous					
IQ5	Information transferred/received using Web 2.0 technologies are timely					
IQ6	Web 2.0 technologies provide up-to-date information					
IQ7	Information provided by Web 2.0 technologies are meaningful					

Items	Service Quality	0	1	2	3	4
SEQ1	Web 2.0 technologies provide reliable and prompt support for learning					
SEQ2	Web 2.0 technologies have up-to-date hardware and software that help in receiving instructional materials					
SEQ3	I have sufficient understanding about the use of Web 2.0 technologies for learning purposes					
SEQ4	Information are sent/delivered securely using Web 2.0 technologies					

SECTION D: Indicate how media synchronicity has influenced your intention to use Web 2.0 technologies for learning practices

Items	Media Synchronicity	0	1	2	3	4
MS1	The use of Web 2.0 technologies aid simultaneous (occurring at the same time) communication between sender and receiver					
MS2	Web 2.0 technologies enable me to give and receive rapid feedback on the communications					
MS3	Web 2.0 technologies allow me to communicate using various symbols					
MS4	Web 2.0 technologies allow me to edit, fine tune or improve the quality of information before sending it					

SECTION E: Indicate your attitude towards use of Web 2.0 technologies for learning purposes

Items	Attitude towards use of Web 2.0 technologies	0	1	2	3	4
ATT1	I have a generally favourable attitude towards using Web 2.0 technologies					
ATT2	I believe it will be a good idea to use Web 2.0 technologies for learning					
ATT3	I prefer to use Web 2.0 technologies for learning					
ATT4	I enjoy learning with Web 2.0 technologies					

SECTION F: Indicate how you intend to use Web 2.0 technologies for learning purposes in the future

Items	Intention to use	0	1	2	3	4
USE1	I intend to use Web 2.0 technologies for learning as frequently as possible.					
USE2	I intend to use Web 2.0 technologies whenever possible for my coursework					
USE3	I will use Web 2.0 tools to communicate with my colleagues					
USE4	I will use Web 2.0 technologies for my learning activities on a regular basis					
USE5	I will use Web 2.0 technologies to access learning materials					
USE6	I will strongly recommend other students to use Web 2.0 technologies for learning					

SECTION G: Indicate the benefits of using Web 2.0 technologies for teaching and learning purposes

Items	Net benefits	0	1	2	3	4
NETB1	Web 2.0 technologies help me to acquire new knowledge and innovative ideas					
NETB2	My learning performance is enhanced with the use of Web 2.0 technologies					
NETB3	Web 2.0 technologies help me to effectively manage and store the information and knowledge that I need for my studies					
NETB4	Web 2.0 technologies enable me to do my assignments more easily and efficiently					
NETB5	Web 2.0 technologies promote my efficiency and effectiveness in learning					
NETB6	Use of Web 2.0 technologies increase my academic productivity					

APPENDIX 2: Questionnaire for Academics

SURVEY QUESTIONNAIRE ON USE OF WEB 2.0 TECHNOLOGIES IN TEACHING AND LEARNING IN SELECTED FEDERAL UNIVERSITIES IN THE SOUTHWEST, NIGERIA

Dear respondent,

Thank you for participating in this survey for a PhD study on *Use of Web 2.0 Technologies in Teaching and Learning in Selected Federal Universities in the Southwest, Nigeria*. All information provided will be treated with utmost confidentiality and used only for the purpose of the research.

Section A: Demographic data of respondents (Please tick (✓) one of the options that best applies to you)

1. **Name of University:** University of Ibadan, Ibadan (UI) []
Federal University of Agriculture, Abeokuta (FUNAAB) []
2. **Faculty/ College:**
Science/ Natural Science [] Technology/Engineering [] Veterinary []
3. **Gender:** Male [] Female []
4. **Age group:**
Below 30 [] 31- 40 [] 41- 50 [] 51- 60 [] 60 and above []
5. **Highest educational qualification (Academics):**
Masters [] PhD [] Others (Please Specify) _____
6. **Please specify your area of specialization:** _____
7. **For how many years have you been using Web 2.0 technologies and tools?**
Less than a year [] 1-2 years [] 3-4 years [] 5-6 years [] 7 years and above []

Section B: Awareness and Use of Web 2.0 technologies

8a. The Table below contains a list of Web 2.0 technologies. Please tick (✓) any of these technologies you are familiar with.

	Web 2.0 Technologies	(✓)
1	Blogs	
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)	
3	Newsgroups/Online forums	
4	Podcasts/Webcasts/Vodcasts	
5	RSS feeds	
6	Skype	
7	Facebook	
8	MySpace	
9	Twitter	
10	WhatsApp	
11	2go	
12	Flickr	
13	Badoo	
14	Bebo	
15	LinkedIn	
16	Social bookmarking (e.g. Delicious)	
17	E-Portfolios	
18	YouTube	
19	Teacher Tube	

20	Wikis	
21	Wikipedia	
22	Wiki-how	
23	Others (Please Specify)	

8b. What do you use Web 2.0 technologies for? Please tick (√) appropriately, those that apply to you

	Web 2.0 technologies	(√)
1.	Communicating with friends or colleagues	
2.	Searching for information	
3.	Personal activities	
4.	Research activities	
5.	Online group discussion (collaboration)	
6.	To access and prepare lecture notes/materials	
7.	To give/receive assignments/tests	
8.	Student assessment and evaluation	
9.	Sharing educational materials	
10.	Academic related activities	
11.	Social based activities	
12.	Fashion related activities	
13.	News update	
14.	To communicate with students	
15.	To share general knowledge	
16.	To share specific knowledge (relating to teaching)	
17.	To access teaching resources	
18.	Others (Please Specify)	

8c. Which of the following Web 2.0 technologies do you use for teaching purpose?

	Web 2.0 Technologies	(√)
1	Blogs	
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)	
3.	Newsgroups/Online forums	
4.	Podcasts/Webcasts/Vodcasts	
5.	RSS feeds	
6.	Skype	
7.	Facebook	
8.	MySpace	
9.	Twitter	
10	WhatsApp	
11.	2go	
12.	Flickr	
13.	Badoo	
14.	Bebo	
15.	LinkedIn	
16.	Social bookmarking (e.g. Delicious)	
17.	E-Portfolios	
18.	YouTube	
19.	Teacher Tube	

20.	Wikis	
21.	Wikipedia	
22.	Wiki-how	
23.	Others (Please Specify)	

9. Frequency of use of Web 2.0 technologies

In the last three (3) months, how frequently have you used the following Web 2.0 technologies for teaching purpose (lecturer-student interaction)?

Web 2.0 Technologies		Never (0)	Rarely 1 – 2 times (1)	Occasionally 3 – 5 Times (2)	Frequently 6 - 10 times (3)	Very frequently More than 10 times (4)
1	Blogs					
2	Instant messaging (e.g. Yahoo messenger, MSN, Google talk, etc.)					
3.	Newsgroups/Online forums					
4.	Podcasts/Webcasts/Vodcasts					
5.	RSS feeds					
6.	Skype					
7.	Facebook					
8.	MySpace					
9.	Twitter					
10	WhatsApp					
11.	2go					
12.	Flickr					
13.	Badoo					
14.	Bebo					
15.	LinkedIn					
16.	Social bookmarking (e.g. Delicious)					
17.	E-Portfolios					
18.	YouTube					
19.	Teacher Tube					
20.	Wikis					
21.	Wikipedia					
22.	Wiki-how					
23.	Others (Please Specify)					

Kindly respond to the items (under section C, D, E and F) below by indicating your level of agreement with the statements. Please check as follows: 0= Undecided (U), 1=Strongly Agree (SA), 2=Agree (A), 3=Disagree (D) and 4=Strongly Disagree (SD)

SECTION C: Indicate how system quality, information quality and service quality influence the use Web 2.0 technologies for teaching purpose

Items	System Quality (SQ)	U	SA	A	D	SD
		0	1	2	3	4
SQ1	I find Web 2.0 technologies easy to use					
SQ2	Web 2.0 technologies are reliable for teaching					
SQ3	Web 2.0 technologies make it easy for me collaborate to with my colleagues					
SQ4	Web 2.0 technologies make teaching easy					
SQ5	Web 2.0 technologies help me accomplish my teaching tasks more quickly					
SQ6	I find Web 2.0 technologies useful in teaching					

Items	Information Quality (IQ)	0	1	2	3	4
IQ1	Web 2.0 technologies make it easy for me to obtain and prepare teaching materials					
IQ2	Web 2.0 technologies provide me with sufficient information for teaching					
IQ3	Web 2.0 technologies allow information to be accurately presented					
IQ4	Information provided are clear and unambiguous					
IQ5	Information transferred/received using Web 2.0 technologies are timely					
IQ6	Web 2.0 technologies provide up-to-date information					
IQ7	Information provided by Web 2.0 technologies are meaningful					

Items	Service Quality	0	1	2	3	4
SEQ1	Web 2.0 technologies provide reliable and prompt support for teaching					
SEQ2	Web 2.0 technologies have up-to-date hardware and software that help in delivering instructions					
SEQ3	I have sufficient understanding about the use of Web 2.0 technologies for teaching purposes					
SEQ4	Information are sent/delivered securely using Web 2.0 technologies					

SECTION D: Indicate how media synchronicity has influenced your intention to use Web 2.0 technologies for teaching purposes

Items	Media Synchronicity (MS)	0	1	2	3	4
MS1	The use of Web 2.0 technologies aid simultaneous (occurring at the same time) communication between sender and receiver					
MS2	Web 2.0 technologies enable me to give and receive rapid feedback on the communications					
MS3	Web 2.0 technologies allow me to communicate using various symbols					
MS4	Web 2.0 technologies allow me to edit, fine tune or improve the quality of information before sending it					

SECTION E: Indicate your attitude towards use of Web 2.0 technologies for teaching purpose

Items	Attitude towards use of Web 2.0 technologies (ATT)	0	1	2	3	4
ATT1	I have a generally favourable attitude towards using Web 2.0 technologies					
ATT2	I believe it will be a good idea to use Web 2.0 technologies for teaching					
ATT3	I prefer to use Web 2.0 technologies for teaching					
ATT4	I enjoy teaching with Web 2.0 technologies					

SECTION F: Indicate how you intend to use Web 2.0 technologies for teaching in the future

Items	Intention to use	0	1	2	3	4
USE1	I intend to use Web 2.0 technologies for teaching as frequently as possible.					
USE2	I intend to use Web 2.0 technologies whenever possible for teaching					
USE3	I will use Web 2.0 tools to communicate with my students					
USE4	I will use Web 2.0 technologies for teaching activities on a regular basis					
USE5	I will use Web 2.0 technologies to access teaching materials					
USE6	I will strongly recommend other academics to use Web 2.0 technologies for teaching					

SECTION G: Indicate the benefits of using Web 2.0 technologies for teaching purposes

Items	Net benefits (NTB)	0	1	2	3	4
NTB1	Web 2.0 technologies help me to acquire new knowledge and innovative ideas					
NTB2	My teaching performance is enhanced with the use of Web 2.0 technologies					
NTB3	Web 2.0 technologies help me to effectively manage and store the information and knowledge needed for teaching					
NTB4	Web 2.0 technologies enable me to do my teaching job more easily and efficiently					
NTB5	Web 2.0 technologies promote my efficiency and effectiveness in teaching					
NTB6	Use of Web 2.0 technologies increase my academic productivity					

APPENDIX 3:

Interview Guide for Heads of Faculties and Librarians in Selected Nigerian Universities

Demographic Information:

University: _____

Faculty: _____

Status/ Designation: _____

Experience working as an academic/librarian: _____

Number of years working in this university: _____

Gender: Female [] Male []

Age category: Below 30 [] 31- 40 [] 41-50 [] 51-60 [] 61 and above []

1. What do you understand by the term Web 2.0 technologies? (Please give examples)
2. Do you think Web 2.0 technologies are necessary tools for teaching and learning in your university?
 - a. If yes, why do you think they are necessary?
 - b. If no, why do you think they are not necessary?
3. Which Web 2.0 technologies are used for teaching and learning in your university?
4. How are Web 2.0 technologies used in teaching and learning in your university?
5. How would you describe the extent of use of Web 2.0 technologies for teaching and learning at your university?
6. What level of budget is given to Web 2.0 technologies in your university?
7. What technical support is provided for the use of Web 2.0 technologies in your university?
8. What has been the impact of Web 2.0 technologies on teaching and learning?
9. What ICT infrastructures are available to support the use of Web 2.0 technologies by students and academics in your university?
10. What institutional policies are available in your university to support the integration of Web 2.0 technologies for teaching and learning purposes?
11. What capacity building programmes are in place to enhance the use of Web 2.0 technologies in your university?
12. How are students' academic performances evaluated in using web 2.0 technologies?
13. How would you describe students' attitude towards the use of web 2.0 technologies in your university?
14. How would you describe the attitude of academics towards the use of web 2.0 technologies in Your university?
15. How do you think the attitude of academics and students would influence their use of Web 2.0 technologies for teaching and learning?
16. In your opinion, what factors facilitate the use of Web 2.0 technologies for teaching and learning?
17. What factors do you think constrain the use of Web 2.0 technologies for teaching and learning and what solutions can be proffered?
18. What role do you think the library should play in facilitating adoption and use of Web 2.0 technologies for teaching and learning in Nigerian Universities?

Any other relevant comments-Thank you for your time and cooperation.

APPENDIX 4:
INFORMED CONSENT I



7 January 2015

Dear Respondent,

Informed Consent Letter for Questionnaire

INVITATION TO PARTICIPATE IN A SURVEY

I wish to invite you to participate in a study entitled: Use of Web 2.0 Technologies in Teaching and Learning in Selected Federal Universities in the Southwest Nigeria. The research study is undertaken as part of the requirements for PhD in Information Studies programme at the University of KwaZulu-Natal.

The aim of this study is to investigate the extent of use of Web 2.0 technologies in teaching and learning in selected Federal Universities in Southwest, Nigeria. The study is expected to contribute to policy, practice and theory in various ways and provide useful information on incorporating Web 2.0 technologies into Nigerian university education for effective learning and collaboration amongst students/students, students/academics and academics/academics.

Participation in this research project is voluntary. You may refuse to participate or withdraw from the study at any point without having to explain your *reasons* for such withdrawal or non-participation. There will be no monetary gain from participating in this research project. Both the researcher and the Information Studies Programme in the School of Social Sciences within the College of Humanities, University of KwaZulu-Natal will maintain confidentiality and anonymity of records identifying you as a participant.

It should take you about 15 minutes to complete the questionnaire. You are requested to kindly answer all questions to the best of your ability.

If you have any questions or concerns about participating in this study, please feel free to contact me or my supervisor by email or telephone.

Thank you for participating in this study.

Supervisor: Prof. Stephen Mutula
Institution: University of KwaZulu-Natal, PMB
Telephone number: +27 (0) 33 260 5571
Email address: Mutulas@ukzn.ac.za

Researcher: Priscilla Ayooluwa Kolawole
Institution: University of KwaZulu-Natal, PMB
Cell: +27(0)843656172/ +2348165766164
Email address: 214573084@stu.ukzn.ac.za/talk2pris2001@yahoo.com

HSSREC Research Office: Ms P Ximba
Institution: University of KwaZulu-Natal
Telephone number: +27 (0) 31 260 3587
Email address: ximbap@ukzn.ac.za

Informed Consent form for survey participants

Please complete this form

Title of study: Use of Web 2.0 Technologies in Teaching and Learning in selected Federal Universities in Southwest, Nigeria

I,, hereby consent to participate in the study as outlined in the document about the study/ as explained to me by the researcher.

I acknowledge that I have been informed of the purpose of this survey. I am aware that participation in the study is voluntary and I may refuse to participate or withdraw from the study at any stage and for any reason without any form of disadvantage. I acknowledge that I understand the contents of this form and freely consented to participating in the study.

Participant

Signed..... Date:

Researcher

Signed Date:

APPENDIX 5:
INFORMED CONSENT II



7 January 2015

Dear Respondent,

Informed consent letter for Interview

INVITATION TO PARTICIPATE IN A SURVEY

I wish to invite you to participate in a study entitled: Use of Web 2.0 Technologies in Teaching and Learning in Selected Federal Universities in the Southwest Nigeria. The research study is undertaken as part of the requirements for PhD in Information Studies programme at the University of KwaZulu-Natal.

The aim of this study is to investigate the extent of use of Web 2.0 technologies in teaching and learning in selected Federal Universities in Southwest, Nigeria. The study is expected to contribute to policy, practice and theory in various ways and provide useful information on incorporating Web 2.0 technologies into Nigerian university education for effective learning and collaboration amongst students/students, students/academics and academics/academics.

Participation is voluntary; you may refuse to participate or withdraw from the study at any point without having to explain your *reasons* for such withdrawal or non participation. There will be no monetary gain from participating in this research project. Both the researcher and the Information Studies Programme in the School of Social Sciences within the College of Humanities, University of KwaZulu-Natal will maintain confidentiality and anonymity of records identifying you as a participant.

It should take about 30 minutes to complete the interview. You are requested to kindly answer all questions to the best of your ability.

If you have any questions or concerns about participating in this study, please feel free to contact me or my supervisor by email or telephone.

Thank you for participating in this study.

Supervisor: Prof. Stephen Mutula
Institution: University of KwaZulu-Natal, PMB
Telephone number: +27 (0) 33 260 5571
Email address: Mutulas@ukzn.ac.za

Researcher: Ms. Priscilla Kolawole
Institution: University of KwaZulu-Natal, PMB
Cell: +27843656172 / +2348165766164
Email address: 214573084@stu.ukzn.ac.za/ talk2pris2001@yahoo.com

HSSREC Research Office: Ms P Ximba
Institution: University of KwaZulu-Natal
Telephone number: +27 (0) 31 260 3587
Email address: ximbap@ukzn.ac.za

Informed Consent form for survey participants

Please complete this form

Title of study: Use of Web 2.0 Technologies in Teaching and Learning in Selected Federal Universities in the Southwest Nigeria

I....., hereby confirm that I understand the contents of this document and the nature of the research project, and I agree to participate in the research project as outlined in the document about the study. I consent / do not consent to have this interview recorded.

I acknowledge that I have been informed of the purpose of this interview. I am aware that participation in the study is voluntary and I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participant

Signed..... Date:

Researcher

Signed Date:

APPENDIX 6: LETTER SEEKING PERMISSION I



Information Studies
School of Social Sciences
University of KwaZulu-Natal (UKZN)
Pietermaritzburg Campus
Private Bag X01
Scottsville 3209
South Africa
Phone (SA) +27843656172
(NG) +2348165766164
Email: 214573084@stu.ukzn.ac.za,
priscillakolawole@gmail.com
12th June, 2014

The Registrar,
University of Ibadan,
Ibadan,
Oyo-State,
Nigeria.

Dear Sir:

Request for Permission to access your University to Collect Data for PhD Research

I Ms. Priscilla Ayooluwa **KOLAWOLE**, a doctoral student of Information Studies, School of Social Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa, write to solicit for your consent to access your University for the purpose of data collection. My study is on **"Use of Web 2.0 Technologies in Teaching and Learning: Case study of selected Federal Universities in the Southwest, Nigeria"**. The questionnaire is to be completed by selected academic staff and undergraduate students in the faculties of Science, Technology, Veterinary and Agriculture. Any participant who wishes to refrain from participating in the survey is obliged to do so. Permission is also sought to conduct an in-depth interview with the Deans and Librarians of the faculties named above.

I would appreciate your cooperation towards completing the administered questionnaire, interview schedule and the research as a whole. The data obtained will be used solely for research work. The study will determine the extent of use of Web 2.0 tools by students and academics, examine the extent to which Web 2.0 tools are integrated in teaching and learning in the selected universities in Nigeria and investigate the factors influencing the use of Web 2.0 technologies for teaching and learning. The study aims at providing useful information on incorporating Web 2.0 technologies into Nigerian university

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

School of Social Sciences






Postal Address: Private Bag X01, Scottsville, 3209, South Africa
Telephone: +27 (0) 33 260 5320/5007 Facsimile: +27 (0) 33 260 5092
Email: socialsciences@ukzn.ac.za

education for effective learning and collaboration amongst students/students, students/academics and academics/academics.

Kindly direct your further enquiries concerning this study to my supervisor, Prof. Stephen Mutula, (telephone +2773326055, email: Mutulas@ukzn.ac.za).

Thank you for your anticipated cooperation.

Priscilla Ayooluwa KOLAWOLE

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

School of Social Sciences

Postal Address: Private Bag X01, Scottsville, 3209, South Africa

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Facsimile: +27 (0) 33 260 5092

Email: socialsciences@ukzn.ac.za

APPENDIX 7: LETTER SEEKING PERMISSION II



Information Studies
School of Social Sciences
University of KwaZulu-Natal (UKZN)
Pietermaritzburg Campus
Private Bag X01
Scottsville 3209
South Africa
Phone (SA) +27843656172
(NG) +2348165766164
Email: 214573084@stu.ukzn.ac.za,
priscillakolawole@gmail.com
12th June, 2014




The Registrar,
Federal University of Agriculture, Abeokuta (FUNAAB),
Ogun State,
Nigeria.

Dear Sir:

Request for Permission to access your University to Collect Data for PhD Research

I Ms. Priscilla Ayooluwa KOLAWOLE, a doctoral student of Information Studies, School of Social Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, South Africa, write to solicit for your consent to access your University for the purpose of data collection. My study is on **“Use of Web 2.0 Technologies in Teaching and Learning: Case study of selected Federal Universities in the Southwest, Nigeria”**. The questionnaire is to be completed by selected academic staff and undergraduate students in the Natural Sciences, Engineering, Veterinary and Agriculture. Any participant who wishes to refrain from participating in the survey is obliged to do so. Permission is also sought to conduct an in-depth interview with the Deans and Librarians of the faculties named above.

I would appreciate your cooperation towards completing the administered questionnaire, interview schedule and the research as a whole. The data obtained will be used solely for research work. The study will determine the extent of use of Web 2.0 tools by students and academics, examine the extent to which Web 2.0 tools are integrated in teaching and learning in the selected universities in Nigeria and investigate the factors influencing the use of Web 2.0 technologies for teaching and learning. The study aims at providing useful information on incorporating Web 2.0 technologies into Nigerian university

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education for effective learning and collaboration amongst students/students, students/academics and academics/academics.

Kindly direct your further enquiries concerning this study to my supervisor, Prof. Stephen Mutula, (telephone +2773326055, email: Mutulas@ukzn.ac.za).

Thank you for your anticipated cooperation.

Priscilla Ayooluwa KOLAWOLE

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School of Social Sciences

Postal Address: Private Bag X01, Scottsville, 3209, South Africa

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Facsimile: +27 (0) 33 260 5092

Email: socialsciences@ukzn.ac.za

APPENDIX 8: UKZN Ethical Clearance



14 November 2014

Ms PA Kolawole 214573084
School of Social Sciences
Pietermaritzburg Campus

Dear Ms Kolawole

Protocol reference number: HSS/1485/014D

Project title: Use of Web 2.0 Technologies in Teaching and Learning: Case study of selected Federal Universities in the Southwest, Nigeria

Full Approval – Expedited Application

In response to your application received 30 October 2014, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.


Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully


.....
Dr Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

Cc Supervisor: Professor SM Mutula
Cc Academic Leader Research: Professor Sabine Marschall
Cc School Administrator: Ms Nancy Mudau

Humanities & Social Sciences Research Ethics Committee

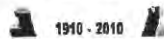
Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbas@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za

Website: www.ukzn.ac.za



100 YEARS OF ACADEMIC EXCELLENCE

For more information

Edgewood

Howard College

Medical School

Pietermaritzburg

Westville

APPENDIX 9: APPROVAL LETTER I



FEDERAL UNIVERSITY OF AGRICULTURE ABEOKUTA, NIGERIA

OFFICE OF THE REGISTRAR
Registrar: Mr. M. O. Ayoola, JP.
P.M.B 2240, Abeokuta, Ogun State, Nigeria
email: registrar@funaab.edu.ng
ayoolamo@funaab.edu.ng
Website: www.funaab.edu.ng
Tel: 234-803-391-8405

FUNAAB/R/ESTAB.91/286

July 21, 2014

Ms. Priscilla Ayooluwa Kolawole,
Information Studies,
School of Social Sciences,
University of KwaZulu-Natal (UKZN),
Pietermaritzburg Campus,
Private Bag X01,
Scottsville 3209,
South Africa.

Dear Ms. Kolawole,

**RE: REQUEST FOR PERMISSION TO ACCESS YOUR UNIVERSITY TO
COLLECT DATA FOR PH.D. RESEARCH**

Please refer to your letter dated June 12, 2014 on the above subject-matter.

I write to inform you that the Vice-Chancellor, Federal University of Agriculture, Abeokuta (FUNAAB) has approved your request for permission to access the Federal University of Agriculture, Abeokuta for the purpose of your data collection on the Use of Web 2.0 Technologies in Teaching and Learning.

Please note that the approval is with the proviso that information provided will not be used against the University.

Thank you.

Yours sincerely,

O. M. Dawodu (Mrs.)
For: Registrar

Our Vision:
To be a Centre of Excellence in Knowledge
generation for global development and the
sustenance of an environmentally friendly society

Our Mission
To build future leaders and generate knowledge through
research and intellectually stimulating environment for teaching,
learning and community outreach towards sustainable development

APPENDIX 10: APPROVAL LETTER II



UNIVERSITY OF IBADAN IBADAN, NIGERIA

Research Management Office

Central Administration Building

E-mail: rmo@mail.ui.edu.ng

rmo-office@mail.ui.edu.ng

Phone: +234(0)22910558

+234 (0) 7043886129

1 August 2014

Information Studies Programme
School of Social Sciences
University of KwaZulu- Natal (UKZN)
Pietermaritzburg Campus
Private Bag X01
Scotsville 3209, South Africa

Dear Ms. Priscilla Ayooluwa Kolawole,

Approval for Data Collection

Your letter dated 12th June 2014 refers. I write to convey the approval of the Vice Chancellor of the University of Ibadan, Prof Isaac F. Adewole, regarding your request to collect data for the study titled **"Use Web 2.0 Technologies in Teaching and Learning: Case study of selected Federal Universities in Southwest Nigeria"**. Should you require any assistance in accessing the study participants in the selected faculties, please feel free to contact the Research Management Office staff.

Upon completion of the doctoral thesis, it is expected that you will make the results pertinent to the University of Ibadan available to the relevant authorities.

We wish you all the best as you commence the fieldwork and look forward to receiving a feedback regarding your findings.

Yours sincerely,

Dr Eme T. Owoaje.
Director

Our Vision

To be a world-class institution for academic excellence geared towards meeting societal needs

Our Mission

To expand the frontiers of knowledge through provision of excellent conditions for learning and research
To produce graduates who are worthy in character and sound judgement.
To contribute to the transformation of society through creativity and innovation
To serve as a dynamic custodian of society's salutary values and thus sustain its integrity.

APPENDIX 11: EDITOR'S REPORT

**Dominie Lewis Consulting
Independent Contractor**

Postal Address

Postnet Suite H94 (Hilton), Private Bag X9118
dominilewis@gmail.com
Pietermaritzburg, KwaZulu Natal, 3201, South Africa

Phone 082 331 8703

Email

**For Attention
Professor S. Mutula
Supervisor**

21 March 2016

Dear Professor Mutula

**CONFIRMATION OF COMPLETION OF EXTERNAL EDITING OF STUDENT'S DISSERTATION
STUDENT: PRISCILLA AYOOLUWA KOLAWOLE
STUDENT NUMBER: 214573084**

This serves to confirm that I was contracted by Ms P. A. Kolawole as an independent, external editor for her dissertation submitted to the University of KwaZulu Natal. I have extensive editing experience in that I was the co-ordinating editor of a human rights magazine, have edited human rights journals for publication and have for the past two years edited a number of student dissertations for submission for degree purposes.

The subject of Ms Kolawole's research topic on which she completed her dissertation was as follows:
Use of Web 2.0 Technologies for Teaching and Learning in Selected Federal Universities in Southwest Nigeria.

I confirm that I edited the text of Ms Kolawole's dissertation which was given to me as a paper document and that the editing of this text by myself was completed on the paper document itself.

Should you require any additional information, please contact me as detailed above.

Thank you.

Yours sincerely


Dominie Lewis (Ms)

Dominie Lewis letter editing of dissertation P. A. Kolawole 21 March 2016