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**General Attitude and Acceptance of Holography
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Introduction

It is our great pleasure and honour to introduce this special issue of IAFOR Journal of Education. This issue is a selection of papers submitted directly to our journal as well as studies presented during:

1. The Sixth Asian Conference on Education and The Second Asian Conference on Society, Education & Technology, ACE & ACSET 2014, “Transforming and Changing Education: Individuals, Communities, Societies”, held in Osaka in October-November 2014.
2. The Asian Conference on Technology in the Classroom 2015. ACTC2015.
3. The European Conference on Technology in the Classroom 2014 (ECTC2014).
The conference held in Brighton, UK, in July 2014
4. The European Conference on Education 2014, Brighton, UK, in July 2014 (ECE2014)
5. The IAFOR International Conference on Education 2015, IICE2015, Dubai, UAE.

The focus of this special issue is on “**Emerging Technologies in Teaching and Learning**”.

The aim is to discuss issues and address the challenges of using emerging technologies in learning and teaching. Additionally, this issue attempts to answer different questions regarding the impact of emerging technologies adoption in instructional activities, and presents cases from different fields and applications, in various countries.

This special edition focuses on how emerging technologies are being used to transform teaching and learning practices in education, which may lead to qualitative outcomes in education. Our journal is proud to introduce scholars from all over the world:

The first paper entitled "Teacher Education Perceptions of a Proposed Mobile Classroom Manager" is authored by Dave E. Marcial. The paper examines the acceptability of a mobile classroom manager among teacher educators in Central Visayas, Philippines. Marcial specifically details his findings from an empirical investigation on the level of perceived usefulness and ease of use of the mobile classroom manager. The paper concludes that teacher educators will intensely adopt the proposed instructional tool and integrate it into their teaching and learning activities. The paper ended with a recommendation that the mobile classroom manager application will be developed in accordance with the teaching practices of the teacher educators.

The second paper entitled "Social Media Use in Algerian Universities: University of Constantine 2 Case Study" is authored by Dr Behdja Boumarafi. This paper investigates Algerian students' engagement to understand the developmental implications of academic achievement. The author seeks to advance the use of instructional interactions in two ways: i: enhancing the academic validity of social networking, ii: making the link to students' collaborative learning explicit. Data is collected from 300 students. Findings show that social media are used for a multitude of purposes mainly for networking and socializing and sparingly used for informal academic activities. All participants declared having a facebook account in addition to other social network. Social media is useful for buiding relationships, improving communication skills, and improving foreign language skills. However, it may violate privacy, could be time consuming. Concerns are raised as far as the quality of information posted by students on their network site.

The third paper entitled "Assessing the Applicability of 3D Holographic Technology as an Enhanced Technology for Distance Learning" is co-authored by Pradeep Kalansooriya, Ashu Marasinghe, and K.M.D.N. Bandara. They have assessed the applicability of 3D Holographic Technology as an enhanced technology for distance learning. It was analyzed on the experiences

and perceptions of expertise on video based education and hologram based education. Accordingly, in the initial evaluation, they found that interactive teaching methods and effective communication are the factors rated high in the comparison of factors of effective teaching environment (Interactive teaching methods, Effective communication, Diversity in method of presentation, Classroom environment, Lecture breaks). Later in the comparison of factors of effective teaching environment for video based education and hologram based education has revealed that hologram based distance education is superior and more suitable than video based education for factors other than 'Lecture breaks'. 'Lack of infrastructure' and 'High initial cost of infrastructure' have been identified as the main two barriers. Additionally 'Limited bandwidth' was also identified as a secondary roadblock in the process of implementing 3D Hologram based classroom. However there is a controversy in expert view points on responses. Authors suggested to increase the sample size and diversity to avoid such controversy.

The fourth paper ("Social Media in Tertiary Education-Vhembe Further Education Training College Case Study") is co-authored by Manzira Francis Mungofa and Peter Tsvara. This paper focus on social media technologies usage in higher education. It was based on a case study area of a further education training college located in the rural part of South Africa. It focused on a broad range of social media technologies that are being used in higher education across the world. Data was collected through questionnaire survey and analyses using software package used for statistical analysis (SPSS). Findings revealed that students in the rural areas have adopted social media technologies in their learning process although there were notable challenges such as cost of bandwidth, cost of smart phones, network availability that prohibited them from having a full access and unlimited use of such technologies as: Facebook, WhatsApp, Twitter and Youtube, which have become popular. The use of social media in higher learning enables student interaction with content they can create individually or share with colleagues. Furthermore, potential learning occurs outside the classroom or independent of location as students can be able to access educational resources as long as they are connected to internet. Results indicate that students enjoy and indeed benefit from the use of social media technologies that have positive effect on their performance and growth.

The fifth paper, written by Ana Niño, is entitled "Language Learners Perceptions and Experiences on the Use of Mobile Applications for Independent Language Learning in Higher Education". Ana Niño explored the potentials and limitations of using mobile applications for independent language learning in Higher Education with a view to investigate (i) how language learners use mobile apps to enhance their learning experience, and (ii) how these could be integrated in the language class. The sixth paper ("Strategies for Digital Inclusion: Towards a Pedagogy for Embracing and Sustaining Student Diversity and Engagement with Online Learning") is co-authored by Baylie Hart Clarida, Milena Bobeva, Maggie Hutchings and Jacqui Taylor. The paper reports on the progress of a PhD research study. The research study will eventually develop a conceptual framework for effective teaching and learning approaches that influence digital inclusion and exclusion of students from diverse backgrounds. The focus of this paper is to outline the research to date. Two initial phases have been completed and are reported in this paper. Findings suggest that digital exclusion cannot be predicted or dealt with by categorising students into groupings of: gender, age, ethnicity, geography, socio-economic status and educational background. The paper also discusses how digital exclusion is influenced by organisational factors, such as elements of the course content or navigation of the virtual learning environment rather than intrinsic factors such as individual technological skills.

The seventh paper, entitled "Using mobile technology to enhance undergraduate student digital information literacy skills: A Canadian case study", is co-authored by Alice Schmidt Hanbidge, Nicole Sanderson, and Tony Tin. An overview of the development and administration of an

innovative mobile information literacy tool to enhance information literacy training was explored with the aim to contribute to the understanding of the innovative practice for mobile technology academic learning. A mixed method non-experimental research study with university arts faculty students investigated the frequency of access to the information literacy tool and the change in fluency of information literacy skills using mobile devices. Study participants completed thirteen mobile information literacy lessons (online), pre- and post-tests and a questionnaire. Collaborative efforts between faculty and library staff provided recommendations to support anytime, anywhere m-learning.

The eighth paper, entitled “Development of a Blended Instructional Model via Weblog to Enhance English Summary Writing Ability of Thai Undergraduate Students”, is written by Saisunee Termsinsuk. The main objective of this research was to develop an effective blended instructional model via weblog to enhance English summary writing ability of Thai undergraduate students. The study was divided into 4 phases: Analyzing the context, synthesizing the instructional model, developing the efficiency of the model through action research, and studying the effect of the model on English summary writing of the university students through an experimental research. It was found that the blended instructional model via weblog comprised three stages of blended activities: extracting information via face to face instruction, summarizing via weblog, and publishing on weblog. It was named “S2A Model.” The model was effective in enhancing the university students’ English summary writing ability as the post-test scores of the students met the set criterion of the study.

The ninth paper, entitled “General Attitude and Acceptance of Holography in Teaching Among Lecturers in Nigerian Colleges of Education”, is co-authored by Suleiman A. Ahmad, Isyaku M. Abdullahi, and Muhammad Usman. The study has a general focus on holography and its application in education. Four objectives were identified such as: 1. To investigate on the attitude toward holography in teaching among Nigerian colleges of education teachers 2. To find out the extent of acceptance of holography in teaching among Nigerian colleges of education Educators 3. To identify the gender difference among Nigerian colleges of education educators in the attitude towards holography in teaching 4. To identify the attitudinal difference towards holography in teaching among Nigerian colleges of education educators in terms of their designation/level. The paper identifies the ICT penetration as very low and the digital divide also quite wide in Nigeria. It also states that none of the Nigerian tertiary institution in records practically employs or even attempted to test the holography as a course or as practical experience in the process of teaching and learning.

Please note that we welcome original research papers in the field of education submitted by teachers, scholars, and education professionals. They may send their manuscript even though they did not participate to one of the conferences held by IAFOR.

We also welcome book reviews, reviews of the literature in the field, and contributions introducing key educational scholars. The next issue scheduled for February 15, 2016 will also be a selection of papers submitted during the above mentioned conferences. IAFOR publications are freely accessible on the [website](#) (Open Access).

Moreover, there is no publication fee for authors. Please find the guidelines at this end of this issue and follow our guide for authors before submitting your paper.

Best regards,
Bernard Montoneri and Vasileios Paliktzoglou



Teacher Education Perceptions of a Proposed Mobile Classroom Manager

Dave E. Marcial

Abstract

In a knowledge-driven enterprise, mobile learning introduces new ways for students to learn and educators to teach. This paper investigates the acceptability of a mobile classroom manager among teacher educators in Central Visayas, Philippines. Specifically, this paper presents findings from an empirical investigation on the level of perceived usefulness and ease of use of the mobile classroom manager. A total of 383 responses from 76 private and public higher education institutions were included in the analysis. The instrument used in data gathering was a survey questionnaire adopted from the first Technology Acceptance Model by Davis (1989).

The study reveals that a mobile class record application is highly useful as perceived by the respondents ($\bar{x} = 5.48$). A mobile class record application is also perceived to be good in terms of its ease of use ($\bar{x} = 5.32$). The result implies that the respondents will assuredly accept and use the mobile tool in their classroom. It can be concluded that teacher educators will strongly adopt the proposed instructional tool and integrate it into their teaching and learning activities. It is highly recommended that the mobile classroom manager application will be developed in accordance with the teaching practices of the teacher educators.

Keywords: ICT in education; mobile learning; mobile technology; technology acceptance model.

Introduction

Mobile learning revolutionized the traditional way of classroom learning (Vinu, Sherimon & Krishnan, 2011), for both formal and informal contexts (Martí and Ferrer, 2012). El-Hussein and Cronje (2010) defined mobile learning as “any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners and mobility of learning”. Students have a high level of acceptance of mobile learning that can be explained by their position as digital natives . Digital natives are generation of people who were born during or after the rise of digital technologies (Prensky, 2001). Mobile learning is viewed positively by students in terms of accessing information quickly, communicating and collaborating, introducing a variety of ways to learn, and situated learning like game-based learning (Gikas & Grant, 2013). Students in higher education have a high level of personal innovation and mobile readiness (Jazihan Mahat, Ahmad Fauzi Mohd Ayub, & Su Luan, 2012). In fact, many mobile applications are targeted primarily at students. Mobile technologies involve applications that students use semi-independently in a classroom or after-school setting to supplement or enhance teacher-led instruction.

Mobile learning requires a technology that can build and deploy applications. Mobile technology devices range from basic mobile phones to tablet PCs, and include PDAs, MP3 players, memory sticks, e-readers, and smartphones (UNESCO, 2011). Mobile technologies refer to a combination of hardware, operating systems, networking and software, including content, learning platforms, and applications. Further, a mobile application, referred to as an app, is a software application designed to run on Smartphones, tablet computers and other mobile devices. They are available through application distribution platforms, which are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Marketplace and BlackBerry App World. Some apps are free, while others are not. Usually, they are downloaded from the platform to a target device, such as an iPhone, BlackBerry, Android phone or Windows Phone 7, but sometimes they can be downloaded to less mobile computers, such as laptops or desktops (Siegler, 2008).

Although there are many mobile apps available in the market, there is no app that is specifically designed for teacher educators who are Filipinos. It is in this context that a research project on the development of a mobile classroom manager is submitted and approved by the Philippine’s Commission on Higher Education through Philippine Higher Education Research Network (Marcial, 2014). The proposed mobile app is called m-APP, and it will contain several features that will integrate some of the related features found from the existing mobile apps in the market like classroom management, attendance checking and scores recording. On top of these features, the proposed mobile app will be unique because it will include a vocabulary of terms for teacher education and training as handy and quick guide for teachers in the education program. This innovation is aimed to support the teaching instructions of Filipino teacher educators.

This paper examines the acceptability of the proposed mobile learning tool among teacher educators in the four provinces in Central Visayas, Philippines. Specifically, it investigates the perceived usefulness and perceived ease of use of the proposed mobile classroom manager among the teacher educators in Central Visayas, Philippines. It also explains the relationships between the respondent’s demographic profile such as sex, age, status, institution, number of years in teaching, highest educational attainment and the acceptability of mobile classroom manager. Likewise, it also shows the relationship between the respondent’s technology ownership of a desktop, Smartphone, tablet, and a laptop and a mobile classroom manager. Moreover, the paper also presents the relationship between Internet accessibility and perceptions towards a mobile classroom manager.

Literature Review

Mobile technology is applied and accepted in many areas such as in government operations (Aloudat, Michael, Chen, & Al-Debei, 2014), commerce (Chen, Li, Chen, & Xu, 2011; Gerpott, 2011), advertising (Liu, Sinkovics, Pezderka, & Haghirian, 2012), health (Selma Limam Mansar, Shashank Jariwala, & Maahd Shah, 2012), security (Mekonnen, Lerasle, & Herbulot, 2013) and robotics (Quintía, Iglesias, & Regueiro, 2010). Most importantly, many mobile development projects support instruction, both in and outside of classrooms (Dykes and Knight, 2012). Issues such as classroom management, information sharing, collaboration, grade control and among others, are issues and topics that appeal most to teachers. Young (2011) listed some features of a mobile app that teachers would want to have, these are: taking attendance, collecting data, reading scholarly articles, recording notes, and using textbook tools. Moreover, table 1 lists some of the mobile apps for teachers in the market today. As shown in the table, most of the applications are very specific to a single purpose and do not offer a complete, comprehensive service for teachers.

Table 1. Common Mobile Apps for teachers

<i>Name</i>	<i>Subscription</i>	<i>Features</i>	<i>Platform</i>
Attendance	Paid	Allows attendance recording, can be used for meetings and group gatherings, unlimited courses, move students from one class to another, photo recognition, customizable attendance statuses.	iOS
ClassDroid	Free	Allows teachers control many areas of the classroom information, supports images stored on a Wordpress site, which are available using a web browser on any web-enabled device, students and parents can then view their work and grades online	Android
Educate	Free	Attendance monitoring, student photos for each student, address book or student information importing	iPad
Evernote	Free	Captures the information in any environment using any device, and makes everything accessible and searchable, from anywhere, captures teacher's ideas, snapshots, voice memos, and just about anything else that a user want to remember.	Microsoft Windows, Mac OSX, Chrome OS, Android, IOS, WebOS
Flipboard	Free	Allows to set twitter feeds, and then re-presents it in a magazine format, makes online textbooks for specific classes or even further reading lists	iPad
Grade Rubric	Free	Records grade	Android
GradePad	Paid	Manages groups, do assessments, track performance, and share data.	iPhone
iGrade	Paid	Manages all student information including notes, tardiness and absences, provides teachers with detailed statistics in real time, lesson plans can be designed using the notes section	Android
PowerTeacher	Free	Records student scores and make observations about student progress from individual student desks, the gym, playground, at a sporting event or while on a field trip	iPad
PrimaryPad	Free	Helps teachers collaborate in real time with other teachers and pupils, anyone can edit and create new information, and it is on the screen so that everyone can benefit from the shared information	Android

RtM	Free	Offers task management, can sync it between devices	Android
Schmoop	Free	Calculates test scores, supports English, Spanish, and French languages, helps teachers with their lesson plans since it makes grading easier.	Android
Teacher Pal	Free	Enables teacher to organize classes, and students, tracks the attendance, grades and behavior of their students, simple tapping of attendance, grade books, enter grade with an intuitive touchpad, import, export data files from and to CSV files.	iPhone and iPad
Teacher Tool	Free	Saves grades and makes suggestions for grades, saves remarks about students and presents them to you in the upcoming lesson, remembers the date of any grade and lets the teacher store comments along with it, keeps track students' absences	Mac

The literature iterates that there are many issues to consider in mobile learning apps. Usability, technical and functional aspects are significant issues in mobile learning (Bidin & Ziden, 2013; Economides & Nikolaou, 2008). Likewise, Abachi & Muhammad (2014) reveal that accessibility is a top concern in a mobile learning service. They assert that this matter includes, but not limited to bandwidth, speed, network coverage, security and reliability of the service provider. In the same manner, Gikas & Grant (2013) also found that mobile learning may generate frustrations among learners. These frustrations include anti-technology instructors in other classes, device challenges, and devices as a distraction.

Moreover, the acceptance of mobile technology challenges the digital immigrants such inadequate skills, lack of infrastructure, and other behavioral and institutional related concerns. Because of the challenges, there is a need to have a clear understanding of technology adoption theory. According to Oliveira & Martins (2011), the most used technology adoption theories include: Technology Acceptance Model, Theory of Planned Behavior, Unified Theory of Acceptance and Use of Technology, Diffusion on Innovation Theory, and the Technology, Organization, and Environment Framework. Likewise, Kim & Crowston (2011) listed the same theories including the Social Cognitive Theory.

Merriam-Webster dictionary online defines innovation as “the act or process of introducing new ideas, devices, or methods”. The proposed instructional technology for teachers is not new in the knowledge enterprise, however, the tool, especially the process of integration is a new method for the faculty in the teacher education program. Because of this innovation, it is noteworthy to have an explicit understanding of Diffusion of Innovation theory. Diffusion and innovation theory “seeks to explain how innovations are taken up in a population” (Robinson, 2009). Surry & Farquhar (1997) assert that Innovation Theory is potentially valuable to the field of instructional technology for three reasons.

First, most instructional technologists do not understand why their products are, or are not, adopted. Second, instructional technology is inherently an innovation-based discipline. Lastly, the study of diffusion theory could lead to the development of a systematic, prescriptive model of adoption and diffusion. Shown in Figure 1 is the innovation-decision process. Innovation-decision process “is the process through which an individual passes from first knowledge of an innovation; to forming an attitude toward an innovation; to a decision to adopt or reject; to implementation of the new idea; and to confirmation of this decision” (Rogers, 2003).

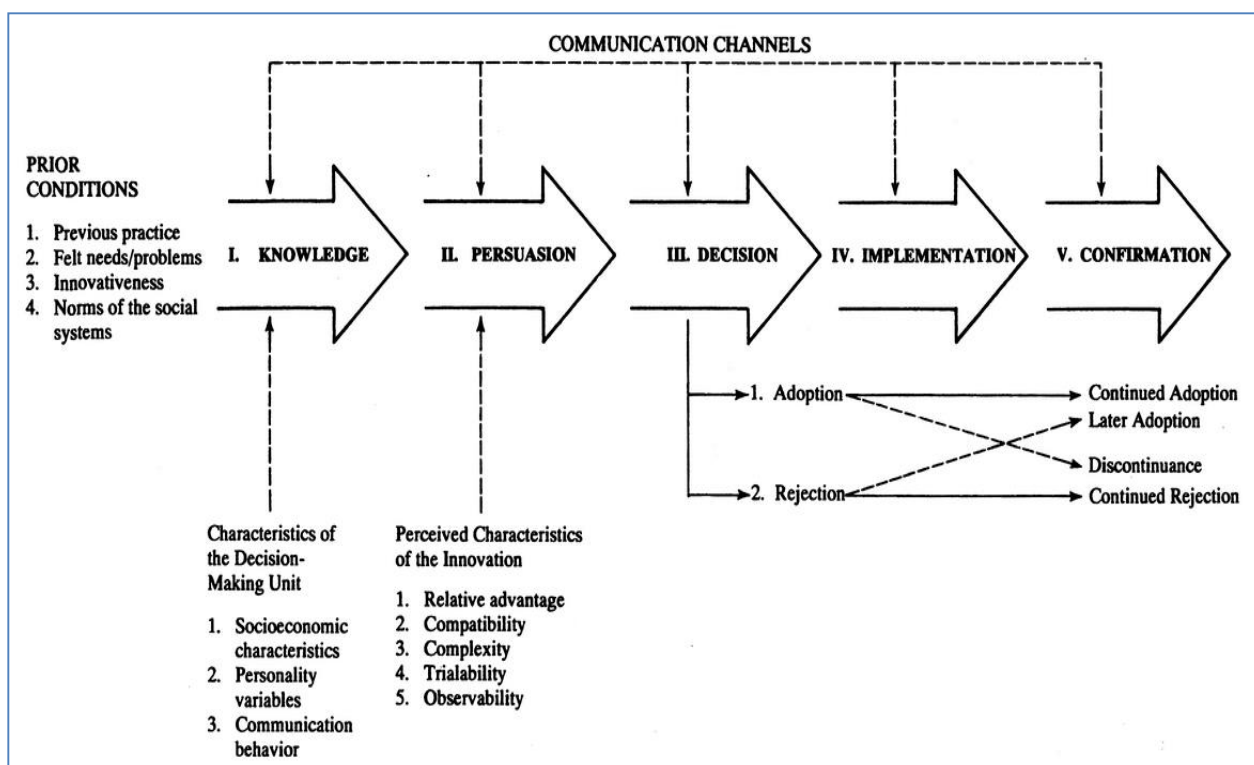


Figure 1. A Model of Five Stages in the Innovation-Decision Process (captured from Rogers, 2003)

On the other hand, the Technology Acceptance Model (TAM) is also considered carefully being one of the most influential extensions of the theory of reasoned action, shown in figure 2. TAM is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. First, perceived usefulness (PU) which is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance". Secondly, perceived ease-of-use (PEOU) that is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). The TAM has been continuously studied and expanded the two major upgrades being the TAM 2 (Venkatesh & Davis, 2000; Venkatesh, 2000) and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). TAM 3 has also been proposed (Venkatesh & Bala, 2008).

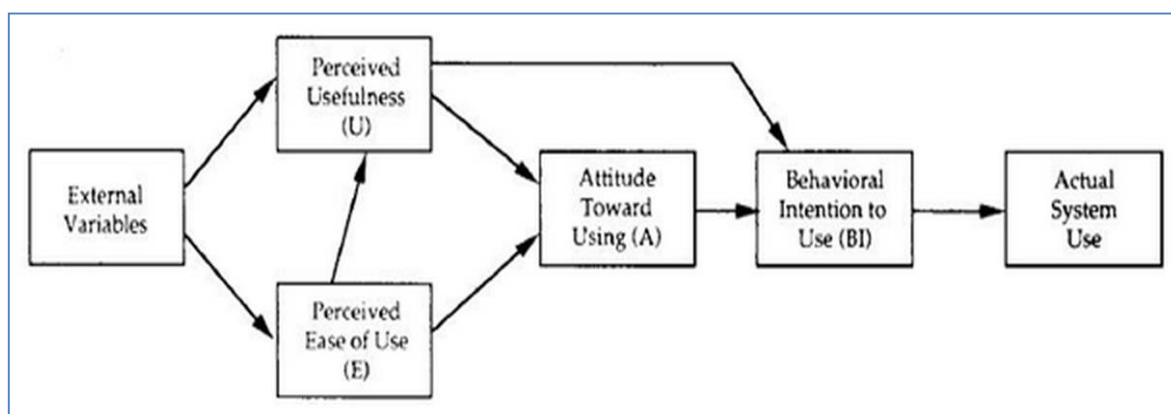


Figure 2. Technology Acceptance Model (captured from Davis, Bagozzi, & Warshaw, 1989)

It is highly noted that the perceived usefulness and ease-of-use are significant variables linked to the behavioral intention to adopt any technology (Davis, 1989; Venkatesh and Davis, 2000; Chuttur,

2009). Indrayani (2013) asserts that perceptions of ICT users will determine a person's attitudes and behavior towards the use and integration of ICT. The Technology Acceptance Model explains that "users are driven to adopt an application primarily because of the functions it performs for them, and secondarily for how easy or hard it is to get the system to perform those functions". Further, the model suggests that adoption and actual system use is correlated with high behavioral intention to use. Attitudes and perceived usefulness are useful indicators of behavioral intention in using mobile technology (Aloudat, Michael, Chen, & Al-Debei, 2014). Brown and Town (2002) reveal that perceived usefulness is not a major factor in technology usage particularly in web-based learning technology. Moreover, user training is a crucial factor in any technology use and implementation. Petter, William, & Ephraim (2008) assert "user training and education were significantly related to use in the earlier stages of the information system". Orientation about the technology has a significant direct effect to increase perception to new innovation (Alkhaldi, Khraim, & Ta'amneh, 2014).

Methodology

Design and Environment

The study implemented a descriptive-correlational design that begins with description, based on observation, of an event or events, from which theories may later be developed to explain the observations as well as a survey method. All of the study was conducted in recognized higher education institutions (HEIs) offering any teacher education programs in the four provinces in region 7, the Central Visayas in the Philippines. The teacher education program refers to degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in both public and private HEIs. All private and public HEIs including community colleges were included. The respondents of the study are all full-time faculty teaching any professional or specialization courses of the teacher education program in the provinces of Bohol, Cebu, Negros Oriental and Siquijor.

Respondents

All HEIs offering teacher education programs in Central Visayas were considered. A complete enumeration of respondents was administered during the identification of respondents. The identification of HEIs was based from the list given by the Philippine's Commission on Higher Education CHED Region 7 office, dated January 31, 2013. Table 2 shows the summary of the number of HEIs offering teacher education programs in the region.

Table 2. Summary of HEIs offering teacher education program in region 7

<i>Type of HEIs</i>	<i>Bohol</i>		<i>Cebu</i>		<i>Negros Oriental</i>		<i>Siquijor</i>		<i>Total</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Public	7	35.00	17	27.42	9	42.86	1	25	34	31.78
Private	13	65.00	45	72.58	12	57.14	3	75	73	68.22
Total	20	100.00	62	100.00	21	100.00	4	100	107	100.00

A total of 76 out of 107 HEIs participated during the administration of the survey as shown in table 3. All schools in Bohol and Siquijor participated in the study. In Negros Oriental, 12 out of 21 schools from Negros Oriental involved and included in the analysis of the study. Five HEIs in Negros Oriental are not anymore offering teacher education program as listed in CHED's database. Some HEIs in Negros Oriental did not return the questionnaires. In Cebu, 40 out of 62 HEIs were included in the analysis of the study. There were filled-up questionnaires from two schools rejected due to the qualifications of the person who answered the survey questionnaire. Some Cebu schools

opted not to participate in the study, and some did not return the questionnaires after several days of extension. In total, responses from 23 (30.26%) public and 53 (69.74%) private HEIs were included in the analysis of the study. In total, 383 responses were accepted and included in the analysis coming from 76 private and public HEIs in the four provinces.

Table 3. Summary of HEIs participated in the study

<i>Type of HEIs</i>	<i>Bohol</i>		<i>Cebu</i>		<i>Negros Oriental</i>		<i>Siquijor</i>		<i>Total</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Public	7	35.00	12	19.35	3	25.00	1	25	23	30.26
Private	13	65.00	28	45.16	9	75.00	3	75	53	69.74
Total	20	100.00	40	100.00	12	100.00	4	100	76	100.00

Instrument

The instrument used in data gathering to accomplish the specific objectives of the study was a survey questionnaire. Questions related to perceived usefulness and ease of use are adopted from the first Technology Acceptance Model (Davis, 1989). Respondents were asked to evaluate the level of their competency according to the seven possible choices: 1 – extremely unlikely, 2 – quite unlikely, 3 – slightly unlikely, 4 – neither, 5 – slightly likely, 6 – quite likely, and 7 – extremely likely.

Data Gathering and Statistical Treatment

The survey administration process was done into two distribution periods due to unexpected delays in the project funding. The first administration was done on April 1 – 30, 2013 by the assigned area coordinators. Field enumerators are also identified to assist during the distribution and collection of the self-administered questionnaire for each province. A briefing was done before the survey administration with an emphasis on the ethical standards and protocol. A post - enumeration meeting was also conducted to gather relevant issues during the data gathering. An endorsement letter from the CHED regional director was attached in all survey questionnaires. As part of the protocol, the program or school head was met first, and they are the source of information in terms of the total number of eligible respondents. Only those who were present at the time of the visit were given a questionnaire to fill and they were collected before leaving the school. Copies of the questionnaire were also left for the school staff to be distributed to all qualified respondents who were not present at the time of the delivery. Retrieval of these questionnaires was done during the last week of April, 2013.

There are some schools in Cebu and one school in Negros Oriental that were not visited because of the geographical concern and distance considerations. Instead, printed copies of questionnaires with a return postage stamp were sent via a courier addressed to the school head in reference to the CHED regional's database. Follow-up processes were limited to a telephone call, as well as sending text messages to the respondents who did not respond by the indicated deadline. A weekly follow-up through email was also done to encourage greater participation from HEIs. The first distribution was done only from April 1-30, 2013 in order to get a result necessary to the skills enhancement training on May as scheduled. In order to improve the number of responses from the respondents and participation from other HEIs, the second distribution was done from July to August 2013. Printed copies of the questionnaire were sent to all respondents who were on vacation leave during the April visit. The questionnaires were mailed through a speed mailing service with the inclusion of a prepaid post stamp. All questionnaires were sent directly to the dean or head of the teacher education program. Filled-up questionnaires from unqualified respondents were rejected, including

those questionnaires that are mostly unanswered. In this case, 40 survey questionnaires were rejected. The statistical tools employed in the data processing are the weighted mean for measuring the competency level and chi-square for testing the relationships.

Results and Discussion

Perceived Usefulness of m-APP

The study shows that a mobile classroom manager, m-APP is quite likely useful as perceived by the respondents ($\bar{x} = 5.48$), shown in table 4. The results imply that a mobile classroom manager is acceptable and very important to the teaching job of the respondents. It is highly noted that all indicators of the perceived usefulness are rated with a description 'quite likely'. Like with many literatures on the technology acceptance model, perceived usefulness had significant positive impact on participants' attitude toward the system (Zhou, Mohammed, & Zhang, 2012). Further, the result of study contradicts to the study of Brown and Town (2002).

Table 4. Perceived Usefulness towards m-APP

<i>Perceived Usefulness</i>	<i>Bohol</i>	<i>Cebu</i>	<i>Negros Oriental</i>	<i>Siquijor</i>	<i>Total</i>
	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>
a. Using them-APP in my job would enable me to accomplish tasks more quickly.	(5.30) Quite Likely	(5.42) Quite Likely	(5.46) Quite Likely	(5.42) Quite Likely	(5.40) Quite Likely
b. Using m-APP would improve my job performance.	(5.32) Quite Likely	(5.46) Quite Likely	(5.53) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
c. Using m-APP in my job would increase my productivity.	(5.34) Quite Likely	(5.46) Quite Likely	(5.56) Quite Likely	(5.62) Quite Likely	(5.50) Quite Likely
d. Using m-APP would enhance my effectiveness on the job.	(5.35) Quite Likely	(5.42) Quite Likely	(5.51) Quite Likely	(5.69) Quite Likely	(5.49) Quite Likely
e. Using m-APP would make it easier to do my job.	(5.32) Quite Likely	(5.38) Quite Likely	(5.60) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
f. I would find m-APP useful in my job.	(5.33) Quite Likely	(5.42) Quite Likely	(5.57) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
Aggregate Mean	(5.33) Quite Likely	(5.43) Quite Likely	(5.54) Quite Likely	(5.63) Quite Likely	(5.48) Quite Likely

Perceived Ease-of-use of m-APP

In the same manner, the study shows that the perceived ease of use of a mobile classroom manager is evaluated with a mean of 5.32 described as 'quite likely' (table 5). The result suggests that a mobile classroom manager is appropriate and very user-friendly that would provide flexibility to the teachers. Specifically, learning to operate a mobile classroom manager and to instruct it what to do is rated with a description 'slightly likely'. The result shows that the respondents somewhat agree that a mobile classroom manager is appropriate and user-friendly. Interestingly, respondents in Bohol and Cebu rated all indicators 'slightly likely' while respondents from Negros Oriental and Siquijor rated all indicators 'quite likely'. The result is analogous to Zhou et al. (2012) study that

found out that ease-of-use positively affected attitude toward the system and ease-of-use had a positive influence on perceived efficiency. Venkatesh (2000) articulated that perceived ease-of-use is “a key driver of technology acceptance, adoption, and usage behavior”. He added that the strongest determinants of perceived ease-of-use is the individual’s general beliefs about computers.

Table 5. Perceived ease-of-use towards m-APP

<i>Perceived ease-of-use</i>	<i>Bohol</i>	<i>Cebu</i>	<i>Negros Oriental</i>	<i>Siquijor</i>	<i>Total</i>
	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>
a. Learning to operate m-APP would be easy for me.	(4.94) Slightly likely	(5.08) Slightly likely	(5.51) Quite Likely	(5.54) Quite Likely	(5.27) Slightly likely
b. I would find it easy to get m-APP to do what I want it to do.	(4.99) Slightly likely	(5.09) Slightly likely	(5.53) Quite Likely	(5.54) Quite Likely	(5.29) Slightly likely
c. My interaction with m-APP would be clear and understandable.	(4.89) Slightly likely	(5.11) Slightly likely	(5.57) Quite Likely	(5.69) Quite Likely	(5.32) Quite Likely
d. I would find m-APP to be flexible to interact with.	(5.04) Slightly likely	(5.16) Slightly likely	(5.56) Quite Likely	(5.54) Quite Likely	(5.33) Quite Likely
e. It would be easy for me to become skillful at using m-APP.	(5.05) Slightly likely	(5.12) Slightly likely	(5.54) Quite Likely	(5.54) Quite Likely	(5.31) Quite Likely
f. I would find m-APP easy to use.	(4.97) Slightly likely	(5.07) Slightly likely	(5.90) Quite Likely	(5.54) Quite Likely	(5.37) Quite Likely
Aggregate Mean	(4.98) Slightly likely	(5.11) Slightly likely	(5.60) Quite Likely	(5.57) Quite Likely	(5.32) Quite Likely

Table 6. Summary of Acceptability Level towards m-APP

<i>Acceptability</i>	<i>Bohol</i>	<i>Cebu</i>	<i>Negros Oriental</i>	<i>Siquijor</i>	<i>Total</i>
	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>	($\bar{x}$) <i>Description</i>
Perceived Usefulness	(5.33) Quite Likely	(5.43) Quite Likely	(5.54) Quite Likely	(5.63) Quite Likely	(5.48) Quite Likely
Perceived ease-of-use	(4.98) Slightly likely	(5.11) Slightly likely	(5.60) Quite Likely	(5.57) Quite Likely	(5.32) Quite Likely
Overall Mean	(5.16) Slightly likely	(5.27) Slightly likely	(5.57) Quite Likely	(5.60) Quite Likely	(5.40) Quite Likely

Essential features of m-APP

When asked about important features that a mobile classroom manager should have, 376 (97.66%) respondents believe that a module for management of classroom information, attendance monitoring and test score calculation must be included (table 7). The result implies that teachers give more importance to the formative assessment activity, and they want this feature to be the first

to develop in any mobile learning application. It may support to the claim of Hwang & Chang (2011) who asserts “formative assessment-based approach is helpful to the students in improving their learning achievements in the mobile learning environment”. About 97% of the respondents also agreed that a dictionary of general educational terms must be integrated with a mobile classroom manager. It is followed by features that teachers can store grades and comments along with it as well as a task management module where almost 97% respondents agreed. 361 (93.77%) respondents believe that a mobile classroom manager must contain address book and grouping management modules. A feature that can suggest grades is also rated important by 356 (92.47%) respondents. Surprisingly, only 339 (88.05%) respondents agreed that it is necessary for teachers can upload photos for each student in a mobile classroom manager.

Table 7. Ranking of the Features of the proposed m-APP

<i>Features</i>	<i>Yes (%)</i>	<i>Ranking</i>
Teachers can manage classroom information	376(97.66)	2
Teachers can monitor attendance	376(97.66)	2
Calculates test scores	376(97.66)	2
Dictionary of general education terms	374(97.14)	4
Offers task management	372(96.62)	5.5
Stores grade and let the teacher store comments along with it	372(96.62)	5.5
Address book	361(93.77)	7.5
Manages groups	361(93.77)	7.5
Make a suggestion for a grade	356(92.47)	9
Teachers can upload photos for each student	339(88.05)	10

Relationship between Perceptions towards m-APP and the Respondent's Demographic and Technology Ownership Profile

Table 8 shows the results of chi-square computation for determining if significant relationships exist between the acceptability of a mobile classroom manager and demographic profile among the respondents. It is interesting to note that the study shows no significant relationship between the mobile application and the respondent's sex, age, status, institution, number of years in teaching and highest educational attainment. Age category is based on Erikson's stages of development, such as young adulthood (19-40), middle adulthood (41-65), and maturity (66-death). The results may be compared to the study of Lishan Xuea, et al., (2012). They found out that age and educational attainment are predictors of a mobile phone-based intervention.

Similarly, this study is opposite to the result of Ronggang Zhou, Pei-Luen Patrick Rau, Wei Zhang, & Damin Zhuang (2012) who found out that age is an important factor in using mobile devices. Further, the result may compare to the results of Fezile Ozdamli, Emrah Soykana, & Ezgi Pelin Yild (2013) who found that the level of use of mobile devices for male students was higher than female students. Perhaps, the result of this study is due to being based in HEIs.

Table 8. Relationship between acceptability of a mobile application manager and the respondent's demographic profile

<i>Acceptability and</i>	<i>χ^2 Value</i>	<i>P value</i>	<i>df</i>	<i>Remarks</i>
Sex	9.31	0.157	6	Not Significant
Age	9.31	0.503	10	Not Significant
Status	2.32	0.804	5	Not Significant
Type of Institution	1.33	0.970	6	Not Significant
No. of years in teaching	17.80	0.603	20	Not Significant

Highest educational attainment	7.09	0.717	10	Not Significant
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On the other hand, table 9 shows the results of chi-square computation for determining if significant relationships exist between the acceptability of a mobile classroom manager and respondent's technology ownership. The study shows that there is evidence of a significant relationship between the acceptability of a mobile classroom manager and the respondent's ownership of desktop (χ^2 (6, $N = 383$) = 19.40, $p < .01$). Acceptability level is affected also by smartphone ownership (χ^2 (6, $N = 383$) = 13.00, $p < .05$). Laptop ownership is correlated with the acceptability of a mobile classroom manager (χ^2 (6, $N = 383$) = 12.60, $p < .01$). Further, internet accessibility in school is may affect also the acceptability of a mobile classroom manager (χ^2 (6, $N = 383$) = 18.20, $p < .01$). Surprisingly, there is no enough evidence that tablet ownership has a significant correlation with the acceptability of a mobile classroom manager. The result can be interrupted as the respondents having scant ideas on how tablet computers support mobile learning as a new pedagogy in teaching and learning.

Table 9. Relationship between acceptability of a mobile application manager and the respondent's technology ownership profile

<i>Acceptability and</i>	<i>χ^2 Value</i>	<i>P value</i>	<i>df</i>	<i>Remarks</i>
Desktop Ownership	19.40	0.004	6	Significant
Smartphone Ownership	13.00	0.043	6	Significant
Tablet Ownership	12.30	0.055	6	Not Significant
Laptop Ownership	20.60	0.002	6	Significant
Internet accessibility in the school	18.20	0.006	6	Significant

Summary and Conclusion

The acceptability of the teacher educators towards to the development of a mobile classroom manager is very high, positive and encouraging. The perceived usefulness and perceived ease-of-use are significant variables linked to the behavioral intention to adopt any technology (Davis, 1989; Venkatesh and Davis, 1996; Chuttur, 2009). It may be concluded that teacher educators in Central Visayas, Philippines will vigorously adopt the proposed instructional tools and integrate mobile learning into their teaching and learning activities. In reference to the Technology Acceptance Model, it is highly likely that the proposed m-APP is likely to be adopted. In the same manner, adoption of the proposed m-APP is likely to be more successful if the preferred features are taken into consideration. It is further recommended that a similar study should be conducted among academic administrators in the teacher education program and measure if there is a significant difference between the two groups of respondents. Further, a user training on the use of the proposed mobile classroom manager must be conducted.

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Social Media Use in Algerian Universities: University of Constantine 2 Case Study

Behdja Boumarafi

Abstract

Social media technologies initially used for socializing, and entertainment have in recent years expanded their reaches into learning activities providing an open space for students' engagement. The positive effect of such technologies on pedagogy is to make learning applicable to the cyber environment to achieve independent and collaborative learning. Students learn to communicate and collaborate electronically. This requires rethinking the way pedagogical activities are carried out to develop synergistic learning relationships to create the best learning model in line with this new educational paradigm.

This paper investigates Algerian students' engagement to understand the developmental implications of academic achievement. The author seeks to advance the use of instructional interactions in two ways: i: enhancing the academic validity of social networking, ii: making the link to students' collaborative learning explicit. Data is collected from 300 students. Findings show that social media are used for a multitude of purposes and Facebook is most popular.

Keywords: Social media; students; Algeria; collaborative learning; academic achievement.

Introduction

The unprecedented developments of information and communication technology (ICT) and related digital technologies have ushered in many changes in all spheres of life. They have changed the way people communicate, work and study. Furthermore, the speed at which such technologies are penetrating education institutions and offering new ways and tools for the delivery of knowledge across the globe making the cyber-space a borderless learning sphere. By the adoption of social media in academia, instructors are shifting some of their teaching activities to students seeking their involvement in enhancing self and collaborative learning. Documented literature that attempts to shed light on social media adoption in learning indicates an increase in the use and popularity of social network sites among students. Facebook, twitter, LinkedIn, Skype, YouTube, MySpace, Google+ among others are making a considerable impact as essential tools to promote exchange of knowledge and to create virtual academic communities.

The internet revolution is creating a new culture in learning and instruction activities. It is very clear that education industry worldwide is in the midst of a revolution caused by the evolving technologies such as the web 2.0 and the advent of web 3.0 allowing students to create content, exchange ideas and share knowledge. So much so that in the last few years there has been extensive discussion and heated debate exploring social media in journal articles and conferences. Much of this discussion has focused on developing a clearer understanding of the capabilities of such technology as a new platform for enhancing students' independent learning and how much academic achievement social networking has yielded and whether it could be used as new pedagogical tools outside the classroom. At the same time, the ubiquitous presence of social media has attracted researchers to study both positive aspects and concerns of using such tools in various settings offering new and various ways of using computers or/and mobile devices. (Paliktzoglou and Suhonen, 2014).

As education institutions are embracing social media there is a need to optimize the positive effect of such technologies to bring them into pedagogy to make instruction and learning active and applicable to the cyber environment of the new millennium. In recent years, more and more education institutions are making a presence in social networks such as blogs, twitter, YouTube, Facebook to create effective ways for the establishment of collaborative and interactive online learning system. Therefore, technology-driven culture is featuring prominently in all pedagogical activities. Hence, the focus of learning and instruction needs to be viewed from a newer perspective "without gathering students and teachers in the same physical space" (Maney, 2009). In other words, learning is no longer tied to a particular location and a particular time table.

For a generation immersed in a world of evolving technologies where internet applications, specifically the web 2.0 tools are having a considerable impact on the way people work, study, play, and communicate. Social network sites promise the opportunity to motivate students to constantly quest for new learning experience out of the physical locations of the university encouraging them to create and share ideas rather than simply memorizing lecture notes. The use of social networks in education has created a paradigm shift; from emphasis on teaching content to helping students develop the ability to create content tailored to their learning needs and share it with peers.

Basically, social network sites provide open avenues for "collaborative education which in essence creates a synergy by bringing together technologically learners and instructors with a shift towards less instructor led teaching to a greater student's involvement" (Boumarafi, 2010). It is therefore, pertinent to say that the use of social network sites extend far beyond their traditional purpose of communication and entertainment to promote students' self-reliance in learning through enquiry and sharing.

This underscores the need to empower students to take charge of their own learning taking place anytime anywhere. This highlights the necessity for rethinking the way core pedagogical activities are carried out and assess their effect on both learners and instructors. The purpose of this study is to provide a better understanding of how students at the University of Constantine 2 (Algeria) are investing their technological skills and learning time, in using social networks for better academic achievements and examine factors affecting their use. The study will build upon the existing body of documented literature that seeks to explore the use of social media in the academic environment. To explore such understanding further, the following objectives were set forth:

- Seek Algerian students' insights about the use of social network sites in learning;
- Identify which social network sites are more popular among students;
- Identify the reasons for social networking.
- Identify which personal information users reveal when using social media.

Literature Review

Boyd and Ellison (2008) traced the history of social network sites (SNS) use back to 1997 when sixdegrees.com, was launched. Since then several social networks were established between 1998 and 2000. However, it was not until the introduction of Friendster, MySpace and Facebook that SNS started to grow in popularity and gained significant mainstream and worldwide popularity (comScore, 2007). The use of social media in academic environment was explored by Jabr (2011) who argued that people use social media for interacting to exchange information, brainstorm ideas, search for new friends, and share everyday news. Back in 1996, Blake and Sikkal declared that in the academic environment, new technological developments specifically Web 2.0 applications will group students into virtual communities whose homogeneity in interest and intellect will create a synergy to learn and benefit from their heterogeneous cultural background and experience. In a similar context, Ellison, Steinfield & Lampe, (2007) observed that Facebook supports resource sharing by establishing the social foundation between students and their peers. In essence the advent of social networking technology is also the advent of new learning systems and a rapid growth in educational technology.

There is a whole host of surveys that pointed to the increased use social network sites by academic community and their impact on instruction and learning activities. Just as social networks extended the function of communication, they also extended their usefulness to learning and instruction allowing for better "communication, collaboration, community creativity, and convergence". (Friedman and Friedman, 2008). The best example of this is the increasing trend towards what is today called collaborative and interactive learning where students' self-governed and problem-solving activities are considered the focal point of a new learning process. For example, Tiryakioğlu and Erzurum (2011) moved the focus to Facebook as an educational tool. They reported that the majority of participants they surveyed have a Facebook account. Most of them used it as a communication tool. 80% agreed that it contributed to communication between classmates. Results of their study also indicate that most faculty members are willing to use Facebook to create academic groups to share information about their courses. Al Maitairi's (2013) study also highlighted that Facebook is used as an educational supporting tool offering faculty at the University of Kuwait a substitute channel to enrich their educational experience through a communication channel for both students and educators.

Jabr (2011) used online questionnaire to explore the use of social networks by students at Sultan Qaboos University in Oman. The study revealed that 70% of the 650 respondents use Facebook, 26% have a MySpace account, 9% use Twitter and only 5% use LinkedIn. The study confirmed that these are mostly used for communication and socializing purpose at a percentage of 91 and only 23% use social networking for assignment preparation. In a similar context, Paliktzoglou and

Suhonen (2014) used questionnaire and interview to empirically investigate the use of Facebook to support problem-based learning (PLB) of Bahraini students. Results of the survey showed experimental evidence of a positive reception of the tool by participants. Findings revealed also popularity of Facebook among students and engagement as self-directed learners and instructors as facilitators in enhancing independent learning. Alexakis, Paliktzoglou and Suhonen (2012) assessed the familiarity and use of wikis by Students in Cyprus. They found that participants are more familiar with the social networks highlighting a frequency of use among students. The authors emphasized the need for formal training to help students overcome the technophobia and lack of skills that are causing a negative reception of web 2.0 tools, specifically the wiki and support them as collaborators, more confident and self learners. In another study, Paliktzoglou, Stylianou, and Sohenen (2014) examined the reception of students towards Google educational applications. They found evidence that Google apps can support pedagogical activities by increasing students' engagement and team work.

Some researchers are not convinced that social networking can be used as a medium of education. For example, results of a survey conducted by Malesky and Peters (2012) showed that 40% of students and 30% of faculty believe that it is inappropriate for professors to use SNs. Other surveys have painted a different picture. For instance Reuben (2008) contends that there is a great potential in education for Facebook and YouTube. SNs have been utilized by institutions of higher education to connect with, and disseminate information to current students, potential students, and alumni. Universities have links to Facebook and Twitter on their homepage; they use them to relay information to students (Malesky and Peters, 2012). In retrospect it is important to learn how to integrate evolving technology into learning strategies; not just for technology's sake, but for the added value that these tools already familiar to learners provide Brotherton (2011).

Social media can cause negative feelings and reduce members' life satisfaction. A survey of 600 Facebook users reported that more than one third developed feelings of frustration and envious when reading friends' postings, checking news feeds and browsing photos related to friends' travel and leisure posted on the platform. This may cause a negative effect on users' satisfaction with their own life. (Krasnova and Buxmann, 2012). Despite the contradictory results of some surveys, what is clear is that a considerable portion of the digital era students consider the traditional mode of learning and instruction no longer the most appropriate model of education. However, the growing use of social network sites by students for learning has increased concerns about the quality of knowledge exchanged among them and how do they assess its credibility.

Although social network sites tools are not created for educational purposes, Dalsgaard (2005) argues that they can be used to support learning. Using social software can help facilitate an approach to e-learning which differs from using learning management systems and which better supports self-governed, problem-based and collaborative activities. Basically, the purpose is to provide students with tools which they can use to solve problems on their own and/or in collaboration with other students.

Battouche (2012) conducted a seminal study to investigate the use of social networks by Algerian youth aged 8 to 24. He found that 84% of the surveyed population used Facebook, 8% used twitter and only 4% used MySpace. 37% of respondents indicated that making new friends was the main reason for using social networks, 40% cited their usefulness in acquiring new knowledge, 11% mentioned effective communication and 18% networking. The results of the study also show that 65% of the surveyed population benefited from social networks in improving their foreign language skills, 25% in strengthening national identity and belongingness and 11% in acquiring the ability to convince in debates.

Research methods

Data collection

To collect data for this study, a questionnaire instrument was designed based on the previous literature. The questionnaire used a five-point Likert scale ranging from (1) completely inappropriate as a learning tool to (5) completely appropriate. The statistical package for social sciences (SPSS) was used to analyze the data. Four students and two faculty members pre-tested the questionnaire. Based on their suggestions, the questionnaire was revised to its final form.

Survey population

Participants of this study consisted of master students at the Institute of Library and Documentation Science at the University of Constantine 2. A request for participation along with 300 questionnaires was e-mailed to participants through the “Infocomdz” group. This is a discussion group created by students of the University of Constantine 2 and using it to communicate and share information and knowledge. Respondents were asked to complete the questionnaire which included questions on type of social network used, frequency of use of social network sites, purpose for the use of social network sites, perception about the usefulness of social network sites, and drawbacks of social network sites. 140; a response rate of 46.66% usable questionnaires were subjected to analysis.

Results

Participants

All respondents were master students at the Institute of Library and Documentation Science. Female student participants (n=90; 64.28%) out- numbered male participants (n=50; 35.71%). In actual fact the number of female students outnumbers the male students' intake in general in Algerian Universities. The age group of students is 21-28, those who grew up as active users of different internet applications i.e. the internet generation. All participants (n=140; 100%) reported using social network sites (SNS) for different purposes and some of them have more than one social media account.

Type of social network preferred by students

Respondents were asked which social network they prefer to use. Their preferences are summarized in table 1. As expected, all respondents 140 (100%) gave the top rank to Facebook at a mean of 4.95. Previous studies also identified Facebook as the most frequently used SNS (Tiryakioglu and Erzurum, 2011; Jabr, 2011; Battouche, 2012; Al Maitairi, 2013). Twitter is used by 70 (50%) respondents as the second most popular social network site with a mean of 3.95. Respondents put YouTube in third position in terms of importance with 40 (28.57%) users and a mean of 3.78. Other social network sites scored lower means i.e.: 2.75 for Skype that respondents use to communicate with family and friends abroad. LinkedIn scored 2.01. MySpace is ranked last with only 5 (3.58%) respondents at a mean of 1.40.

Table 1. Preferred social network sites (n=140)

Type of social network	Mean	Standard Deviation	Number of users	percentage	Rank
Facebook	4.95	2.98	140	100	1
YouTube	3.95	1.83	70	50	2
Twitter	3.78	2.78	40	28.57	3
Skype	2.75	2.04	15	10.70	4
LinkedIn	2.01	1.97	10	7.15	5
MySpace	1.40	2.52	5	3.58	6

Purpose for using Social network sites

Respondents were asked to indicate the purpose for using social network sites. According to the results in Table 2, it is clear that social network sites is primarily used as a communication tool for exchanging e-mails, receiving the top rank with the highest mean 4.5. Keeping in touch with family and friends is ranked second at a mean of 4.1. Making new virtual friends scored 3.98, followed by sharing photos, tracing an old friend, with means of 3.95 and 3.85 respectively. These results match the findings of Gentzler and Oberhauser (2011) who reported that students use social networks mostly for communication and socializing. Respondents use social networks to discuss group project works, share assignments and course work as well as files and lecture notes also scoring high means ranging from 3.78 to 3.35 and creating content and exchanging ideas at means of 2.98 and 2.50 respectively. This indicates that the surveyed population of this study uses social networks not just for socializing and communication but also for academic activities. Respondents seem to be interested in becoming global citizen by having a presence in the virtual world. Surprisingly, the study found that joining discussion forums, searching for a job and downloading videos and audios were the least reasons for using social network sites among the surveyed population. The most likelihood is that participants are using other websites for online discussion and looking for jobs in other job announcement sources i.e. newspapers and job sites.

Table 2. Purpose for using social network sites (n=140)

Purpose	Mean	Standard deviation	Rank
Communicate with others through e-mail	4.5	.62	1
Keep in touch with family and friends	4.1	.98	2
Make new virtual friends worldwide	3.98	.74	3
Share photos	3.95	1.00	4
Trace old friends	3.85	1.05	5
Have a presence in the virtual world	3.83	.93	6
Discuss group project works	3.78	1.18	7
Share assignments and course work	3.50	1.15	8
Share files and lecture notes	3.35	1.08	9
Create content	2.92	1.99	10
Exchange ideas	2.50	1.87	11
Join discussion forums	2.35	2.50	12
Searching for a job	2.25	2.90	13
Download videos and audios	2.00	1.89	14
Make a presence in the cyber-space	1.98	2.00	15

Students' perception about the usefulness of social network sites

The study intends to explore the students' opinion about the usefulness of social network sites. Results in table 3 show that SNs are primarily used for building relationships with a mean of 4.90 followed by "improve communication skills with 4.50 and develop social skills ranked third at a mean of 4.30. These findings support the results in table 2 that indicate that social networking is still more popular among Algerian students for communication and socializing. Respondents perceive social networking appropriate for improving their foreign language skills. This could be the reason for "making new virtual friends worldwide" being the fourth most important reason for using social networks as shown in table 2. Participants seem a little less clear about the using SNs to "share ideas, improve learning, make contact with faculty easier, and enhance academic achievement" giving them means less than the mid-point 3. This could be attributed to the fact that the use of social networks in academic activities is still new and not perceived as a very important tool for academic purposes (Al-Muitairi, 2013).

Table 3. Usefulness of social network sites (n=140)

Statement	Mean	Standard deviation	Rank
Build relationships with others	4.90	1.96	1
Improve communication skills	4.50	1.65	2
Develop social skills and modify one's behavior	4.30	2.05	3
Improve foreign language skills	4.05	1.15	4
Improve one's personal image	3.98	2.01	5
Self regulated learning	3.90	2.00	6
Share ideas and promote creativity	3.85	1.99	7
Create Peer to peer learning communities	3.80	1.15	8
Personalization of learning content	3.75	1.75	9
Improve learning in general	3.50	1.70	10
Make contact with faculty easier	2.00	1.22	11
Enhance academic achievement	1.30	1.90	12

Drawbacks of using social network sites

Participants were asked to indicate the problems and drawbacks related to the use of social network sites. Their answers as reported in table 4 indicate that students are very much concerned about the violation of their privacy rating it first with a mean of 3.73. They report that social networking is time consuming at a mean of 3.58. Participants seem to believe that social media is inappropriate for formal academic activities. This finding is supported by previous literature which indicated that social networks are used for some sort of informal academic purpose; for revision, arranging group or project work, often initiated by students themselves and not part of a formal requirement of a course (Downes, 2004). The reason for this are concerns about quality control of information posted by students on social networks. Participants reported “discouraging face-to-face communication” ranking it before last with the lower mean score of 2.43. Finally, participants believe that having a presence in the virtual world may turn them into schizophrenic leading two separate lives; one in virtual world and one in real world. Respondents do not seem to provide wrong information about themselves in that “it is easy to lie about one's life” is ranked last. Some respondents mentioned the use of YouTube and Skype where they can see whom they are networking within a virtual environment.

Table 4. Social network sites drawbacks (n=140)

Statement	Means	Standard deviation	Rank
Violates privacy	3.73	1.18	1
Time consuming	3.58	2.18	2
Concerned about the quality of information	3.35	2.03	3
Not appropriate for formal academic activities	2.87	1.94	4
Discourages face-to-face communication	2.43	1.82	5
Can cause schizophrenia	2.25	1.78	6
Easy to lie about one's situation	2.00	1.55	7

Conclusion

Professional literature indicates an increase in the use of social network sites highlighting their popularity among students. They are gradually making inroads as educational tools, and seem to have the potential to support collaborative instruction and learning. The purpose of the present study is to validate students' perception of social media as support tools for enhancing academic achievements. Results indicated a high use of social network sites. Participants showed a preference

for Facebook as the most popular tool. This is supported by Tiryakioglu's and Erzurum's (2011) study. Participants are using social media mainly for communication and socializing. It is also used for independent and collaborative learning and extending social networking. This is emphasized in a number of studies (Jabr, 2011; Dalsgaard, 2004; Paliktzoglou, Stylianou, & Suhonen, 2014; Paliktzoglou and Suhonen, 2014). However, perceptions of respondents expressed through the survey do not indicate that the use of social media is enhancing their academic achievements.

On the contrary, previous research provided experimental evidence that social media; specifically Facebook is a great tool for collaborative learning. Results of the study indicate that respondents are somehow apprehensive about social networks thinking that they violate their privacy, are time consuming and discourage face-to-face communication. They also expressed concerns about quality control of information and integrity. The same is expressed in the literature raising concerns about privacy as well as information security and integrity as argued by Paliktzoglou and Suhonen, (2014). Results of this study cannot be generalized as they reported the views expressed by the master students of Library and Documentation; only a small portion of students at the University of Constantine 2 (Algeria). Nevertheless, they provide an indication that social media gradually making its way as a learning tool in Algerian universities. This suggests as faculty and students become more engaged in learning and instruction through communication and collaboration, this new form of learning will get widespread in education.

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Assessing the Applicability of 3D Holographic Technology as an Enhanced Technology for Distance Learning

Pradeep Kalansooriya, Ashu Marasinghe, and K.M.D.N. Bandara

Abstract

Distance learning has provided an excellent platform for students in geographically remote locations while enabling them to learn at their own pace and convenience. A number of technologies are currently being utilized to conceptualize, design, enhance and foster distance learning. Teleconferences, electronic field trips, podcasts, webinars, video conferencing and online courses are among such technologies used in providing distance learning opportunities. However limitations in those existing technologies have affected to the increase of distance learners dropout rates. As an attempt to overcome the limitations in the currently adopted distance learning practices, the study aims to utilize 3D Hologram Technology (3DHT) in the Engineering discipline. 3D hologram facilitates live and life size 3D telepresence that can interact with remote audiences.

A survey had been conducted, using Delphi Technique to gather data from the experts in the field to evaluate the potential of 3DHT over existing technologies. Results of the survey suggested that 3DHT as a good distance learning technology and have the potential of overcoming existing limitations. Lack of infrastructure, High initial cost of infrastructure and Lack of technical know how are the main encounters identified by the experts in the sample. It is expected to develop a classroom environment with 3DHT and to evaluate its effectiveness for the distance learning in the next stage of the study.

Keywords: Distance learning; 3D hologram technology; 3D telepresence; classroom environment.

Introduction

Distance Education

Distance Education or Distance Learning is a field of education that focuses on teaching methods and technology with the aim of delivering teaching, often on an individual basis, to students who are not physically present in a traditional educational setting such as a classroom (Subrahmanyam & Ravichandran, 2013). Fundamentals of distance education are that teachers and students are in different places for all or most of the time that they teach and learn. Hence it requires some form of communication technology to connect the teacher and the student. Accordingly, Bratt (1977) stated that history of distance education dates back to the early 18th century, nonetheless conclusive evidences were found in 1833 in the form of advertisement by old Swedish university city of Lund, which offered opportunities to study through the medium of the post. Another early attempt to provide distance education was made in England by Isaac Pitman who taught shorthand on postcards (Holmberg, 2005).

Distance Education has progressed in leaps and bounces due to the fast evolution of communication technology allowing faster and convenient opportunities for the students and teachers. Webinar, Teleconference, Podcast, Virtual world and Blogs are some of the modern communication technologies used in Distance Education. Some of the modern communication technologies and their advantages and disadvantages had been summarized in Table 1. Accordingly, difficulty of interacting between teacher and student was noticeable in different levels on almost every technology compared to the conventional classroom interaction with teacher and student. Hence developing innovative communication technology, which eliminates difficulties of interacting between teacher and student, will be exciting area of research.

Table 1. Advantages and Disadvantages of exiting communication technologies of Distance Education

Communication Technology	Description	Advantages	Disadvantages
Webinar	Instructor leads the learning, and all learners are logged on simultaneously and communicate directly with each other (Shi & Morrow, 2006)	• Ability of real time sharing of knowledge and learning • Opportunity for immediate access to the instructor to ask questions and receive answers	• Only 2D communication can be possible, hence good interaction cannot be possible • Requires quality bandwidth and computing power
Virtual world	Computer simulated environment that enables users to interact with each other without geographical confines. An avatar represents each user. (Harris & Rea, 2009)	• Ability of interacting large number of communities • Ability of cost effective and robust simulation for educational activities	• Avatar or graphical representation is not real, so that the interaction between the parties are artificial • Requires quality bandwidth and computing power
Podcast	It involves downloading a series of audio or video broadcasts (files) onto a digital media player,	• Ability of using the materials repeatedly • Ability of using any time user want	• Only one sided interaction is possible • They are stagnant. Once created, they cannot be changed or modified

	via a computer, over a period of weeks (Evans, 2008)		
Text based materials		• No special facilities or equipment are needed to use it • Ability of easy navigating; random access of specific portions is convenient and fast	• Interactivity is more difficult to achieve with print than with some other media
Electronic field trip	Use digital and computer visualization techniques based on the personal computer and internet (Qiu & Hubble, 2002)	• Ability of presenting trips to inaccessible areas • Provide an alternative of fieldwork, when time, expenses, and/or logistics are real issues	• Do not convey the true three-dimensional nature of objects • Do not convey the non-visual and aural feelings of touch, smell etc

Among all these technologies, Virtual Environments (VE) have been subjected to many researches over the years for its potential of facilitating for education in many disciplines, such as, learning sciences, computer science, psychology, communication, etc... (Bailenson et al, 2008). There are number of learning opportunities provided by VEs as learning modules stems from their ability to implement contexts and relationships not possible to achieve in a traditional learning setting.

Embodiment of agents that teach and learn

In recent studies many efforts have been made to create intelligent virtual agents who teach a learner about a specific domain. Rickel and colleagues' work (1998) on evaluating the possibility of using virtual agents in performing complex mechanical tasks in a learning VE, the creation of a virtual tutor for teaching the fundamentals of hardware and operating systems developed based on the natural language processing interface (Hill et al., 2003), the digitally augmented dollhouse that encourages children to tell stories as a way of promoting literary competencies (Cassell, 2004) are some of the noteworthy examples of such. Virtual agents not only allow a user to enter into a learning experience at his or her own convenience, but they can also provide personalized one-on-one learning experiences tailored to the individual that would be prohibitively expensive otherwise (Baylor & Kim, 2005).

Existence of Co-learners

There is a factual reality on the success rate of students learning in groups outperform students in individualistic conditions (Johnson, Johnson, & Skon, 1979; Wood, Willoughby, Reilly, Elliot, & DuCharme, 1995). Therefore, in the reality, it is a substantial shortcoming of the typical individualized learning environments with virtual teachers. However the introduction of co-learners in VEs, as a solution for the aforementioned issue, have been thoroughly studied and confirmed conceivably better than a traditional classroom since virtual co-learners can be programmed to behave specifically to enhance each user's learning process (Bailenson et al., 2008). Studies conducted to evaluate the credibility of having virtual co-learners in the process of learning suggest that co-learner's positive behavior can enhance a user's increased performance (Ju, Nickell, Eng, & Nass, 2005).

Visualizations

Visualization is one of the salient features of VEs. It helps the users with visual, haptic and auditory cues to enhance and swift between different perspectives of a given set of complex information. For an example, the study conducted by Perdomo and the team in 2005 concluded that abstract concepts such as architectural settings, engineering setups, or chemical structures can be conveniently understood by the user, if they were enabled to create, alter, and rotate in real time three dimensions. In addition enabling users with multiple perspectives on the same situation - central, peripheral, bird's-eye view, and so on, assist them in the learning process through allowing them to understand different aspects of the situation clearly (Ellis, Tharp, Grunwald, & Smith, 1991).

Synthesis of archived behaviors

One of the strong suits of VEs, which was highly noted by many scholars, is that every single action that is rendered must be formally represented in order to appear to the users. Subsequently every action carried out by the users can be constantly recorded over time, and assimilation of such data can be used to evaluate behavioral profiles (Bailenson et al., 2008). For example, Rizzo and colleagues (2000) automatically collected the gaze behavior of students in a virtual classroom via head-tracking devices and used patterns of attention and gaze to diagnose deficits in attention among children. Bailenson and team (2008) clearly mentioned that when the behavioral tracking systems become more elaborate, the ability to use this information to track student performance and consequently improve learning systems should become a major advantage of using virtual classrooms.

3D Hologram Technology

Evolution of 3D Hologram Technology (3DHT)

Holography can be referring to as a method of obtaining photographic image in three dimensions (Ahmad, 2014). It involves the use of a laser, interference, and deflection, light intensity recording and suitable illumination of the recording. (Upadhye, 2013) specified that the term hologram be composed of the Greek terms, "holos" for "whole view" and gram for "written". However the technical term for the holography is wave front reconstruction.

Dennis Gabor Hungarian Physicist is considered as the father of Holography as he invented this technique when he was working on to improve his electron microscope. However (Chavis, 2009) noted that the technique was not fully exploited till 1960s, as the laser technology had not been improved to standards. Records indicate that by the time of 1962 scientists in both in United States and Soviet Union had developed 3D holographic technology. Today Holograms is expanding its boundaries from science fictions to one of world's attractive communication method. Live and realistic 3D hologram representations can now interact with their distance audiences whether they are a band or artist performing on stage, a politician delivering a keynote speech, announcers broadcasting a live program simultaneously from different places or a CEO holding an interactive meeting with colleagues around the world.

Process of 3DHT

As per the following figure 1 the two laser beams reach the recording medium, their light waves intersect and interfere with each other. Those interferences are imprinted on the recording medium and can be considered an encrypted version of the scene. In order to view its contents require a laser beam identical to the original light source used to record the hologram. When such laser is beamed at the developed film, it illuminates the hologram and it is diffracted by the hologram's surface pattern. This phenomenon produces a light field identical to the one originally produced by the scene and scattered onto the hologram. The image this effect produces in a person's retina is known as a virtual image.

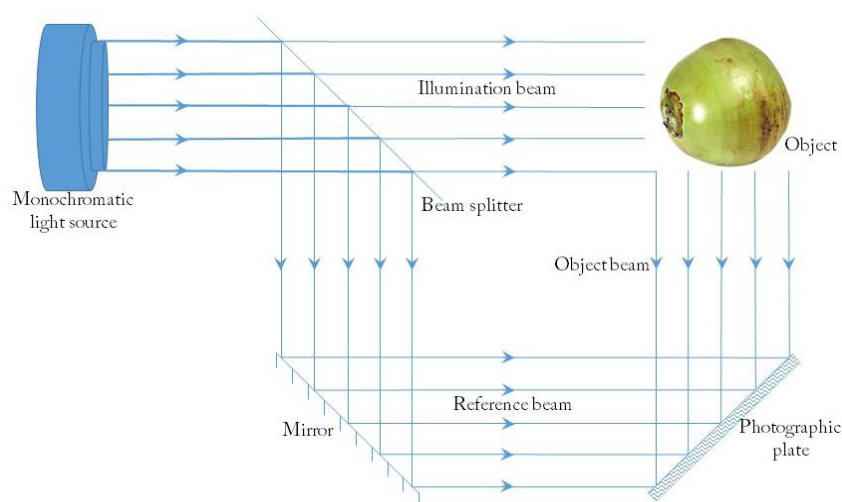


Figure 1. Recording a hologram

About some of the famous examples, which are recognized as implications of 3DHT, there are some contradictive opinions expressing that those are truly not 3DHT implications. Narendra Modi's election campaign and Michael Jackson performance on the 2014 Billboard Music Awards are two such events that commonly considered implications of 3DHT but have contradictive opinions. Some expertise argues that those events are advancement of Pepper Ghost Technology. "Pepper's Ghost" occurs when a semitransparent image appears in front of a background and it involves reflecting an image from a beam splitter placed in front of a scene. "Pepper's Ghost" provides only a single reflection. It does not allow multiple planes of transparent images. Furthermore, it cannot produce images that pass through each other in a direction parallel to the optical path to the viewer. Figure 2 simply graphically demonstrates the process of Pepper's Ghost.

Table 2. Recent real-world implications of 3DHT

Example	Description	Features
Narendra Modi's election campaign	The prime minister of India, Modi used holographic technology in his election campaign 2012. He Addressed the voters in different locations simultaneously through filmed speeches by broadcasting them live via a satellite uplink to the stages. (Musion, 2014)	Offered a 3D convincing view of the president. Addressed different locations simultaneously
Election result broadcasting on CNN - 2008	At the election coverage program 2008 in America announcer in Chicago was beamed up into Wolf Blitzer's studio in New York with a very realistic display. This event attracted millions viewers to watch the hologram effect via a YouTube clip.	Sensed that two announcers were at same place. Interaction between announcers were attractive and efficient Realistic view of the announcer
Michael Jackson performance on the 2014 Billboard Music Awards	Beaming Michel Jackson's performance on to the stage commenced billboard Music Award 2014. (Gallo, 2014)	Performance was creative and attractive as the famous character brought to life again.

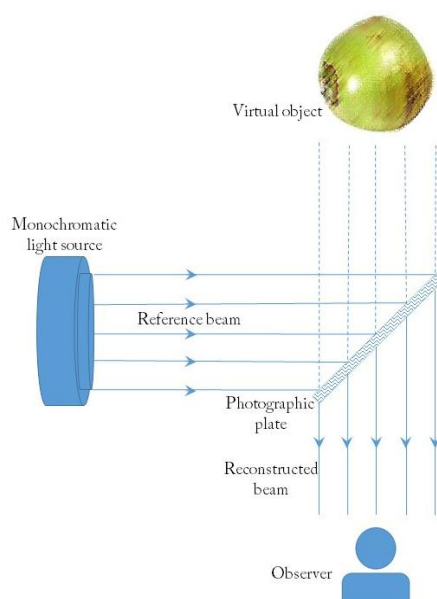


Figure 2. Reconstructing a hologram

Despite the contradictive arguments most of those implications are considered as implications of 3DHT. To conclude appropriate definition and process requires deep review of literature, which is not in the scope of this study. Hence both those processes are considered under 3DHT and implications from both processes are taken in to consideration in latter parts of this study.

Implications of 3DHT

Currently 3DHT is 3DHT has been used in many fields due its increasing popularity. Some of the recent implications are summarized in the table 2. “Narendra Modi’s” election campaign by using 3DHT was noteworthy example. As India is a very large country successful election campaign is a challenging task. Using 3DHT for the election campaign helped the speakers to address different locations simultaneously through filmed speeches by broadcasting them live via a satellite uplink to the stages. Those views of the politicians were very convincing, thus it was very attractive and touched the people who had never seen a politician addressing them so close to them. Another example of 3DHT, which attracted millions of YouTube viewers, was Election result broadcasting on CNN – 2008. It allowed two announcers in two different places to broadcast the results with better interaction and creativity. Michael Jackson performance on the 2014 Billboard Music Awards was another exciting example 3DHT. It was a fascinating and creative performance for the fans of Michael Jackson as the famous character brought to life again. In addition to above examples, some Museums use 3DHT to bring world-renowned masterpieces to life again.

The importance of 3DHT on education

It may possible to take advantages of some of the features mentioned in the table 2. Those features in the table 2 can be review and summarized as follows:

- Ability of offering convincing and realistic view of the user
- Ability of communicating users in different locations
- Ability of attractive and efficient communication
- Ability of bringing famous characters back to life

Students and teachers can afford to communicate and interact even though they were very far from each other. Students might benefit from the realistic and convincing views of the study materials. The hologram teacher appears to be in the classroom, and can see and speak to the students as if they were all in the same room, which enables attractive and efficient interaction between student and teacher. Further to that it can enhance the educational process by bringing famous characters to life again from the past, and they speak about themselves and/or explain something as an assistant teacher would be attractive for the students. However those potentials have not been testified realistically yet. Thus this study attempts to provide an initial groundwork for the above purpose.

Methodology

Questionnaire and sampling procedure

The questionnaire adapted in this study comprised with three parts with an objective of evaluating experience and ideas in a distance-learning environment. First part of the questionnaire aimed to compare important factors in teaching environment and evaluate the level of importance of video based education and hologram based education. Important factors in teaching environment which were used in the questionnaire is shown in figure 1. Second part of the questionnaire focused on the evaluation of the applicability of hologram technology in classroom environment by identifying major barriers and technical difficulties in implementing a hologram based classroom. Finally, the third section comprises of general information of the responder. Qualitative responses were quantified through a 1 to 5 Likert scale where 1 indicated the strong disagreement while 5 indicated the strong agreement level.

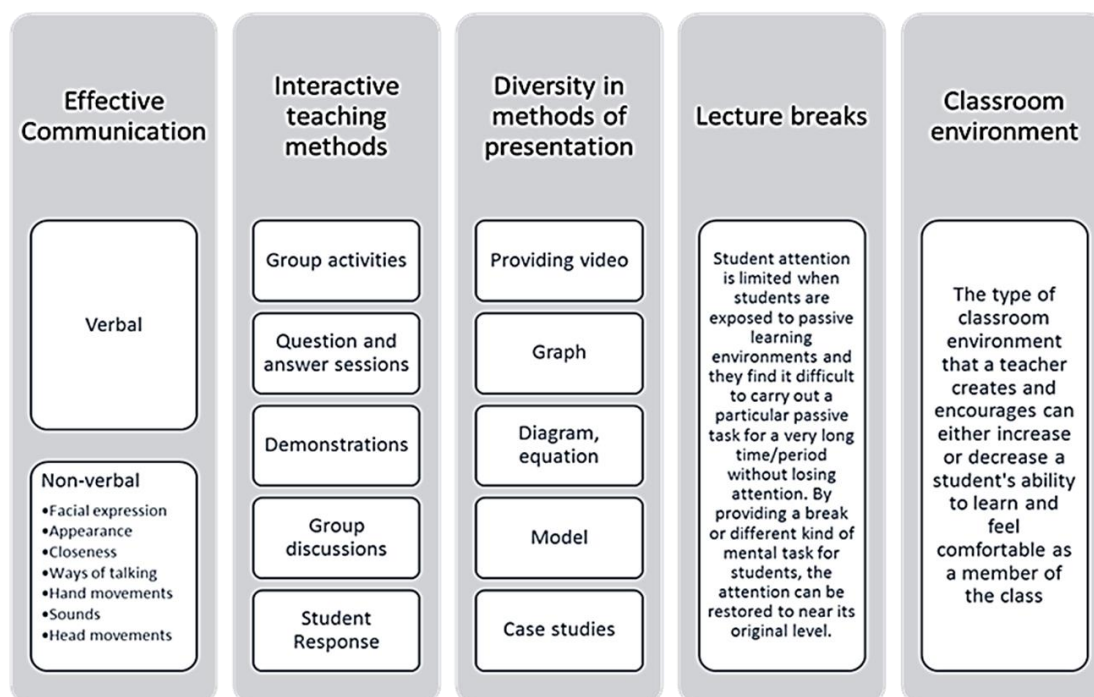


Figure 1. Factors and indicators of effective teaching environment

Since, 3DH is a developing technology therefore the awareness about 3DHT is at a lower point among general public, experts' views were considered for the study. The Delphi technique¹ was used in selection of the sample of 25 each from two categories; University Academia, and IT related professionals. Only 17 (43.6%) and 22 (56.4%) participants have responded and considered valid for the analysis of the study respectively.

Analysis Procedure

Data obtained from the survey had been analyzed in three stages using Analytic Hierarchy Process (AHP), Descriptive analysis, and Analysis of Variation (One-Way ANOVA) consecutively. AHP was used to conduct a pair wise comparison of factors of effective teaching environment and thereby to evaluate the suitability (according to the perceptions of participants) of Video technology based education and Hologram technology based education. Means and Standard Deviations of the dependent variables; Likability to use 3DHT, Cost effectiveness, and Students' active involvement, were used to describe the behavior of the sample. Finally, the mean differences of groups within separate categories; gender, experience, Profession/ Expertise were calculated using Analysis of Variation (One-Way ANOVA).

Analysis

Pairwise comparison of importance of factors related to teaching and learning environment

Each respondent in the sample was given an opportunity to make pair wise comparison between 'Effective communication', 'Interactive teaching methods', 'Diversity in method of presentation', 'Lecture breaks', and 'Classroom environment' and requested to give weights according to the level of importance. According to AHP 'Interactive teaching methods' and 'Effective communication' are the factors rated highly with generalized weights of 26.58% and 24.13% respectively.

Table 1. Results of pairwise comparison of factors related to teaching and learning environment

Factor	Weights (%)
Interactive teaching methods	26.58
Effective communication	24.19
Diversity in method of presentation	19.88
Classroom environment	16.71
Lecture breaks	12.65

Comparison of video based education and hologram based education for the factors related to teaching environment

The participants were asked to rank the level of importance on a scale of 1 to 5 where 1 is the lowest and the 5 is the highest. The Figure 2 and Table 3 illustrate the level of importance that each factor received for both teaching mechanisms. Almost all the factors were recorded important other than for lecture breaks for both categories. Additionally Hologram based distance education was recorded important for factors other than 'Lecture breaks' in relation to video based education. Further it was statistically proven by the generalized mean of 3.892 (Standard Deviation: 0.453).

¹ "The Delphi technique is well suited as a method for consensus-building by using a series of questionnaires delivered using multiple iterations to collect data from a panel of selected subjects." (Hsu & Sandford, 2007).

Table 2. Comparison of video based education and hologram based education

	N	Minimum	Maximum	Mean	Std. Deviation
Video based distance education	39	1.608	4.355	2.948	0.710
Hologram based distance education	39	2.759	4.747	3.892	0.453

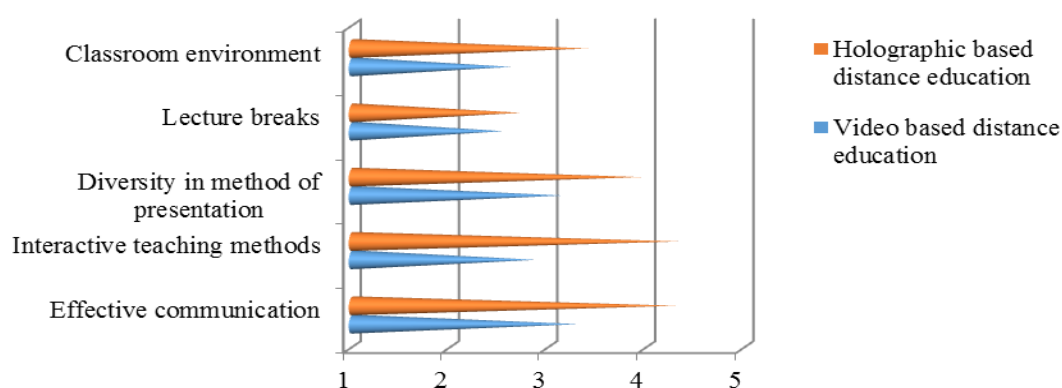


Figure 2. Comparison of video based education and hologram based education for the factors related to teaching environment

Perceptions on 3D Hologram based classroom environment

One –way ANOVA statistical test was performed to test whether there are differences between independent variables; gender, experience, and employment groups.

Likability to engage

Table 3. Perceptions on likability to engage in 3D Hologram based classroom environment

	N (%)	Mean	Std. Deviation	Minimum	Maximum
Male	61.5	3.96	1.429	1	5
Female	38.5	4.47	0.640	3	5
≤10 year experience	48.7	4.42	0.607	3	5
>10 year experience	51.3	3.90	1.553	1	5
University Academia	43.6	3.59	1.583	1	5
IT related professionals	56.4	4.59	0.503	4	5
Total	100	4.15	1.204	1	5

There is a statistically significant difference between University academia and IT related professionals ($F(1,37) = 7.851, p = 0.008$). No other groups have indicated heterogeneity within groups mentioned above. Tukey post-hoc test was not possible, since there is no any group consists with at least three sub categories.

Cost effectiveness

Table 4. Perceptions on cost effectiveness of 3D Hologram based classroom environment

	N (%)	Mean	Std. Deviation	Minimum	Maximum
Male	61.5	3.33	0.868	1	4
Female	38.5	3.40	0.910	1	4
≤10 year experience	48.7	3.53	0.841	1	4
>10 year experience	51.3	3.20	0.894	1	4
University Academia	43.6	3.18	1.015	1	4
IT related professionals	56.4	3.50	0.740	1	4
Total	100	3.36	0.873	1	4

There is no statistically significant difference between groups mentioned above.

Students' active involvement

Table 5. Perceptions on active involvement of students in 3D Hologram based classroom environment

	N (%)	Mean	Std. Deviation	Minimum	Maximum
Male	61.5	3.38	1.279	1	5
Female	38.5	3.60	1.183	1	5
≤10 year experience	48.7	4.11	0.937	1	5
>10 year experience	51.3	2.85	1.182	1	5
University Academia	43.6	3.24	1.348	1	5
IT related professionals	56.4	3.64	1.136	1	5
Total	100	3.46	1.232	1	5

There is a statistically significant difference between experience groups ($F(1,37) = 13.417$, $p = .001$). No other groups have indicated heterogeneity within groups mentioned above. Tukey post-hoc test was not possible, since there is no any group consists with at least three sub categories.

Major barriers in implementing 3D Hologram based classroom

Participants responded vividly to the question regarding major barriers in implementing 3DH based classroom. 'Lack of infrastructure' and 'High initial cost of infrastructure' have been identified as the main two barriers with Mean values reached more than 4.00. Additionally 'Limited bandwidth' was also identified as a secondary roadblock in the process of implementing 3D Hologram based classroom (Table 7, Figure 3).

Table 6. Major barriers in implementing 3D Hologram based classroom

	Minimum	Maximum	Mean	Std. Deviation
Lack of infrastructure	2	5	4.36	0.811
High initial cost of infrastructure	2	5	4.23	0.872
Bandwidth limitations	2	5	3.46	0.854
Backwardness in adapting to new trends	1	5	3.08	1.265
Lack of technical know-how	1	5	3.92	1.178

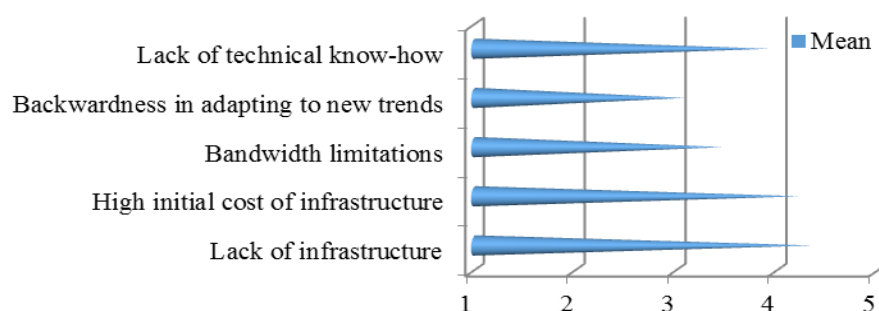


Figure 3. Graphical representation of major barriers in implementing 3D Hologram based classroom

Perceived benefits of 3D Hologram based classroom

At least 30% of the respondents believed that 3DH classrooms enhance the real time experience of students through 3D perceptual effects and effective in both theoretical and practical subject content delivery. Fifteen percent of the sample believed that 3DH classrooms in distance learning have the power to enhance effective interaction between student and teacher while reaching out for mass audiences regardless of distance and time barriers (Figure 5).

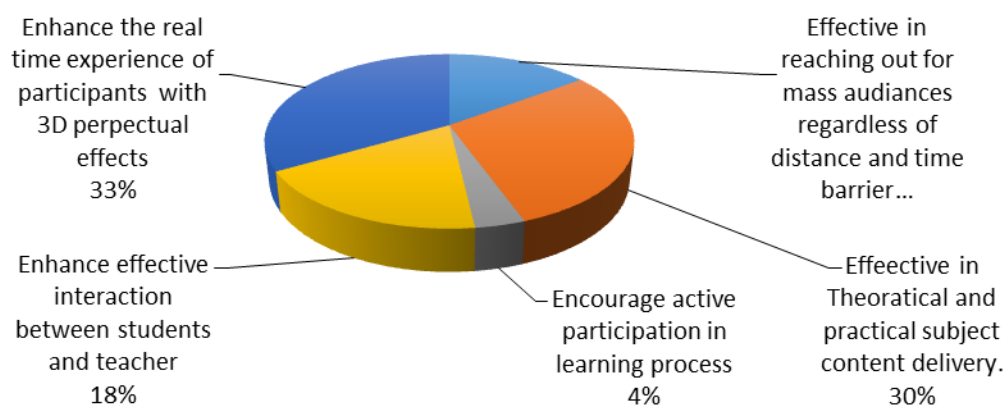


Figure 4. Perceived benefits of 3D Hologram based classroom

Discussion and Conclusion

3DH is recognized as an applicable and strongly appreciated technology for distance education in the comparison with the video based distance learning. All the experts, irrespective to their domain, interviewed in the study shared the common conception that 3DH is far better than video based education for distance education. However, the experts have no clear cut idea about the cost effectiveness and active involvement of students in 3DH classroom. There is a significant

difference in perceptions between University academia and IT related professionals on likability to engage 3DHT based classroom. IT related professionals share a stronger level of agreement on likability to engage 3DHT based classroom than the University academia. University academia seemed to conceive the idea of 3DHT as an encounter rather than a feasible and encouraging mode of education in real world application. However an explicit demonstration is due in the next step of this study. Even though the participants disagreed upon the applicability of 3DHT, all of them slightly agreed that it is a cost effective mode of distance education. Further, the perceptions on cost effectiveness of 3DHT based classroom did not show a significant difference under any group classification selected in this study. There is a significant difference in perceptions between experience level groups on active involvement of students in 3DHT based classroom. Participants with less experience strongly suggested that students will accept 3DHT and involve actively in learning process while the participants with higher level of experience didn't. The reasons given by the experienced experts were again related with the reason given by university academia on likability to engage 3DHT based classroom.

Lack of infrastructure, High initial cost of infrastructure and Lack of technical know how are the main barriers identified by the experts in the sample. Nevertheless, majority of respondents believed that 3DH classrooms enhance the real time experience of students through 3D perceptual effects and is an effective mode of delivery in both theoretical and practical subject content.

In the study design authors had to confine the size of the sample since it wasn't easy to find enough experts for the interview and some aspects of the study found obsolete because of the aforementioned. Therefore it is suggested to redefine the sample size in the next step of study along with interactive demonstrations on the applications of 3DHT.

However finally it was concluded that 3DH is an applicable and strongly appreciated technology for distance education with some drastic measures in the design of subject modules offered in distance learning programs.

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Social Media in Tertiary Education-Vhembe Further Education Training College Case Study

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Abstract

Social media technologies are being widely used by students in institutions of higher education and these are transforming their way of learning, social conduct, communication and networking. The intend of this research was conducted to determine value of social media technologies to students in higher education but with a focus that was directed towards students in a vocational training college. A random sample of 105 students from Vhembe Further Education Training College (FET) participated in the study and they were the following departments, Business/Finance, Engineering, Hospitality and Tourism. Analysis of results was executed through application of SPSS statistical package. Findings show that social media technology has infused a new culture of learning among students. In addition, social media applications which are being widely used by students for learning activities that include studying, access of education content, and social communication are: Facebook, WhatsApp, Twitter and YouTube.

Keywords: Learning culture; social media; social networking technologies.

Introduction

Background of study

Trends in technology developments are altering the course of some existing models and methodologies of enhancing student learning to those who are engaged in both formal and informal education. Most initiatives for educational technologies are affected by a broad range of challenges that include weak bandwidth, lack of qualified personnel in the field of technology and old infrastructure, (Carr & Czerniewicz, 2011). Social media technology usage has increased in the past five years due to a combination of factors that entails affordability of the mobile devices and increased internet bandwidth amongst the consumers. (Bell, 2010; Selwyn, 2012). This paper will address the concept of social media technologies being used in the field of higher education. Social media is being widely used through desktop computers and mobile devices. Trubitt and Overholtzer (2009) indicated in their research that social networks have been embedded in people's cultures resulting in creation of personal and professional networks.

The most popular interfaces being used are Facebook, Flickr and Twitter although the list of some is endless. Users can connect in cyberspace, creating groups that enable sharing and exchanging of information and ideas. According to Zanamwe, Rupere and Kufandirimbwa (2013), social networking technologies were received with mixed reactions by academics in developing countries although the trend seems to be in their favor of adoption. The social networking technologies improve computer skills of a student who may not have had access to formal introductory computer courses. The increase of social media tools has contributed towards an increase in user generated content through use of self-help tutorials that are freely available from the internet.

Research Objectives

This research seeks to establish whether social media technologies are being considered as disruptive or complimentary technologies in the context of Further Education Training College located in the rural environment. Another aspect will focus on how the technologies are benefiting students in the rural environment where technological changes lag behind unlike in the urban areas.

Literature review

Social media in learning

Social media technology is now an essential requirement in people's daily lives contributed by a combination of factors that include growth of affordability of mobile computing devices, improved internet wireless bandwidth, social media technologies and several other web 2.0 technologies (Lenhart, Purcell, Smith, & Zickuhr, 2010). The present day college students are exposed to existing, new and emerging technologies in many aspects of their lives (Browning, Gerlich, & Westermann, 2011). They use the following devices on daily basis: e-readers, tablets, desktop computers, laptops, and cell phones / mobile devices to actively engage in social networking, text messaging, blogging, content sharing, online learning, and much more (Cassidy, Griffin, Manolovitz, Shen, & Turney, 2011). Paliktzoglou and Suhonen (2014) argued that concept behind social media tools were not a new phenomenon as interfaces such as chat rooms, internet forums, message boards, web communities and blogs were being used since the revolution of internet.

In social media, people use the web based and mobile applications for social interaction. In addition, individuals and organizations can generate new content, share existing content in the cyberspace. A number of interfaces used for social media have increased with Twitter, Facebook, WhatsApp,

MySpace, and Flickr being among the top. (Davis, Deil-Amen, Rios-Aguilar & Gonzalez-Canchem, 2012; Junco, Heiberger, & Loken, 2010).

The social media tools and networking sites enables students to engage with one another, express and share their creativity. There are drawbacks associated with social media technology especially when students develop a continuous usage of internet which encompasses reduction in higher-order reasoning processes. In addition continuous internet use is likely to exposes students to interactive, repetitive, and addictive stimuli that produce permanent changes in brain structure, WCER (2011).

Zanamwe, et al. (2013), Greenhow and Gleason (2012), Junco, Elasky and Heighberger (2012) revealed in their research, that students who improved in their communication, technology and research skills, assist in helping student connection with application concept as well as increasing student engagement in course material, through the use of social media which are critical in their development. This is an indication that social media technologies contribute positively behind the classroom but to a student's life experience, knowledge and skills this develops over a period of time. Application of social media in education would imply that learners have to take lead by participating, producing knowledge rather than consuming only which in turn contribute towards support of personal life goals and needs (Lee & McLoughlin, 2010). A point to note is that learners do not only engage in social interaction on the social media but contribute in the shaping of their career and personal life that form key components of personal development.

Application of social media in student recruitment

International universities have embraced social media for international recruitment of students due to increased competition and reduced funding by the governments. In order to meet the recruitment targets, it is important for colleges and universities to adapt to changes as the social media technology platforms enable them to reach out a large target of potential students across the world (Choudaha, 2013). The use of websites by the institutions reduces communication costs over geographic distances and in addition, disintermediation will reduce the communication channel since students are able to connect directly. However institutions need to remain guarding against loss of information control due to the unlimited number of social applications available. It should be noted that social media conversations are informal which requires high interaction for the parties involved which enables deep engagement with prospective students intending to enroll at a given institution.

Disruptiveness of technologies in higher education

Higher Education Institutions (HEIs) have significantly invested in electronic learning technologies such as Blackboard, and Moodle, but they have not been universally adopted and used by students and staff. Instead, other technologies such as social media or social networking technologies which are not owned or controlled by the institutions are widely used to support learning and teaching (Flavin, 2012). Disruptive technologies are those that disrupt established practices, often starting with a small number of users, but growing over time to the extent that they displace a previously dominant, incumbent technology. Christensen's theory of Disruptive Innovation (1997) emphasizes that the disruptive technologies are not designed explicitly to support learning and teaching in higher education, but have educational potential. The theory propounded by Christensen (1997) shows that new technology can disrupt existing practices which may run a risk of rejection, but also that the new technology can go on to change the practice itself. Facebook is a success story in higher education when compared to other social networks because of easy to use features and is deemed as a lightweight technology (Boyd & Ellison, 2010). As such, educators' interests have increase both in use and research of Facebook.

However, Facebook, Google, and other web based applications can simultaneously seize and fragment a human being's attention. They have the possibility to subvert higher-order reasoning activities, that include the kind of focus, concentration, and persistence that is necessary for critical thinking and intellectual development (Wisconsin Centre for Education Research, 2011).

Significance of technologies in higher education

Social media supported learning seems to be occurring more outside the formal higher education system as opposed to the internal systems since several platforms are being used to distribute learning content and courseware, and a list among them include YouTube, EDU, iTunes U, Academic Earth. Applications used by students do differ from across the continent although there is a list of popular interfaces widely accessed, (Selwyn, 2011). In the South African context, MXit which is an indigenous mobile social networking platform, has played a crucial role in the spread of the mobile Internet in South Africa (Bosch, 2008; Chigona, Chigona, Ngqokelela, & Mpofu, 2009; Nitsckie & Parker, 2009). The cost of social media technology is minimal to such an extent that students can be able to afford both the devices and amount of data required to access applications such as WhatsApp, Facebook, Twitter, and Mixit. For example, more than 7.4 million registered MXit users (Worldwideworx, 2014) in South Africa pay only 1 South African cent (US\$.0012) per instant message. A latest encouraging trend among the general population that will entail the overall population of students was the announcement by CNBCAFRICA (2014) that gave East African customers free access to Facebook social networking site across all mobile networks after a strategic partnership with Tigo. A very positive development was the ability of the Facebook site to be offered in English and Swahili, the national language of Tanzanians and the majority of people in East, Central and Southern Africa. Below was a quote from the general manager, Diego Gutierrez.

"Facebook has been a fantastic driver of data on mobile networks. With this unique partnership, we are making Tigo stand out from the crowd and giving many customers their first taste of the internet and social media, including in Swahili. That's what creating the digital lifestyle all is about, and it reinforces our strategy to encourage more Tigo customers to use data as part of their daily communications activity,"

Paliktzoglou and Suhonen (2014)'s research findings support that using Facebook can increase student engagement through communication and collaboration which makes it an important educational tool to support Problem Based Learning, (PBL).

Past research indicates that incorporation of social media in learning and teaching has the power to bring new ways of enquiry, communication, collaboration, knowledge development; in addition it can have negative or positive cognitive, social and emotional impacts. (Gao, Luo, & Zhang, 2012; Greenhow & Burton, 2011; Pimmer, Linxen, & Grohbiel, 2012; Ranieri, Manca, & Fini, 2012).

Methodology

Case study approach was considered most suitable for this study as it seeks to *"build up a rich picture of an entity, using different kinds of data collection and gathering the views, perceptions, experiences and/or ideas of diverse individuals relating to the case."* (Hamilton, 2011). Yin (1994), defined a case study as *"an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident and it relies on multiple sources of evidence"*. This enhances the understanding of the reality in the rural settings thereby enhancing the development of conclusion that will enable to determine the contribution of social media technology in higher education. This research covered Vhembe Further Education Training College. A questionnaire was used to collect primary data. It comprised of three sections namely demographics, experience in the use of social media and

benefits of using social media technology. A random sample of 105 students from all the departments (Business and Finance Engineering, Hospitality and Tourism) at the institution were drawn that formed sample size of the population. Thirteen students were used to pre validate the questionnaire. A mixed methodology approach for this research was adopted and a combination of quantitative and qualitative data was collected, through the use of a case study that involved questionnaires being administered. A single case study was used as this enabled data to be collected data from a wider range of different subjects which in the case are students. The case study approach allows for multi-perspective analysis in such that there is the interaction of the researchers and a relevant group of actors involved (Tellis, 1997).

Results

This section shows the analysis and discussion of results of the study that was conducted after the survey. In this analysis, there were various presentation of graphical tools used to illustrate varying responses that were solicited from the survey.

Table 1. Gender of respondents

Gender	Frequency	Percent
Male	58	55.2
Female	47	44.8
Total	105	100.0

Table 1 shows the demographic information of the participants. A total number of 105 students participated in the survey and their gender showed that there were 55.2% male and 44.8% female students as shown in table 1.

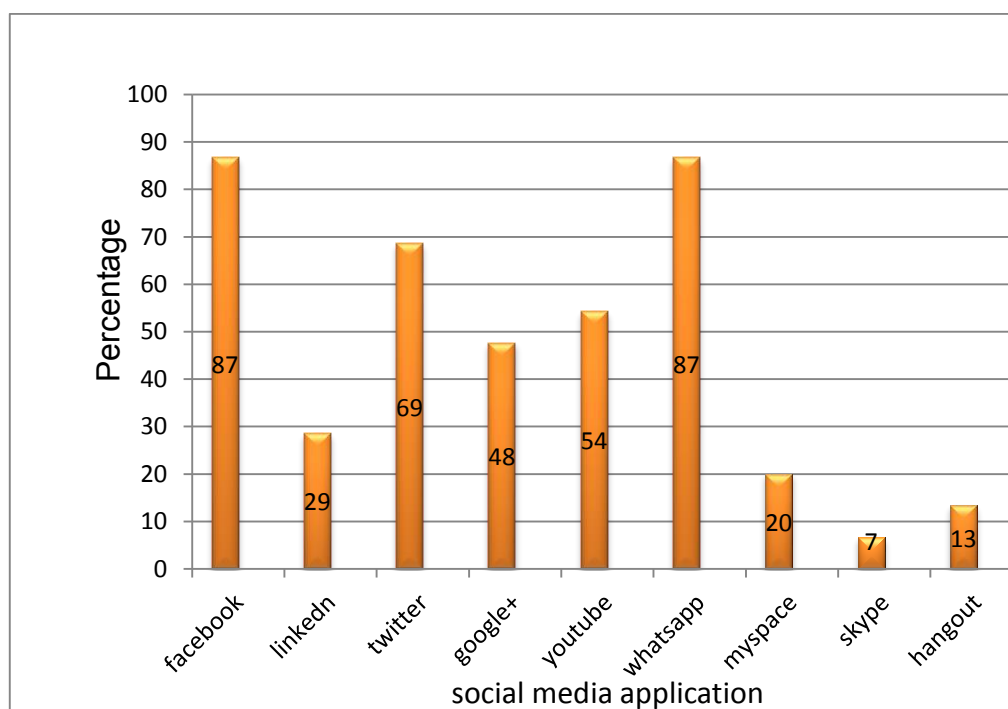


Figure 1. Social media application usage

Figure1 shows the responses of the students and their frequencies to the use of various social media application. High usage of the applications can be noted on Facebook which has 87%, and WhatsApp (87%) which are at par, followed by Twitter (69%), YouTube (54%) and Google+ (48). Although there are other applications included in the survey, their usage among students is below 30% and these include LinkedIn, MySpace, Skype, and Hangout.

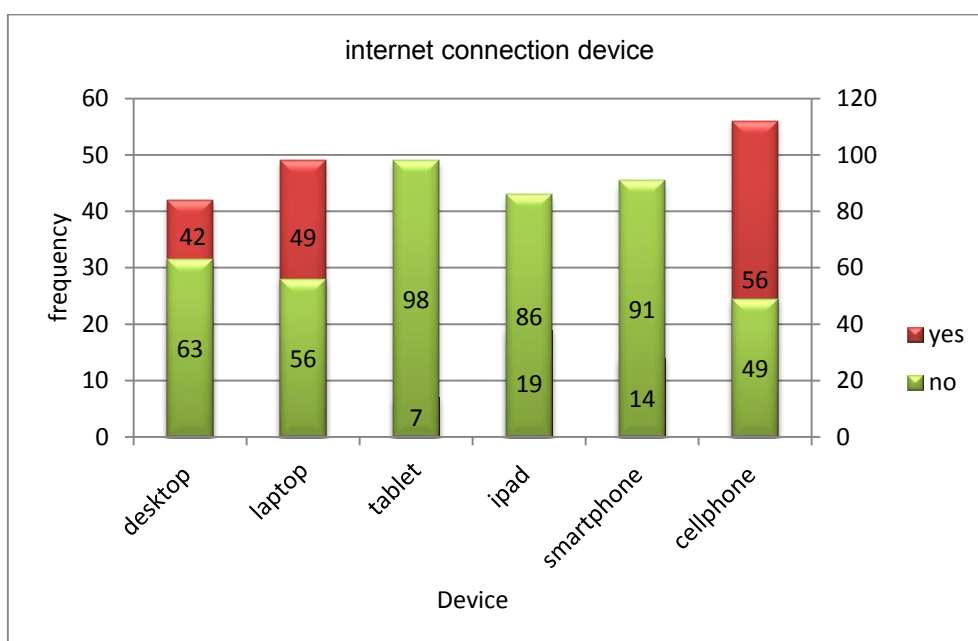


Figure 2. Devices used to connect to internet by students

Figure 2 shows the devices used by students to access internet connectivity. The highest percentage is depicted on cell phones which tops 56%, followed by laptop (49%) and desktop (42%). This indicates that students access internet from their mobile devices through the use of 2G or 3G network. All other remaining handheld devices that include tablets, iPads and smartphones, rank low in terms of their usage by students (below 20%).

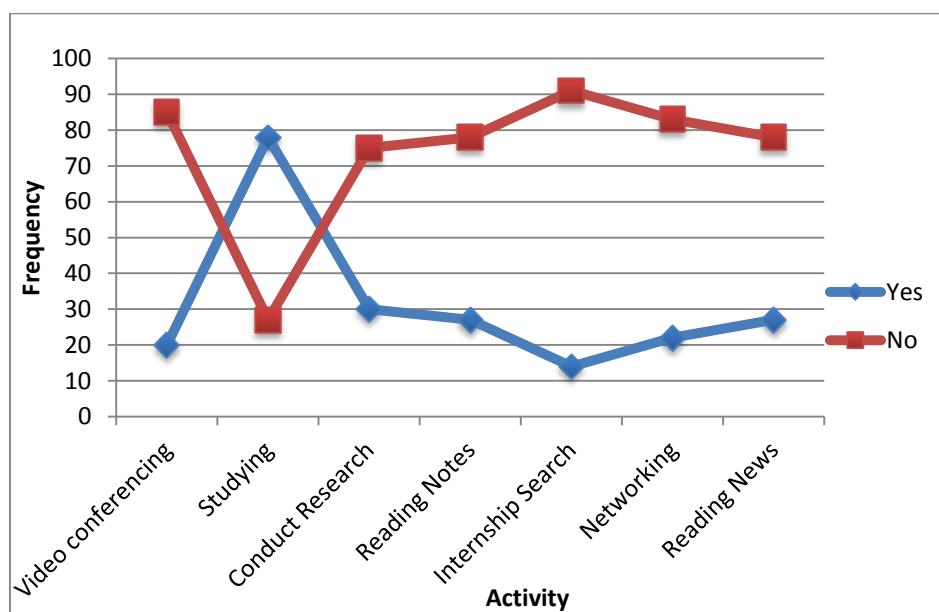


Figure 3. Social media usage

A result depicted in Figure 3 indicates that students use the social media application in their various study activities which are listed along the horizontal axis. Highest response confirms that social media is being widely used for studying purposes followed by research, and reading both news and notes.

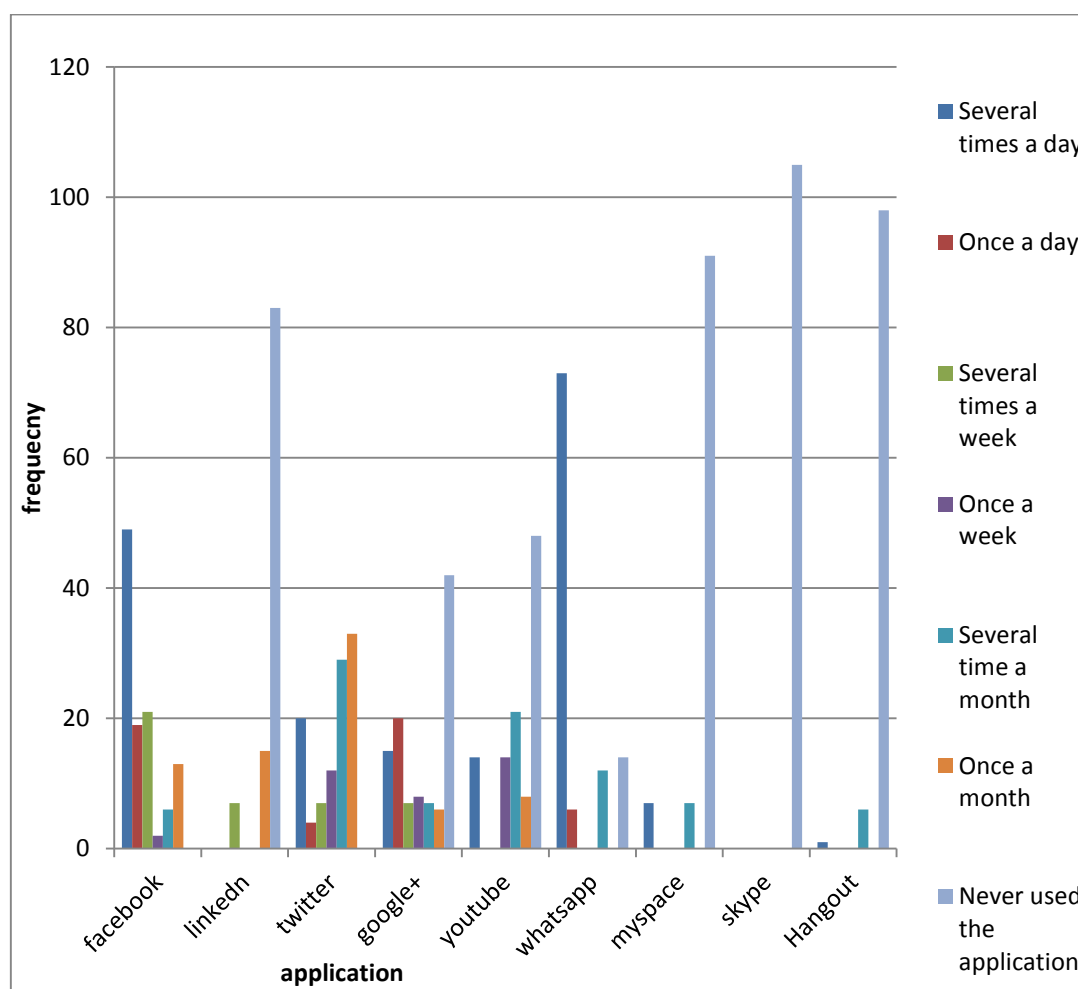


Figure 4. Time spent on various social application media

Figure 4 shows the frequency of access to a wide range of social media applications used by the students who were involved in the study. It can be deduced that they spent more time on the social networking sites. WhatsApp is being the popularly used application on a daily basis. Facebook is the second in category and twitter being on third position. However results indicate that there are applications which were rarely used and this point to MySpace, Hangout and Skype.

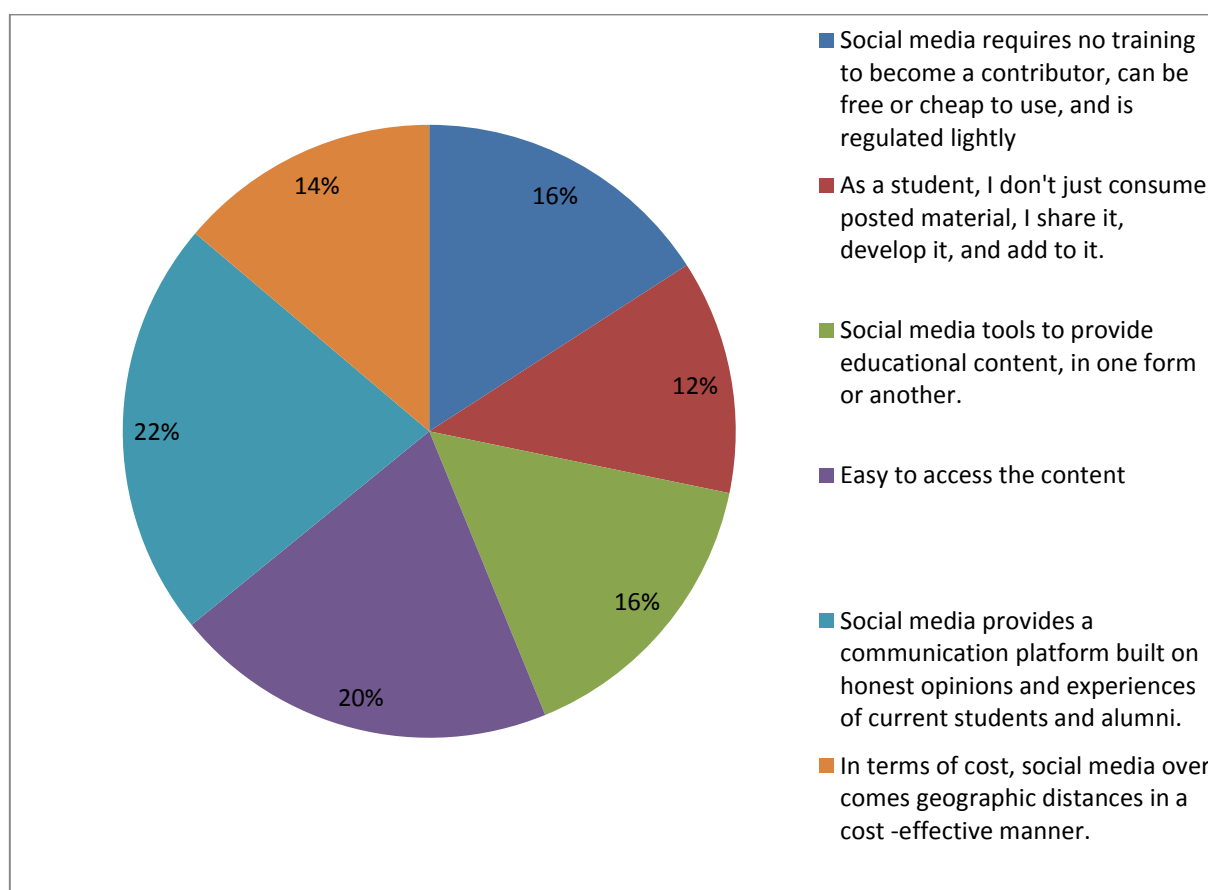


Figure 5. Benefits of using social media technology

The results in Figure 5 shows that summarize the benefits gained by students through the use of social media technologies. 22% of the respondents highlighted that social media enabled them to learn from the past experiences of their current and former counterparts who shared information, 20% indicated the easy access to content. 16 % of the respondents indicated that they either used social media as source of educational learning content or its affordability with less training required. Geographic distances and costs are reduced as indicated by the 14% population of the respondents who participated in the study.

Discussion

Research findings indicate that the popularly used social media applications by the students are Facebook, WhatsApp, Twitter and YouTube. Furthermore the results showed that students spent quite a considerable amount of their time as shown by the frequencies of access to these applications. These findings conform to the results of Reuben (n.d.), Paliktzoglou and Suhonen (2014), Pewinternet (2013) which reflects a growing number of Facebook users on comparative basis of year 2012-2013. WhatsApp which has become the most popular tested application as it is distributed among various smart-phone platforms is being widely used by the students because of reasons that include affordability of smartphones, decreasing data costs and improved internet bandwidth, (Schrittwieser, Frühwirth, Kieseberg, Manuel, Mulazzani, Markus Huber, & Weippl, 2012).

Findings show that social media technology has infused a new culture of learning among students which is in line with the research of Thomas and Seely-Brown (2011). In addition, students attending the Vhembe FET in the rural settings are benefiting from use of technology through interaction and exchange of information online with counterparts from within the local community

and outside the geographical boundaries. It is evident that internet is replacing traditional publishing, digital camera on handheld mobile devices is replacing film photography, and downloadable media such as movies from YouTube are replacing theaters, mobile cell phones are replacing pay phones and hardwired home phones, massive online open courses (MOOCs) are replacing the traditional classroom, Redding and Walberg (2012). In addition, the students have opted for the technologies as they enable them to create self-content as depicted in Figure 5. Furthermore results from the study indicate that students have adopted the new technologies which are enhancing their learning and networking process in college setting.

Conclusion

The use of social media in higher learning enables student interaction with content they can create individually or share with other students. Furthermore, potential learning occurs outside the classroom or independent of location as students can be able to access educational resources as long as they are connected to internet. Results indicate that students enjoy and indeed benefit from the use of social media technologies that have positive effect on their performance and growth. This concurs with findings from the research results of Zanamwe, et al. (2013); Gikas & Grant (2013).

However it is worth mentioning that one specific limitation of the study was that the students who participated were from a single rural further education training college. It would be advisable to expand further studies with a broader set of participants from institutions across provinces in the country. As a result there was no opportunity to carry out a comparative analysis of more than one institution which would have enabled the researchers to gain a broader view of social media technologies in higher education institutions located in rural settings. Further research is required to cover institutions in the whole region of South Africa.

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Language Learners Perceptions and Experiences on the Use of Mobile Applications for Independent Language Learning in Higher Education

Ana Niño

Abstract

With the widespread use of mobile phones and portable devices it is inevitable to think of Mobile Assisted Language Learning as a means of independent learning in Higher Education.

Nowadays many learners are keen to explore the wide variety of applications available in their portable and always readily available mobile phones and tablets. The fact that they are keen to take control of their learning and autonomy is thought to lead to greater motivation and engagement, and the link with games-based learning suggests that the fun factor involved should not be overseen.

This paper focuses on the use of mobile applications for independent language learning in higher education. It investigates how learners use mobile apps in line with their classes to enhance their learning experience. We base our analysis on a survey carried out in autumn 2013 in which 286 credited and non-credited language students from various levels of proficiency at The University of Manchester express their perceptions on the advantages and disadvantages of the use of mobile applications for independent language learning, together with examples of useful apps and suggestions of how these could be integrated in the language class.

Keywords: Mobile assisted language learning (MALL); mobile language learning; higher education (HE); student perspectives; independent language learning.

Introduction

Mobile technologies are expanding very rapidly providing multiple resources, including interactive apps, suitable for independent language learning opening up new contexts for learning (Pachler et al. 2010) where the students are at the centre of the scenario deciding which technologies are best for their own learning styles, according to their command of the language, own interests and/or needs. These ubiquitous technologies in this respect constitute a simple yet appealing means to create meaning and improve accuracy by exposing students to the language in a more autonomous way. Connecting this independent practice with the contents seen in class and with social context for meaningful interaction, however, requires tutor's monitoring and guidance leading to a more efficient and enriching way of teaching.

This investigation looks at the results of a survey on the use of Mobile Assisted Language Learning (MALL) apps by students at Higher Education to learn about the language learners' perceptions and experiences on their use of mobile apps for independent language learning.

We will start by defining MALL and its relation to m-learning and CALL, for it provides the theoretical foundations of this investigation. Then we will guide you through the results of this study, which will provide answers to the following open ended questions:

1. How do students use MALL?
2. How do they perceive its usefulness?
3. How MALL can be integrated in the class according to students?
4. What implications does this have for the future? both from the learning and teaching point of view.

Research questions 1 and 2 will be answered in the Results and findings section, whereas questions 3 and 4 will be dealt with in the sections Students suggestions for integrating MALL in the language class, and Pedagogical implications.

Theoretical background

Mobile Assisted Language Learning (MALL) constitutes the theoretical framework for this study. MALL describes an approach to language learning that is enhanced through the use of a handheld device or mobile technology, such as pocket electronic dictionaries, e-books, personal digital assistants (PDAs), MP3 players and, most recently, ultra portable tablet PCs and smartphones.

MALL is a subset of both m-learning and CALL. M-learning or mobile learning is defined as "learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton 2013: 4). Sharples et al. (2005:225) put it this way: M-learning is "a process of coming to know through conversations across multiple contexts among people and personal interactive technologies". The common factors in this state-of-the-art way of learning are mobile devices that allow for social interaction and collaboration in various contexts.

According to Kukulska-Hulme and Shield 2008, MALL differs from CALL mainly "in its use of personal, portable devices that enable new ways of learning, emphasizing continuity or spontaneity of access and interaction across different contexts of use". This emphasises the role of students as main experimenters/explorers and the role of teachers as mere guiders or facilitators in their mobile applications endeavours outside the class. Let's not forget that, precisely, one of the main advantages of MALL is the freedom to use language-learning resources at anytime from anywhere, as well as the freedom to communicate with fellow students and with the tutor. In this sense it makes sense to learn more about the students' preferences, needs and motivations to use mobile devices with a view to experiment innovative effective ways to maximise their language acquisition.

Pedagogical approaches such as Social Constructivism (Vygovksy 1978) and Connectivism are well suited for MALL. Constructivism stresses on social learning, and must be viewed as an active student-centered process where learners actively construct their knowledge through their interaction with mobile devices and with each other. Task-based and problem-based cases are commonly used with a view to progress in their language learning. Connectivism describes the nature of learning as a process of making connections with people, resources, and networks, and creating networks of personal knowledge mediated by ubiquitous technology (Downes, 2007; Siemens, 2007).

In this paper we will explore contexts in which MALL can be used and examples of social and content interactions for independent language learning as suggested by students at Higher Education.

In terms of how can MALL enhance language learning, Kukulska-Hulme (2006) identified four main ways in which mobile devices are typically used at the moment:

1. To support communication, arranging students in groups to encourage collaborative practice.
2. For content delivery and creation, for mobile devices allow for a faster turnaround of learning resources creating a continuum of in-class and outside-class learning resources and opportunities.
3. To encourage personal engagement by social interaction and personalisation.
4. In contextual learning, where students use mobile devices as part of a larger activity, e.g. for data collection, location awareness, collaboration or to support retention or understanding of specific learning items.

These main uses of mobile technologies will be revisited in the last sections of this paper where we will present various examples of the use of mobile apps for independent language practice by students, together with discussions around their integration in the language class.

In this theoretical background we would also like to mention a couple of factors that we deem as essential to better understand the findings and pedagogical implications of language learning in a mobile technologies setting. Firstly, an efficient use of in-class time, especially if this is rather limited, by expanding the opportunities for language exposure outside the class to ensure language acquisition (Kennedy and Levy 2009). Mobile technologies in this respect allow frequent independent informal practice for the students, which according to Kukulska-Hulme (2012), constitutes an essential requirement for foreign language mastery. Secondly, we should not forget the major language areas and skills to be considered for language acquisition to take place. According to Levy (2009), these areas, in CALL, are grammar, vocabulary, reading, writing, pronunciation, listening, speaking and culture. This study considers these areas in terms of students' reported use of mobile apps and the learning benefits and limitations they perceive. The types of apps that are used by language learners are also described in the results and discussion section.

Given the growing availability of mobile devices in the university language class, we were interested in investigating the educational use of this omnipresent mobile technology from the students' perspective. We sought to find out whether students use mobile apps for their independent language learning, and, if so, which are these and how they use them, what do they think about their use for independent language learning purposes, and whether they had any recommendations on how language tutors can implement MALL in the class.

For this purpose in autumn 2013 we run a survey for language students at The University of Manchester. Participants ranged from credited students studying a language or more as their main degree, to credited non-specialist students, non credited students and MoPs (members of the public). As represented in table 1, there were a total of 252 respondents (n=252) and the languages being studied ranged from widely studied languages such as French (74), Spanish (67), German (53),

English (32), Arabic (27) or Chinese (21), to other languages such as Italian (21), Portuguese (9), Korean (7) or Urdu (1).

Table 1. Respondents' languages of study

LANGUAGE	RESPONSE TOTAL	RESPONSE PERCENT
FRENCH	74	29%
SPANISH	67	27%
GERMAN	53	21%
ENGLISH	32	13%
ARABIC	27	11%
CHINESE	21	8%
ITALIAN	21	8%
JAPANESE	15	6%
RUSSIAN	10	4%
PORTUGUESE	9	4%
KOREAN	7	3%
POLISH	6	2%
PERSIAN, HEBREW, DUCTH	2	1%
URDU	1	
252 TOTAL RESPONDENTS		

As for the level of the language of the students participating, the great majority of them had an A1 level (91%), followed by a B1-B2 level (21 and 19% respectively), A2, 17%, with only a 14% having a C1 and just 7% with a proficient /C2 level (see figure 1).

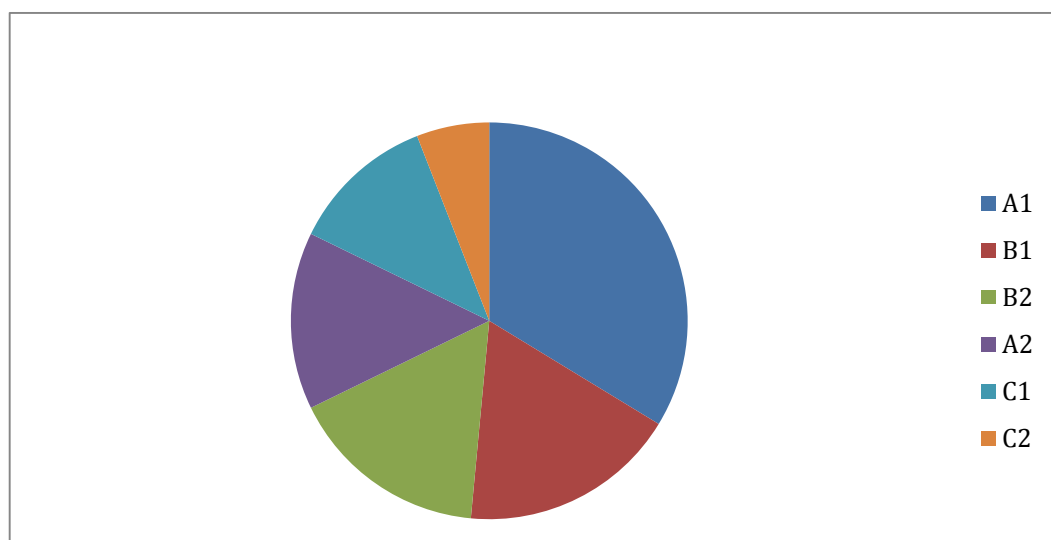


Figure 1. Respondents' language level

Results and Discussion

As pointed out before, one of the main purposes of this paper is to provide some indication of how do Higher Education students use MALL. For this purpose, we presented them with a series of closed questions with multiple choice options which are easier to code and allow for statistical summaries of a large number of cases. Some questions also gave respondents the opportunity to answer them in their own words.

To the question *Have you used mobile apps to support your language learning?* 33% of the respondents replied Often, followed by a close 31% Sometimes, however, 36% of them had Never or rarely used them and this will show in their comments later on.

To the question *How often have you used mobile apps?* it is clear that the great majority of them used them often or sometimes with a total of 80% as opposed to just a 20% who never or rarely used them.

With regard to the students' actual use of mobile apps for language learning, students were enquired to complete the statement *For my language learning I use mobile apps in order to ...* and prompted with various suggestions of use (see table 2 below). These were the results by order of frequency:

Table 2. Use of mobile apps for language learning

STATEMENTS	RESPONSES	%
Look up words, phrases and idiomatic expressions	156	72
Translate words/phrases I do not understand into my language	115	53
Translate words/phrases into the language I am learning	106	49
Listen how words are pronounced	93	43
Look for definitions in the target language	92	43
Revise and practise vocabulary	84	39
Help me conjugate verbs	68	31
Look up synonyms in the target language	59	27
Listen and repeat to improve my pronunciation	51	24
To read	48	22
To revise and practise grammar	47	22
To listen to mp3s, podcasts, radio, etc.	45	21
For social networking	40	19
To listen to music	35	16
To speak with my friends, conversation exchanges, etc.	30	14
To watch authentic videos and TV	26	12
To play games	22	10
To chat	20	9
For professional networking	8	4
For checking infographics for inspiration	5	2

By far the most frequent use was looking up words, phrases and idiomatic expressions with a 72% of responses, followed closely by translating words/phrases into the L1 first (for comprehension purposes), and into the L2 secondly (for production purposes). Two other main uses were listening how words are pronounced, looking for definitions in the target language or revising and practicing vocabulary. This suggests that the meaning of small chunks of language (and their pronunciation) is at the top of students' priorities when checking their mobile apps, and suggests we can be mainly looking at beginners' level students. The quickness of access to these apps whilst completing a language task inside or outside of class reinforces retention and accuracy, thus simplifying the language task process.

Steel (2012) curiously came up with similar results in her study reporting that mobile apps benefited most with vocabulary (particularly for memorization, accessing meaning and contexts for use) and with reading, writing, grammar and translation tasks. Within vocabulary apps, she highlighted

those that offer mobile versions of language dictionaries, translators and verb conjugators and labeled these as “indispensable” in any language learning portable device.

Surprisingly, in our study the conjugation of verbs only had a 31% of responses. This is a common concern at all levels, especially in Romance languages such as French or Spanish, followed by looking up synonyms into the target language (27%), which may suggest a more advanced level use. Reading use reported a 22% with apps such as e-books, digital newspapers and magazines, followed by a 22% of grammar revision use and 21% listening use, mainly MP3s, podcasts and radio.

Social networking had a return of 19% followed by other leisure-associated uses such as listening to music, speaking to friends over *Skype*, watching authentic videos, playing games, chatting, professional networking or checking infographics for inspiration. As for the usefulness of mobile apps for independent language learning, an overwhelming 88% of the students questioned considered them helpful for this particular purpose.

Mirroring the results from an aforementioned question (*For my language learning I use mobile apps in order to ...*), table 3 below shows answers to the question *In what ways do you find mobile apps useful?* 73% of the students thought the main usefulness of these apps is their helping increase vocabulary. The portability and freedom of use for extra practice at any time and at the students' own pace was regarded as the second most important practicality, followed by help memorizing (41%), reading comprehension (32%), and the fact that it makes revision fun (39%).

Table 3. Usefulness of mobile apps for language learning

STATEMENTS	RESPONSES	%
Helps increase vocabulary	154	73
Provides resources for extra practice at any time and at my own pace	100	48
Helps memorizing words, phrases, genders, conjugations, etc.	86	41
Helps improve reading comprehension	68	32
Makes revision easier/fun	82	39
Helps improve pronunciation and intonation	70	33
Helps sentence building	69	33
Helps improve oral comprehension	68	32
Helps improve grammar accuracy	67	32
Helps me write properly	44	21

Other ways in which students found mobile apps useful were in improving pronunciation and intonation, in sentence building and oral comprehension, which also suggests a lower level (A1-B1), or, at least, that the student is still exploring the first stages of learning a language. Last in the list stand help improve grammar accuracy and help write properly, which usually demand more formal learning and a more deep knowledge of the language, together with contextualized practice and feedback or some way of interaction.

Most of the students questioned were widely aware of the various mobile apps available for language learning and this showed in their answers to the question *Can you mention examples of apps that you found useful for your independent language learning?* (see table 4 below).

Table 4. Examples of mobile apps respondents found useful for independent language learning

TYPE	APPS
DICTIONARIES AND CONCORDANCERS	<i>WordReference, Dict CC, LEO Pons, Jisho, Pleco, Arabic Dict, Linguee</i>

TRANSLATORS	Google Translate, iTranslate
L PRACTICE	Duolingo, Busuu, Babble
FLASHCARDS	Quizlet, Memrise, Brainscape, Anki
CONJUGATORS	Iverbs French, I Verbi, Wiktionary, El Conjugador
PODCASTS	Itunes Podcasts, Chinese Pod, Deutsche Welle, France Culture, Tfs Radio Germany
NEWSPAPERS	Courier International, Der Spiegel, El País
VIDEOS	YouTube, RTVE, Atres Player
GAMES	Mind Snacks
NOTES	Notes, Notability
MESSENGERS	Whatsapp, FaceBook Messenger

These mobile apps could be grouped in the following categories:

- **Dictionaries and concordancers** such as *Wordreference* with fast accurate translations of words, idioms and collocations, and language forums to discuss various linguistic issues; the overlay *QuickDict* and bidirectional offline dictionaries such as *Dictionary CC* or *Arabic Dict*, online dictionary apps such as *Pons*, *Jisho*, *Pleco*, or even a powerful combined offline and online dictionary plus concordancer such as *Linguee*.
- **Translation apps** such as *Google Translate* that students use to translate words between two languages back and forth quickly and easily. They were aware, though, that it does not work as well with full phrases, sentences to use in real life or grammar. Of *Google Translate* they liked the fact that it produces a list of synonyms with the translation, that it enables audio so you can hear the words you are translating, input words into the translator through your own voice and play back the words.
- **Language practice apps** such as *Duolingo*, which students find good for revision of basic and more advanced language skills. The fun and interactive tasks help enhance reading, writing, oral and listening skills and you can also set goals and do mini tests to monitor your progress and achievements. Their comments on this app provide lots of clues of mobile features they value such as the fact that they can have grammar and meaning explanations, translate to and from the language, practice their vocabulary and conjugations for a limited period of time (5 minutes), listen to the correct pronunciation of words, do speaking practice, and even compare themselves with their friends because the app is paired with *Facebook*. They also like the fact that they receive a reminder to practice every day. Similar apps to *Duolingo* are *Busuu* and *Babble*, a speech to text and text to speech app to practice accurate pronunciation of short phrases and sentences and challenges to you repeat them correctly in 4 seconds. Some advantages pointed out by students were that it has various levels to help you build up, you are given feedback and you can see your improvements over time.
- Among the **Flashcard applications** that they highlighted were *Quizlet*, to record their own vocabulary and be tested on it, *Memrise* which combines memorizing and gaming features, and similar tools such as *Brainscape* and *Anki*. Students seemed to enjoy not only the sharing and personalization of resources that these apps allow, but also the challenge and competition involved.
- Many of the students also suggested the use of **conjugation apps** such as *I Verbs French*, *I Verbi*, *Wiktionary* or *El Conjugador* to check for irregular verb use and help with their grammatical accuracy.
- For **listening comprehension** they seemed to make extensive use of podcasting apps and tools such as iTunes podcasts, *Notes in Spanish*, *Chinese pod*, *France Culture*, *tfs Radio Germany* with different accents and increasing oral understanding, or *Deutsche Welle* where they found useful its manageable speaking speed and transcriptions.

- They also mentioned **newspaper apps** such as *Courier International*, *Der Spiegel* or *El Pais* not only for reading and cultural awareness, but also for oral comprehension skills.
- **Video apps** such as *YouTube*, *RTVE* or *Atresplayer* with multiple opportunities for practice (watching video clips, TV extracts, full movies, listening to music with lyrics, etc.).
- **Games** such as *MIndsnacks*, which are great incentives, fun and allow you to unlock more games as you go up. On the negative side, they mentioned they can get repetitive after some time.
- **Note taking apps** such as *Notes* or *Notability* to write words and phrases and make learning more accessible and easier to memorize.
- And, finally, **chat or messenger apps** such as *Whatsapp* or *Facebook Messenger* to communicate with other people on the go.

These types of mobile apps suggested by the students cover areas and skills such as grammar, vocabulary, reading, writing, pronunciation, listening, speaking and culture, which were already identified by Levy (2009) as benefiting learning and contributing to language acquisition in CALL.

Students' suggestions for integrating MALL in the language class

Our research also looked into how can MALL be integrated in the class. To the question *Would it be helpful if your tutor would embed the use of mobile apps for language learning as extra materials in class or via the VLE?* a great majority, 82% of the students, found this Always (50%) or Sometimes helpful (50%), as opposed to a 16% who would Rarely or never find it useful, mainly claiming that mobile apps are not for everybody, that they work best as additional optional practice to use in their own time (for independent revision, rather than as a main part of the course), and that not everybody has smart phones so some people would be missing out.

In the last part of the survey we asked students to share their views on the educational potential of mobile apps inside and outside the language class. Students comments will be commented on in the form of suggestions for integration in a language course as well as pedagogical advantages and hindrances of their use.

Among the suggestions for integration in a language course, students provided the following:

- giving links on the VLE to some useful apps and sign posting these in class
- linking apps to pop up on your mobile to be able to learn at your own pace during the day
- setting problem-solving tasks as homework or challenges within class e.g. looking for synonyms
- as a 15 min. revision exercise in class
- incorporating interactive games to support covered topics per week for fun extra practice on the move, together with vocabulary lists, translation of phrases/words and short grammar/pronunciation online tests to help learning and progression, or even to compete against the class, in order to link them to contents seen in class so there is a sense of progression and
- to post on discussion fora about new apps as recommended by their fellow students.

Based on these suggestions, it appears that students are realizing the educational potential of mobile apps for language learning. Their suggestions are representative of how mobile devices are currently used for language learning purposes (as pointed out by Kukulska Hulme 2006), namely, their use in contextual learning (e.g. problem solving tasks), content delivery and creation (as exemplified by their suggestions on how to provide links and apps in a VLE), for personal

engagement and interaction (as suggested by the use of games, vocabulary lists and online tests), and for communication (via discussion fora, wikis and social media). However, they seem to need guidance to link all these components to the contents seen in class and realize the usefulness of these to practice the various linguistic skills involved in language learning. Tutors could encourage this by providing good examples of app use and presenting relevant contexts with clearly set learning outcomes in which these could be used as part of a larger language in-class or outside-of-class learning task for authentic, collaborative practice. We believe that, well conducted, this can improve learner engagement and motivation as well as foster language retention in the long term.

Pedagogical implications

Finally, we will discuss some of the pedagogical implications of the use of MALL for the future. Overall, it is clear that MALL has a lot of potential for blended VLEs, that it encourages autonomous learning, motivation and, we believe, social interaction as well, especially if the app is somehow connected to a form of social networking or there is a degree of competition involved. Key attributes such as the use of personalized, situated, authentic, spontaneous and informal tools (Kukulska-Hulme and Traxler, 2007) are also to be taken into consideration in the “rethinking” pedagogy for the use of mobile apps by language learners.

On the other hand, some pedagogical hindrances of the use of mobile apps for language learning, as identified by students, include the fact that there is not much current scope for extensive practice of speaking and writing skills. As opposed to authenticity, some words or phrases as used in mobile apps may become obsolete or different to real life use. Similarly, the free version of some apps may become boring and repetitive after a while, therefore affecting motivation. Students also realized that the quick automatic translations, especially of phrases and sentences, as produced by apps such as *Google Translate*, cannot always be trusted. This provides a good example of positive students’ evaluation of language learning resources, where readiness and quickness of use does not necessarily lead to misuse and plagiarism. Students can then be encouraged to explore more fruitful resources such as concordance apps to look for parallel collocations and structures in the target language.

It is also true, as students well pointed out, that mobile technology is not suitable for all kinds of students and learning styles, that some students may not have smart phones and would automatically be left out.

Finally, students also pointed out that some apps are just condensed versions of websites or demand further guidance for their proper use and, therefore, are commonly left unused. This highlights the importance of induction, guidance and follow-up when it comes to implementing the use of applications inside and outside the language class.

On a final note, our investigation hinted that MALL does not always facilitates synchronous collaborative practice among students. We have seen a few example apps for this purpose such as messenger apps or videoconferencing apps, however, their use for independent language learning seems rather unexplored and the design of the tasks and appropriate /relevant context of learning would make it only suitable for one-to-one distance learning. In other words, students enrolled in a language course may still prefer the face-to-face interactive conversation practice with their fellow students, for example.

Conclusions

From the results of this survey and to conclude we can say that among the pedagogical benefits of MALL, as pointed out by our surveyed students, we can highlight its suitability for passive language skills such as vocabulary acquisition, written and oral comprehension, pronunciation, vocabulary and grammar practice in particular.

Students also indicated that other advantages of the use of mobile apps for language learning include convenience (as a quick check they are always available, at any time and from any place), use of authentic resources (which always trigger cultural awareness) for various language skills, the fact that they provide fun and interactive progression over a wide range of topics in a limited period of time, offer immediate feedback and several opportunities to personalise authentic language practice (for example setting goals in line with their own interests and ideas, creating quizzes on students' own resources, beating game scores, etc.).

Future research

Overall, our survey revealed that, although there is evidence of the use of mobile apps by Higher Education students for independent language practice, students and, undoubtedly, tutors still could benefit from further guidance and support to ensure effective educational use inside and outside the language class. In this respect, listening to students' needs and preferences, together with a close collaboration between language tutor communities and educational technologists can help in the search of innovative, meaningful and appropriate tasks that involve the use of mobile apps and can be successfully integrated into the language curriculum.

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Strategies for Digital Inclusion: Towards a Pedagogy for Embracing and Sustaining Student Diversity and Engagement with Online Learning

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Abstract

This paper reports on the progress of a current PhD research study. The research study will evolve through four phases and eventually develop a conceptual framework for effective teaching and learning approaches that influence digital inclusion and exclusion of students from diverse backgrounds. It will also seek to identify differences in learner characteristics and how these characteristics impact on needs, experiences and engagement with technology for learning, specifically within a blended learning programme. The research will move away from traditional definitions of diversity and explore the differing characteristics of a varied learner population.

The research adopts a critical realist perspective, using a qualitative multi-phase methodology that will evolve sequentially in the future. The focus of this paper is to outline the research to date. Phase 1 and Phase 2 have been completed and are reported in this paper. Findings suggest that digital exclusion cannot be predicted or dealt with by categorising students into groupings of: gender, age, ethnicity, geography, socio-economic status and educational background. Additionally, the findings indicate that digital exclusion is influenced by organisational factors, such as elements of the course content or navigation of the virtual learning environment rather than intrinsic factors such as individual technological skills.

Keywords: Diversity; characteristics; digital exclusion; blended learning.

Introduction

Diverse Students (Intrinsic Factors that Influence Digital Inclusion and Exclusion)

The current trend for encouraging widening participation in higher education institutions (HEI) (Department for Business, Innovation and Skills, 2012) and the vast range of courses on offer in the United Kingdom (UK) has resulted in a more varied learner population, compared to the traditional university population (Universities UK, 2012). Demographic measures, such as gender, age, ethnicity, geography, socio-economic status and educational background, once used to determine learner involvement with technology could now be seen as outdated. In a recent study of learner's participation in online learning, Johnson (2011) observes that it is essential to understand learner characteristics and how they may influence the learning process and outcomes. Johnson however, had not explored further the types of characteristics. By contrast, Draffan and Rainger (2013) are more specific saying, of blended learning,

'to ensure inclusive and accessible learning experiences that meet any challenges to the acquisition of knowledge, development of skills and experience, it is also important to take into account the full spectrum of learner characteristics. These include physical, sensory, and perceptual skills, abilities, attitudes and prior knowledge' (P. 55).

While both the afore mentioned studies discuss the importance of learner characteristics, as with all other studies, the onus of characterizing the learner is with the researcher or educational institution. What distinguishes this research is that it seeks to understand what characteristics learners themselves identify in relation to digital exclusion.

Digital Exclusion (Extrinsic Factors or Organizational Factors that Influence Digital Inclusion and Exclusion)

Blended learning is fast becoming the teaching and learning method of choice by HEI. Blended learning is more than simply blending face to face and online learning. It is an opportunity for teachers to maximize the strengths of both approaches in order to create a more effective way to learn and is gradually becoming one of the most important mediums for education reform today (Picciano et al., 2014). So and Brush (2008) suggest that blended learning can increase student satisfaction therefore impacting on retention (Liu, Gomez and Yen, 2009). Benefits of blended learning are the opportunities it provides teachers to combine human relationships between learners and teachers with emerging technologies, to produce a learner centered approach that enables collaborative inquiry. With the development of digital communications, Web 2.0 and the Internet have provided rich learning environments in HE (Laurillard, 2002). Within a blended learning model, networked collaborative learning is ideally placed to offer formal enhanced learning opportunities through collaborative inquiry and group discussions (Hutchings, 2002). On the other hand, object-oriented sociality theory (Conole et al., 2008) explains how effective social networks are not reliant on the relationships between the learners but on the value found in social objects. Implications of this in a blended learning environment is that course creators should endeavor to encourage social networks built around social objects, that is subjects and activities that are of interest to the learners. Not only is networked collaborative inquiry ideally placed for formal learning opportunities but is used by learners to communicate and learn informally.

The term social media defines a multiplicity of technologies that promote social aspects of connectivity through a channel of communication and is often linked to the term Web 2.0 (Dabbagh and Reo, 2011). Examples of social media include, Facebook, Twitter, Blogging, wikis, YouTube, LinkedIn and Apps that enable document sharing. Over 31 million people in the UK use Facebook (Social Media Today, 2014) and they are using such media for both informal and formal learning (Dabbagh and Kitsantis, 2011). Likewise, HEI are using social media to enable teaching and

learning activities (EDUCAUSE Learning Initiative, 2007). For example, educators are using blogging platforms to encourage group discussions and collaborative projects (Pachler et al., 2012).

Literature Review

The review presented below encompasses an understanding of student diversity, drivers in student engagement in Higher Education Institutions (HEI), blending learning programs, the potential for digital exclusion, digitally inclusive learning practices, and potential digital exclusion attributes.

Student Diversity

Diverse students are categorized by a widely used set of demographics. As far back as the 1800's authors and researchers refer to diversity in education. For example, Sir Edward Taylor (1870) writes about "race", "origin" and "culture" (p.2) when he discusses language learning in his book. Yet much of the literature that focuses on student diversity was before technology was common place in education and certainly does not reflect the rapidly gaining momentum of advances in technology and its impact on the learner and their needs. Furthermore, it is entirely possible that some students will fall into one or more of the groupings (Taylor and House, 2010). A review of historical and recent literature documenting diverse students shows that only demographics such as gender, age, ethnicity, geography, socio-economic status and educational background are used.

Drivers in Student Engagement

University costs have soared in the UK since the 2010 coalition government came to power, (UCAS, 2013) so financial savvy students have become more selective consumers looking for a product that meets all of their needs. Gone are the days when a university campus would mainly consist of college and sixth form leavers pursuing a four year taught degree to start a career. HEI now strive to cater equally for non-traditional students undertaking short and top up courses, foundation degrees and professional development, as they do for once conventional students. An exploration into five aspects of higher education by Haggis (2006) found that with so many non-traditional students, choosing HE, conventional support is unrealistic and that it is up to the educational establishments that provide for these students to move away from traditional support networks and concentrate on new teaching and learning approaches. Importantly, adapting courses so as to utilize new technology, may enable the diverse student population to access and learn the subject.

Blended Learning Programs

Not only has the student population and courses on offer evolved but the way in which the courses are delivered has advanced too. A modern online learning environment can offer blended learning programs that provide opportunities to access course materials, collaborative software, discussion boards, wikis and other learning technologies at university, from home or on ubiquitous mobile devices (Holzinger et al., 2005) and can assist the learning process, (Means et al., 2009). There are many definitions of blended learning, including the ratio of the methods being blended, the blending of different pedagogical models and the variation of learner experience (Oliver and Trigwell, 2005). According to Garrison and Vaughan (2008) a misconception of blended learning is that its aim is to combine face-to-face (f2f) and online delivery, often to minimize lecturer workload. Additionally, Launer (2010) suggests that blended learning does not even have to involve online learning but could utilize a blend of f2f delivery and self-research. However, this research defines blended learning as the facilitation of teaching and learning using a combination of f2f and online methods, where technology replaces elements of a unit (Mason, 1998) and it is this combination that this research will investigate.

Potentialities in Digital Exclusion

The rapid momentum that ICT gains in its development signifies an urgent re-evaluation of whether students' experiences of digital exclusion and inclusion are the same now as they were before technology was a ubiquitous part of life.

Historically, Information Communication Technology (ICT) use (or non-use) has been measured by researchers and educational establishments by categorizing students into non-traditional participation groupings such as: gender, age, ethnicity, geography, socio-economic status and educational background. For example Boonaert and Vettenburg's (2011) research of young people discuss a digital divide as 'unequal access to the internet and its use' that is influenced by demographic factors such as age, gender and socio-economic status. More recently Ofcom (2012) has suggested that traditional conceptions of this divide might be out of date and misplaced as over 95% of UK households with children now have access to the internet. Encouraging widening participation in higher education institutions (HEI) (Department for Business, Innovation and Skills, 2012) and the vast range of courses on offer in the United Kingdom (UK) has resulted in a more varied student population, compared to the traditional university population (Universities UK, 2012). It is fair to say that the basic set of measures above, once used to determine student involvement with technology could now be seen as outdated. In a recent research of student's participation in online learning, Johnson (2011) observes that it is essential to understand student characteristics and how they may influence the learning process and outcomes.

Digitally Inclusive Organizational Practices

A search for e-learning pedagogy in the literature revealed a lack of research into specific models and frameworks directly influencing teaching and learning using technology. Mayes and DeFreitas (2004) concluded in their e-learning review that there were no e-learning models, only e-enhancements of existing teaching and learning models and frameworks. An example of this is Mason's (1998) models which are influenced by distance learning. He states:

All of the elements I am about to discuss are very familiar educational approaches - they are simply being adapted and re-discovered in their online form (p. 3)

Gilly Salmon's 5 Stage E-Moderating Model (2004) has been offered as an alternative, but this specifically describes the stages of participation in an online community and does not set out to address e-learning pedagogy per se. The most recent and influential review of e-learning was conducted by Conole in 2010. Her report sought to review pedagogical models and how they were being used in an e-learning context. Conole's review follows a number of other comprehensive reviews on e-learning pedagogy (Mayes and DeFreitas, 2004; Beetham, 2004; Dyke et al., 2006; Conole, 2008; Ala-Mutka, 2009) but as technology is a moving target with regards to development, dated reviews, although important, cannot account for these new advances. Additionally, all of these reports (on the most part) reviewed how e-learning 'fits' in with different pedagogical approaches, almost shoe-horning technology into something within which it can be given a pedagogical label. JISC's E-learning Program (2012) goes much further to understanding e-learning pedagogy. JISC ran a series of studies that incorporated different aspects of e-learning but nothing specifically investigating blended learning and student characteristics since 2009 (Conole et al., 2009), which looked at e-learning in a practice-based context. In practice, experienced teachers often use a tried and tested approach to designing activities that subconsciously incorporate theories and approaches to teaching and learning. With new technologies introduced into the learning environment there can be a difficulty in understanding how and why to use them (Falconer and Conole, 2006).

Potential Exclusion Attributes: Age, Gender, Socio-economic Status, Culturally and Linguistically Diverse Backgrounds and Geographical Locations and Life Experiences

A research study of university students conducted by Yorke and Longdon (2008) found that students failing to adjust to different and unfamiliar teaching and learning environments were 'at risk' of withdrawing from their program of study. Of those, mature students are more likely to 'drop out' in the first year compared to younger students (Coffield et al., 2004). According to Knowles (2012), older learners, argued to be 'digital immigrants' by Prensky (2009), learn in a different way to their younger counterparts. This humanistic view of andragogy, the science behind the teaching of adults, proposes that adult learners may need different support networks to younger learners such as, academic, technical or pastoral support for self-managed learning. Recently, a great deal of literature has argued against Prensky's digital native/digital immigrant concepts (McKenzie, 2007 Kennedy et al., 2010). Prensky's assertions concerning digital immigrants can be misunderstood. When he discusses digital immigrants, he refers to the time in which they were born and not the level of technological competence they possess. However, despite these gloomy assertions for older learners, over two thirds of students obtain qualifications later in life (Institute of Education, 2013). This signifies that older learners are using HE to improve life and career chances more than ever.

Gender can impact on how students learn (Bennet and Marsh, 2003; Wehrwein et al., 2006). Female students are less likely to speak out in a traditional face to face classroom environment yet in online course discussions are more likely to voice contributions, in turn impacting on perceived deeper learning, (Anderson and Haddad, 2005). Kay (2008) reports that male learners have higher self-efficacy than females when learning online but females are slightly more positive about the online learning experience and perform better on computer-related tasks. In contrast, research exploring gender perceptions of e-learning found that female learners place more importance on the planning of e-learning activities and value contact with the teacher (González-Gómez et al., 2012).

Teacher contact and more specifically monitoring of student progress and support, was found to be essential elements to successful online learning for multi-cultural students according to McNaught and Vogel (2004). A number of researchers have studied the preferences of different ethnic groups towards online learning (Chin et al., 1999; Munro-Smith, 2002). However, Boyette (2008) points out that there is little research on some ethnic groups with reference to online learning. Online content itself is a cause for concern. Heemskerk (2005) suggests that on a practical level, certain ethnic groups are under-represented in e-learning materials.

According to some of the literature, where students live impacts on their use of technology. There are areas in the UK that are 'digitally unengaged' (Longley and Singleton 2008). Longley and Singleton's research showed that approximately 1.15 million people in England live in an area of digital unengagement, in turn impacting on educational success with technology. Unengaged areas are more often than not linked to areas of material deprivation but not always. In some coastal and rural areas the geographies are different. There is little material deprivation but other factors influence digital unengagement, such as lack of or slow bandwidth is a major factor along with the ages of the population.

As previously mentioned, geographical unengagement is often linked to material deprivation. Generally, the digital divide represents the gap between people who can use and have access to technology and those that do not. Chen and Wellman (2004) describe the digital divide as 'differences between those who have all the necessary resources to participate in current society and those who do not' (Eynon, 2009, p.27). Lichy (2011) talks about a 'second-level' digital divide within the UK. Their research investigated students and their use of the internet. Largely down to the Labor Government's 2008 'Home Access' scheme, which provided lower income families with IT equipment and internet packages, they concluded that there was no longer a significant 'divide' between students being able to access the internet or not; the 'second-level divide' appeared in the way in which the internet was being used. Although this scheme has now ceased, families will still benefit from the equipment provided and as stated earlier, 95% of families now have internet access

(Ofcom, 2012). Students from higher socio-economic backgrounds used the internet more for school and home work than lower socio-economic groups. This is backed up by an Ofcom (2012) research that suggests that internet access at home is now close to entirety across all economic classes. These are encouraging reports considering that school pupils who are eligible for Free School Meals (FSM) are less than half as likely to go to university as other pupils (BIS, 2012).

Many universities in the UK encourage students to enroll on courses regardless of previous academic success but with evidence of career experience in the subject. This has resulted in mixed academic (proven) ability within cohorts, (Wooden et al., 2001). Students who enter HE with 'non-traditional' qualifications could be disadvantaged due to the lack of preparation for essay writing and research skills (O'Driscoll et al., 2010). Students who are most likely to say they are not interested in connecting to the internet are those with lower levels of education (Helsper and Godoy-Etcheverry, 2011). However, Koivusilta et al. (2007) propose that links between educational background and technology use is in the activity itself and not the time spent on it. In particular, digital gaming was linked to poor school achievement in some cases.

Summary

It can be seen from the literature that there is no shortage of research investigating how diverse groups interact with technology. Studies which include research on these groups go some way to explain the challenges that certain students may face when using ICT within an HEI environment. Fewer studies however, have considered combinations of groups and no research could be located that has investigated whether there are other characteristics that may be influential in technology use or non-use. Additionally, e-learning pedagogy, which sets out effective strategies for online teaching and learning, seem to be adapted from traditional pedagogical frameworks, may be outdated in the context of emerging or disruptive technologies or are influenced by other forms of online learning such as distance learning.

Research Approach

The aim of the research is to identify differences in learner characteristics and how these characteristics impact on their experiences of using technology for learning. The findings will eventually be incorporated into a conceptual framework for effective teaching and learning approaches and of factors that influence digital inclusion and exclusion.

Specifically, the objectives of this research and discussed in this paper are:

1. To explore the characteristics of learners and analyze their influence on digital exclusion and inclusion.
2. To investigate what current and emerging pedagogies are being used for engaging students with technology enabled learning (TEL).

The first two phases of this research will be discussed in this paper and will form the starting point for the next two phases (3 and 4) which will be conducted in 2015. The objectives of Phases 3 and 4 are:

1. To assess the value of current and emerging pedagogies with a diversity of learners.
2. To examine what students need to be effectively engaged with a blended learning program.
3. To incorporate the findings into a conceptual framework for effective learning approaches and of factors that influence digital inclusion and exclusion.

By combining a sequential mixture of qualitative and quantitative methods, Table 1 below demonstrates how through four phases, a conceptual framework will eventually be created.

Table 1. Illustration of whole research design

Phase	Year of Commencement	Method	Sample
1	2013	Semi structured interviews	Undergraduate Health and Social Care students, Bournemouth University
2	2014	Semi structured interviews	Undergraduate Health and Social Care students, Bournemouth University
3	2015	Survey	Undergraduate students (mixed schools), Bournemouth University
4	2015	Action research	Undergraduate students, External Universities

Research Design

A qualitative multi-phase approach will be used sequentially in this research. (Creswell and Plano Clark, 2007). The research takes place at Bournemouth University (BU) in the south of England. Two samples of undergraduate Health and Social Care (HSC) students were the focus of Phases 1 and 2. The interviews took place after the completion of a particular unit on a blended learning course (Phase 1 in 2013 and Phase 2 in 2014). The Program Leader was approached to confirm that the unit remained the same from the previous year with no variables that could affect the analysis.

The research uses a critical realist approach. In the social sciences, critical realism has been a prominent approach for the past thirty years (Miller and Tsang, 2011) and a key feature is that ontologically you believe in one real world that exists independent of human perception and construction, yet at the same time, epistemologically believe that the world can be interpreted in different ways by each of us (Frazer and Lacey, 1993). In line with a critical realist approach, semi-structured interviews will allow participants to describe their experiences of digital inclusion and exclusion in their own words. Semi-structured interview techniques were adopted as the initial method to encourage rich descriptions (Kvale, 2008). This method will also expose which characteristics affect barriers to digital inclusion and uncover the wide-ranging needs that influence engagement with blended learning programs.

Since the research is concerned with identifying which characteristics affect digital inclusion and exclusion, the interview would start with an open question: *'Tell me a bit about yourself'*. It was hoped that this opening question would allow the participant to voice their characteristics in their own words without being influenced by any pre-determined (correct or incorrect) knowledge gained from literature. For example, the following excerpt was taken from one participant,

'... I am a mature student. I have two children, [...] and [...]. I worked in [...], my career in the beginning in [...]. We came to Bournemouth in [...] and wanted to change my career so that I'm doing a [...] degree. I always wanted to work in this kind of work with people [...], so the reason I decided to do [...] and that is quite hard at the moment because as you can imagine it was more than [...] years ago that I studied and now I'm going back to that sort of studying more. Everything is really hard work for me and English is my second language so it makes it even harder.'

They were then given the opportunity to express their experiences of technology during their program. It was not until the end of the interview that usual demographic questions such as: gender; age; ethnicity; geography; socio-economic status and educational background, (ONS, 2013), were asked.

A thematic analysis framework was adopted to analyze the data. At a rudimentary level, thematic analysis is a method for recognizing, analyzing, and reporting patterns within data. Thematic analysis is favored for a critical realist approach (Roulston, 2001) although its flexibility allows it to be utilized across many epistemological and theoretical stances. Braun and Clarke's (2006) hierarchy for qualitative data analysis has been adapted for the analytical process using Nvivo software to manage the data. To ensure a level of trustworthiness and quality in the research, the researcher used a triangulation of methods as suggested by Guba and Lincon (1989; 1994) as well as the consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist adapted from Tong et al. (2007).

Findings and Results: Phase 1

As a result of the data analysis, themes were generated from the nodes. Further, characteristics were identified from the participant's narratives and compared to the existing literature.

Diverse Students

After the themes had been identified, characteristics that were revealed by the interview participants, were organized to indicate which were dominant, that is most prevalent in each theme. They were:

- Age
- Geographics
- Previous jobs/life experiences
- Year of research
- Course of research
- Motivations
- Hobbies
- Family
- Previous qualifications

The most interesting revelation from the data is that there appears to be no age limit to digital exclusion or inclusion. Additionally, many of the students who shared characteristics across a number of themes also fell into one or more of the traditional groupings. This highlights the complexity of students and erroneous task of trying to group them in order to predict how they might engage with technology. Any age can experience aspects of exclusion. This is contrary to much of the literature that suggests that older learners experience digital exclusion more than their younger counterparts. Furthermore, digital exclusion was not greatly attributed to the other characteristics.

Digital Exclusion

Digital exclusion is defined in this research as being unable to access or use technology, or use it in the way it was intended to facilitate the learning process for any reason. 13 out of the 16 participants disclosed attitudes indicating digital exclusion in some form. The main themes that emerged are discussed below:

Table 2. Themes and sources

Theme	Sources
Appropriate Content	8
Compatibility	5
Clarity	6
Peers	6
M-learning	4
IT Support	6
Equipment	6
Navigation	3
Logging in	4
Online Submission	3

Note. Sources: number of participants expressing experiences of exclusion within the theme.

Appropriate Content

The data revealed that the most significant area of exclusion for the sample is in perceived irrelevant or confusing content of course material. Feelings of frustration and stress can be experienced if online content is not clear. For example, one participant states,

'...there was one unit that we started in our first year evidence to support guide practice. And it was just everyone hated it. There was no point in it and to be honest I don't think it should be part of the course. I don't see how it makes us better nurses. Replace it with something that is relevant.'

Moreover, unclear face to face content can influence the frustration when students then work independently online. This mirrors a similar research by Beaudoin et al. (2009) who researched student's online experiences that affected satisfaction. As discussed in the literature review, Anderson and Haddad (2005) found that female students' perceptions of deeper learning were facilitated by online discussion. It could be the case that the students were not participating as planned or did not appreciate why they were being asked to complete this part of the course as they were.

Compatibility

Another significant finding is the experiences of participants with compatibility. A common pattern of frustration was not being able to access information at home due to incompatibility issues. One participant stated that,

'...I can't access everything I need to access, and umm last week apparently- I had tried to look at the formative test but I could only see the answers I could select, I couldn't actually see the questions, and I can't, can't rectify this. Apparently it's because my operating system is too old to support the technology used. So I found that quite frustrating.'

This is a potentially significant problem for those students who are to research a blended learning program.

Clarity

The data clearly shows that regardless of age, students need clear instructions and structure to online content for it to be effective. One participant voices this in the following way,

'...OK we're adults we need to do self-study but you need to give clear structure to me and I'll be able to follow it.'

Feelings of frustration and stress can be experienced if online content is not clear. Moreover, unclear face to face content can influence the frustration when students then work independently online.

Peers

Peers can contribute to digital exclusion by not participating appropriately in collaborative tasks. One participant stated,

'...I suppose if you did have a number that didn't pull their weight as much, it would make it quite awkward.'

This can lead to other students feeling awkward and possibly not completing the task to their best ability. Peers also contribute to the problems that are encountered on group Facebook pages, generating rumors and false information.

IT support

The data reveals that IT support within the university is widely offered and utilized. There are a number of support networks in place within HSC that students seem to be unaware of. One participant stated,

'... they {IT Services} need to change some aspect of the support they're giving to their students.'

Phase 2 will pursue the reasons for this in more depth.

M-learning & Equipment

M-learning is described as the use of handheld technology that relies on wireless and mobile phone networks, to aid teaching, learning and support, (m-learning.org). With this in mind, the BU app is very much part of the student's support network. However, some participants were unable to use it effectively, especially with iPhones and iPads. The app was installed on one participant's smartphone but was still unable to use it effectively. They stated that,

'... the new I_BU app crashes a lot sometimes.'

Navigation and logging in

Negotiating the Virtual Learning Environment (VLE) through a number of tabs and entering your student password and ID three or four times to access one form causes some frustration with the participants. One participant was vocal about navigational problems with the VLE system. They state that,

'... The format of myBU umm, I know that's it customized, or you can customize it to some extent but it's just very messy, umm everything is under sub headings, and it makes it very difficult to access very simple information sometimes because you need to go through, you know, like several links to get to one thing. And I don't think that's very clear.'

Online submission

A number of forms and assessments now utilize the technology for submission. One participant said of her placement form,

'... you have to fill out your evaluation to get your next bit of placement time, so once you fill out the form {POW}, it tells you where you are located next, so if the whole system crashes and you lose all of your answers, you lose your timetable for the next bit of your placement.'

Others reveal that submitting essays online can be problematic if left until the last minute as others are also trying to submit and the system can crash. This is particularly concerning when a deadline has to be met.

Summary

The research presented here demonstrates that factors in the university structure of digital delivery were more likely to produce exclusion than characteristics of diverse students. This is evidenced by a wide variety of individuals from varying age groups reporting digital exclusion. The next section discusses Phase 2 of the research.

Findings and Results: Phase 2

Phase 2 addressed the points raised in Phase 1. A new sample was interviewed who completed the same unit as the sample in Phase 1. Ten participants were interviewed. The iterative process of data analysis produced some interesting results.

Diverse Students

Of the participants, 8 out of 10 reported that there was an element of a 'Chinese whispers' effect that happens on the groups Facebook page. 5 of which went as far to say that this generated a sense of panic within the group. Looking at the characteristics of these 5 participants, there is no pattern as to which students experience this. Although most of the participants admitted to a 'Chinese whisper' phenomenon, this did not deter them from using the Facebook group as a support network, as what they gained from it was far more beneficial to them. The social circles within this sample that are created using social media play a part in constructing attitudes towards digital exclusion in as much as misinformed or incorrect posts lead to anxiety and concern. This did only seem to happen on social media sites as although rumors could spread verbally this did not seem to cause any panic as it was limited to the immediate social circle and not the whole Facebook group.

Previous Experiences with Technology

Phase 2 did not confirm that previous experiences influenced current perceptions of technology per se: it did however find that previous experiences of technology generated feelings of self-doubt towards using technology. 9 of the 10 participants voiced feelings of uncertainty with the technology to be used on the course and whether they had used it before. The older participants that had entered the course after a long period of employment perceived the technology to be different to that they had been using at work or at home and therefore unable or difficult to use. These feelings of self-doubt were experienced prior to the course starting but developed into something positive when the course started. Whereas the younger participants who shared similar views were not anxious about the technology until after the course had started and they knew which technologies they were to use. The older participants all agreed that it had not materialized in practice and that they were able to use the technology without any problems that related to their skills.

Age as a Barrier to Learning

Additionally, none of the older students shared any experiences of digital exclusion due to a lack of personal technological skills. Any experiences they had faced with new technologies, such as blogs, they had met with an opportunist and positive view which allowed them to pick up the new skills quickly. Phase 2 confirmed the findings from Phase 1 with regard to the digital native/immigrant debate. Phase 1 discovered that age played no part in digital exclusion. During Phase 2, this hypothesis was investigated further. Interestingly, the younger participants, considered by some to be digital natives, perceived the older participants, considered by some to be digital immigrants, as facing certain challenges with technology, yet none of the older participants interviewed shared this view. While the older students would admit that some technologies were new to them, they did not consider this to be a hurdle only an opportunity to learn something new. Furthermore, the older students perceived the younger students as having previous knowledge and experience of using new technologies, therefore an advantage. The younger students also perceived themselves as having an advantage with technology; however this did not translate into practice.

Digital Communication

The younger students in this sample were limited in which technologies they used, being very capable of using social media for communication and informal learning but not as comfortable using social media for formal learning. Additionally, they were unconfident of finding information on the internet for research purposes and using the VLE. This runs parallel with the literature from the Technology Acceptance Model (TAM) (Teo, 2009) which emphasizes younger students' perceived ease of use with ubiquitous technology and using technology for consumption and not creation (Bennett et al., 2011). A hypothesis for this could be that as technology evolves and becomes more ubiquitous in education and everyday life, older learners, through experience have caught up with younger learners. So even though older learners who are 'digital immigrants' due to being born before technology was commonplace, are now as comfortable using technology as their younger counterparts. Perhaps a renaming for this younger group: 'digital communicators' would now be more appropriate than 'digital natives'.

Digital Exclusion

Again, with the Phase 2 sample 'support' was a significant theme that emerged from the data. The support networks at the university that were commonly used by this sample were IT support and Library support. The group's Facebook page was an important source of support (academically and emotionally) and some participants relied on peers and lecturers for face to face support. 7 of the 10 participants were aware of being informed about support networks during their induction at the start of the course, however as the support was not needed then, they did not store the information. This raises an important point. Most universities will prepare a carefully organized induction for their new students in order to inform them of all the necessary information that they may need during their time there, yet it could be argued that most of that information is lost and only the information that is significant at that time is remembered. There is an argument here for universities and other institutions to stagger the induction process so that certain information is given later at a time when it might be more relevant.

Summary

The research presented here goes some way to confirm that factors in the university structure of digital delivery were more likely to produce exclusion than characteristics of diverse students. However, this phase also found links between age and digital exclusion. Younger students were more likely to experience challenges using unfamiliar technology, especially for formal learning purposes. Whereas older students faced with unfamiliar technology considered it as a positive

learning experience. This is evidenced by a variety of individuals from differing age groups reporting digital exclusion.

Table 3. A summary of the results from Phase 2

Participants report experiences of digital exclusion in the form of;	Characteristics of participants;
Support	Previous Jobs Age Year of Research Children Motivations Family Geographic's
Self-doubt and perceptions of technology	
Learning	
Perceptions of influence of own age and perceptions of influence of others' age	
Self confidence	
Convenience of learning and m-learning	
Collective opinions	
Beginning of the course	
Frustrations with the VLE	
Social Media	
Interactivity	

Preliminary Discussion-Diverse Students

This research suggests that there is no typical attribute that is more closely associated with digital exclusion or inclusion than any other. Most of the participants that took part in the research experienced exclusion of some form or other during the unit studied. Significantly, links between age and digital exclusion were not as expected. Younger students were more likely to experience challenges using unfamiliar technology, especially for formal learning purposes. Whereas older students faced with unfamiliar technology considered it as a positive learning experience. Younger students use social media to communicate and learn informally with friends and peers but are less willing to use social media for formal learning. This sentiment was not shared by the older participants who valued the opportunity to use social media for both informal and formal learning purposes.

In line with a critical realist approach, the participants shared their own perceptions of digital exclusion, which were unique to them, whilst recognizing that certain factors, such as organizational factors, were potentially the same for everyone on their program.

Preliminary Discussion-Digital Exclusion

Most of the participants felt exclusion in the form of the content being used to facilitate the unit and not their own technological skills. It could be argued that technological advances within IT are so ubiquitous and widespread in our homes, learning to cope with technology is becoming a lifestyle. Many of the perceptions of the participants were similar. Even in the cases of misguided information about support networks for example. If you consider Salmon's five stage e-moderating model (2004) to communicating online, a prerequisite of achieving Stage 1 is that the learners know how and where to access help and support. It would seem that as students talk with each other, it may be the case that a miscommunication of information or a 'Chinese whisper' scenario can develop amongst cohorts. Additionally, this can be fuelled by the student's Facebook group.

The timing of when information is given was found to be important. Information given during the induction process at the start of a program of study can be futile, as students in this research want to be given the information at relevant times, for example immediately before they will need to use that information. This suggests that a staggered induction process could be beneficial, giving out information throughout the program of study.

Limitations

As this research utilizes interview data collection techniques and is grounded in critical realism beliefs, it is subjective and based on personal interpretations of the researcher. The findings are limited to one unit of a course being studied within one school at Bournemouth University. The unit is delivered with a blended learning model but it is recognized by the researcher that other courses/units may have a different blend of methods. It is also recognized that the samples in both phases were fairly small, although saturation had been reached.

Future Directions

The obligation by HEI to provide competitive TEL offers, results in an abundance of studies and reports into pedagogical must haves for successful designs however, further investigation is needed into whether this is being translated into practice. For example, the disparity between what a student needs to do to be a successful e-learner, what the student actually does and whether they understand why they are doing it. This confirms the need for e-learning strategies to address the new factors determining the divide. The future direction of this research is to implement Phase 3 to evaluate the trustworthiness of the data analysis in Phases 1 and 2. The final Phase 4 will be the creation of a conceptual framework for effective learning approaches and of factors that influence digital inclusion and exclusion.

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Using Mobile Technology to Enhance Undergraduate Student Digital Information Literacy Skills: A Canadian Case Study

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Abstract

Learning essential information literacy skills through the use of mobile phones is an innovative m-learning pilot project that was collaboratively undertaken in a Canadian university college over the course of two academic terms by faculty and the library staff. The research pilot project involved ninety one undergraduate students in five different classes majoring in psychology, social work, education or social development studies in an attempt to determine the effectiveness of using mobile technology to enhance students' information literacy skills and learning experiences. Pre and post-test measures, and survey questionnaires generated quantitative and qualitative data that was analyzed to determine the degree of changes in frequency of mobile device information literacy access and fluency in digital literacy skills. The article highlights the Mobile Information Literacy innovation and includes the development and design of the mobile lessons, interactive exercises, and its applications. The study's main results and conclusions are also discussed. Additionally, the successes and challenges of the pilot to support anytime, anywhere student mobile information literacy eLearning training that engages mobile learners and enhances their learning experience are identified and critically reflected upon to improve the innovation for stage two of the project.

Keywords: Mobile learning; information literacy; e-Learning; digital literacy; post-secondary education.

Introduction

University students frequently use academic material both on and off campus, there is demonstrated need to provide easily accessible tools to assist them (Baggaley, 2004; Brown, 2004; Perry, 2000). Academic literature has emphasized the value of teaching information literacy skills, clearly linked with academic and critical thinking skills, as part of a comprehensive university education (Kim & Shumaker, 2015; MacPherson, 2004; Tumbleson & Burke, 2013). Information literacy is commonly defined as the ability to locate, to access, evaluate, and use information that cuts across all disciplines, all learning environments, and all levels of education (Association of College & Research Libraries' Information Literacy Competency Standards for Higher Education, 2000; Saunders, 2012). Despite the aspiration towards pedagogical innovation in higher education, the inclusion of information literacy in undergraduate education often remains an objective rather than a fully realized ideal/accomplishment

This project supported the development and administration of the mobile information literacy (MIL) tool, being a web search application for use by undergraduate arts and humanities students at Renison University College, affiliated with the University of Waterloo, Waterloo, Ontario, Canada. Participants had the opportunity to utilize this tool and reported on their level of satisfaction with the tool. Project objectives were to develop best strategies, from a user perspective, for delivering and accessing information that enhances student information literacy skills through mobile technology. With the MIL tool, the research team hypothesized that students would improve their literacy skills and would increase their access, retrieval and evaluation skills, to ascertain and understand reliable and credible academic information. The research team also felt that other school communities would benefit from the MIL tool to assist them to complete academic assignments and research projects. Our research aims to contribute to the understanding of the innovative practice for mobile technology academic learning (m-learning).

The pilot study was a mixed-method (quantitative and qualitative) non-experimental approach that included both pre- and post- digital literacy tests and student questionnaires. All study participants completed a digital literacy pre-test and a digital literacy post-test. Undergraduates in three participant groups completed thirteen mobile information literacy lessons (online) before completing the post-test and questionnaire. Students in the comparison group received a one hour research skills library workshop and completed the pre and post digital literacy test. The comparison group participants did not participate in the thirteen online literacy lessons.

Literature Review

M-learning involves the use of mobile devices to deliver electronic learning materials with built-in learning strategies to allow access to knowledge from anywhere and at any time (Ally, 2004). M-learning or “education on the go” utilizing mobile devices such as mobile phones and tablets, expands the boundaries of anytime, anywhere learning and will play an important role in the future of learning (Keegan, 2002; Wu et al., 2012). As this type of learning is an emerging field, the full potential of m-learning is still untapped and best-practice guidelines for m-learning are still unknown. Although using mobile technology for information literacy training is limited, there are a few programs in universities and colleges in the United States, England and Australia that include infusing information literacy and technology into the educational experience in for-credit courses and a certificate provided upon graduation for completion of the lessons (DaCosta, 2010; Kraemer et al., 2007; Salisbury & Ellis, 2003; Warnken, 2004).

Research on m- learning is a recent development and there has been limited research conducted in this area (Attewell, 2005; British Educational Communications Technology Agency, 2004; Keegan, 2002; Savill-Smith & Kent, 2003). A study conducted by DaCosta (2010) on the integration of

information literacy skills in selected post-secondary higher education curricula in England and the United States found limited integration of information literacy in the curriculum across a variety of academic disciplines, including arts, education, sciences and engineering. Although information literacy skills were deemed to be important tools by faculty and librarians for students, opportunities for integration were limited. There appears to be no consensus among faculty on when students should learn the skills or if they need to be taught information literacy in the curriculum (DaCosta, 2010). This highlights the gap between understanding the level of importance of the information literacy skills and embedding them into the curriculum. Another identified challenge is the misperception by some faculty that computer literacy equals information literacy (Salisbury & Ellis, 2003). Osmosis does not work for the development of such skills, but rather pedagogical collaborations between faculty and librarians can be encouraged and established to assist in incorporating information literacy into higher education curriculums.

Typically, information literacy competencies are highly valued by faculty in various disciplines at colleges and universities, however little has been written on information literacy outside of the library literature. The transformation of information literacy from a library-centered issue to a mainstream educational issue is just beginning (DaCosta, 2010; McGuinness, 2006; Owusu-Ansah, 2004). Often, there is limited interaction between faculty and librarians and the seeming unwillingness of academic faculty to partner with librarians may have less to do with a lack of respect for the position, and more to do with a lack of understanding of how librarians can contribute to and support their instruction (Saunders, 2012). The pilot study described in this paper aimed to enhance the collaborative efforts between these two roles in order to allow them to share responsibility for teaching students information literacy skills in an innovative way.

More research, from a user perspective, is needed to discover the best strategies for maximizing m-learning, including discovering what is the best mobile device for accessing digital information tools such as the MIL, and what form the content needs to take to contribute to effective m-learning to engage mobile learners. The passion to help student learners improve their information skills using mobile devices shaped the research framework for this project. Overall, the research on the educational use of mobile devices is in the early stages and limited research includes case studies of different implementations. Cross-faculty and library collaborations are still needed.

Outcomes of this project will have several meaningful and significant contributions to the emerging knowledge in the field of m-learning. To be successful and independent learners for life, students must graduate with the ability to successfully navigate electronic environments. Understanding and using both the information and technology related to their fields of study is deemed critical. With emergence of new technology, ways to develop information and digital literacy skills in the curriculum that interact with mobile technology offers exciting possibilities (Sandars, 2012; Saunders, 2012).

We ask the question, “Is m-learning the next evolutionary step of e-learning?” To fill the gap in the research, this innovative project was designed and implemented to support and enhance m-learning pedagogy at Renison University College. Students enrolled in both the Bachelor of Social Work and the Bachelor of Social Development Studies degree programs are required to write numerous academic papers over the course of their programs. Many students struggle with information literacy in searching for appropriate information and evaluating the validity of sources. It is especially critical that students understand how to conduct research and be self-reliant in the electronic information environment at a time when there is less need to consult with a librarian or to access a library.

It is anticipated that m-learning will grow quickly in the next few years. With the development of a variety of mobile devices that are more powerful, portable and have increased Wi-Fi access, this research will serve as a foundation for developing and promoting segments of mobile learning among students, the community and beyond. There is an apparent gap between the information literacy skills that faculty want their students to have and those that they actively support and develop. It is a gap that faculty and librarians from various faculties are best placed to fill as collaborators and bridge builders. This project begins this collaborative, bridge-building process.

Methodology and methods

Our study used a mixed-method (quantitative and qualitative) non-experimental approach, including both pre- and post- literacy tests and student questionnaires. This project and the survey instruments were approved by the Research Ethics Board at the University of Waterloo. Ninety-one university undergraduate students participated in the project during the fall 2014 and winter 2015 school semesters as part of their course activities from five Social Development Studies (SDS) and Social Work classes at Renison University College. University participants ranged in year of study from their second year to their fourth year. Undergraduates in four of the five participant groups completed a pre-test, thirteen mobile information literacy lessons (online) before completing the post-test and questionnaire. These students accessed their personal smart phones and tablets to complete the exercises in their spare time (e.g. riding a bus). Students in the comparison group (n=32) received a one hour research skills library workshop and completed the pre and post digital literacy test, but they did not participate in the thirteen online literacy lessons.

A short training session on the use of the MIL tool was provided by the librarian to students before completing the on-line lessons. At the start of the session, participants completed paper and pencil pre-tests to determine a baseline understanding of information literacy. On-line student participants completed pre-test/post-test surveys through a web link accessed using their course newsfeed in the university's course management learning system. Survey questions explored participants' knowledge about accessing data, including the university's library database system, Primo. Administration of pre and post-test surveys occurred during the first week of classes and in the final week of the term respectively. Additionally, students provided an assessment of their use of the MIL tool at the end of the semester. All study participants received a 1% bonus mark in their course at the end of the completion of the study.

Both quantitative and qualitative data was collected and coded. Statistical analysis of the completed surveys and questionnaires was done using Survey Monkey's Analyze tool and by reviewing the raw data through the program Wordpress (<https://wordpress.org>). Opened ended questions were coded and thematically analyzed while usage of the MIL web app tool was explored through Google Analytics. The data was analyzed for program improvement, MIL tool enhancement and expansion, and as basic research in the emerging field of information literacy instruction.

Findings

Data collected through a Survey Monkey link, an online cloud-based survey tool, retained participant demographic information and survey results. Almost 60% of students were in a post-degree Bachelor of Social Work program, while 25% of students were in an undergraduate SDS program and the remaining students (about 15%) identified their programs as other arts faculty or humanities programs (psychology, sociology, French or fine arts). The comparison group demographics closely matched with other participant groups and consisted of thirty two Bachelor of Social Work students. Most study participants were female (90%) and 77% of the participants were between the ages of eighteen and twenty-five, while 3.5% of participants indicated they were

over fifty years of age. Prior to participating in this MIL pilot study, almost 87% of students had not received any type of literacy skills training.

Close to ninety-eight percent of participants owned a smartphone and 58% of these participants were Apple iPhone users. This group reported using their phone and other mobile devices (i.e. tablets) on a daily basis. Only twenty-eight percent of this group used a mobile device to search for academic related information despite daily usage, while thirty-six percent of them made phone calls with their device. Texting was their main use (86%), while 35% browsed the internet and less than 10% of students played games on their smartphones.

Students who accessed academic information or conducted research on their phones significantly preferred using a Google search engine (69%) over other search tools, such as the University of Waterloo's research and discovery tool, Primo (29%), other research databases, including Google Scholar (30%), or RefWorks (3%), a web-based citation and bibliography tool.

Variations in accessing the mobile lessons by study participants were noted (see Table 1) as some lessons proved to be more frequently accessed than others.

Table 1. Access to the mobile lessons by study participants

Lessons	Response Percent
Locate: Lesson 1: An Introduction to Primo Central	60.2%
Locate: Lesson 2: The Basics: How to Search	44%
Locate: Lesson 3: Finding Articles	78.3% (3)
Locate: Lesson 4: Finding Peer Reviewed Journals	82.3% (1)
Evaluate: Lesson 5: Evaluating Information Sources	73.3% (4)
Evaluate: Lesson 6: Peer Review Process	60%
Evaluate: Lesson 7: Popular Vs. Scholarly Resources	73.2% (5)
Use: Lesson 8: Using the Web for Resources	67.9%
Use: Lesson 9: RefWorks	61.3%
Use: Lesson 10: When to Cite Your Articles	79.3% (2)
Use: Lesson 11: Types of Written Articles	64.1%
Use: Lesson 12: How to Approach Assignments	68.2%
Use: Lesson 13: What is a Paragraph?	56.8%

Seventy-nine participants completed the pre and post-tests, the MIL questionnaire, and all thirteen information lessons. A majority of those participants (77.2%) gained or maintained their MIL knowledge as evidenced by the test results. Of those, 50.63% improved their information literacy knowledge while 26.58% maintained their knowledge from beginning to end of the semester. There was a decrease in test scores noted in 23% of participants.

Study Findings: Information Literacy Knowledge

Several key findings emerged during the review of the information literacy knowledge pre and post-test scores for participant and comparison group scores (see Table 2). These included: 1) three of the four participant group score averages (participant groups A,B, and D) increased substantially (about 50%), 2) Group B, who had the least number of participants (n=4), varied significantly in final scores in relation to all other groups and increases in knowledge were not reported, 3) many of the online participants (75%) had significant improvements in their post test scores, 4) over one-quarter (28%) of the study participant's information literacy knowledge decreased from beginning to the end of the semester while about half that number (12.5%) of comparison participants information literacy knowledge declined, and 5) comparison group participant post-test scores were surprisingly strong and actually surpassed the post test scores of the participant students that completed the MIL lessons via smartphones.

Table 2. Information Literacy Knowledge Pre-Post Test Score Results

	Number of participants	Increase		Decrease		Maintain		Total
		N	%	N	%	N	%	
TOTAL participants 99								
On-campus participants								
A. SDS-01	27	16	59.3%	7	25.9%	4	14.8%	100%
B. SDS-02	4	0	0%	3	75%	1	25%	100%
C. Social Work	16	8	50%	4	25%	4	25%	100%
Online participants								
D. Social Work online	20	13	65%	5	25%	2	10%	100%
Participants (A+B+C+D)	67	37	55.2%	19	28.4%	11	16.4%	100%
Comparison group								
E. Comparison Group (SW)	32	16	50%	4	12.5%	12	37.5%	100%

Notable enhancements (55%) in information literacy knowledge occurred for three of the four participant groups from the beginning to the end of the semester, whether they completed the mobile lessons online or through their smartphones (see Table 3). For participant group A (n=27), a class in SDS, almost 60% (16 of 27) of the students demonstrated an increase in information literacy knowledge from the start of classes to the end of the semester. Almost 38% maintained the information literacy knowledge throughout the semester. These students were required to write research paper proposals, which were then used as the starting point for their course research papers. Perhaps group A students were able to apply what they learned from the MIL tool directly to their course assignments.

The smallest participant group B (n=4) varied significantly from the other groups. This small group did not improve their information literacy scores by the end of the semester (0%), rather the scores decreased for three of the four students while the fourth student retained the information literacy knowledge from the beginning to the end of the semester. As voluntary participation in this project was offered to students and only four volunteered from this class, perhaps the results may not be representative due to small numbers.

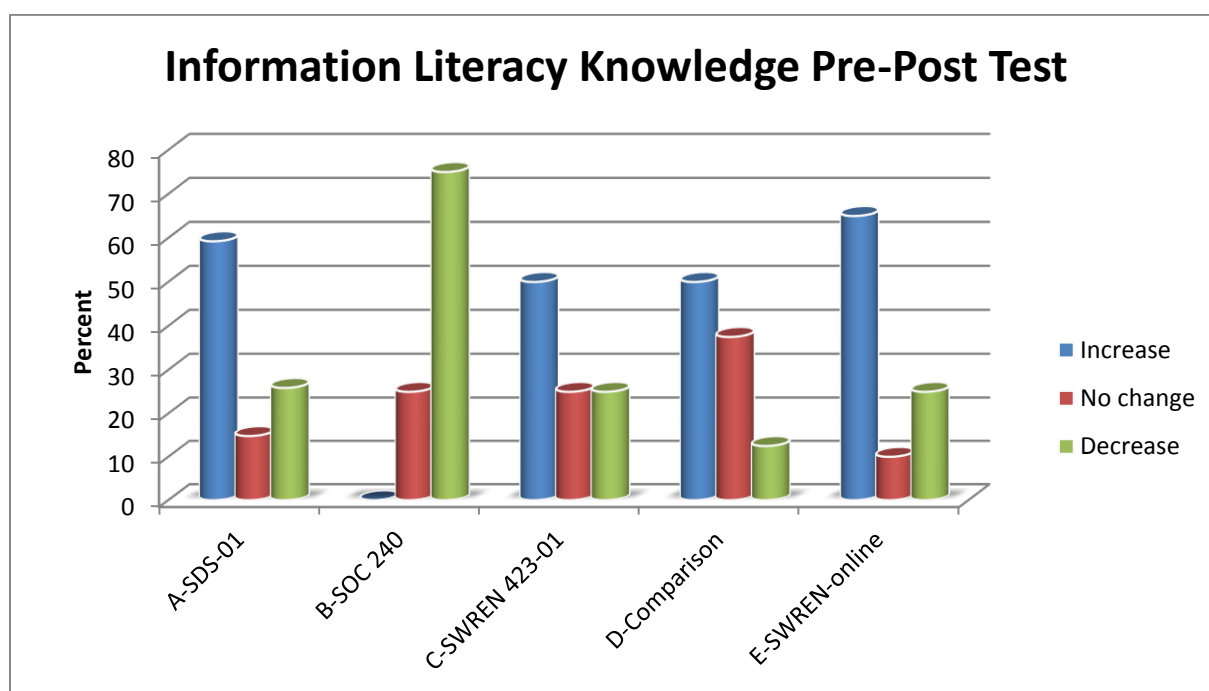
Seventy-five percent (12 of 16 students) in the social work Group C (n= 16) participant group retained or increased their information literacy knowledge over the course of the semester. Online

learners, Group D (n=20) demonstrated the greatest increases (65%) in information literacy of the study participants. Seventy-five percent of those online students who increased their post test scores recorded gains of thirty to forty percent. Could this be a reflection of a student's familiarity and comfort with online learning where they easily gravitated to the online modules?

Scores between the pre and post-tests decreased for some students in all participant groups indicating a loss of information literacy knowledge. The loss of information literacy knowledge was greater for those students in the online class (about 25%) than the participants in the comparison group (12.5%). The decline could reflect the negative impact on study participant memory recall arising from the lapse in time between the completion of lessons early in the semester and the post-test many weeks later.

Comparison group E members that received the in-class information literacy tutorial demonstrated significant gains during the semester. Twelve comparison group students (40%) maintained their information literacy knowledge at the same level, as compared to twenty (65%) of the online Social Work class. It is interesting to note that over eighty-seven percent of the students who received their information literacy lesson in person retained or increased their information literacy knowledge as compared to forty-eight (71.6%) of the students who received the information via their smartphones. Not all students in the participant groups completed all the thirteen lessons which may explain the decline in their follow up test scores. The research team also recognizes this is a pilot study and future development, enhancement and refinement of the MIL tool, pre and post tests and the questionnaire are necessary which may impact outcomes and may address the variance in scores.

Table 3. Information Literacy knowledge Pre-Post Test



The authors of this paper present the study findings in Table 3 as preliminary results and a reflection on lessons learned from our pilot study. These results will inform Stage 2 of the MIL project e.g. testing the revised MIL tool, revised pre/post-test surveys and questionnaires, and a larger sample size.

Description of the MIL Tool

The MIL web app contains 13 lessons, focusing on how to locate, evaluate and use information (Figure 1) and is accessible at URL: <http://beam.to/renmil>. The learning contents are designed for use with the University of Waterloo's library resources and services. The lessons contain multiple instructional videos about topics such as Boolean operators, database functions, writing search strategies using keywords, and bibliographic management tools such as Refworks.

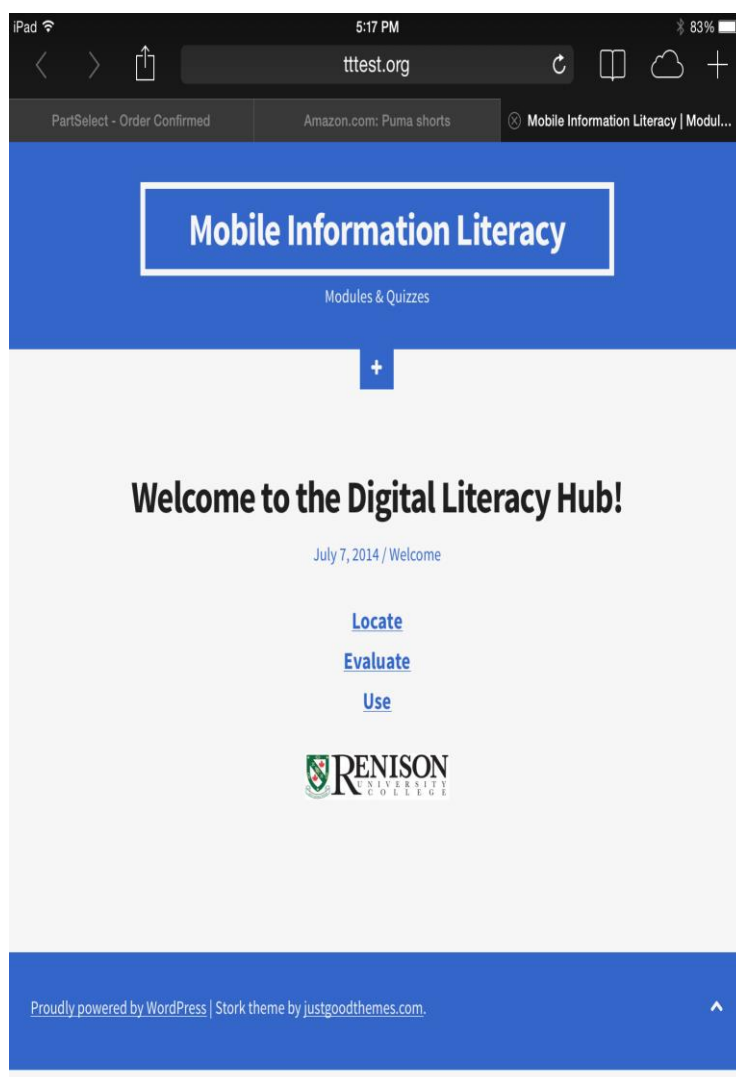
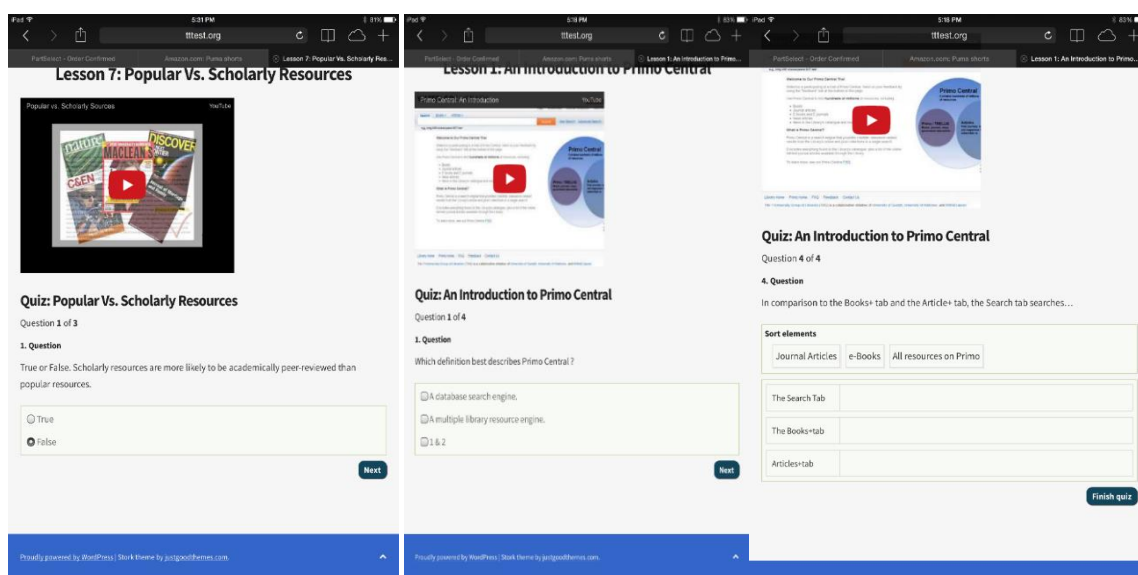
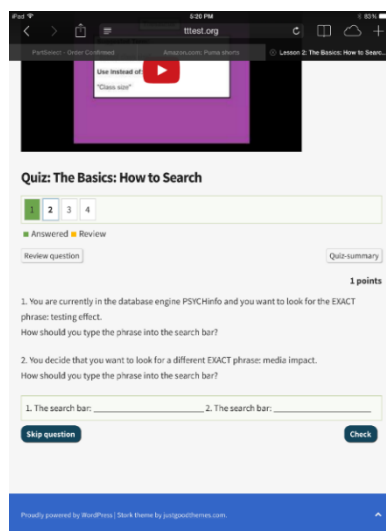


Figure 1. Web App

Many information literacy studies indicate that interactivity and assessment can help to reinforce concepts learned (Grassian & Kaplowitz, 2001; Yarmey, 2011). For these reasons, each MIL lesson has interactive exercises providing instant feedback including True/False, Multiple Choice, Text Impute, and Drag and Drop as demonstrated in Figure 2.



True/False Multiple Choice Text input



Drag and Drop

Figure 2. Different types of interactive exercises

The web app also provides two types of assessment tools to evaluate students' progress as shown in Figure 3. The formative assessment allows students to complete one question and then view their results before moving on to subsequent questions. The summative evaluation permits student to view their results at the end of the lesson exercise and to compare their results with peers.

The web app also tracks the amount of time that students spend completing the exercises. The web app supports knowledge construction, dissemination and collective intelligence, by encouraging students to post their search tips at the mobile friendly site.

Formative Evaluation

Summative Evaluation

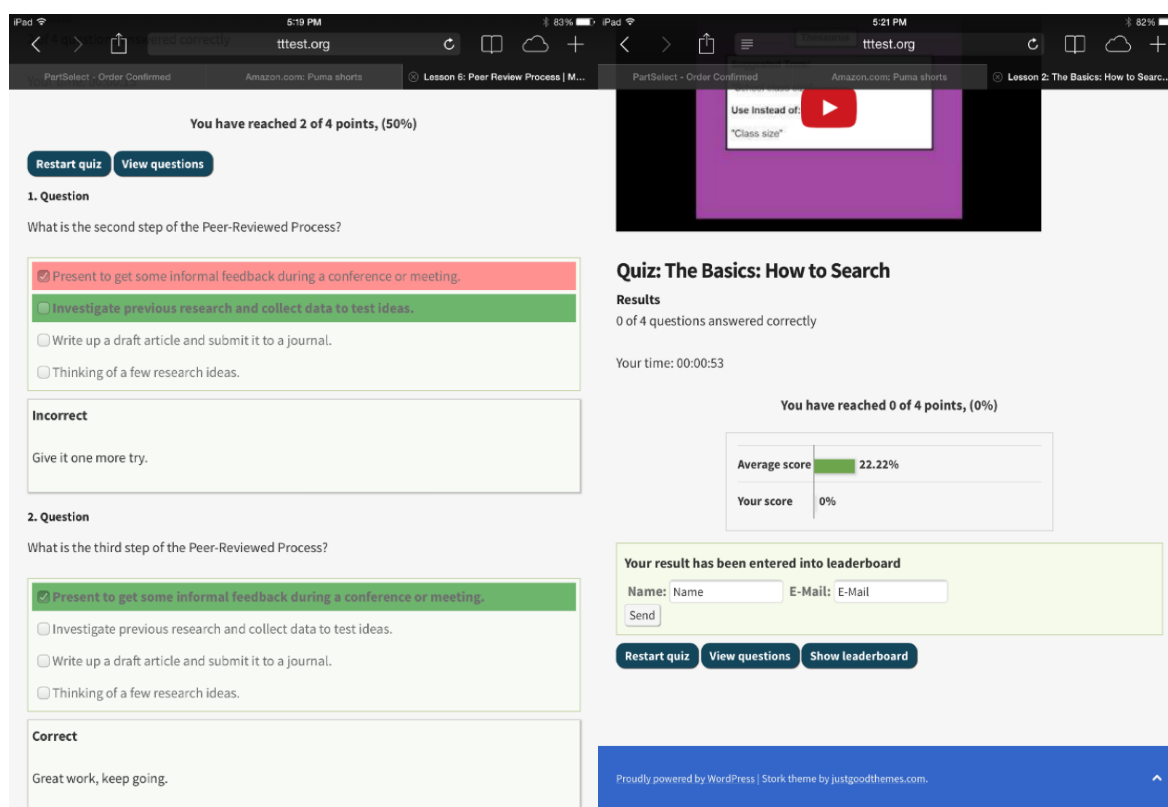


Figure 3. Summative and formative response

The MIL web app runs on WordPress (<https://wordpress.org>), an open source content management system based on MYSQL and PHP. It generates content on the fly without any html programming involved. MIL utilizes a mobile plugin to auto-detect the mobile browser and load the mobile version of the MIL site. For assessment, a plug-in program called Wp-Pro-Quiz generates different types of quizzes and the web app also tracks users' scores and generates statistical reports. Google Analytics was used to analyze student use and engagement, especially time spent on the MIL site and detects the content students interacted with the most.

Discussion

MIL training for students, especially mobile learners will enhance mobility and flexibility in learning, as well as enable students to be "spontaneous, personal, informal, contextual, portable, ubiquitous, and pervasive" (Kukulska-Hume, 2005, p.5). Most participants in the pilot study expressed a positive experience using the mobile web app technology to learn information literacy skills, and appreciated the flexibility of "anytime" availability of the MIL materials. Study participants identified positive experiences with m-learning. They felt that this project gave them a new opportunity to learn: about information literacy; an appreciation for the visual aspects of the MIL tool; a better understanding of how mobile phones can be used as tools for efficiency; accessibility to the vast quantity of information available on the internet (especially Wi-Fi access), and the speed with which the lessons could be completed using the tool.

One common concern voiced by participants regarding the use of smart phones was the cost of accessing Internet data. Availability of more Wi-Fi capable phones and accessible locations should address the issues of the cost of access. Additional issues raised by the participants with regards to MIL training, included: eye strain caused by small mobile screens; difficulty inputting data on small keyboard or the phone lacked a keyboard altogether; need to use more multimedia, including videos and interactive exercises; MIL web app is only optimized for IOS use, thus causing some

viewing issues on Android devices (e.g. Drag and Drop exercises work with touch screen devices); and slow Internet connectivity may impact access to videos in MIL lessons.

Some concerns raised by participants can be addressed by incorporating more sophisticated instructional design and by improving the accessibility and functionality of the mobile friendly website, while others such as the size of the screen and the limitations on band width are inherent limitations of the current technology. Shurtz and von Isenburg (2011) contend that increased screen size and touch features on contemporary mobile devices are expected to increase the use of mobile technology in education.

The MIL tool has the potential to be an important aid for m-learning, however to make it more effective some enhancements and upgrading of features in the tool and in the lessons will be required. Not all MIL contents are fully interactive. Phase 2 of this study/tool will aim to enhance student learning and will do further testing of learning analytics. With these enhancements, students will be better able to access MIL training resources with interactive module formats on demand with multimedia-rich content (such as text, audio, and video), with the aim of increasing learner motivation and interest while facilitating more self-directed study. Future implementation of HTML5 will allow better animation, smooth video playback, and the capability to run the app and store content on the local device even when disconnected from the Internet. We suggest that information literacy training could be delivered more effectively if MIL was embedded in the curriculum.

Analysis of the data gathered in the pilot and sharing of the lessons learned from the process will benefit future research. Phase 2 will begin in September 2015 with the goal of increasing the number and scope of student participants.

Conclusions

Notwithstanding the general increase in mobile applications, our research indicates that there is a need to collect more information to develop a strong underlying evidence base to support the benefits to students of m-learning and information literacy training. Information literacy is not a standard part of classroom content, but appears to be provided only to those students who actively seek out the information. Based on our early findings, it appears that students' information literacy knowledge may be linked to specific training. This leads the authors to advocate that information literacy be embedded as part of the classroom curriculum. This project has reinforced our belief that both learners and educators need to develop a range of information literacy skills and that they be provided supportive materials to take full advantage of and make the best use of the emerging technologies.

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Development of a Blended Instructional Model via Weblog to Enhance English Summary Writing Ability of Thai Undergraduate Students

Saisunee Termsinsuk

Abstract

The objective of this research and development was to develop an effective blended instructional model via weblog to enhance English summary writing ability of Thai undergraduate students. A sample group in the English program of Nakhon Ratchasima Rajabhat University was studied in academic year 2010-2013. The research instruments were an effective semi-structured interview form, the learning and instructional record format, the test of English summary writing ability, and the English summary writing criterion. The data were analyzed by percentage, means, standard deviation, and the t-test. It was found that the blended instructional model via weblog comprised three stages of blended activities: extracting information via face to face instruction, summarizing via weblog, and publishing on weblog. It was named “S2A Model.” The model was effective in enhancing the university students’ English summary writing ability as the post-test scores of the students met the set criterion of the study.

Keywords: Blended instruction; weblog; summary writing; 21st century writing.

Introduction

English is important among Thai university students for at least two reasons. First, it is a means for boosting job opportunities following graduation. Second, it is beneficial for use in further advanced studies, both in Thailand and abroad. Thus, fundamental courses in English are offered at Thai universities that cover a range of different topics.

Although the Thai government has tried to support English instruction at all levels of education, the students have confronted various difficulties in their English studies. Students can read, but cannot write effectively in English, as shown by the English test results of 12,000 foreign graduate students in Australia in 2007 which revealed that 50 percent of Thai students scored low (Charoenwongsak, 2008). This finding was similar to the results of other written test scores for Thai undergraduate students where low scores pointed to weaknesses in (1) paragraph and an essay writing, (2) writing mechanics, and (3) grammatical structure, parts of speech, and sentence structures (Tidthongkam, 2008; Khansamrong, 2004). Similarly, the study of academic writing problems at Nakhon Ratchasima Rajabhat University in 2009-2010 found that most students had confronted some difficulties in locating topic sentences and details, organizing ideas, using grammatical structures and vocabulary, and summary writing (Termsinsuk, 2010).

In accordance with instructional methods and methodology for teaching writing in the 21st century, writing in English is taught through the use of technology, teaching fully online, or in a blended way. Using technology web 2.0, a web for educational medias like wikis and weblogs, makes students become more interested in attending online training among real readers, whereas teaching face-to-face assists students in learning the right rules and principles and in obtaining useful feedback (Newman, 2009; Prinz, 2010; Crane, 2009). Using both of these techniques is called writing through blended instruction.

Blended instruction via weblog has been studied and almost all of the study revealed its positive effects on learning. For the effect in a language classroom, most practitioners in Japan, Turkey and Korea found that after using blended instruction via weblogs, the students' writing abilities were increased (Oh & Park, 2009; Bahce & Taslaci, 2009; Kizil & Arslan, 2010; Miyazoe & Anderson, 2010).

To solve the problems of undergraduate students in Thailand and boost the ability of the students in this century, the blended instructional model via weblog should be developed, with an appropriate amount of stress placed on summary writing ability.

Research Objectives

The research objectives were to:

1. Develop a blended instructional model via weblog to enhance English summary writing ability of Thai undergraduate students.
2. Develop the efficiency of the blended instructional model via weblog to enhance English summary writing ability of Thai undergraduate students.
3. Study English summary writing of the university students taught by the blended instructional model via weblog.
4. Study the effect of the blended instructional model via weblog on English summary writing of Thai undergraduate students.

Literature Review

English summary writing ability is the use of the English language to write a brief account of the concepts contained within a text. This ability focuses on accuracy of information, content clarity and organization, use of different vocabulary, sentence structure, writing mechanics, and citations.

A good summary writing should be shorter than the original and be written in different words. The most important thing is that it contains all the main points of the original text, and it is composed using proper citation, thesis statements, major details, transitions, grammar and writing mechanics, and having a length of one third the original text. (Langan, 2000; MacMillan, 2009; Newman, 2009; Ramage, Bean, & Johnson, 2009).

To produce good summary writers, an effective model of instruction should be developed first. An instructional model is an explanation of learning activity procedures, teachers' roles, students' roles, and the learning environment. It consists of four components: principles, objectives, instructional activities, and evaluation. To design an effective instructional model, the developmental sequence should be considered.

A model can be developed through spiral activities consisting of analysis, design, development, implementation, and evaluation (Clark, 2000). Analysis is a contextual study to discover need and feasibility of the theoretical framework while designing instructional model for 21st century learning focuses on three aspects: (1) knowledge, work and the new economy; (2) cognitive methods of instruction; and (3) technology and training. Development takes the form of a drafted model and is explained in more detail via the four components. Implementation is used for effective model development to investigate whether learning can be improved. Evaluation appears at the end of the implementation and shows that the model is proven to produce effective results.

It is important to recognize the three drivers in the new design for building an instructional model, as proposed by Clark in 2002. The first driver responds to social need for the new economy which requires people with decision-making ability and problem-solving skills. That's the way to teach thinking to students. The second is a learning process through integration of new information and prior knowledge within an individual's memory. The process is related to the three types of memory in brain: sensory, short-term, and long-term memory. Viewing the screen of a computer monitor firstly affects learning in a sensory way, followed by the process of retrieving information in short-term memory, and then by storing permanent knowledge and skills in long-term memory. The final driver is the use of a computer as a medium for developing and revising the learning task as part of a process. This responds to the characteristics of students' learning methods in the twenty-first century. Use of these three drivers as components blended instruction should be considered for instructional model development in the twenty-first century.

Presently, modern model development is concerned with how students learn amidst the technology changes that are spreading all over the world. These changes have brought about opportunities for the use of educational technology called technology web 2.0. It provides both teachers and students with real situations for language use as two-way communication, especially when teaching writing (Crane, 2009).

Teaching writing in the 21st century could be modernized in four components as suggested by Prinz (2010); *multimodality of text* which are audio design, spatial design, visual design, and linguistic design that make the content interesting, *screens as emerging dominant media* is a monitor which is a mediated presenting writing tasks such as weblog and wikis, instead of presenting through papers, *transformation blog mode and medium constellations* are writing mode adaptation for writing process such as collaborative and online interaction, *changing social structures and relations*

is a traditional writing structure and a writing format that could be adjusted into a two-way communication which can be responding immediately. These four components make teaching writing effective in this era, when weblog is used in teaching as a tool for two-way communication.

Weblog is a tool of technology web 2.0 used for learning mediation that connects face-to-face learning and online learning. It is mediated in three ways of learning: linking to other weblogs, publishing written tasks of student writers, and performing as an electronic portfolio on the internet. Besides this, the use of weblog in social networks builds teacher-to-student friendships, students-to-student friendships, and students-to-“any other” friendships. With this communication, students improve their writing skill, being more autonomous writers, presenting their ideas freely, and posting more creative works on their weblogs (Prinz, 2010; Llach, 2010; Clark & Olson, 2010; Babaee, 2012).

On the other hand, Bahce & Taslaci (2009) found in an EFL experimental study at university level that weblogs affect EFL student writers, as they were used for language improvement, as well as for sharing and exchanging ideas, (not just for being a writing classroom). From this research finding it can be inferred that weblog, as full online learning, will not be suited for EFL learners, but will instead be used in a blended way that is more practical.

Blended instruction via weblog is a combination of in-class learning and online learning activities using weblog as a mediated form of learning. The mediation fare are used for searching among the links between learning sources in the world wide web, for publishing writing tasks, and for collecting the written tasks as portfolios that can be reached at anytime and anywhere (Lee & Lee, 2007; Oh & Park, 2009; Fujishiro & Miyaji, 2010; Prinz, 2010; Tiantong, 2011).

Considering the problems with English writing in Thailand mentioned previously, and the findings of blended instruction presented, the blended instructional model should be developed in Thai universities. Consequently, it should also be investigated whether Thai undergraduate students' summary writing ability is increased after learning via the model.

Related Study

The study of blended instruction is mostly conducted in EFL context as follow:

Miyazoe & Anderson (2010) conducted an experimental study in order to study a development of writing ability and satisfaction of the 61 second year students in Tokyo University using blended instruction via weblog, forum, and wikis. The face to face activity in class and online writing practice out of class were designed and used. All students were taught via the three technology medias. The lesson started with forums for an online discussion through a key board about a reading passage whereas a blog was used for writing activity after the discussion. Then Wikis was used for translating from English into Japanese for collaboration. All activity was done once a week. For writing, students practiced on blogs and a teacher also followed their progress via blogs. The finding were revealed that the students presented their positive attitudes to the blended instruction and the students has shown their writing progression as they used higher level of vocabulary and more complex of sentence writing.

In the same year, Kizil & Arslan (2010) found a significance of his blended instruction study through experimental research. The aim of the study was to study EFL writing integrated to process writing via weblog. A group of samples used in the study were 27 students who were studying English as a foreign language in Turkey University for 16 weeks. The group of students owned two blogs for each, for publish writing tasks and for follow up tasks. The tutor's blog was used for material delivery on line. The finding has shown that weblog affected writing performance in all

aspects, weblogs affected writing learning in all steps, weblogs affected feedback and revising writing task, and weblogs positively affected interest and motivation in using technology for learning.

Oh and Park (2009) surveyed the use of blended instruction and attitude of the university lecturers in Korea through questionnaires. All participants were 151 lectures from 33 different universities and representative teaching official from Office of the Higher Education Commission of Korea. The finding were revealed that 1) 64.4 percents of the lecturers used online instructional materials in class 2) 95.9 of the participants designed, developed, and revised online learning materials with the positive attitude towards blended instruction. 3) 70.6 percents of lectures were lack of motivation and 61.8 percents were also lack of enthusiasm in using blended instruction. They all need supporting facilities from faculties which is workshop about instructional design and technology that supports blended instruction in order to increase the use of blended instruction at tertiary level in the country.

Bahce and Taslaci (2009) had conducted an experimental research in order to study writing ability of the students using blended instruction via weblog learning and face-to-face learning. 55 students of Anadolu University in Turkey were used in this study for 1 year (around the year 2007-2008). Teaching time is 6 hours a week. Learning activities were weblog orientation, face-to-face learning, and writing practice via blogs. At the end of the study, the results indicated that 1) blog is an interaction resource in real life which the students can directly experience in three folds: learning output, technology, creativity, and learning innovation. 2) Blogs is an effective learning resource that provides real effective learning output 3) blog provides opportunity for interaction at anytime and anywhere with unlimited learning. 4) Blogs is a place for collaborative resource for language development, not a language classroom.

In conclusion, blended instruction via weblog can probably enhance the university students' summary writing in effective ways. The idea of blended instruction is designed for orientation first, and then flowed by both in class and out of class activity via weblogs.

Methodology and Methods

The mixed methodology was conducted in academic year 2010-2013 with four phases: analyzing context using a qualitative procedure, synthesizing the instructional model using document analysis, developing the model's efficiency through action research, and study the effect of the model on English summary writing ability of the university students. To achieve the objective of the study, it was conducted and implemented in academic year 2010-2013 as shown in figure 1 below:

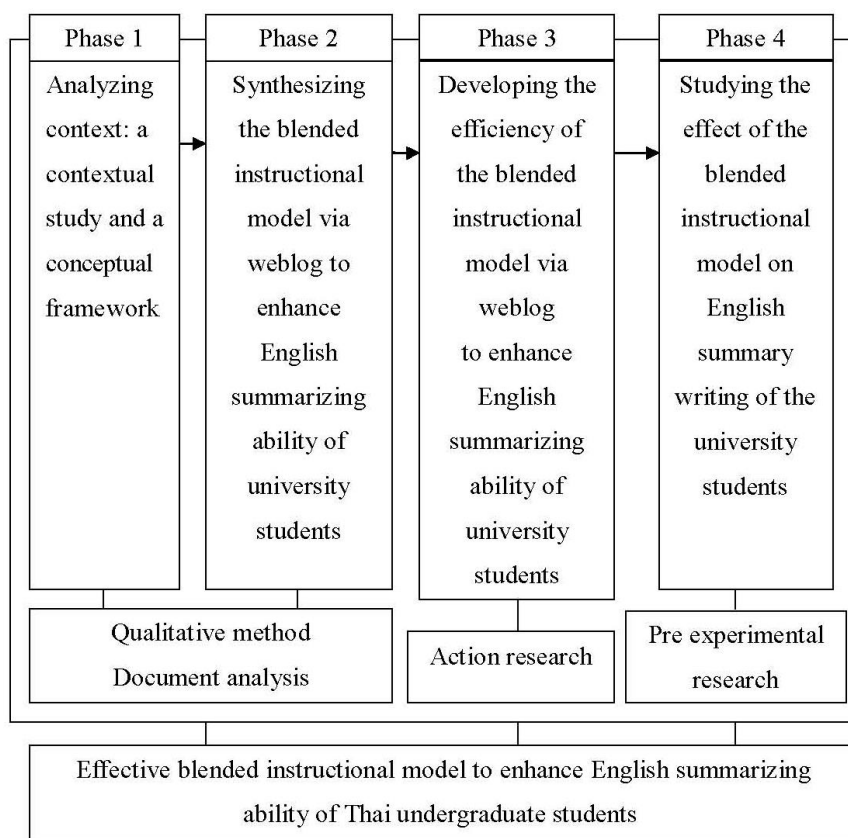


Figure 1. Phases of the study

Figure 1 shows phases of the study which can be explained as follows:

Phase 1: Analyzing context. The objectives of this phase were to study some vital information of undergraduate students at Nakhon Ratchasima Rajabhat University, concerning their problem-solving of English summary writing ability, and to study a conceptual framework. Participants were composed of thirty students majoring in English. Other participants were two selected lecturers in the English program. Data collection was informal interview using semi-structured interview form and a test. After that document analysis from various sources was reviewed and analyzed. Then typology technique was used to categorize the information. The output was a conceptual framework prepared for the instructional model design and construction.

Phase 2: Synthesizing the instructional model. The objective of this phase was to construct the instructional model. It was constructed via the conceptual framework without participants. The instructional model was synthesized and quality-checked its construct validity by three experts. The experts were qualified in curriculum and instruction, specific in teaching English of at least 10 years of teaching English experience at the university level. The output of this phase was a proposed blended instructional model via weblog for enhancing summary writing ability of Thai undergraduate students.

Phase 3: Developing the model's efficiency. The objective of this phase was to develop the efficiency and effectiveness of the proposed instructional model using action research. It was implemented through three action research cycles (Costello, 2003). The criterion was set at 80 percent of the target group achieving the English summary writing criterion at 70 percent of the total post-test scores. Fourteen students majoring in English of Nakhon Ratchasima Rajabhat University were volunteers as a target group. The instruments used were lesson plans, a semi-

structured interview form, the learning and instructional record format, the record format of individualized ability development, efficient writing criteria, and an effective test for English summary writing.

Eight experts were used in this phase. Three of them were phase-two experts for examining and quality-checking the model and its lesson plan, a semi-structured interview form, the learning and instructional record format, the record format of individualized ability development, efficient writing criteria, and an effective test for English summary writing. Another three experts were qualified in master degree in English and teaching English as a foreign language and hold a certificate in testing and material production for examining and quality-checking a scoring rubric. Another two experts were qualified in master degree in English and English Study and have at least teaching English experience of the campus for 3-5 years for being co-raters of the scoring rubrics with a researcher.

The average mean score of construct validity among three experts was 3.89; its quality was at a very good level of construction according to theories contained in the conceptual framework. Average scores of reliability among three experts of the proposed model, lesson plan, the record format of individualized ability development, the learning and instructional record format, teaching behavior record format, learning behavior record format, and a semi-structured interview form were 4.08, 4.00, 3.80, 3.92, 3.92, 4.00, and 3.67, respectively. Also, a writing criterion had its validity at 4.00 with its relevancy among three raters considered in three couples were at 0.73, 0.75, and 0.79 which were at a very high reliability for those written test that could be evaluated by anyone. Besides, an average score of IOC index among three experts of a written test of English summary writing was at 1.00.

The target group took a pre-test then studied a summary writing via the proposed model and its quality-checked lesson plan for three cycles. During each cycle of action research was done, the data were gathered via a semi-structured interview form, the learning and instructional record format, the record format of individualized ability development, and efficient writing criteria. Instructional activities were altered according to unsatisfied data from each cycle, until the set criterion was achieved. The group took posttest at the end of the study. The data were then analyzed by percentage, means, standard deviation, and the t-test for dependent samples. The output is an efficient blended instructional model via weblog to enhance English summary writing of Thai under graduate students.

Phase 4: Studying the effect of the efficient blended instructional model. The objective of this phase was to investigate the effect of the efficient model on English summary writing of university students. A “one group post-test only design” was used as a research design at this phase. The criterion was set at 80 percent of the students achieving the English summary writing criterion at 75 percent of the total post-test scores. A sample group was formed of forty-one students majoring in English who registered for an academic writing course in semester 2 of academic year 2013. The instruments were all taken from phase 3. The data were then analyzed by using percentage. The output was the effective blended instructional model via weblog to enhance English summary writing for Thai undergraduate students.

Results

1. A proposed blended instructional model via weblog to enhance English summary writing ability of Thai undergraduate students was synthesized based on the conceptual framework. All instruction activities were described in the five components: background of the model, locating model components, principles, objectives, contents, learning activities, media, and assessment and

evaluation. The instruction consisted of preparations, taking notes, summarizing, and publishing. The first three were face-to-face activities, whereas the fourth was on weblog.

2. After three cycles of action research, the proposed model was found to be effective. The model was revised by changing some learning activities based on the qualitative data from the students' interview. Then, two phases of instruction were carried out: the preparatory phase and the instructional phase. The first one concerning the lecturer's and the student's preparation for teaching and learning, and medias preparation relating to the tutor's and students' weblogs. The second is the instructional phase containing three stages of instruction. Firstly, extracting information involves four activities in class: surveying text, identifying key sentences, taking notes, and analyzing key-words. Secondly, summary writing via weblog comprised of three activities in process writing; drafting, reviewing and revising, and editing. The final stage of instruction: publishing on weblog comprises uploading files, studying comments, selecting possible comments, and visiting classmates' weblogs.

According to the three-staged activities of the instructional model, it was also found in cycle 3 that 100 percent of the students had achieved the writing criterion set at 70 percent (34 scores) of the total post-test scores as shown in table 1.

Table 1. Post-test scores of the students compared to the set criterion at 70 percent of the total scores (34 scores; N=14).

Test	Total scores	Average) $\bar{X}$ (	Numbers of students passed	Percentage of students passed
Posttest	48	41.43	14	100

Table 1 shows post-test scores of the students compared to the setting criterion at 70 percent of the total scores. It was revealed that the average score that students obtained was 41.43, with 100 percents of students achieving the criterion at 70 percent of the total post-test scores.

3. It was also revealed that the post-test scores of the students after the model implementation was higher than the pretest scores at .05 level of significance as shown in Table 2.

Table 2. A summary of writing ability pretest and post-test scores after teaching through the use of the proposed model.

Test	N	$\bar{X}$	S.D.	t	Sig.
Pretest	14	22.7857	3.23867	14.945*	.000
Posttest	14	41.4286	3.79705		

* significant level .05

Table 2 shows a summary of writing ability pretest and post-test scores after teaching through the use of the proposed model. It was revealed that post-test scores were higher than pretest scores at .05 level of significance. From the results in table 1 and 2, it can be concluded that after teaching using the proposed model, the students significantly improved their summary writing ability.

4. After teaching with the effective model using pre-experimental research, it was revealed that more than 80 percent of the students achieved the writing criterion set at 75 percent of the total post-test scores as shown in table 3.

Table 3. Average post-test scores for English summary writing compared to the set criterion at 75 percent (36 scores) of the total scores (48 scores) N=41).

Test	Total scores	Number of students	Number of students passed	Average $\bar{X}$	Percentage of students passed
Posttest	48	41	41	43.88	100

Table 3 shows post-test scores of the students compared to the set criterion at 75 percent of the total scores. It was revealed that the average scores students obtained was 43.88, with more than 80 percents of the students achieving the criterion at 75 percent of the total posttest scores.

For qualitative data gathered during three action research cycle, they affected the instructional activities lead to some changes of instructional activities as shown in figure 2 below:

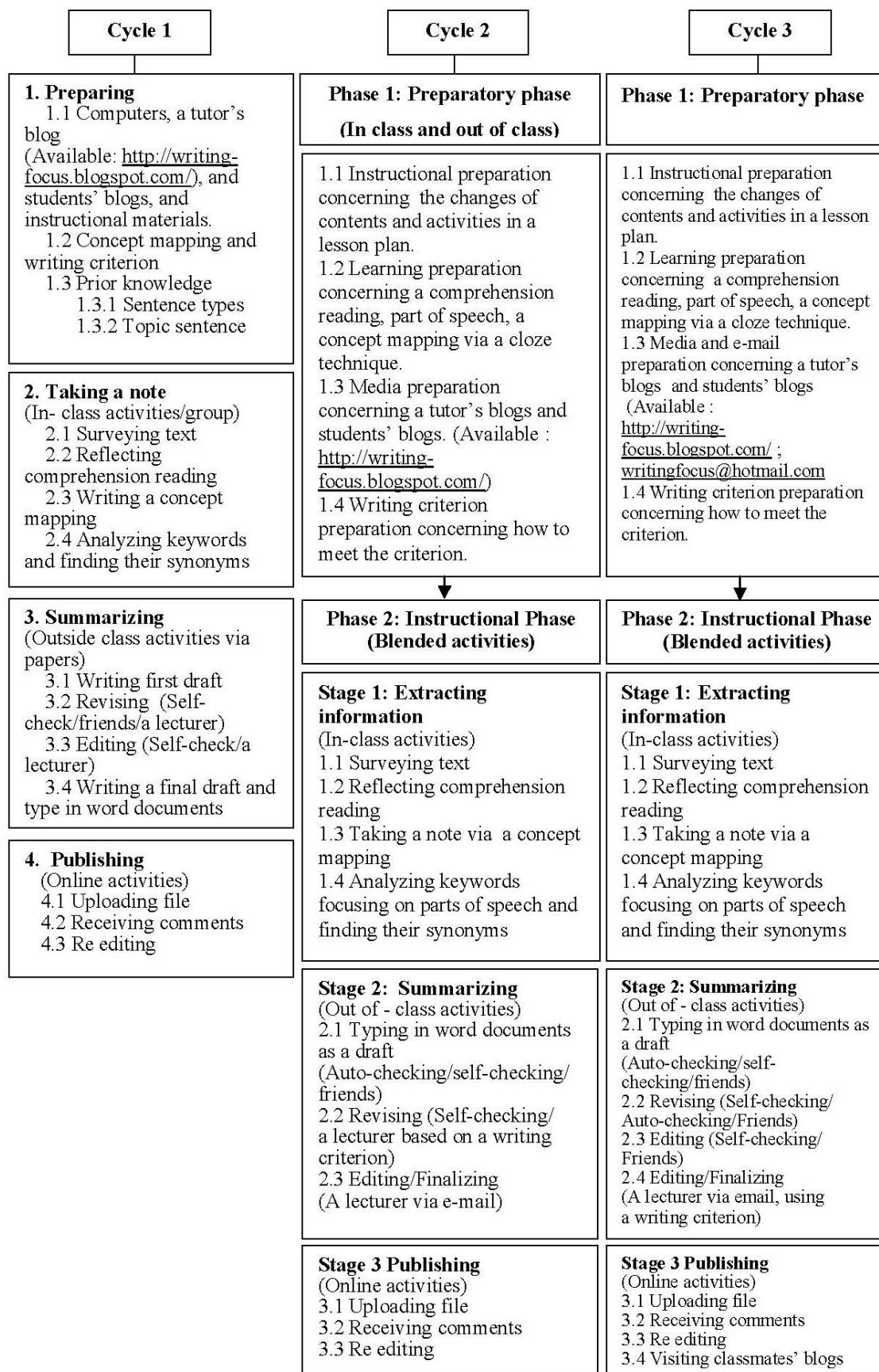


Figure 2. Changes of instructional activities among three cycles of the action research.

Figure 2 show the changes of instructional activities among three cycles of the action research. Considering cycle three, the instructional model was effective, as the criterion was achieved by 100 percent of the students, with its activities comprised two preparatory phases and three instructional stages as follow:

1. The preparatory phase. There are three activities for teachers and students;
 - 1.1. Lecturer's preparation for teaching.
 - 1.2. Student's preparation for learning.
 - 1.3. Medias preparation concerning the tutor's and students' weblogs.
2. The instructional phase. The instructional phase containing three stages of instruction;
 - 2.1. Extracting information involves four activities in class: surveying text, identifying key sentences, taking notes, and analyzing key-words.
 - 2.2. Summary writing via weblog comprised three activities in process writing; drafting, reviewing and revising, and editing.
 - 2.3. Publishing on weblog comprises uploading files, studying comments, selecting possible comments, and visiting classmates' weblogs.

Based on the findings, it can be concluded that the model constructed by the researcher was effective, as it increased student's English summary writing ability at all phases of the study. At the end of the study, the model was named "S2A Model" (S two A Model) which stands for "Summary Writing in Academic Area Model".

Discussion

The model is effective in enhancing writing ability of the students as shown in table 1-3. The effectiveness may be due to the following reasons:

1. The model is designed based on drivers of the new instructional design that develop problem-solving skills, thinking skills, and writing skills via technology web 2.0. In other words; they learned and practiced using searching skills, chunking skills, and using computer skills. These abilities supported their writing skills by helping them discover vocabularies they needed via the links between networks, grouping the main points leading to accurate summarizing, and conveniently producing and publishing their written tasks via two-way communication technology. Therefore, the criterion was achieved both in phase 3 and 4. The result is related to the ideas of Clark (2002) who stated that modernized instructional design responds to computer literacy, which in turn support writing literacy of students in this era.
2. The model consisted of a combination of face-to-face learning activity (in class) and online practice activity via weblog (out of class); therein focusing on collaboration among students in a learning environment with interesting technology. Students acquire accuracy of knowledge along the correct methods used for finding it in terms of the right citation through the use of online learning supports and group works. This resulted in students obtaining direct experience during their face-to-face activities in class. When writing, they would receive feedback from the teacher that affected their self-practice out-of-class in positive way. Thus the model is effective in increasing students' writing ability. The result is related to the finding of Kizil & Arslan (2010) that positive feedback via learning supports are caused by effective blended instruction via weblog.

3. Weblog helps in solving writing problems such as using words in context, grammar, sentence types, and writing mechanics that students can access from the links a teacher provides in the tutor's blog. This is the help that students need while writing when they are both in and out of class. Also, weblog plays an important role in terms of an electronic portfolio that can be reached at anytime and anywhere, a place for sharing and publishing their written assignments, and having interaction among friends by linking to each other's weblogs. Furthermore, after face to face activity, students practiced on weblogs, with a teacher also following their progress via weblogs. This boosted the effectiveness of the model as shown in the study.

The finding was similar to the research results of Bahce & Taslaci (2009), Miyazoe and Anderson (2010), and Babee (2012) who reported that weblog was a place for online collaborative learning during completion of the assignments, and it was two-way communication that helped students improve their summary writing skill via interaction.

4. The findings showed that the blended instructional model via weblog is effective. It clearly revealed its effectiveness with its blended learning activities both in and out of class. The model led the students to boost their writing summary skills, as they summarized using more academic vocabulary, accurate punctuation, accurate content and clarity, and accurate citation. These abilities result from the effective learning activities included in the model. The successful finding is related to the results of Bahce and Taslaci (2009), Kizil & Arslan (2010), and Miyazoe & Anderson (2010) who found significant results which showed that undergraduate students acquired effective writing skills after they were taught using blended instruction via weblog.

Conclusions

According to the results of each phase of the study, it can be concluded that the blended instructional model via weblog was effective with its steps of instruction that significantly enhanced the English summary writing of Thai undergraduate students.

The out- put of this study was the effective model of instruction to enhance English summary writing ability of Thai university students. The model was synthesized and explained in four components: Principles, objectives, instructional activities, and evaluation techniques.

The instructional activities consisted of the following activities:

1. The preparatory phase. There are three activities for teachers and students: (1.1) Lecturer's preparation for teaching. (1.2) Student's preparation for learning. And (1.3) Medias preparation concerning the tutor's and students' weblogs.

2. The instructional phase. The instructional phase contains three stages of instruction: (2.1) Extracting information involves four activities in class: surveying text, identifying key sentences, taking notes, and analyzing key-words. (2.2) Summary writing via weblog comprised three activities in process writing; drafting, reviewing and revising, and editing. (2.3) Publishing on weblog comprises uploading files, studying comments, selecting possible comments, and visiting classmates' weblogs.

The model is effective as the finding is revealed that it had enhanced the summary writing ability of the Thai undergraduate students. Therefore, the blended instructional model via weblog to enhance English summary writing of university students constructed by the researcher or "S2A Model" is the effective model of instruction that is practical in teaching summary writing in Thai university.

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General Attitude and Acceptance of Holography in Teaching Among Lecturers in Nigerian Colleges of Education

Suleiman A. Ahmad, Isyaku M. Abdullahi, and Mohammed Usman

Abstract

E-learning is a byproduct of instructional design. Thus online learning designers, in their approaches are expected to be familiar with the epistemological underpinnings of several theories and their consequences on the process of instruction. In the same vein constructivism holds assumptions, that learning is an active process whereby the learner constructs knowledge base on experience. Secondly, learning occurs when there is disequilibrium. It therefore takes place in a social context. Recently, technological developments are playing an important role in improving the educational process especially the integration of holographic presentation in the area. A hologram is a three-dimensional record of the positive interference of laser light waves. Teacher training in virtual holographic classrooms could help the new teachers adapt to a real problematic classroom with such tools. Nigeria being one of the moderately growing economy and a successful and relatively stable democracy, educational development is always on the increase due to commitment of government in the area.

Holography is a virgin area in the Nigerian educational mindset. Colleges of education in Nigeria are basically teacher training institutions. Teachers are the backbone of education every development. This brought about the need of this study to investigate on the perception, appreciation attitude as well as acceptance of holography in teaching among the academicians in colleges of education in the Nigerian context. This study therefore in a small sample of 100 teachers survey opinions and reported the results in a descriptive statistics as well as variance (t-test and ANOVA) with regards to gender and designation. On the scale of structural equation modeling (SEM) tool and SPSS regression analysis as well, it presents the actual model of the modified technology acceptance model TAM. The finding indicates less positive attitude and less general acceptance of the holographic system in the teaching processes by teachers in the Nigerian College of Education.

Keywords: TAM; holography; teaching; colleges; Nigeria.

Introduction

Hologram Technology

Holography can be referring to as a method of obtaining photographic image in three-dimensions. The word hologram is Greek, the root words are *holos*, “whole”; *gram*, “message”) and translates into ‘whole picture’. Holograms differ from ordinary photographs, because the holograms record an extremely accurate three-dimensional (3D) image of the original object. A hologram is a three-dimensional record of the positive interference of laser light waves. The structure of a synthetic hologram is made of thousands of 3D computer graphic images corresponding to as much points of view on a three-dimensional scene. These can be done without a lens, that is why is sometimes called lens less photography. Dennis Gabor in 1947 had the credit of father of holography for theorizing these principles. His write up become the foundation of modern holography. A hologram looks so realistic because it is an exact recording of the light waves reflected from the object. Holograms do not usually reproduce the true colors of the original object. The image’s color mainly depends on the color of the laser used to make the hologram and is also determined by processing methods. Multi-colored images are created by using different lasers. The most common type of laser used is helium-neon (HeNe). Even though some holograms are made from diodes from red laser pointers, they are usually unstable and less coherent. Although, holography is generally referred to as “lens-less photography,” it requires lenses. Unlike photography, holographic lenses spread out beamed light in hologram. The beam splitter is used to divide a beam of light into two (Wilson 2010).

Laser technology

Without light there will be no hologram. The light as is known scientifically is an output of the excited atoms that give off energy. The atoms themselves are the building blocks of all matter and they consist of positively charged nucleus of protons and neutrons that are orbited by a cloud of negatively charged electrons. Laser beam is a produced collection rays of light. Laser technology forms the platform for holography. Albert Einstein was the first to suggest the idea regarding the laser back in 1917. Einstein postulated that light was made up of a series of particles which he called photons and were traveling in a continuous move as wave. The technical term for “LASER” is an acronym which stands for “Light Amplification by Stimulated Emission of Radiation.” Thus, stimulated emission refers to the act of one light particle (photon) stimulating the emission of another photon. Radiation therefore is energy that travels in a wave and spreads out as it goes. In lasers, the radiation refers to that energy emitted by the laser in the form of radiating light particles or photons. Other forms of radiation include radio waves, microwaves, infrared waves, ultraviolet rays, and gamma rays.

Holograms process

In (Figure 1) below it illustrates a basic set up of how holograms work. The process involves using a laser, a beam splitter, two mirrors, two lenses and the object itself. The laser beams light into the beam splitter, which divides the light into two (Wilson, 2010).

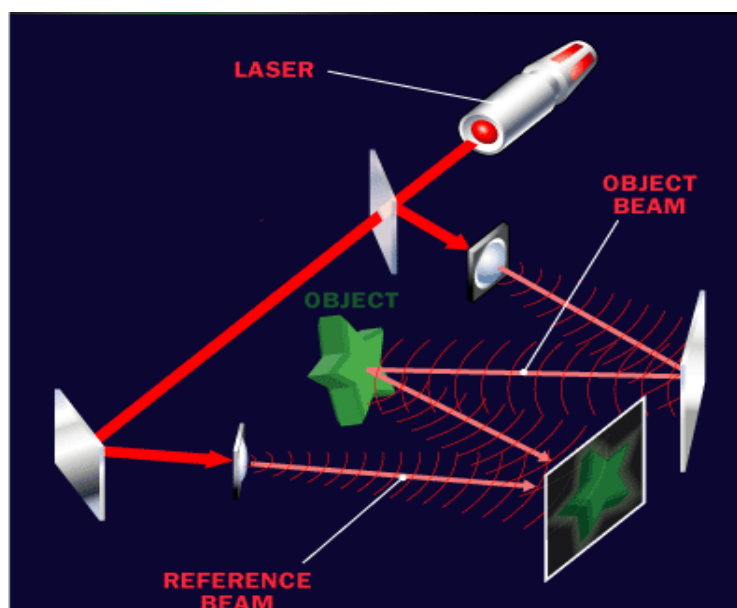


Figure 1. Set up of how laser holograms work (Wilson, 2010)

Before the first lasers, the first holograms weren't three-dimensional, but flat two-dimensional transparencies made from the very slightly coherent light of a sodium vapor lamp. In 1962, Emmett Leith and Juris Upatienks, at the University of Michigan started making of three-dimensional holograms. Now hologram can be projected in a complete 360 degree holographic display (figure 2).



Figure 2. Complete 360 degree holographic display

Sometimes back the president of the Microsoft Corporation Bill Gates appeared holographically in Kuala Lumpur to address a group of people. Prince Charles also addressed a crowd in Abu Dhabi via holography (Mail Online, 2007). Now a day, I have a dream one day I will holographically make my conference presentation somewhere. As a teacher, holography can impact my lesson through tool approach presentation. It can be use to easily bring teaching materials/aids for the learners to view. It can be seen now a difficult task, unrealistic, unnecessary and undesirable. None the less good catch is for the early bird. It has never been early starting from the scratch. Albert Einstein German-born U.S. physicist puts that "if an idea is not absurd at first, then there is no hope for it." Brighter doors are open for better hopes on holography.

Purpose

The purpose of this research is to put forward innovative ways in which holographic technologies can be applied in education. Thus, this work focuses on holography and its application in education. This research intends to promote further research and development in the field of holography and its application in education considering the fact that it's a virgin area to many academics especially in Nigeria. It therefore needs to be explored.

Objectives

This study aims:

1. To investigate on the attitude toward holography in teaching among Nigerian colleges of education teachers
2. To find out the extent of acceptance of holography in teaching among Nigerian colleges of education Educators
3. To identify the gender difference among Nigerian colleges of education educators in the attitude towards holography in teaching.
4. To identify the attitudinal difference towards holography in teaching among Nigerian colleges of education educators in terms of their designation/level.

Hypotheses

The research therefore addresses the following hypothesis;

1. There is no significant attitude toward holography in teaching among Nigerian colleges of education teachers
2. Nigerian colleges of education educators do not significantly accept holography in teaching
3. There is no significant gender difference in the attitude towards holography in teaching among Nigerian colleges of education teachers
4. There is no significant difference in terms of designation/level in the attitude towards holography in teaching among Nigerian colleges of education teachers

Literature

How holography works

The way holography operates is by creating the illusion of three-dimensional imagery. A light source is projected onto the surface of an object and scattered. A second light illuminates the object to create interference between both sources. Essentially, the two light sources interact with each other and cause diffraction, which appears as a 3D image.

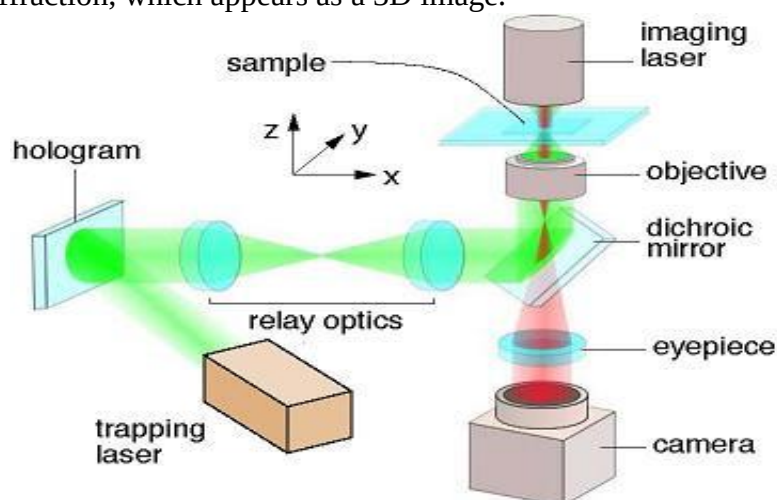


Figure 3. Diagram of the Hologram (Serrao, 2008)

Holography in Future in Nigeria

The theory of constructivism stresses great importance on improving open learning experience and by doing. Nonetheless, for the past two decades major progress has taken place in the field of ICT usage in learning environments. The advantages offered by ICT in education sector have led many educational institutions to integrate ICT services into their respective academic departments especially in the advanced societies and very few third world countries. These rapid developments result tremendous changes in many fields and endeavors of life education inclusive. Therefore, educational institutions quickly took advantages of constructivist technological services by integrating ICT into education, which in turn has produced new models of education such as e-learning, m-learning, interactive learning and blended learning. Recently, technological developments are playing an important role in improving the educational process especially the integration of holographic presentation in the area. Holography will surely enhance research going on in the field of virtual office concepts and video conferencing. Those studying holographic technologies will be preferred by educators and students and business trainers. Avatars can be introduced to assist youngsters in eLearning. This will help with teaching in overloaded classrooms and increases the learning of the students. However none of the Nigerian tertiary institution practically employs or even attempted to test the holography as a course or as practical experience in the process of teaching and learning.



Figure 4. Map of Nigeria (World Fact Book)

The art of ‘public speaking fears’ was defeated. Training teachers in virtual holographic classrooms could help the new teachers adapt to a real problematic situation in classroom (Winslow, 2007). Of course such virtual artificial intelligence tools or holographic assistants can come in many forms such as ‘one on one’ with holographic avatars or for use in training of adults in real life simulation. A college class may have a guest speaker and soon such virtual holographic speakers ought to be a little bit cheaper compare to the physical speakers because no flight risk, no hosting and feeding (Harrison, 2009). Presentation and demonstrations on distance e-learning initiatives where the holographic images are broadcast/beam over the internet would be made possible sooner and everywhere (Lance, 2007; Suleiman, 2014).

Alas! Power being a basic requirement to the technological development is yet to be adequate in my country Nigeria. There is less or lack of so many infrastructural and technological facilities in most tertiary institutions in the country. The ICT penetration is very low and the digital divide is quite wide. Nigeria has a total number of 129 approved universities in Nigeria comprising 40 Federal Universities, 39 State Universities and 50 Private Universities (NUC, 2014; Iruonagbe et al., 2015). In 2013, for instance the government allocated and spent over \$2.84 billion (N426.53 billion) in running these institutions (Suleiman, 2014; TETFund, 2014). All these geared toward improving dynamism and positive change and innovations in ascertaining quality education for a viable development.

Recently, technological developments are playing an important role in improving the educational process especially the integration of holographic presentation in the area. It has also produced new models of education such as e-learning, m-learning, interactive learning and blended learning. Teacher Training in virtual Holographic Classrooms could help the new teachers adapt to a real problematic classroom with such tools (Husain 2010). Nigeria being one of the moderately growing economy and a successful and relatively stable democracy, educational development is always on the increase due to commitment of government in the area. Holography is a virgin area in the Nigerian educational mindset. Most Nigerian tertiary institutions have teacher training programs but holography is not well recognized to be teaching tool in such departments. However, it is well established that teachers are the backbone of education every development (Suleiman, 2014).

Holography and Education

By now, holography is already being used in various aspects of our lives. There are also ongoing researches in holography by educational institutions to elevate holography from its infant stage. However, holography as it is has already been tested for the benefit of educational institutions. Holography being in its infant stage has not been widely used in education even in the advance countries. However, application of holography in education is not new; it has been used in the past in a school but technological requirements are hampering its applications (BBC, 2000). In the year 2000, a hologram of Catharine Darnton, a Mathematics teacher was successfully beamed into an exhibition centre in a school in South London. Although, the distance of transition was minimal, long distance projection is possible since the images are transmitted over the internet.



Figure 5. Demonstration of a Holoteacher
(http://news.bbc.co.uk/2/hi/in_depth/education/2000/bett2000/600667.stm)

Holography differs from video conferencing because the teacher's full 3D image can be beamed and appears to be in the classroom. While in video conferencing users can easily notice the image on a screen from a one camera (BBC, 2000). Several benefits were identified with the use of holography to teachers. Darnton, states "I teach further mathematics, we've only got six candidates in the school doing that. The economics make those sorts of classes difficult to lay on," she said.

"But if you could have a single teacher being able to see three or four classrooms across a borough or something like that, then perhaps those sorts of subjects would be viable (BBC, 2000).



Figure 6. Touchable hologram bounces in contact with a human hand (Pescovitz, 2009)

The holographic projection of Darnton was made possible by Edex, the largest supplier of internet connections in United Kingdom in educational technology market. According to Edex, for the system to be usable, fast internet connection is required. Thus, Edex is advocating for a fast national network for education (BBC, 2000). Haptic holography's applicability in education is further enhanced by the possibility of allowing people to feel the presence of the holographic environment and interact with it by touching (fig 6). This is a system that uses airborne ultrasound tactile display which was developed and demonstrated at University of Tokyo by group of researchers (Takayuki Iwamoto & Mari Tatzono) led by Hiroyuki Shinoda. Although such display cannot be feel or sense without use of retro-reflective device yet there is need for such physical interaction with the holographic environment especially in interactive educational fields for teaching, training and learning (fig 7) (Takayuki, Mari, & Hiroyuki, 2008).



Figure 7. Samsung mobile functionality displayed using holography (Gizmodo, 2010)

In this area we can take advantage of holography in different forms. For example, holograms now allow students to be taught by a "virtual teacher" who could be many kilometers away. The process goes a step beyond video conferencing in that the hologram teacher appears to be in the classroom, and can be seen and can speak to the pupils as if they were all in the same room (Husain 2010). The system used by Edex was shown in London (BBC, 2000). Moreover, holography can enhance the educational process by bringing famous characters back to life again from the past. They can speak about themselves and/or explain something as an assistant teacher. In Seoul's for instance,

‘Alive Gallery Project Holograms’ and ‘3-D Animation Technology’ bring world-renowned masterpieces of Western Art to life again. In that project visitors can see the exhibited hologram in 3D animation of ‘Mona Lisa’ (fig.8) answering questions from students, such as "why don't you have any eyebrows?" She is answering, “when I was alive, a woman who had big forehead was considered a beauty ... so most women had their eyebrows taken off for beauty" (Husain, 2010; Suleiman, 2014).



Figure 8. Display of the Hologram Mona Lisa (<http://www.bridgemanimages.com/en-GB/explore/news/images-in-action/2011/june11/Alive-gallery-interactive>)

Augmented Reality and holography

Holography could be understood in different forms such as augmented reality and SixthSense. This gives an adjusted real world where images or text are displayed upon real objects (Burdea & Coiffet, 2003). Augmented reality is also becoming part of our everyday life which includes mobile appliances, shopping malls, training, and more importantly education. Sixth Sense illustrates augmented reality system which can let one (teacher/learner) to project a holographic keyboard on the table top and/or phone pad onto one's hand (fig. 10) (Boyd, 2009). The Sixth Sense augmented reality systems is an innovation by the Pranav Mistry in 1997 at MIT's Medialab, it is a wearable gestural Ambient Intelligence device. The SixthSense adjusts our physical environment with digital information and enables our natural hand to connect with the displayed information (Tscheligi et al., 2009). SixthSense consolidates our environments (physical and virtual) with digital information (fig. 11) on daily news, weather forecast, travel schedules, global markets prices and so forth.



Figure 10. Holographic display of phone pad onto one's hand



Figure 11. A 220px-SixthSense_Augmented_Newspaper

Virtual Reality and holography

Virtual reality (VR) is another different form of holography and it is here and everywhere now; simply because even students at remote places can attend lectures in virtual environment. Virtual reality allows for mobility since students can access the virtual campus from many other different locations. This idea emanates back in 1960s from the works of Raymond Goertz at Argonne National Laboratory in Argonne, Illinois, and Ivan Sutherland at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts all USA. The process of virtual reality creates a three-dimensional computer-generated representation of either a real or proposed object or environment. There exists that kind of symbiotic relationship between virtual reality and holography. Holography takes us a step further by bringing the virtual environment into our physical presence. There are several potentials and predictions of how the holography technology can be used as an educational tool in the future (Bellis, 2010). Holographic technologies are currently being used for many purposes such as security stamps for currencies, display of goods and services for marketing purposes and now for educational purposes.

Holography may be used in various ways in the educational sector and can change the way people learn in the future. For instance, using holography to beam a live teacher to various locations around the world may enhance learning and solve some educational problems. One of the problems identified is the shortage of teachers in educational institutions. Holography can also enhance learning processes and standard of education. Imagine oneself in a classroom in Nigeria and a renowned researcher or teacher from any part of the world, Japan for instance is beamed through into the classroom over there in Nigeria to interact and collaborate with learners. One can interact with the researcher in real-time and it appears exactly like everyone is in the same room. Researchers and teachers will not only be able to use verbal communication but also body language and virtual images to share and exchange information. In addition, education tools which may be physically unavailable due to cost or scarcity can be projected into the other classrooms as holograms to serve as teaching materials.

Methodology

The design of this study is a quantitative research that surveyed on a piloted small sample (100) assessed from few targeted teacher training institutions in Nigeria consisting of two from each of the geo-political zone of the country. The researchers collected data by distributing 130 questionnaires physically and by email to some randomly and purposefully selected subjects in form of snowball from the targeted institutions of the accessible population in the scope area of the research that is Nigeria. The distribution and collection was also done through the National Commission for College of Education which is the accreditation body for all the colleges of

educations in Nigeria The distribution cut across various strata with regards to gender and academic level or designation in institutions from the 12 targeted colleges of education in Nigeria of which only two were selected from each geo-political zone of the country (Table 1).

Considering the fact that Nigeria has numerous federal, state and privately funded college of education numbered to about 102 (21 federal, 45 state and, 36 private) (NCCE/ FGN, 2014). The population comprised only of all the academic staff in the public universities in Nigeria totaled to about 17,951 (assistant lecturer to chief lecturer) (NCCE, 2013). This population was chosen for the fact that the colleges of education academic staff had been involved in provision and using ICT tools in their service delivery in the country and to some extent they are moderately funded alongside other tertiary institutions.

TAM has been applied in numerous studies testing user acceptance of word processors (Davis et al., 1989), spreadsheet applications (Mathieson, 1991), e-mail (Szajna, 1996), web browser (Morris & Dillon, 1997), telemedicine (Hu et al., 1999), websites (Koufaris, 2002), e-collaboration (Dasgupta, Granger, & McGarry, 2002), and blackboard (Landry, Griffeth & Hartman, 2006) the e-learning (Masrom, 2007). Davis (1989) proposes that ease of use and usefulness of technology are predictors of user attitude towards using the technology, subsequent behavioral intentions and actual usage. Perceived ease of use was also considered to influence perceived usefulness of technology.

Table 1. List of colleges of education targeted

S/N	Institutions Sampled	Zone	State
1	Federal College of Education Akoka	South West	Lagos
2	College of Education (Special) Oyo	South West	Oyo
3	Federal College of Education Obudu	South South	Cross Rivers
4	College of Education Warri	South South	Delta
5	Federal College of Education (Tech) Umunze	South East	Anambra
6	College of Education Enugu	South East	Enugu
7	Federal College of Education Okene	North Central	Kogi
8	College of Education Minna	North Central	Niger
9.	College of Education Maiduguri	North East	Maiduguri
10.	Federal College of Education Yola	North East	Adamawa
11	Federal College of Education Gusau	North West	Zamfara
12	College of Education Kano	North West	Kano

Findings and Discussions

Quantitative

The distribution of the demography indicates gender level (table 2) of the frequency 59 female and 41 male (mean=**1.4**/SD=**.49**) while the academic level or designation (table 3) shows middle level having the highest of 49 and the lowest is indicated as other with the frequency of 11 respondents. (mean=**2.1**/SD=**.91**)

Table 2. Frequency distribution on the gender among Nigerian college of education teachers

		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	SD
Valid	FEMALE	59	59.0	59.0	59.0	1.41	.494
	MALE	41	41.0	41.0	100.0		
	Total	100	100.0	100.0			

Table 3. Frequency distribution on the designation/level among Nigerian college of education Teachers

		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	SD
Valid	lower level (L3-AS)	25	25.0	25.0	25.0	2.12	.913
	middle level (L2)	49	49.0	49.0	74.0		
	upper level (CL-PL)	15	15.0	15.0	89.0		
	other (emeritus/contract/instructor)	11	11.0	11.0	100.0		
	Total	100	100.0	100.0			

The reliability test was carried out on the main construct attitude thus, the Cronbach Alpha reliability indicates **.841** at the initial this suggests high internal consistency reliability (table 4).

Table 4. Reliability Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.841	35

To address the issues on the general attitude and acceptance of holography in teaching among Nigerian colleges of education educators the proposed technology acceptance model (TAM) was tested with regression analysis and the actual model (figure 11) and the regression statistics (table 5 and 6) were present as follows:

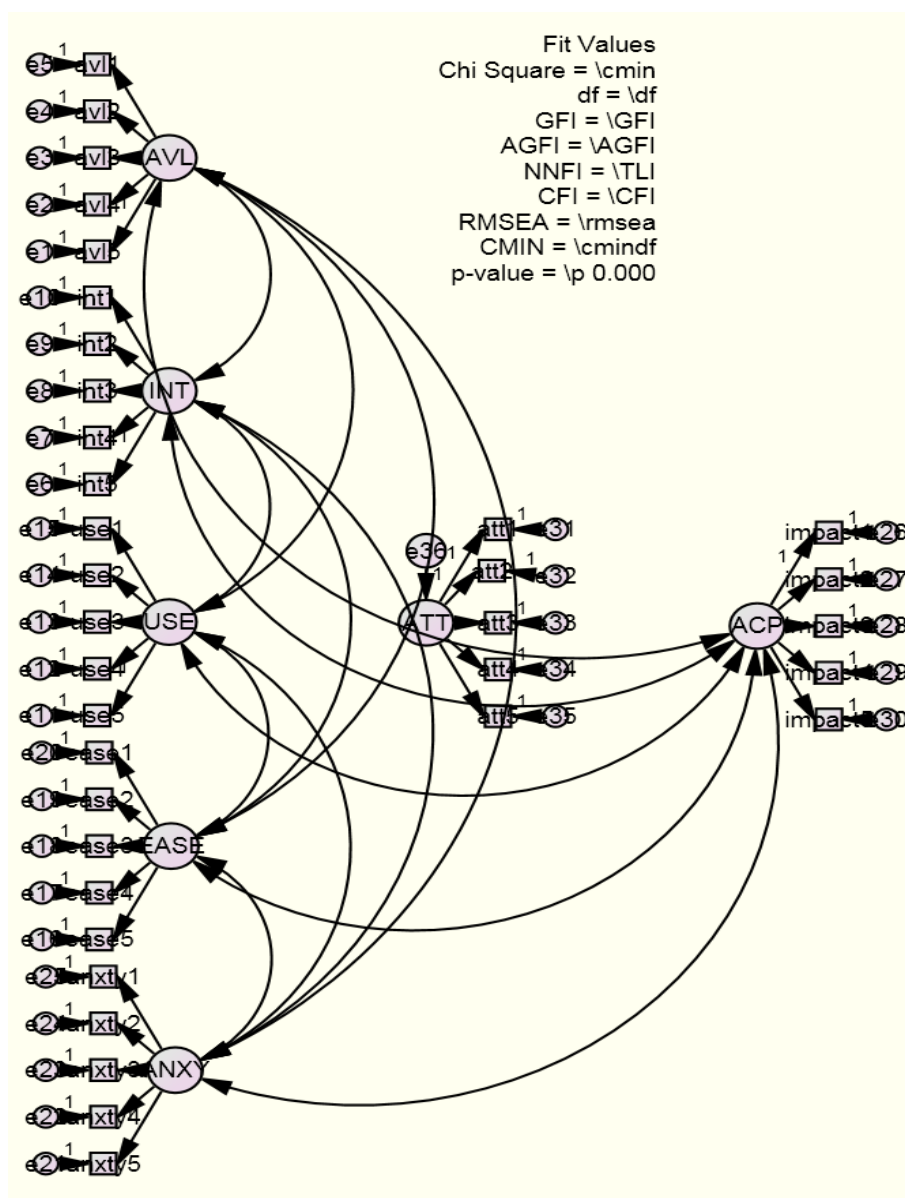


Figure 11. SEM actual models on attitude and acceptance of holography in teaching among Nigerian colleges of education educators

Table 5. Regression model summary on the actual model on attitude and acceptance of holography in teaching among Nigerian colleges of education educators

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.159 ^a	.025	-.027	2.79639
a. Predictors: (Constant), ANXTY, EASE, AVL, INT, USE				

Table 6. Regression model coefficients on attitude and acceptance of holography in teaching among Nigerian colleges of education educators

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.758	2.231		3.477	.001
	AVL	.192	.134	.152	1.431	.156
	USE	.019	.089	.023	.211	.834
	EASE	.030	.104	.030	.291	.772
	INT	-.055	.117	-.050	-.469	.640
	ANXTY	.006	.129	.005	.047	.963
a. Dependent Variable: ATT						

The table 5 and 6 present the regression analysis of the actualized model where the significance level were presented ranging from highest (beta=0.15) (**p=0.15**) on availability to lowest (beta=0.005) (**p=0.96**) on anxiety. The r square level indicates (**0.025**) representing (**2.5%**) which is quite less significant considering the standard error of the estimate at (**2.79**). This suggests that the model is not quite fit, meaning that the availability, intention, use, ease of use and level anxiety over holography partially influence attitude positively which consequently lead to the less general acceptance of the holography in teaching among the teachers of colleges of education in Nigeria. It can be glean that the higher the availability the higher the attitude. Similarly, it suggest that the higher the anxiety the lower the attitude. It also indicates that the lower negative in the intention to use holography the higher the attitude towards it.

To also address the issues on the attitudinal differences in terms of gender and designation among the educators of Nigerian colleges of education the t-test and ANOVA results were presented (tables: 7, 8, & 9) as follows:

Table 7. Independent sample t-test on the attitudinal difference on holography in terms of gender among Nigerian college of education teachers

ATT	Levene's Test for Equality of Variances		t-test for Equality of Means						
			t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
	F	Sig.						Lower	Upper
assumed	1.149	.286	1.104	98	.272	.61893	.56053	-.49343	1.73130
not assumed			1.125	91.459	.264	.61893	.55021	-.47392	1.71178

On table 7 it shows the variance on general attitude toward holography in terms of gender among the College of Education teachers in Nigeria. The overall result indicates no significant gender differences in their attitude toward holography in teaching because the result shows the significance level of **(.286)** and F value of **(1.15)** with the degree of freedom (**df= 98**). Thereby the calculated value indicates to be greater than the critical value (**p>0.05**).

Table 8. One way **ANOVA** on attitudinal difference on holography in terms of designation/level among Nigerian college of education teachers

		Sum of Squares	df	Mean Square	F	Sig.
ATT	Between Groups	23.489	3	7.830	1.029	.383
	Within Groups	730.625	96	7.611		
	Total	754.114	99			

Table 9. Bonferroni multiple comparisons test on attitudinal difference on holography in terms of designation/level among Nigerian college of education teachers

ATT						
Bonferroni						
(I) Designation/L evel		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Lower Level	(AL-L3)	-.21510	.65367	1.000	-1.8076	1.3774
		-1.41769	.81447	.255	-3.4019	.5665
Middle Level	(L2-L1)	.21510	.65367	1.000	-1.3774	1.8076
		-1.20259	.71681	.290	-2.9489	.5437
Upper Level	(PL-CL)	1.41769	.81447	.255	-.5665	3.4019
		1.20259	.71681	.290	-.5437	2.9489

On table 8 it shows the variance on general attitude toward holography in terms of designation/level among the College of Education teachers in Nigeria. The overall result indicates significance differences in their attitude toward holography in teaching in terms of designation/level because the result shows the significance level of **(.383)** and F value of **(1.02)** with the total degree of freedom (**df**) of **(99)**. Thereby the calculated value indicates to be greater than the critical value

($p > 0.05$). The gap can be identified from the *Bonferroni* test on Multiple Comparisons (table 9) especially in the significance level and the mean difference between the lower level (L3-AL) cadre and the upper level (PL-CL). The former assumed to have higher degree of significance of **(1.00)** and the mean difference of **(-0.21)** while the latter appears to have significance of **(0.25)** and the mean difference of **(1.41)** on the attitude toward the holography. Thus the difference is wider between the lower level and the upper level.

Table 10. Pearson correlation on the relationship on: availability, intention, use, ease of use, anxiety, attitude and acceptance of holography in teaching among Nigerian colleges of education teachers

		ATT	AVL	USE	EASE	INT	ANXTY	ACCEP T
ATT	Pearson Correlation	1	.149	.044	.013	-.025	.016	.129
	Sig. (2-tailed)							
	N	100	100	100	100	100	100	100
AVL	Pearson Correlation		1	.225*	-.074	.134	.148	-.040
	Sig. (2-tailed)							
	N		100	100	100	100	100	100
USE	Pearson Correlation			1	-.225*	.127	.016	-.051
	Sig. (2-tailed)							
	N			100	100	100	100	100
EASE	Pearson Correlation				1	.012	.000	.253*
	Sig. (2-tailed)							
	N				100	100	100	100
INT	Pearson Correlation					1	.239*	-.021
	Sig. (2-tailed)							
	N					100	100	100
ANXT Y	Pearson Correlation						1	.075
	Sig. (2-tailed)							
	N						100	100
ACCEP T	Pearson Correlation							1

	Sig. (2-tailed)							
	N	100	100	100	100	100	100	100
*. Correlation is significant at the 0.05 level (2-tailed).								

On table 10 it shows the correlations on *availability, intention, use, ease of use, anxiety, as well as attitude toward holography and its acceptance in teaching among the college of education teachers in Nigeria*. The result indicates significance with quite significance between availability and use (.225*), ease of use and acceptance (.253*), and intention to use and anxiety (.239*). On the other hand the result also suggests none significance between attitude and availability (.149), availability and intention (.134), availability and anxiety (.134) as well as between attitude and acceptance (.134). The result as well shows negatively none significance on the use and ease of use (-.225*) and quite negatively high none significance between intention and acceptance (-.021). It further suggest quite high none significance between ease of use and intention (.012) and a perfect none significance between ease of use and anxiety (0.00)

Discussion of results

From these results some few major things were identified. The results show that majority have agreed to have like holography and also agreed to use holography in teaching as well as encourage others to employ it as well. However, it indicates less availability of the tools in their institution many of the respondents have interest in acquiring such kit for their usage even though it shows that the tools may be difficult to use especially to non technologist and are very expensive to afford now a day. The result moreover, indicates positive relationship between the holography and enhancement of teaching and learning. Although hologram technology enhances performed, effectiveness and improves productivity it will not only change the face of education, especially in tertiary education but all aspect of life. That means hologram technology could be a future tool not only for teachers in the phase of higher education but almost all human endeavours of life. Holography will be a tool of teacher, because the holography is mainly seen as an effective tool for the teacher in the future as it eases the teaching process especially for those teachers with proficient ICT knowledge and solve the problem of inadequate teachers. It is overwhelmingly agreed that using holography is worthwhile thus it is postulated that in the near future not far away this holographic tools just as common projectors would be available in every place thus, holographic projectors would be everywhere because of increase in positive attitude and zero phobic attitude as well as collaborations that would exist in using such tools among individuals and across different global institutions and organizations.

However, ideas vary on whether the integration of the hologram into education it could be readily accepted or rejected and be prevented. For this, some phobic attitudes among the respondents were revealed in dealing with holography. However that would not be a major factor which would prevent them to deal with this technology. This is because it is vulnerable to so many interruptions at any given moment which may invariably disrupt the smooth flow of the learning process. This is in consideration specifically with the general requirement of such hologram technology in learning environment. In Nigeria adequate power supply and high level of techno failures are the possible barriers identified with holography when to be integrated into the learning environment. Other things were non commitments as well as poor maintenance culture. These are some of the views noted on the idea that holography as a teaching tool may get hindered from its integration into the Nigeria learning environment. For example, majority of the respondents confirmed that holography reinforces the learning process, as well as potentially being an effective teaching tool for the future. However, this technology would not change the face of education as claimed by many teachers. Moreover, other teachers hold the thought that the main barriers that can resist the

integration of such holographic technology into the Nigerian learning environment are the high cost of purchase and installation and requirements of a high-speed internet connection, subscription and the qualified personnel to manage it.

Possibly teachers can be replaced by holograms. This sounds like a science fiction. Nonetheless is there anything that would happen if holographic teachers could be sent to you? The reality is that this technology has been created to bring live holograms from one location and beam them into any other desired location in the world. It has been possible, because nothing is impossible.

Conclusion and Summary

These findings, suggested main barriers that may hinder the integration of holography into learning environments. Although holography is very expensive and difficult to integrate with the learning environment, it is of much very interesting to use this technology in the teaching process even if it is very expensive to implement at present. Holographic Technologies are not just about art or business communication, they are about safety, security, education, planning and the strength of our civilization here and beyond. This phenomenon should lead other researchers to investigate whether Holography will be an effective tool for the teachers in the future. Furthermore, the researchers wished to explore the main barriers that might prevent holography being integrated into a learning environment this is in order to move towards an answer in this issue.

As one of the limitations of the study, some of the questionnaires were not returned. It investigated on the general perception as well as the relationship between the holography and teaching learning process at different levels of education and gender. It also examine if holography will enhance teaching learning process in the future. If hologram technology will support the learning process then what sort of challenges and prospect are there in. The teachers especially in higher education emphasized the importance of the hologram in supporting the educational process.

Recommendations

For educational institutions to take full advantage of holography, some technologies need to be developed or introduced. Architectural design of classrooms may also require modification to accommodate the implementation of holography.

The amount of data needed to transmit and project a holographic environment or real time hologram is enormous. Hence, one of the barriers to holographic environments becoming reality is the Internet speed requirement of 1000 times faster than today's Internet standard. Other technologies required to be able to fully utilize the holographic technology are haptics and display technologies. Haptic sensors are needed to allow people interact with the holographic projection by touching and super computers that can make trillions of calculation to produce the holographic environment (Bonsor, 2010).

Another essential infrastructure need to use holography is the display system. The display medium determines how realistic the projected hologram appears. The display also determines the viewing angle capability and affects the infrastructural requirement on the receiving end. Holographic displays capable of projecting holograms into free air are preferable because they may allow interaction with human. Thus, generating holograms which are touchable using airborne ultrasound tactile display such as the one demonstrated in 2009 at University of Tokyo Japan (fig 6). Display into free air will also save space which may have been used for physical display systems. In this regard Japan claims to broadcast their 2022 world cup to about 360 spectators by means of holography to 400 stadiums within 208 countries.

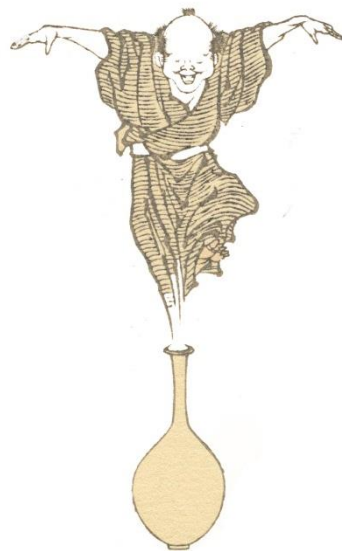
Lack of adequate equipment is a daunting problem which makes studying in some Nigerian educational institutions theoretical, non interactive and based on illusion. For instance, in an engineering program in higher institutions in Nigeria, most teachers rely on theory, such attitude needs to be redress and address.

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A concise and factual abstract is required (maximum length of **250 words**). The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, references should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

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Immediately after the abstract, provide a maximum of **6 keywords**.

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Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

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