

# A Model of Acceptance of Web 2.0 in learning in higher education: a case study of two cultures

Abel Usoro

School of Computing  
University of the West of Scotland  
Paisley, United Kingdom  
[abel.usoro@uws.ac.uk](mailto:abel.usoro@uws.ac.uk)

Razep Echeng

School of Computing  
University of the West of Scotland  
Paisley, United Kingdom  
[razep.echeng@uws.ac.uk](mailto:razep.echeng@uws.ac.uk)

Grzegorz Majewski

Faculty of Information Studies  
Novo Mesto  
Slovenia  
[grzegorz.majewski@gmail.com](mailto:grzegorz.majewski@gmail.com)

**Abstract** - Though a few empirical studies on acceptance of Web 2.0 as a social networking tool in teaching and learning exist, apparently none of such studies is on students and faculties views from different cultures which is the focus of this study. This paper reports on a pilot study that begins to fill this gap by investigating the perceptions, attitude and acceptance of Web 2.0 in teaching and learning from two countries (developed and developing). A conceptual model of 9 variables and associated hypotheses was designed based on literature review and initial primary study. A questionnaire was developed from the model operationalization and used to collect data from 317 students from 5 universities in Nigeria and 273 students and lecturers from one university in Scotland. The findings that came from data analysis indicate that all the variables are validated from the data collected in Scotland but *motivation* via learning management systems which are not presently used in these universities in Nigeria affect intention to use Web 2.0 in e-learning in Nigeria. Some of the validated variables are perceived usefulness and prior knowledge. The major conclusions and recommendations include the utilization of Web 2.0 facilities to stimulate participation in learning. This work will contribute to the body of knowledge on acceptance of Web 2.0 social networking tools in teaching and learning. It will aid the key players of e-learning which include content developers, technology vendors and service providers. It may also support management decisions toward investing better on technology so as to improve the educational sector.

**Index Terms** - Web 2.0; collaboration; active participation; enhanced learning; Web 2.0 acceptance; learning; higher education; technology based learning

## I. BACKGROUND

A number of empirical studies on the usefulness of Web 2.0 tools has been done by few researchers. For example, Parker et al. [2] researched Twitter, McKinney et al. [4] studied podcast Xie et al. [1] studied blogs and Ajjan and Hortshorn [3] researched acceptance. Research on the impacts of Web 2.0 tools in higher education is increasing by the day in developed and developing countries [5] [6] [7] [8] [9] with more in developed economies. Few studies are beginning to emerge in developing countries e.g. Nigeria on the use of Web 2.0 in higher institution, using learning management system for example Anunobi and Ogbonna [10]. However Web 2.0 technologies adoption for learning in

higher education is still under utilised in higher education learning environments, hence the need for investigation of factors that could influence effective use and adoption in higher education [3].

Web 2.0 provides social networks as a student support feature [11] [12] [13]. It enables the sharing of learning experiences, exchanging of information about the subjects being taught and assessment requirements, and provision of moral support. Web 2.0 technologies provide opportunities for students to construct and share knowledge with each other. Jucevičienė and Valinevičienė [13] concluded in their studies that there are four main factors that determine the adoption of social network usage in higher education: academic service support; student support; social and cooperate learning; and achievement representation. This paper tests three models of acceptance and discusses the acceptance of Web 2.0 technologies in learning. The rest of this paper will present the need for Web 2.0 technologies in education, theoretical framework, method, findings and discussion, and summary and future work.

## II. LITERATURE REVIEW

### A. The Need for Web 2.0 technologies in education

Web 2.0 is such a technology that provides very effective web-based collaborative systems. Being a relatively young technology, a number of issues are yet to be resolved. One of these is its acceptance and use in teaching and learning [6]. However, several studies, for example, Redecker [7] [14], have shown that Web 2.0 social computing tools and application in education and training enhances participatory learning, collaboration, knowledge and information sharing. Also research findings from Xia and Sharma [1] show that students' thinking levels were increased as the students updated their blogs weekly. It also offers effective strategies for implementing what has been learnt by exploring other media. In order to achieve a better learner centred approach, there is need for education and training institutions to adopt the 21st-century technologies that improve learner engagement among other benefits.

However, despite the advantages of using Web 2.0

technologies in learning, adoption is low [10] [15]. This research investigates factors that could influence adoption in Nigerian and in one Scottish learning environment using an adapted technology acceptance model. The empirical work using this model examines attitudes and perceptions of users in order to predict their acceptance of Web 2.0 technologies for learning.

### B. Theoretical framework

This research used, as underpinning theories, the technology acceptance model (TAM) and the unified theory of the use and acceptance of technology (UTAUT). The TAM theory which origin is from theory of reasoned action (TRA) [16] states that users' behavioural intentions determine their acceptance of technology and their behaviour in turn influences their attitude [17]. Two variables, perceived ease of use and perceive usefulness, are the fundamental determinants of acceptance of technology [17]. TAM has been tested and validated in business settings with few validations in educational sectors [18].

From research, various theories have been developed to predict acceptance of technology but these theories are applicable to few cultures mainly in developed countries. Researchers who have carried out empirical research using the existing models usually select variables from these models to measure general acceptance or adjust existing models to fit the technology being queried [18] [19] [20]. Technology Acceptance Model (TAM) which is frequently used by researchers to predict acceptance of technology was reported not valid across cultures. The differences were detected between Singaporean and Malaysian pre-service teachers. In that study, relationships between perceived usefulness (PU), perceived ease of use (EoU) and computer attitude (CA) on the one hand and behavioural intention (BI) on the other were validated as significant whereas the relationship between behavioural intention (BI) and motivation to use (MtU) was not significant [18].

Unified theory of acceptance and use of technology (UTAUT) which was extended from TAM with seven others (theory of reasoned action, motivational model, theory of planned behaviour and model of PC utilization) has been used by few researchers to predict acceptance. The UTAUT was validated in eight countries [21]. Oshiyanki et al. [19], in a follow up study, collected data from eight other countries but analysed from only three of the countries - United Kingdom, United States, and New Zealand - who speak English language. They measured and validated five out of the eight variables of UTAUT. These variables are effort expectancy, performance, attitude, social factor and self-efficacy. In addition, they added to and validated *anxiety* in their model. This means that there is a need for the eight variables to be tested in other cultures to see if these variables would be valid or not.

The UTAUT was extended in a research to predict

acceptance of technology [19] with 290 participants. The result of the study showed that performance expectancy, social factors, facilitating conditions and system flexibility have direct effect on the employees' intention to use technology for training, while system enjoyment, effort expectancy and system interactivity have *indirect effects on employees' intention* to use the system. From secondary studies with empirical researches done so far *there is a lack of a good general framework of predicting user acceptance of the use of Web 2.0 technologies in learning and this research takes this challenge with regards to two cultures from where data was collected.*

### III. INSTRUMENT DEVELOPMENT

A combination of some variables from the Unified Theory of Acceptance and Use of Technology (UTAUT) by Vankatesh et al. [21], Technology Acceptance Model (TAM) (Davis, 1989), Technology Acceptance Model Extended (TAM2) by Davis et al. [17] and the Theory of Reasoned Action by Fishbein and Ajzen [16] underpin this research. A combination of some variables from these theories with one additional variable was used to formulate the hypothesis that was used to develop the research model of this paper (Fig 1).

The rest of this section will explain the variables of the research model and hypotheses that describe the relationships between them.

#### A. Perceived Usefulness (PU)

Perceived usefulness is the belief of an individual that technology will make their work better. Davies et al. [17] argued that perceived usefulness is a factor that affects technology acceptance and the variable was valid across cultures. This research takes the same stand that perceived usefulness of Web 2.0 tools should positively co-vary with the acceptance of these tools in teaching and learning. Thus the hypothesis:

**H<sub>1</sub>:** *There is a positive relationship between Perceived Usefulness and Behavioural Intention to use Web 2.0 tools in learning in higher education.*

#### B. Social Factors (SF)

The social factor is an interpersonal agreement that binds individuals or people within a particular environment. Davis et al. [17] argued that there are other external factors that may influence the acceptance of technology, and this research supports this argument that social factors should relate positively with the behaviour intention to use Web 2.0 tools learning. Therefore:

**H<sub>2</sub>:** *Social factors have a positive relationship with the Behavioural Intention to use Web 2.0 tools in learning in higher education.*

#### C. Prior Knowledge (PK)

Prior knowledge is very important in a learning environment. This affects the attitude of the learner and from a psychological point of view; people’s attitudes are a large part of their behaviour [16]. In the context of this study the prior knowledge of the learner toward the use of Web 2.0 tools social activities is considered an important factor to determine the behaviour intention to engage in academic activity. Thus,

**H<sub>3</sub>:** *Prior Knowledge* has a positive relationship with *Behavioural Intention* to use Web 2.0 tools in learning in higher education.

**D. Facilitating conditions (FC)**

Technology, including the Web 2.0, cannot be used without internet facilities. Users need to have access to computers, PDAs, phones with internet facilities to utilize Web 2.0 in their activities. Effective use of Web 2.0 tools would require users to own or have access to internet facilities to a sufficient extent [21].

**H<sub>4</sub>:** There is positive relationship between *Facilitating Conditions* and *Behavioural Intention* of Web 2.0 tools in learning in higher education.

**E. Perceived Ease of use (PeoU)**

Perceived ease of use is the feeling that the use of technology will be without much effort, but will achieve much in a short time. This has been used by Davis et al. [17] to predict acceptance of technology, and this research supports the notion that perceived ease of use would co-vary with the behavioural intention to use Web 2.0 hence the hypothesis

**H<sub>5</sub>:** There is positive relationship between *Perceived Ease of Use* and *Behavioural Intention* to use Web 2.0 in learning in Higher education.

**F. Performance Expectancy (PE)**

Performance expectancy is the degree to which an individual or group of people expect to be proficient in their

work or education when they are using technology. Venkatesh et al. [21] researched and validated performance expectancy as one of the factors that can promote acceptance of technology and this research is in support of this. Therefore we expect this variable to co-vary with behavioural intention to use Web 2.0, thus the following:

**H<sub>6</sub>:** There is positive relationship between *Performance Expectancy* and *Behavioural Intention* to use Web 2.0 tools in learning in higher education.

**G. Motivation (MtU)**

Motivation involves internal and external processes that give behaviour its energy and directions [17]. Motivational perspectives were adapted in TAM model (e.g. perceived usefulness and enjoyment from both intrinsic and extrinsic motivation). Motivation to use Web 2.0 tools in learning is likely to co-vary with attitude of the users, and motivation should co-vary with behavioural intention.

**H<sub>7</sub>:** There is a positive relationship between *Motivation* and *Behavioural intention* to use Web 2.0 tools in learning in higher education.

**H. Behavioural Intention (BI)**

Ajzen and Fishbein [21] emphasized that attitudes can be used to determine behaviour. Davis et al. [17] in TAM argued that behaviour can influence acceptance of technology and this research supports the argument that the behavioural intention should co-vary with the actual use, hence this hypothesis:

**H<sub>8</sub>:** *Behavioural Intention* has a positive relationship with *Actual use* of Web 2.0 tools in learning in higher education.

Based on the hypotheses presented in this section a conceptual model was developed (see Fig. 1). This conceptual model displays constructs from the literature review and relates them to each other (each link represents a relationship between constructs and is reflected in the relevant hypothesis).

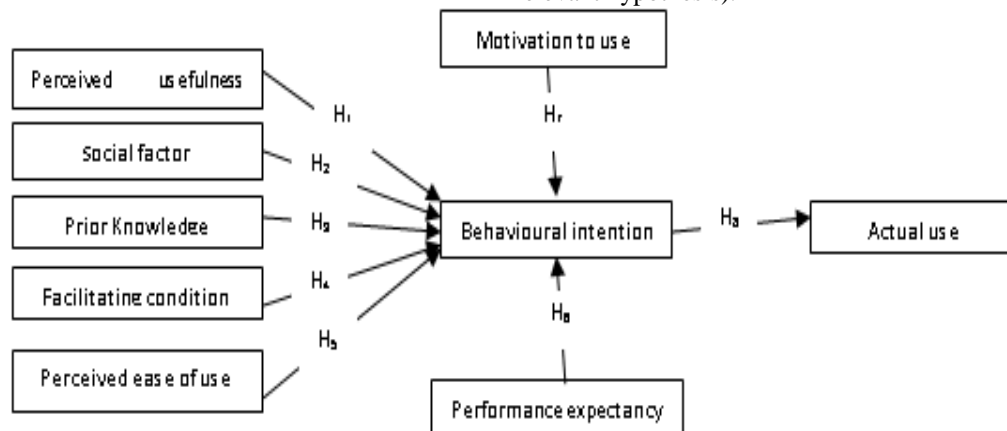


Fig. 1. Model showing Acceptance to use Web 2.0 for learning

TABLE 1. VARIABLES AND SOURCE

Variables	Source
Prior knowledge (PK)	Mine (new)
Social factors (SF)	TAM, UTAUT
Perceived usefulness (PU)	TAM
Performance expectancy (PE)	UTAUT
Motivation MtU	TRA
Perceived Ease of use (PEoU)	TAM
Facilitating conditions (FC)	UTAUT
Actual use (AU)	TAM UTAUT
Behavior intention (BI)	TAM UTAUT

C. METHOD

These variables were operationalised into a questionnaire (see Table 1 for the source of the variables and Table 2 for the operationalisation). The questionnaire was divided into three parts. The first part measured students' level of

satisfaction in learning and facilities available for teaching and learning; the second part measured the eight constructs in the research model (prior knowledge, actual use, perceived usefulness, perceived ease of use, social factor, behaviour intention, motivation to use and performance expectancy. Then the third part investigated demographics (e.g. age, gender, educational level and faculty). Items were measured using 5 and 7-point Likert scale with 19 questions adapted from similar research on technology acceptance [21] [17].

A. Content Validation

To achieve content validity, the questions had strong literature underpinning. Also, they were pilot-tested with knowledge experts as well as a few students who represented prospective respondents. The questionnaire was amended based on comments from this process [22].

B. Participants

500 questionnaires were administered to students and lecturers in five Nigerian universities (two federal, two states and one private university) in the class by lecturers and 317 were collected back, making a response rate of 63%. The questionnaire was also sent via email to students and lecturers in one university in Scotland and yield 273 responses.

TABLE 2. OPERATIONALISATION

Constructs	Questions	Items
Perceived Ease of Use (EoU)	How easy do you find using these Web 2.0 tools listed below to obtain the resources you need for your studies?	7
Actual Use (AtU)	Academic Purpose How many times do you use Web 2.0 tools listed above for academic purposes per week?	5
	Social Purpose How many times do you use Web 2.0 per week?	6
Motivation to Use (MtU)	To what extent do you agree that social part of e-learning platforms (e.g. Module and Blackboard) motivate learner to a great extend to achieve learning objectives?	8
	E-learning platforms enable you to send mails, download course materials upload assignments, read announcements, access the library material and discuss with other students, professionals and your lecturers. To what extent do you think such system would motivate you to achieve your learning objectives?	10
Facilitating Conditions (FC)	Regarding facilities available for learning and teaching in the university, how satisfied are you? Add any necessary comments regarding technology and facilities available in your university	4
	Do you own personal computers or phone with internet connection	
Perceived Usefulness (PU)	To what extent do you agree that Web 2.0 tools would speed up acquisition of knowledge?	11
Behavioural Intention (BI)	To what extent do you agree that social computing should be adopted in education and training for sharing of knowledge and information?	9

Social Factors (SF)		To what extent do you agree that Web 2.0 tools will encourage active participation?	11
PE		To what extent do you agree that the use of Web 2.0 technology in education will help improve performance	14
Demographics	Gender	What is your gender?	16
	Status	Are you a student or lecturer?	1
	Field	What is your field?	19
	Age bracket	What is your age bracket?	17

D. FINDINGS AND DISCUSSION

The bar chart on Fig. 2 shows the frequency distribution for *perceived usefulness*. The distribution is left-skewed with values: *neutral, slightly agree and agree* achieving higher frequencies as compared to other responses. This means that most of the users agree that the introduction of Web 2.0 tools will enhance students’ learning.

Fig. 2. Frequency distribution for Perceived Usefulness

To perform inferential statistics, correlation analysis was used to evaluate the relationships between variables therefore testing the hypotheses of this study (see the research model at Fig. 1). The correlation formula is given as:

$$\rho_{X,Y} = \text{corr}(X, Y) = \frac{\text{cov}(X, Y)}{\sigma_X \sigma_Y} = \frac{E[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y},$$

where x is one variable, eg *motivation to use* and y another, eg *behavioural intention*; and  $\rho_{X,Y}$  is the correlation coefficient.

Rank correlation coefficients (Kendall tau) were used since we do not have absolute values [22]. Table 3 and 4 shows a summary of relationships between variables and links the relationships to hypotheses presented previously in the model. Correlations marked with a single asterisk are significant at level 0.05 and those with double asterisks are significant at level 0.01. The rest of this section will discuss each pair of variables before a general summary of the findings and implications are presented.

The correlation between Behavioral Intention (BI) and Perceived Usefulness (PU) is highly significant in both cultures and reaches the value of 0.549 and 0.616 (for Nigeria and Scotland respectively. The rest of the reported pair of correlations are in this order). That means that there is a relationship between acceptance and usefulness in the case of Web 2.0 technologies. The rest of this section will investigate the relationships between BI and other variables.

The correlation between variables BI and Performance Expectancy (PE) is highly significant and reaches the value of 0.431 and 0.620. That means that there is a relationship

between BI and PE in the case of Web 2.0 technologies in higher education of Nigeria.

The correlation between variables BI and Social Factors (SF) is highly significant and reaches value of 0.423 and 0.674 that means that there is a relationship between BI and SF.

The correlation between variables BI and Actual Use (AU) is significant and reaches the value of 0.169 and 0.155 approximately 0.2, meaning there is relationship between BI and AC for academics purpose.

The correlation between variables BI and Prior Knowledge (PK) is highly significant with the value of 0.431 and 0.625. That means that there is a relationship BI and PK.

The correlation between variables BI and Motivation (MtU) is not significant in Nigeria but significant in Scotland with value 0.290, meaning that LMS (e.g. moodle) can be a motivating MtU has a relationship with BI.

The correlation between variables BI and Facilitating Conditions (FC) is significant and reaches the value of 0.115 and 0.130. That means that there is a relationship between BI and FC.

The table below is a summary of the correlation analyses.

TABLE 3. SUMMARY OF CORRELATIONS BETWEEN BEHAVIOURAL INTENTION (BI) AND OTHER CONSTRUCTS (Data from Nigeria)

Construct	Correlation Coefficient	Significance	Hypothesis
PU	.549**	Yes	H <sub>1</sub>
PE	.431**	Yes	H <sub>2</sub>
SF	.520**	Yes	H <sub>3</sub>
AU	.169*	Yes	H <sub>4</sub>
PK	.153*	Yes	H <sub>5</sub>
MtU	.932	No	H <sub>6</sub>

EoU	.134*	Yes	H <sub>7</sub>
FC	.115*	Yes	H <sub>8</sub>

Fig 2. HISTOGRAM OF PERCEIVED USEFULNESS (PU).

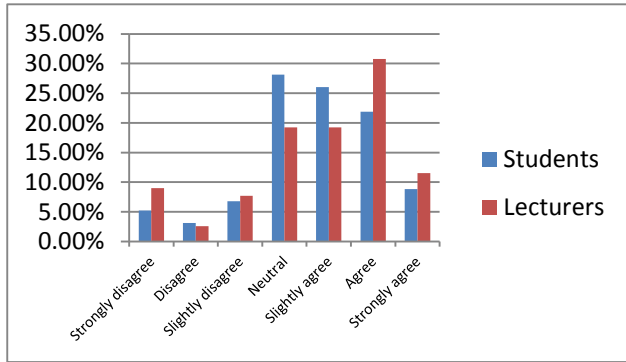


Table 4. SUMMARY OF CORRELATIONS BETWEEN BEHAVIOURAL INTENTION (BI) AND OTHER CONSTRUCTS (Data from Scotland)

Construct	Correlation Coefficient	Significance	Hypothesis
PU	.616**	Yes 0.01	H <sub>1</sub>
SF	.674**	Yes 0.01	H <sub>2</sub>
PK	.625**	Yes 0.01	H <sub>3</sub>
FC	.130*	Yes 0.05	H <sub>4</sub>
PEoU	.221**	Yes 0.01	H <sub>5</sub>
PE	.620**	Yes 0.01	H <sub>6</sub>
MtU	.290**	Yes 0.01	H <sub>7</sub>
AU	.155*	Yes 0.01	H <sub>8</sub>

In summary, all relationships except the one between *motivation to use* and *behavioural intention* are significant as individually presented in this section. The variables with the significant relationships are *perceived usefulness*, *performance expectancy*, *social factor*, *behavioural intentions*, *prior knowledge or use for social purpose* and *facilitating conditions*. One of them, *prior knowledge* is a new variable that was generated by the researcher. The results generally confirm earlier research in acceptance of technology [17] [21].

The general implication of this research is that the use of Web 2.0 technologies would encourage active participation in teaching and learning. A specific implication is to increase each of the variables, if possible, so as to encourage greater use of these systems. For instance, the systems should be customised in a way that is as easy to use as possible so as to encourage its use. However many Nigerians are not familiar with these technologies for teaching and learning. This was also observed by Anunobi and Ogbonna [10] in their

research. Therefore, utilisation of these tools for academic purposes as well as awareness is needed to gain benefits from them.

### V. SUMMARY AND FUTURE WORK

The research developed a model based on some variables of TAM, UTAUT and TRA along with one added variable to examine the intention to adopt Web 2.0 in learning in Nigerian higher education. The results showed seven out of eight variables to significantly co-relate with behavioural intention. These variables include *perceived usefulness*, *performance expectancy*, *social factor*, and *prior knowledge*. The implications of the study include the need to make the tools available in the first place in Nigerian higher education; and to deploy them in an easy-to-use way so as contribute to learning and teaching in this environment.

As has been noted, *motivation* did not exhibit a significant influence on intention likely because the students were not using the any learning management systems (Moodle or Blackboard) whereas the question on *motivation* was emphasizing the use of Moodle or Blackboard platform enhancing learning activities. However previous research in United Kingdom [24] was significant probably because the students are familiar with Moodle. Therefore this variable will be tested again in the future after the students are exposed to LMS. A setting up of a LMS will also enable experiments that will engage the students and teachers in Web 2.0 technologies. Such experiments will produce useful qualitative data that will richly complement this quantitative study.

### REFERENCE

- [1] Y. Xie and P. Shama, "The effect of peer-interaction styles in team blogging on students' cognitive thinking and blog participation", *Journal of Educational Computing*, vol. 42 no. 4, pp. 459-479, 2010.
- [2] K. R. Parker and J. T. Chao, "Wiki as a Teaching Tool, Interdisciplinary" *Journal of knowledge and learning Objects*, vol. 3, pp. 57-72, 2007.
- [3] H. Ajjan and R Hartshorne, "Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests", *The Internet and Higher Education*, vol. 11, no 2, pp. 71-80, 2008.
- [4] D. McKinney, J. Dych, and E. Luber, "I-tunes University and the Classroom: Can Podcasts replace Professor?" *Computer & education journal*, vol. 52, pp. 617-623, 2009.
- [5] B. Alexander, "Web 2.0: A new wave of innovation for teaching and learning?" *EDUCAUSE Review*, vol. 41, no. 2, pp. 32-44, 2006.
- [6] T. Franklin and M. Van Harmelen, *Web 2.0 for content for learning and teaching in higher education*, London: Joint Information Systems Committee, 2007.
- [7] C. Redecker, "Review of Learning 2.0 practices", *Study on the Impact of Web 2.0 Innovations on Education and Training in Europe, 2009* Available online <https://europa.eu/Publications/pub.cfm?id=2059> [Accessed: 25-11-2011].
- [8] N. Vlahovic, "Web 2.0 and its Impact on Information Extraction Practices", *Proceedings of the International Conference on Applied Computer Science*, 2010.
- [9] R. Echeng, *The use of Web 2.0 in teaching and learning in Nigerian higher institution*, An MSc Thesis submitted to the School of Computing, University of the West of Scotland, 2011.

- [10] C. Anunobi and A. Ogbonna, "Web 2.0 use by Librarians in a state in Nigeria", *Developing Country Studies*, vol. 2, no. 5, pp. 7-66, 2012.
- [11] N. Selwyn, "Faceworking: exploring students' education-related use of Facebook", *Learning, Media & Technology – Routledge*, no. 2, vol. 34, pp. 157–174, 2009.
- [12] C. Madge, J. Meek, J. Wellens and T. Hooley, "Facebook, social integration and informal learning at university", *Learning, Media, & Technology – Routledge*, vol. 2, issue 34, pp. 141–155, 2004.
- [13] P. Jucevičienė, G. Valinevičienė, "A Conceptual Model of Social Networking in Higher Education", *Electronics and Electrical Engineering – Kaunas: Technologija*, vol. 6, no. 102, pp. 55–58, 2010.
- [14] M. McLoughlin and J. Lee, "Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era", In the 8<sup>th</sup> conference proceedings of Ascilite (2007).
- [15] G. Olasina, "The use of Web 2.0 tools and social networking sites by librarians, information professionals, and other professionals in workplaces in Nigeria" *PNLA Quarterly*, the official publication of the Pacific Northwest Library Association, vol.75 no.3, pp.72-33, 2011.
- [16] I. Ajzen and M. Fishbein, *Understanding attitudes and predicting social behavior*, Englewood Cliff, NJ: Prentice Hall, 1980.
- [17] F. Davis, R. Bagozzi, and P. Warshaw, "User acceptance of computer technology: a comparison of two theoretical models", *Management Science*, vol. 35, pp. 982-2003, 1989.
- [18] T. Teo, W. Su Luan, and C. Sing, "A cross-cultural examination of the intention to use technology between Singaporean and Malaysian pre-service teachers: an application of the Technology Acceptance Model (TAM)", *Educational Technology & Society*, vol. 11, no. 4, 265–280, 2008.
- [19] L. Oshiyanki, P. Cairns, P and H. Thimbleby, "Validating Unified theory of acceptance and use of Technology (UTAUT) tool cross-culturally", *British computer society Volume 2 proceeding of the 21<sup>st</sup> century BCS group conference*, 2007.
- [20] A. Thamer, M. Alrawashdeh, Muhairat and S. Alqatawnah, *Factors affecting acceptance of web-based training system: using extended UTAUT and structural equation modeling*, 2010.
- [21] V. Venkatesh, M. Morris, G. Davis and F. Davis, "User acceptance of information technology: Toward a unified view", *MIS Quarterly*, vol. 27, no.3 pp. 425–478, 2003.
- [22] G. Zikmund *Business Research Methods*, Mason, OH: Thomson/South Western, 2003.
- [23] G. Yule and M. Kendall, *An Introduction to the Theory of Statistics*, 14th Edition (5th Impression 1968). Charles Griffin & Co., pp. 258–270, 1950.
- [24] R. Echeng, A. Usoro and G. Majewski, "Acceptance of Web 2.0 in Learning in higher education: an empirical study of a Scottish university", *WBC July Conference Proceedings on E-learning*, 2013.