THE ROLE OF OPEN EDUCATIONAL RESOURCES (OERS) AND WEB 2.0 IN TRANSFORMING PEDAGOGY IN HIGHER EDUCATION – IMPLICATIONS TO PRACTICE

Teresita S. Mijares, Rosemarievic A. Bustamante, Eliza B. Ayo, Marcial L. Anacio, Rommel N. Jotic

ABSTRACT

Integrating web 2.0 tools and open educational resources pose a great potential for the enhancement and improvement of course delivery for pre-service teachers. The purpose of this study was to examine the theoretical and /or practical contributions of web 2.0 and OERs in transforming pedagogy in higher education. Specifically, it identified the role of web 2.0 and OERs in transforming pedagogy in higher education and the implications of this transformation to educational theory and practice. Furthermore, it assessed the level of proficiency and frequency of the use of the web 2.0 technologies. This paper also described the factors that will influence the use and eventualy adopt the technologies in the teaching and learning practice. A descriptive method was used in assessing the levels of proficiency, utilization and factors that influenced the respondents' use of Web 2.0 and OERs. The multiple regression was used to predict the adoption factors of Web 2.0 and OERs in the future teaching and learning process of pre-service teachers of Centro Escolar University. The results showed that the pre-service teachers are very much proficient in the use of social networking and may find ways to integrate in their future teaching and learning processes. Also, the results showed that peer influence, facilitating condition – resources and perceived behavioral control, can be used to predict the pre-service teachers' intention to use Web 2.0 and OERs in their future teaching practices.

Keywords: Web 2.0, Open Educational Resources, Higher Education, Pedagogy.

INTRODUCTION

Tertiary and higher education institutions need to address the challenges of the 21st century teaching and learning process. Teachers must go further than what is covered in the course syllabus. Teachers need to walkthrough a process or a framework to help students elevate their level of learning to reach higher forms of creativity and innovation. Teaching pedagogy must be innovated to support and address the needs of a diverse population.

The best learning happens when students are engaged and everyone participates and a proven way for teachers to improve learning outcomes and engage students is through the appropriate use of e-learning resources like open educational resources (OERs) and Web 2.0 tools in teaching (Davies, 2014). Many teachers utilized web 2.0 technologies because many are free and easy to learn via online tutorials, and teachers can use a learning management system where both teachers and students' access are controlled (Kovalik, et al., 2014).

Daher claimed that teachers should be equipped with technical knowhow on both online and offline teaching to be able to apply these modern resources in the teaching and learning process. The use of modern instructional materials should meet the needs of technologically savvy learners. There are unlimited online resources available among educators with a promise that they can make new waves on lessons delivery to create an impact on how students learn. However, without the proper skills set and higher comprehension level on the

software, its function and the internet and how they all work together, such impact will not be created. Teachers' adjustment on learning these technologies should meet the demands of the learners particularly those students who are exposed to the digital arena. (Daher, 2014).

RELATED LITERATURE AND STUDY

This part presents literature and studies which are related but are not exactly the same as the present study.

The utilization of educational technology by and of itself does not create better nor more engaged students. It is the well-chosen education tools and resources integrated into classroom instruction that create better and more engaged students (Byrne, 2009). It is in this context why this present study was conducted.

Several studies showed different utilizations of web 2.0 tools and OERs. One study (Park, 2013) discussed the potential of Web 2.0 technology to engage students by aligning it with self-determination theory. The study recommended practical ways of using different Web 2.0 tools such as google docs, blogs, twitter, and facebook to promote reading engagement in a college classroom.

A similar study (Simkins & Schultz, 2010) showed familiarity of students and teachers with web 2.0 technologies has a very high potential in schools. Common tools like video sharing, podcasting and social bookmarking were used in schools and their personal lives. So were web 2.0 tools like file-sharing, instant messaging and photo sharing sites. The results of this study showed that application of web 2.0 technologies for classroom teaching and learning of the students reinforced by using them in their personal lives.

Web 2.0

"Web 2.0 technologies are accessible through the web. These technologies enable a user to interact with other users by giving information relevant to the topic or ideas presented. (DePietro, 2013). When used in education, students experience new forms of learning, it promotes an efficient and effective ways to participate and interact with information and with other users. Empowering users to contribute knowledge to the data presented is one of the products of web 2.0 technologies. Through blogs, podcasts, forums, wikis and social networks users can share information with online users. They meet people having the same interest to give comments and reaction to the topic at hand. This interaction change the way students and educators conduct teaching and learning process, making it possible to use information to their advantage. (Imperatore, 2009).

Teachers' preference on which technology to use varies, a study (Pritchett, Pritchett, & Wohleb, 2013) revealed that not all web 2.0 tools were utilized by teachers. Only social networks, music, pictures and video sharing were used most often and conversely, blogs and social network were used rarely.

Commonly Used Web 2.0 Tools in the Teaching and Learning Process

Blogs. A blog is a discussion or informational site published on the World Wide Web (Wikipedia). They are also called online diaries which enable users, without requirement of

any technical skill, to create, publish and organize their own webpages that contain dated content, entries, comments, discussion etc. in chronological order (Alexander, 2006).

Wiki. A Wiki provides a workspace to generate and communicate ideas and to construct, edit, and preserve shared knowledge in a readily accessible and open environment (Kear, Donelan, & Williams, 2014).

Social Networking. A social networking site may be defined as "a web-based service that allows individuals to construct a public or semi-public profile within a bounded system to articulate a list of other users with whom they share a connection, and to view and traverse their list of connections and those made by others within the system; the nature and nomenclature of these connections may vary from site to site" (Boyd & Ellison, 2007).
Social bookmarking. It is tagging a website and saving it for later use. Instead of saving them on the web browser, they are saved on the web. Since bookmarks are online, one can easily share them with friends (Nations).

Video Chat. It is a technology for conducting audio and video interaction in real time between users at disparate locations. Video chats are typically conducted via a computer, tablet or smartphone device (also called videophone chatting). It may also involve point-to-point (or one-to-one) interaction, as in the case of Face Timeand Skype; or multipoint (or one-to-many) interaction, as in the typical case of Google Hangouts. (Webopedia)

Open Educational Resources

The licenses of OER for all its materials, from videos to full courses, allow the public in general, to access, use and made changes to all the digital materials as long as it will be for teaching, learning and research activities (OECD, 2007).

A collaborative effort from the people under Ministers of education, senior policy makers, expert practitioners, researchers and relevant stakeholders, declared that all digitized materials be given freely for academe use specifically for teachers and students in the field of education and research. The body assures that all resources when used in education worldwide are free and may be used by public at no cost. This declaration was made in 2012 at UNESCO Headquarters in Paris during its convention for World Open Educational Resources (OER) (UNESCO/Communication and Information, 2012).

The license of all OER resources that are in the public domain states that use of full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques should in teaching, learning and research and should not be used for business (Atkins, Brown, & Hammond, 2007).

Since instructional materials are accessible via internet, additional resources are being added to its content each day, hence safekeeping of digitized knowledge is important. The Internet Archives spearheaded academic libraries and major and cultural heritage institutions, including the National Archives and the Library of Congress to safe keep this information through reliable infrastructure created a database for this purpose. (Atkins, Brown, & Hammond, 2007).

In 2007 Cape Town Open Education Declaration was drafted through the efforts of Open Society Institute and the Shuttleworth Foundation. This was made possible by bringing

together interested parties to collaborate and organize an open and educational resource movement. This movement advocates that all resources be openly shared freely among educators.

The study (Golberg & Magna, 2012) on schools that offer open educational resources via their websites contribute a significant impact to this movement. One is the MITx program which gives incentives to students who can complete a number of open courses offered by their school.

OERs are high-quality, openly licensed, online educational materials that offer an extraordinary opportunity for people everywhere to share, use, and reuse knowledge. They also demonstrate great potential as a mechanism for instructional innovation as networks of teachers and learners share best practices (The William and Flora Hewlett Foundation).

Decomposed Theory of Planned Behavior (DTPB)

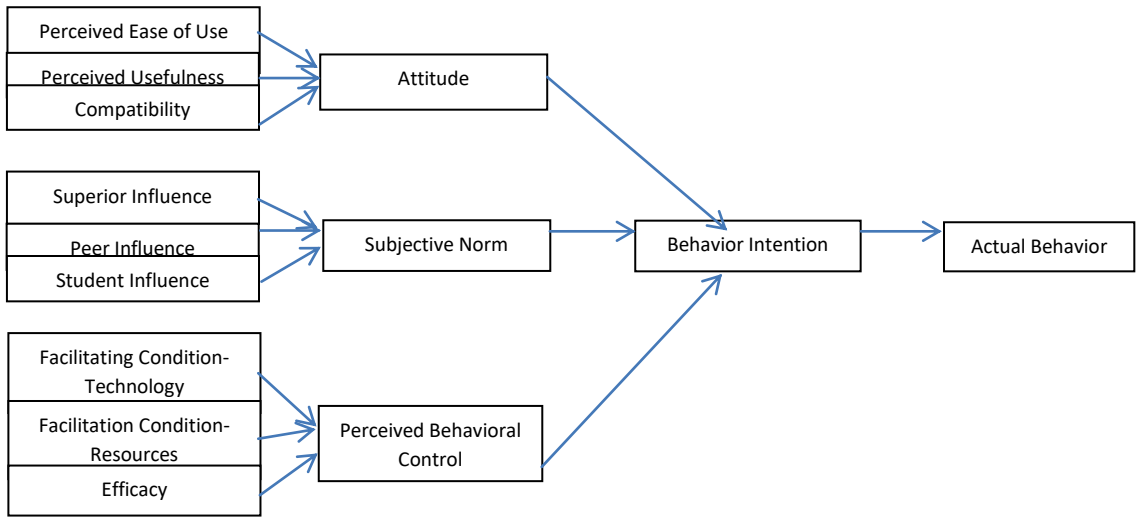

Figure 1.Factors that predict the pre-service teachers' intentions to adopt Web 2.0 and OERs in the teaching and learning practices.

DTPB (Taylor & Todd, 1995) consists of three main factors influencing behavior intention (BI) and actual behavior (adoption) which are attitude (ATT), subjective norms (SN) and perceived behavior control (PBC). Attitude describes an individual's positive or negative behavior towards innovation intention and adoption. It comprises perceived ease of use (PEOU), perceived usefulness (PU) and compatibility. Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort, while PU refers to the degree to which a person believes that using a particular technology will enhance his performance (Davis, 1989). Compatibility (Comp) refers to the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters (Moor &Benbasat, 1991). According to Ajzen and Fishbein (1980) SN describes the social pressure that may affect an individual's intention to perform. In this study it is composed of two normative beliefs: family influences (FM) and mass media influences (MM). FM is defined as a group consisting of parents and siblings. From parents, a person acquires an orientation toward religion, politics and economics, a sense of personal ambition, self worth, and love. FM emphasizes on relationship between the people under the

family control with respect and modesty in Jordan, because this country follows the Arab cultures (Rouibah, 2008).

Mass media influences (MM) is defined as non-personal communication channel consisting of print media such as newspapers and magazines; broadcast media such as radio and televisions; and network media such as telephone, cable, satellite, wireless (Kotler, 2006). Perceived behavior control is considered as reflecting the perceptions of internal and external constraints on behavior (Taylor & Todd, 1995). It is composed of three control beliefs: self-efficacy (SE), government support (GS) and technology support (TS). SE refers to individual's self-confidence in his or her ability to perform a behavior (Compeau& Higgins, 1995). Government support (GS) can play an intervention and leadership role in the diffusion of innovation (Tan &Teo, 2000). Finally, technology support (TS) becomes easily and readily available as e-commerce applications such as internet banking services become more feasible (Shih & Fang, 2004).

According to DTPB, BI is determined by the user's intention to accept, use or adopt one JIBC (August 2010) or more of the information technology such as Internet banking services (IBS). BI has a positive influence on IBS adoption in Singapore and Thailand respectively (Tan &Teo, 2000; Shih & Fang, 2004). It was found that ATT is a significant predictor of BI towards IBS. In IBS setting, previous studies found significant and positive relationship between PEOU, PU, ATT and IBS adoption (IBSA) (Suh& Han, 2002; Celik, 2008; Nor & Pearson, 2008).

Previous studies suggested the link between compatibility and ATT (Nor & Pearson, 2008; Tan &Teo; 2000). Similarly, previous studies found significant relationship between SN and BI (Tan &Teo, 2000; Nor & Pearson, 2008). FM was found a significant antecedent of SN towards IBSA in several past studies (Shih & Fang, 2004; Nor & Pearson, 2008).

There were also several past studies that discussed the relationship between MM influences and SN but in non-banking setting (Ng & Rahim, 2005; Fogelgren-Pedersen, Andersen &Jelbo, 2003; Woon&Kankanhalli, 2007). Tan and Teo (2000) and Shih & Fang (2004) found significant relationship between PBC and BI in banking setting. According to DTPB, self-efficacy predicts PBC when there is an intention of using a wide range of technologically advanced products (Tan &Teo, 2000). Nor and Pearson (2008) found that the relationship between selfefficacy and PBC is positive and significant. Tan and Teo (2000) show that also GS has a significant and positive influence on PBC in banking setting. The absence of the TS and its development is likely to impede the IBS (Jaruwachirathanakul& Fink, 2005).

The theory of planned behavior (TPB) is an extension of the theory of reasoned action (Fishbein&Ajzen, 1975) that predicts behavior over which people do not have complete volitional control. TPB achieves this by "including a predictor of behavioral intention and behavior called perceived behavioral control" (Notani, 1998, p. 248). From the TPB, Taylor and Todd (1995) developed the decomposed TPB (DTPB). This model aims to explain the behavior of users based on the relationship between beliefs, attitudes, intention, and behavior. According to this model, attitudes, subjective norms, and perceived behavioral control are the elements that help to understand the reasons or factors explaining individual actions, even if the intention is considered as the best indicator of behavior (HerreroCrespo& Rodríguez del Bosque,2008).

DTPB focuses on the identification of beliefs and factors that influence the three determinants of behavior, namely attitudes, subjective norms, and perceived behavioral control. This model decomposes attitude into three variables, namely: perceived usefulness, perceived ease of use, and compatibility, a variable arising out of Rogers's diffusion of innovation theory (Rogers, 1995). Compatibility is "the extent to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential users" (Rogers, 1995; Eastin, 2002). Compatibility is largely used as an antecedent of attitude. Chen, Gillenson and Sherrell (2002) proposed a model integrating theory of diffusion of innovation-TDI and TAM and conclude that compatibility influences attitude toward online purchasing and that it is an antecedent of perceived usefulness. Chen and Tan(2004), in a study designed to determine the key success factors for the acceptance of online stores, found that the compatibility variable is an antecedent of attitude among perceived usefulness, perceived ease of use, trust, and perceived service quality. The greater compatibility is, the higher the likelihood of the adoption of online stores. Vijayasarathy, (2004; 2007) also showed that compatibility has an impact on attitude toward the acceptance of the Internet as tool. In addition, the DTPB takes into account the perceived behavioral control (PBC) variable.

PBC reflects a person's perception of the ease or difficulty to implement behavior (Chen and Wu, 2005), The literature on the impact of the perceived behavioral control variable shows that this construct influences behavioral intention only, regardless of the context of the studies. This is justified by the TPB model predicts this relationship (Mathieson, 1991; Taylor & Todd, 1995; Hsu & Lam, 2006; Lu, Zhou & Wang, 2009; Hwang, Lin & Wang, 2010). The last construct of the DTPB concerns subjective norms. Subjective norms refer to "perceptions in relation to an individual's ability to produce a particular behavior" (Davis, Bagozzi&Warshaw, 1989). "Subjective norms refer to consumer perceptions regarding the use of online shopping under the influence of opinions of referent groups such as friends or colleagues" (Lin, 2007). Subjective norms represent the set of influences that shape an individual's compliance behavior in relation to a referent group which is considered important; essentially, they are social pressures (Hsu & Lam, 2006).

Research on the adoption of information technology indicates the importance of intentions in predicting actual use (Ajzen, 1991; Taylor & Todd,1995; Venkatesh, Morris, Davis, & Davis, 2003). Intention is defined as an anticipated outcome that is expected based on a person's planned actions or behavior (Ajzen, 2001). Pre-service teachers' positive intentions toward using technologies have been proven as a major predictor for the future use and successful integration in their classrooms (Myers & Halpin, 2002;Yushau, 2006). For this reason, a number of studies explored influential factors that explain pre-service teachers' acceptance of and intentions to use technology. Many researchers had reported that perceived usefulness and ease of use were the most significant factors affecting pre-service teachers' intentions to use technology (Ma, Andersson, & Streith, 2005; Sadaf, Newby, &Ertmer,2012; Smarkola, 2007; Teo, Lee, & Chai, 2008; Yuen & Ma, 2002). Some studies found self-efficacy as significant determinant of intentions and use (Anderson & Maninger, 2007; Chen, 2010; Giallamas & Nikolopoulou, 2010; Teo, 2009). For instance, Anderson and Maninger (2007) explored the factors that best predicted pre-service teachers' intentions to use a variety of software and found value beliefs and self-efficacy to be significant predictors. Other studies reported that subjective norms (i.e., person's behavior influenced by other people), and facilitative conditions (i.e., available resources and technology) affect pre-service teachers' intentions to use computers (Teo, 2009). Although these studies have explored factors influencing pre-service teachers' technology integration efforts in different contexts and

related to different technologies, few researches have examined the potential factors that determine pre-service teachers' intentions to use Web 2.0 technologies in schools.

Objectives

The study aimed to examine the theoretical and/or practical contributions of open educational resources and Web 2.0 technologies in transforming pedagogy in higher education.
Specifically, the study aimed to answer the following questions:

1. What is the role of Web 2.0 and Open Educational Resources (OERs) in transforming pedagogy in higher education?
2. What are the implications of this transformation to educational theory and practice?

Sub-questions:

a) How do the pre-service teachers assess their level of proficiency of use of the web 2.0 technologies?
b) How are the pre-service teachers currently utilizing Web 2.0 and OERs in their teaching and learning practices across institutions?
c) What are the factors that will influence pre-service teachers' utilization of Web 2.0 and OERs across institutions?
d) What factors best predict the pre-service teachers' intention of adopting web 2.0 technologies in the teaching and learning process?
e) What professional development opportunities are needed for students and educators across institutions to effectively utilize and integrate current technologies for their teaching and learning needs?

METHODOLOGY

This research gathered the assessments of pre-service teachers of Centro Escolar University, Philippines, to examine the theoretical and/or practical contributions of Open Educational Resources and Web 2.0 technologies in transforming pedagogy in higher education.The researchers made use of survey instruments which was a collection of questions from different questionnaires used on similar studies and was divided into three categories. The first category made them assess their level of proficiency and utilization of the Web 2.0 tools and Open Educational Resources (OERs)and used a five-point and four-point likert scale, respectively.

The second category gathered the factors that will influence the pre-service teachers to teach Web 2.0 and OERs in the future. The third category made use of a five-point likert scale based on the "The Decomposed Theory of Planned Behavior" to predict the pre-service teachers intention of adopting web 2.0 and OERs in their future teaching and learning process.

The descriptive method was used in assessing the level of proficiency, utilization and factors that will influence the respondents' use of Web 2.0 and OERs. The researchers also made use of multiple-regression to predict the adoption factors of Web 2.0 and OERs in the future teaching and learning process of pre-service teachers of Centro Escolar University. Purposive sampling technique was employed for this study; specifically, pre-service teachers were the target of this study.

Demographics of Respondents

The sample for this study included pre-service teachers enrolled in Bachelor of Science in Education and Bachelor of Elementary Education programs at Centro Escolar University, Philippines during the second semester of School Year 2014-2015. Of the total population *(n=144)*, 110 participated in the online survey *(response rate of 76%).* Among these 110 respondents, 93 were female *(84.5%)* and 17 were male *(15.5%).* The majority or 44 of the participants *(40.0%)* were 18-19 years of age; 37 of the participants *(33.6%)* were 16-17 years old; 17 of the participants *(15.5%)* were 20-21 years old; and the remaining participants were distributed as follows: 7*(6.4%)* 22-23 years old; and 5*(4.5%)* 26-above years old. Furthermore, 39 *(35.5%)* were first year: 35*(31.8%)* were second year; 23 *(20.9%)* were third year; and 13 *(11.8%)* were fourth year. Moreover, 65 *(59.1%)* are enrolled in Bachelor of Elementary Education program, while 40 *(36.4%)* are enrolled in the Bachelor of Science in Education program. The remaining 5 (4.5%) did not indicate the program they are pursuing.

RESULTS AND DISCUSSION

The results are presented with reference to the research questions. To answer the first research problem, data were gathered and the mean results are presented in Table 1. A four-point Likert scale was used to determine the level of proficiency of the respondents on the use of Web 2.0 tools.

The levels of proficiency of the pre-service teachers were considered in the study to determine their familiarity and readiness to use and integrate web 2.0 and OERs in their future classes. On the one hand, the respondents were proficient in the use of social networking (Facebook, MySpace) *(x=3.72)* and smartphones (iPhone, Blackberry, Samsung, etc) *(x=3.67).* With the real time communication capability, user-friendly features and ease of use, the utilization of the tools have become part of the respondents' daily life. This shows that the pre-service teachers can easily integrate the use of these web 2.0 technologies and OERs in their future teaching practices. This will help the respondents become more efficient and effective in sharing information to the students.

Table 1: Pre-Service Teachers' Level of Proficiency of the Use of Web 2.0

Web 2.0	Mean	STD	Verbal Interpretation
Blogs (Blogger, WordPress)	2.39090909	0.93940694	Novice
Wikis (Confluence, PBwiki)	3.01818182	0.87767226	Comfortable
Social networking (Facebook, MySpace)	3.71818182	0.52692318	Proficient
Social bookmarking (Stixy, Delicious)	2.14545455	0.91707917	Novice
Video Chat (Skype, TokBox)	2.98181818	0.90849021	Comfortable
Instant Messaging (MSN, Yahoo Messenger)	3.30909091	0.79845556	Comfortable
Video Editing/Sharing (Jing, Animoto)	2.65454545	0.91306886	Comfortable
Podcast	1.92727273	1.08119108	Novice
Learning Management System (Moodle, Quia, Edmodo, Schoology, etc)	2.68181818	0.97615439	Comfortable
Smartphones (iPhone, Blackberry, Samsung, etc)	3.67272727	0.57643464	Proficient
Online games	2.71818182	0.9494742	Comfortable
Google Drive	2.9	0.93798535	Comfortable

On the other hand, the respondents were comfortable in the utilization of seven (7) listed Web 2.0 tools; the instant messaging (MSN, Yahoo Messenger) *(x=3.31);* wikis (Confluence,

PBwiki) *(x=3.02);* video chat (Skype, TokBox) *(x=2.98);* google drive (x=2.90); online games (x=2.72); learning management system (Moodle, Quia, Edmodo, Schoology, etc) *(x=2.68);* and video editing sharing (Jing, Animoto) *(x=2.65).* The respondents may have also found the unique features of each tool user-friendly and easy to use, but respondents utilize a tool based on specific need or task.

While the respondents were novice with the use of blogs (Blogger, WordPress) *(x=2.39),* Social book marking (Stixy, Delicious) *(x=2.14),* and podcast (x=1.93). A great possibility is that the respondents were not familiar with the features of these Web 2.0 tools or they are not interested to use them.

Table 2 shows the frequency of use of Web 2.0 tools of the pre-service teachers which answered the first research sub-question. According to the respondents' assessment, three (3) of the listed web 2.0 tools were the most utilized or they were being utilized "weekly". The social networking and smartphones each has a computed mean of 4.48, and instant messaging with computed mean of 3.53.

Table 2: Pre-Service Teachers' Frequency of Use of Web 2.0

Web 2.0	Mean	STD	Verbal Interpretation
Blogs (Blogger, WordPress)	2.390909	1.181629	Not Often
Wikis (Confluence, PBwiki)	3.472727	1.268598	Monthly
Social networking (Facebook, MySpace)	4.481818	1.081384	Weekly
Social bookmarking (Stixy, Delicious)	2.263636	1.186138	Not Often
Video Chat (Skype, TokBox)	2.790909	1.306971	Monthly
Instant Messaging (MSN, Yahoo Messenger)	3.527273	1.345799	Weekly
Video Editing/Sharing (Jing, Animoto)	2.718182	1.212563	Monthly
Podcast	1.963636	1.156769	Not Often
Learning Management System (Moodle, Quia, Edmodo, Schoology, etc)	2.709091	1.214178	Monthly
Smartphones (iPhone, Blackberry, Samsung, etc)	4.481818	1.170994	Weekly
Online games	2.545455	1.424789	Monthly
Google Drive	2.927273	1.475855	Monthly

The data shows that the respondents are very much adept with these technologies and find them easy and useful. Haft of the listed web 2.0 tools were being utilized "monthly" by the respondents. These are wikis (x=3.472727), Google drive (x=2.927273), video chat (x=2.790909), Video Editing (x=2.718182), Learning Management System (x=2.709091), and Online Games (x=2.545455). With the monthly utilization of these web 2.0 tools, it shows that the respondents may have found some of the features of these tools useful to some of their activities.

However, the blogs (x=2.390909), Social bookmarking (x=2.263636), and the podcast (x= 1.963636) were "not often" used by the respondents. A great possibility is that they are not familiar with the features and functions of the tools or they do not have activities which will require the use of these tools. These results are somehow similar to the study conducted by(Pritchett, Pritchett, & Wohleb, 2013) which indicates that not all web 2.0 tools were being utilized by teachers. Only social networks, music, pictures and video sharing were used most often and conversely, blogs social network and cloud computing were reported as being used rarely.

As shown in Table 3, the technology factor yielded the highest frequency of 39 or 35.10% which shows that access to all the devices and tools such as computers, laptops, internet, etc. is the number one factor that will influence the respondents to use web 2.0 and OERs in the their future teaching and learning practices. The availability of all these technologies will help the respondents familiarize themselves with the different features and functions of the web 2.0 tools making them proficient and confident to utilize and integrate in their activities. With the availability of the Internet, the pre-service teachers would be able to search for open educational resources which they can use to supplement their classroom teaching.

Table 3: Factors that will Influence Pre-Service Teachers' Utilization of Web 2.0 and OERs

Factors	Frequency	%
Technology factor: (e.g. Availability of computers, internet, and online Educational game).	39	35.10%
Student factor (e.g. different genders, background, Academic achievement, and learning speed)	24	21.60%
Teacher factor (e.g. skills to implement and integrate the game into the teaching and learning)	12	10.80%
Pedagogical factor: (e.g. teaching and learning strategy incorporate in the game, task, and test)	20	18%
Gameplay design factor: (e.g. game rules, game complex, and appropriate background)	4	3.60%
Social factor :(e.g. influence of teachers, lecturers, and students).	11	9.90%

Second in the list is the student factor with a frequency of 24 or 21.60%. In the utilization of web 2.0 and OERs, the pre-service teachers must take into consideration the background or profile of their students. Not all students are on equal footing. Before a teacher can use a web 2.0 tool, he or she should identify the technological skills of the learners. Third in rank is the pedagogical factor which yielded a frequency of 20 or 18%. The teacher must also take into consideration the changes in the delivery of instruction. It no longer just chalk and board but something new to some of the learners. The teacher factor and the social factor yielded almost the same frequency of 20 (*10.80%*) and 11 (*9.90%*), respectively. For the respondents, these two factors were not that influential on the utilization of web 2.0 and OERs. A great possibility of this result is that the pre-service teachers are skillful enough to use the tools. The last factor is the game play factor with frequency of 4 or 3.60%. For the respondents, this is the least factor to influence them to use the web 2.0 tools, since it is not used often in the teaching and learning process.

The decomposed theory of planned behavior was used to answer the research problem on the factors which best predict the pre-service teachers' intention of adopting web 2.0 and OERs in the teaching and learning practices.

Table 4: Factors Predicting the Adoption of Web 2.0 and OERs

Factors	**R^2 (Adjusted R^2)**	**Beta (t-scores)[1]**
Attitude	**0.702 (0.693)**	
Perceived Usefulness		0.214 (2.998)**
Perceived Ease of Use		0.288 (4.682)***
Compatibility		0.386 (6.488)***
Subjective Norm	**0.711 (0.706)**	
Superior Influence		0.523 (7.068)***

Peer Influence		
Student Influence		0.352 (5.276)***
Perceived Behavioral Control	**0.498 (0.489)**	
Facilitating Condition - Technology		0.466 (7.181)***
Facilitating Condition – Resources		
Efficacy		0.313 (4.583)***
Behavior Intention	**0.614 (0.606)**	
Attitude		0.790 (8.311)***
Perceived Behavioral Control		
Subjective Norm		0.249 (2.543)*
Actual Behavior	**0.187 (0.180)**	
Behavior Intention		0.359 (4.989)***

*Note: Figures shown are beta coefficients with t-values in parentheses. *p<0.5; **p<0.01; ***p<0.001*

Attitude

Multiple-regression results showed that the combined compatibility, perceived ease of use and perceived usefulness all are significant predictors (70.2%) of attitude (R^2). Examining the predictors, compatibility (β = 0.386; t=6.488), perceived ease of use (β = 0.288; t= 4.682), perceived usefulness (β = 0.214; t=2.998) have significant effects on attitude towards the adoption of web 2.0 and OERs in the teaching and learning process. Teachers believe that web 2.0 tools and OERs are well-suited when integrated to the course they are to teach; they are user-friendly and would help improve the delivery of their course.

Subjective Norm

The results indicate that only their superiors and students have great impact on the respondents' decision to use web 2.0 tools in their future classroom. Multiple-regression confirmed that only two predicting factors, namely: superior influence (β = 7.068; t=7.068) and student influence (β = 0.352; t=5.276) are significant predictors (71.1%) in subjective norm (R^2). This could be because the respondents value their superiors and students' suggestions of what technology should be used over that which their peers say.

Perceived Behavior Control

Multiple-regression results showed that two predicting factors are significant predictors (49.8%) of perceived behavior control (R^2). The facilitating condition – technology (β = 0.466; t=7.181) and efficacy (β = 0.313; t=4.583) have both significant effect on the perceived behavior control. This only shows that the pre-service teachers are likely to integrate web 2.0 and OERs in their teaching practice when they are confident that they have the necessary skills to use the tools and when access to all the technology is not a concern.

Behavior Intention

Multiple-regression results showed that only two predicting factors: attitude (β = 0.790; t = 8.311) and subjective norm: (β = 0.249; t = 2.543) are significant predictors (61.4%) in behavior intention (R^2).

Actual Behavior

The results showed that the predicting factor behavior intention (β = 0.359; t=4.989) had significant effect on actual behavior, thus the behavior intention is a significant predictor (18.7%) in actual behavior (R^2). The behavioral intention positively affects the actual behavior of adopting Web 2.0 and OERs in the teaching and learning process.

To effectively utilize and integrate current technologies for the teaching and learning needs, the following recommendations are offered:

(1) Academic institutions should review the course syllabi and to include the use of educational technologies such as web 2.0 and OERs as part of the instructional design and a provision to conduct an online learning classes in the pre-service teacher program.
(2) Conduct intensive training for pre-service teachers on content development.
(3) Prepare the needed infrastructure to support the integration of web 2.0 in the teaching and learning process.

Teaching pedagogy in higher education must be innovated to support the best learning a student must receive and this happens when students are engaged. The proven way to improve learning and engage students is through the appropriate use of web 2.0 and OERs. (Davies, 2014)

Based on the results gathered, the role of web 2.0 and open educational resources in transforming pedagogy in higher education is to improve the course delivery via utilization of appropriate technology and resources for an instructional purpose. Web 2.0 such as blogs, social networking, Instant messaging, video chat are used to share ideas, information and creations; wikis are used to collaborate not only with your peers but also with experts around the world. To exchange information, ideas, resources, materials the best tools are learning management system, Google drive, Social bookmarking.

The implications of a well-thought of and well-designed instruction, integrated with web 2.0 tools and open educational resources will transform the way students access and share information, collaboration which may result in the creation of new knowledge. Teachers may provide current and relevant open educational resources and real-time access may be used for verification of information.

CONCLUSION

On the basis of the findings, the following conclusions were drawn: Firstly, pre-service teachers are very much proficient in the use social networking and smartphones which resulted in the weekly use of the tools. With the frequent use, the respondents may find ways to integrate the technologies in their future teaching process. Secondly, the factor that has the greatest influence in the respondents to use web 2.0 and OERs is the technology factor. Lastly, among the listed factors, peer influence, facilitating condition – resources and perceived behavioral control, can be used to predict the pre-service teachers' intention to use Web 2.0 and OERs in their future teaching practices.

REFERENCES

UNESCO/Communication and Information. (2012, June). Retrieved from http://en.unesco.org/: http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/in-focus-articles/2012/open-educational-resources-congress-passes-historic-declaration/

Ajzen, I. (1991). The Theory of planned behavior. organizational behavior and human decision processes. 50, 179-211.

Alexander, B. (2006). A new way of innovation for teaching and learning. *Educause Review*, 32-44.

Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007, February). A review of the open educational resources (OER) movement: achievements, challenges, and new opportunities. *Creative Commons*, 4. Retrieved from http://creativecommons.org/licenses/by/3.0/

Boyd, D., & Ellison, N. (2007). Social network sites: definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13.

Byrne, R. (2009). The effects of web 2.0 on teaching and learning. *Teach Libr*, 52.

Capo, B. H. (n.d.). Web 2.0 technologies for classroom instruction: high school teachers' perceptions and adoption.

Capo, B. H., & Orellana, A. (2011). Web 2.0 technologies for classroom instruction: high school teachers' perceptions and adoption factors. *The Quater Review of Distance Education, 12*(4), 250.

Daher, T. (2014). Emerging instructional technologies: exploring the extent of faculty use of web 2.0 tools at a midwestern community college. *TechTrends: Linking Research & Practice to Improve Learning, Volume 58*(Number 6), 42.

Davies, A. (2014, July-September). Integrating e-learning to improve learning outcomes. *Planning for Higher Education Journal, Volume 42*(Number 4), 23-29. Retrieved from www.scup.org/phe

DePietro, P. (2013). Transforming education with new media: participatory pedagogy, interactive learning and web 2.0. (I. 1832-3669, Ed.) *The International Journal of Technology, Knowledge, and Society, Volume 8*, 1. Retrieved from http://techandsoc.com

Golberg, E. J., & Magna, M. L. (2012, June). Open educational resources in higher education: A guide to online resources. *Volume 73*. College & Research Libraries News.

Huang, C. k., & Lin, C.-Y. (2011). Enhancing classroom interactivity and engagement: CFL learners' perceptions of the application of Web 2.0 technology. *British Journal Of Educational Technology*, *42*(6), 143.

Imperatore, C. (2009, January). What you need to know about Web 2.0. *Technology Usage in the Classroom*, p. 20.

Kear, K., Donelan, H., & Williams, J. (2014, Spetember). Using wikis for online gropu projects: student and tutor perspectives. *The International Review of Research in Open and Distance Learning, Volume 15*(Number 4), 72.

Kovalik, C., Kuo, C.-L., Cummins, M., Dipzinski, E., Joseph, P., & Laskey, a. S. (2014). Implementing Web 2.0 tools in the classroom; four teachers' accounts. *TechTrends: Linking Research & Practice to Improve Learning, Volume 58*(Number 5), 91.

Nations, D. (n.d.). *About Tech*. Retrieved from http://webtrends.about.com/od/socialbookmarking101/p/aboutsocialtags.htm

OECD. (2007). Giving knowledge for free: The emergence of open educational resources. *Centre for Educational Research and Innovation*, 30.

Park, S. W. (2013, March/April). The Potential of Web 2.0 tools to promote reading engagement in a general education course. *Linking Research & Practice to Improve Learning, Volume 57*(Number 2), 46-53.

Pritchett, C. C., Wohleb, E. C., & Pritchett, C. G. (2013, March/April). Educatiors' perceived importance of Web 2.0 technology application. *TechTrends*, 37.

Pritchett, C. G., Pritchett, C. C., & Wohleb, E. C. (2013). Usage, barriers, and training of Web 2.0 technology applications. *SRATE Journal, Volume 22*(Number 2), 34.

Simkins, M., & Schultz, R. (2010, January/February). Using Web 2.0 tools at school. *Leadership*, 12 - 14.

Taylor, S., & Todd, P. (1995, June). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2), 144.

The William and Flora Hewlett Foundation. (n.d.). Retrieved from http://www.hewlett.org/programs/education/open-educational-resources.

Thompson, J. (2008). Don't be afraid to explore Web 2.0. *Phi Delta Kappan International, Inc.*, 89.

Webopedia. (n.d.). Retrieved from http://www.webopedia.com/TERM/V/video_chat.html

Wikipedia. (n.d.). *http://en.wikipedia.org/wiki/Blog*. Retrieved from Wikipedia.org.

Zdravkova, K., Mirjana, I., & Zoran, P. (2011, November). Experience of integrating Web 2.0 technologies. *Association for Educational Communications and Technology 2011*, 24.