



PEARL

Student learning in higher education through blogging in the classroom

Garcia, E; Moizer, J; Stephen, W; Haddoud, MY

Published in:
Computers and Education

DOI:
[10.1016/j.compedu.2019.03.011](https://doi.org/10.1016/j.compedu.2019.03.011)

Publication date:
2019

Link:
[Link to publication in PEARL](#)

Citation for published version (APA):
Garcia, E., Moizer, J., Stephen, W., & Haddoud, MY. (2019). Student learning in higher education through blogging in the classroom. *Computers and Education*, 136(0), 61-74. <https://doi.org/10.1016/j.compedu.2019.03.011>

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Wherever possible please cite the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

Student Learning in Higher Education Through Blogging in the Classroom

Elaine Garcia^a, Jonathan Moizer^b, Stephen Wilkins^c, Mohamed Yacine Haddoud^b

^a University of Law Business School Online, 14 Store Street, Fitzrovia, London, UK

^b Faculty of Business, University of Plymouth, Drake Circus, Plymouth, UK

^c Faculty of Business & Law, The British University in Dubai, Block 11, Dubai International Academic City, Dubai, United Arab Emirates

ABSTRACT

In the last decade, there has been a significant increase in the range of social media tools that have become available. Despite reports of successful adoption in the higher education classroom, there have been relatively few empirical studies that have explored whether the use of blogs in teaching and learning leads to an increase in perceived learning by students. This research study adopts a post positivist research approach and a quantitative research design that uses PLS-SEM. It was found that students do perceive higher degrees of learning from using blogs, but the recognised benefits of using blogs is influenced by the students' attitudes towards the use of technology in teaching and learning, their perceived usefulness of blogs, and the extent to which they have used blogs previously. The findings have implications for both teachers and students, as they can be used as a framework to help ensure the successful use of pedagogic blogs.

Keywords: Blogs, Higher education, Social media, SEM, PLS

1. Introduction

Social media now permeates the everyday lives of students all around the world, including for many how they study and learn (Stoyle & Morris, 2017; Saha & Karpinski, 2018; Anders, 2018) and even how such technologies can distract students from their study (Flanigan & Babchuk, 2015). Web 2.0 technologies, and particularly blogs, are being used to engage students more fully with learning, however the effectiveness of such tools is still relatively unclear with some studies supportive (Hamid, Waycott, Kurnia & Chang, 2015; Venkatesh, 2016; Lee, 2017) and others indicating caution (Crook, 2012; Kung, 2018).

Blogs – a contraction of ‘web based logs’ or ‘weblogs’ – are essentially online journals where an author publishes a series of chronological, updateable entries or posts on a topic, typically of personal interest to the author and often expressed in a strongly subjective voice, on which readers are invited to comment (Farmer, Yue & Brooks, 2008). This research seeks to assess the factors influencing how higher education (HE) students perceive the levels of learning achieved through engaging with blogs in the classroom and whether their effective use can be quantifiably attributed to different approaches to learning and the use of technology in the classroom. The relatively large number of HE teachers using blogging in the US and UK for teaching and learning (Sim & Hew, 2010) provides the reasoning for selecting these two countries to provide the data on which our analysis is based.

Blogs are one of the most popular forms of social media used in HE (Al-Qallaf & Al-Mutairi, 2016; Moran, Seaman & Tinti-Kane, 2011). To date however, studies concerned with the use of blogs in higher education classrooms have largely focused on qualitative methods or anecdotal evidence (Bennett, Maton & Kervin, 2008; Lai &

Hong, 2015; Neira-Pineiro, 2015). There have also been relatively few studies that have empirically explored the impact of blog use on learning within HE settings (Sim & Hew, 2010; Lee & Bonk, 2016). Whilst studies investigating this impact have been undertaken in Australasia (see Bennett, Maton & Kervin, 2008; Lai & Hong, 2015; Deng, & Yuen, 2013), which may be linked to the history of connecting remote education communities through ICT (Stacey, 2005); the UK & US are still relatively under-researched. The rationale for this study is therefore to close these research gaps in the extant literature on blogging and learning in higher education.

Furthermore, this study seeks to address the limited discussion concerning the degree to which student use of blogs in the classroom is influenced by their digital perceptions. Students are increasingly being defined by terms such as the Net Generation (Rahamat, Shah, Din & Aziz, 2017; Barak, 2018) and iGeneration, (Rosen, 2010, Rosen, Carrier & Cheeve, 2013; Hill & Nance, 2016) and more recently Generation Next (Lai & Hong, 2015); however, the degree to which this applies to their confidence in using Web 2.0 technologies in their learning has not been extensively discussed or tested. Additionally, whilst existing literature relating to constructivism have largely focused on face-to-face teaching and learning contexts, only a few have investigated constructivism in classroom blogging (for instance, Aguaded Gómez, López Meneses & Alonso Díaz, 2010 and Zhang & Olfman, 2010). Against this, the current study therefore seeks to discover whether constructivist views can be applied to test the influence of blogging on student learning in the classroom using quantitative evidence derived from structural equation modelling.

Finally, there has been relatively minimal exploration of the different aspects of blogging activity and rhythm, and specifically how these different activities may influence the perceived learning that may occur in HE classrooms. Thus, this research

explores in empirical terms how the socio-technical structure of blogs (Efimova & De Moor, 2005) and specifically the rhythm of blogging may influence the degree of learning perceived by students. Here, the rhythm of blogging is identified as comprising of writing, reading, 'commenting in' and 'commenting out' of blogs.

The paper is organised as follows. In the following section, the proposed conceptual framework on student blog use is presented, and a review of the literature on pedagogic blogging is conducted in order to support the proposed hypotheses. After this, the framework is translated into a student survey of pedagogic blogging, from which the data are analysed using structural equation modelling. Following this, the findings of the study are reported. Finally, conclusions on the work and implications of the findings for higher education teaching practice are discussed.

2. Conceptual Framework and Hypothesis Development

A review of the literature on technology use in higher education teaching and learning, and in particular on the use of blogs, was conducted in order to develop the proposed conceptual model, as shown in Figure 1. The hypothesis development process is explained in the following sections.

INSERT FIGURE 1 ABOUT HERE

2.1. The rhythm of blogging

The rhythm of blogging describes how people blog. It is a label developed from the socio-technical structure of blogging as developed by Efimova and De Moor (2005) and the blogging model created by Deng and Yuen (2011). There are different forms of interaction with blogs as well as different ways of learning from these. The rhythm of blogging is identified as comprising of writing, reading, 'commenting in' and 'commenting out' of blogs. These activities allow a web conversation to take place. Writing refers to the way in which an individual will write a post for their own blog. Reading refers to how an individual will read and absorb their own comments and posts to a blog or those produced by others. Finally, commenting refers to posting comments in response to a blog. Efimova and De Moor (2005) further distinguish between commenting in and commenting out; with commenting in being where others leave comments on the blog of an individual, and commenting out where individuals leave comments on the blogs of others. A comment is a form of interaction between writer and reader (Kreniske, 2017). Comments are therefore regarded as feedback for an individual about their blog. In accordance with Deng and Yuen (2011), the present study conceptualises the rhythm of blogging through these four dimensions.

2.2. The rhythm of blogging in education

Based on the Technology Acceptance Model (TAM) (Davis, 1989), engagement with technologies such as blogs are generally determined by individual's attitudes and perceptions of various features related to blogging, including their ease of use and usefulness (Kim, 2012; Shiau and Chau, 2012). To be more specific, the extant literature on blogging shows that classroom blogging is determined by students' perceptions of digital technology (Rosen et al., 2013; Prensky, 2012), perceptions of

teaching and learning (Chan & Elliott, 2002), previous blogging experience (Halic, Lee, Paulus & Spence, 2010), and perception of blogging usefulness (Shiau and Chau, 2012; Efimova & De Moor, 2005). These factors are discussed in the following sections.

2.2.1. Perceptions of digital technology

The variable 'perceptions of digital technology' considers the degree to which students consider themselves to be digitally literate and immersed in digital technology within their everyday lives. Today's HE students are the first generation that have grown up engaging with digital media, and therefore these students are expected to have a natural affinity with digital technology, using the Internet as a first choice of information sourcing (Sun, Ye & Hsieh, 2014; Paul, Macedo-Rouet, Rouet & Stadler, 2017). In fact, most students in universities and colleges are not only digitally literate but often immersed in digital environments for entertainment and communication purposes. They are invariably adept at multi-tasking (Calderwood, Green, Joy-Gaba & Moloney, 2016; Teo, Yurdakul & Ursavaş, 2014) and communicating electronically through social networking. Known as the 'web generation', many students use social media as a dominant form of communication in many aspects of their lives and expect such technologies to be present in every aspect of their lives (Imlawi, Gregg & Karimi, 2015), including teaching and learning. Given this ubiquity, it is proposed that student perceptions of digital technology will influence the rhythm of blogging activities.

Hence, the first hypothesis is:

H1 - Positive perceptions towards digital technology results in higher rhythm of blogging activity in the form of (a) writing, (b) reading, (c) commenting in, and (d) commenting out.

2.2.2. Perception of teaching and learning approaches

The changes witnessed in the use of social media, such as blogging at the societal level, have in reality occurred in tandem with fundamental changes in pedagogical paradigms and learning theories, which have moved from behaviourism towards theories related to cognitivism, and later constructivism (De Villiers, 2007). According to Jonassen and Land (2012), we reached a new epoch in learning at the turn of the millennium where learning was no longer a submissive or transmissive activity, and instead became a process that is based on active, constructive and knowledge building activities, which better meets the needs of students who are using blogs in their studies (Mattar, 2018). It is this rejection of more instructional models of teaching and learning and an acceptance that students may want to undertake more active than passive learning (Doherty, 2005) that provides the impetus for using blogs within teaching to the Web Generation. Although not new, this approach could be most closely aligned to the context of the needs of the Web Generation and particularly to blogs.

It would also appear that these approaches would well suit the social and collaborative working nature of the Web Generation. Dikilitaş and Yaylı (2018) identify constructivist theories of learning as a more learner sensitive model of teaching and learning. Constructivist learning is closely aligned to the learning needs of the Web Generation, particularly where blogging is concerned. Blogging as a learning approach could be well suited to the more social and collaborative nature of the Web Generation.

Thus, the second hypothesis of this study is:

H2 - Positive perceptions of teaching and learning as a constructivist activity results in higher perceived rhythm of blogging activity in the form of (a) writing, (b) reading, (c) commenting in, and (d) commenting out.

2.2.3. Previous blogging experience

Previous research has indicated that blogging can provide a positive learning experience (Bista, 2015; Eid & Al-Jabri, 2016; Al-Qallaf & Al-Mutairi, 2016), as it allows students to think about concepts outside the classroom, share their knowledge with peers and enhance their learning (Halic et al., 2010). Hence, it could be argued that such a positive experience is likely to encourage students to repeatedly use blogging in teaching and learning. In this regard, evidence has shown that previous experience of e-learning can enhance the intention and continued use of such technology (Liao & Lua, 2008). Islam and Azad (2015) shows that prior experience using information technologies will lead to a higher perceived usefulness, which would in turn increases intention to use. Agarwal and Karahanna (2000) and Gaševićab, Mirriahic, Dawson and Joksimovića (2017) both indicated that relevant prior experience eased enhance technology adoption amongst students.

This leads to the third hypothesis of this study:

H3 - Positive previous experience of blog usage leads to higher rhythm of blogging activity in the form of (a) writing, (b) reading, (c) commenting in, and (d) commenting out.

2.2.4. Perceived usefulness of blogging

Research shows that successful use of blogs in teaching is contingent on students being receptive to this form of learning within their studies (Sun, 2010;

Fullwood, Sheehan & Nicholls, 2009; Macduff, 2009; Ciampa, 2014). The manner in which HE teachers can affect how students perceive the usefulness and relevance of blogs to their studies can have a significant influence (Richardson, 2010; Churchill, 2009; Deng & Yuen, 2013; Wang, Hou & Wu, 2017). Perceived usefulness in particular has been widely acknowledged as a key driver for the use of technology in higher education (including blogs). In line with the technology acceptance model the more students perceive blogging as useful, the more favourable their attitude towards blogging, and therefore the higher the use. Such a link has been supported by several studies (e.g. Porter & Donthu, 2006; Schoonenboom, 2014).

Therefore, the following hypothesis is proposed:

H4 - Positive perceived usefulness of blogging leads to higher rhythm of blogging activity in the form of (a) writing, (b) reading, (c) commenting in, and (d) commenting out.

2.3. *The impact of blogging on perceived learning*

Blogging can enhance student learning in a number of ways. Students may be motivated to develop their knowledge and write a blog to gain respect and credit from their tutors and peers, as well as to gain helpful feedback through commenting in (Maag, 2005; Ramsay, 2014). Students can improve their learning by reading peer contributions, which may include useful discussions and examples (Betts & Glogoff, 2004; Jackling, Natoli, Siddique & Sciulli, 2015). Commenting in and commenting out can improve the interaction and intellectual exchange between students (Williams & Jacobs, 2004; Lee & Bonk, 2016). In this regard, a study on Korean adult learners found that blogging could be considered a meaningful and enriching learning environment (Park, Heo & Lee, 2011). Here, the authors explained that learners

considered blogging as practical, unlimited and accessible, which are features that are not always found in more traditional forms of education. Blogging sites often act as a warehouse of captured knowledge which is archived for later use (Menkhoff, Chay, Bengtsson, Woodard & Gan, 2015). It is also considered a knowledge management tool whereby information is stored and new knowledge is created (Jou, Lin & Wu, 2016). Ferdig and Trammell (2004) posit that blogging enhances students' expertise in particular subject knowledge through a process of regular scouring, filtering and posting, which increases their interest and ownership in learning, and allows them to engage with other learners and discover diverse perspectives. Farmer (2006) goes further and explains that blogging provides learners with an important sense of valorisation, by allowing them to communicate and be recognised as a part of a community of learners, a feeling often lost when more traditional teaching and learning methods are adopted.

Thus, the following hypothesis is formed:

H5 - Higher blogging rhythm through (a) writing, (b) reading, (c) commenting in, and (d) commenting out results in a higher perception of individual learning.

3. Research sample and procedure

To obtain data on students' perceptions of learning through classroom blog use from a relatively large sample, a survey research approach was adopted. Surveys may be an effective research strategy to explore aspects of a situation or individual attitudes – such as students' attitudes to, and experiences of the four aspects of blogging rhythm – or to seek explanation and provide data for testing hypotheses (Berends, 2006). Furthermore, an online survey is particularly attractive when the target population is difficult to access or is spread widely geographically, as is the case

with educational blog users in this research (King, O'Rourke, & DeLongis, 2014). As we were only interested in surveying individuals who had previous experience of using blogs in their formal HE study, survey method bias from using the Internet for data collection is likely to be minimal (Fulgoni, 2014). Responses were sought from higher education students in the UK and US who had previous experience of using blogs in the classroom as part of their formal learning. Existing research suggests that blog use is more common in the UK and US than in most other countries, providing the rationale for obtaining data in these two countries (Sim & Hew, 2010). A total of 600 responses were commissioned from Smart Survey, a professional survey company, with 300 respondents residing in the UK, and 300 in the US. This provided a panel based non-probability sample.

Notwithstanding its generalisability issue, non-probability sampling is often used in student-based studies (Wilson, Kickul, & Marlino, 2007; Nowinski, Haddoud, Lančarič, Egerová & Czeglédi, 2017). Here, it is argued that non-probability sampling can yield good quality data when samples are characterised with high response rates and participation levels (Coviello & Jones, 2004). It is also argued that using non-probability sampling may allow the researcher to ensure the appropriateness of participants (Carland, Carland & Ensley, 2001).

In this survey, the questions were close-ended with a set number of possible responses measured on a Likert scale. The survey was pre-tested and amended to improve understanding for the target sample. To minimise method bias, several reversed items were included in the survey. Additionally, a post-hoc analysis was conducted to identify any common method bias using Harman's single factor test². In this research model, the single emerging factor reflected 21.39% of the variance within

² In Harman's one-factor analysis if the single emerging factor accounted for more than 50% of the variances, bias would exist within the model.

the full sample, 20.13% in the UK sample and 22.87% in the US sample. These results suggest no major issue with common method bias (see Jiao et al., 2013 for method verification).

In terms of characteristics, 73.48% of respondents were female, 25.74% of respondents were male and 1.09% of respondents preferred not to give a gender. The majority of respondents (65.99%) were aged 18-24 years old with and 34.01% falling over the age of 25 years old. As for their area of study, the most popular subjects were arts and humanities (24.02%), social science, journalism and information (16.85%), natural sciences, mathematics and statistics (13.73%) and business, administration and law (12.48%). Here, the majority of students were studying their HE programme full time. Regarding their blogging activities, Blogger was the most popular blogging platform, used by 38.53% of respondents. This was followed by Tumblr (35.73% of respondents) and WordPress (32.92% of respondents). A number of respondents indicated that they used alternative blogging platforms for their studies. These included blogging systems such as those incorporated into their University's virtual learning environment (Blackboard, Moodle, etc.) and also other websites and tools. Table 1 provides an overview of the sample's characteristics.

INSERT TABLE 1 ABOUT HERE

4. Scales and measures

4.1 Perceptions of digital technology

Perceptions of digital technology (PDT) is an independent variable which was created by combining a set of items used in previous studies (Rosen, 2010; Liaw, 2002). Survey participants were asked to respond to each statement using a five-point

Likert scale ranging from 'strongly agree' to 'strongly disagree'. These items were included to provide an indication of both the respondents' general perceptions of digital technologies as well as their view on its use within teaching and learning.

4.2 Perceptions of teaching and learning

Perception of teaching and learning (PTL) is an independent variable that was created in order to assess the views of respondents towards teaching and learning as a constructivist or behaviourist activity. This variable has been sourced from a survey instrument developed by Chan and Elliott (2002) and seeks to measure the degree to which a respondent agrees with the view of teaching and learning as an instructional and traditional activity.

4.3 Previous blogging experience

Previous blogging experience (PBE) is an independent variable that seeks to establish whether respondents' previous experiences of using blogs for educational purposes were positive. The items for this variable have been developed from a study by Halic et al. (2010).

4.4 Perceived usefulness of blogging

The final independent variable in this study considers the respondents' perceived usefulness of blogging (PUB). This variable has been created using items from a study by Efimova and De Moor (2005). This variable consists of 12 items, each of which seeks to establish whether respondents perceive future blogging activities as likely to be positive or negative.

4.5 Rhythm of blogging

Rhythm (RYB) is a dependent variable within this study which is comprised of four different areas. These are reading, writing, commenting in and commenting out. These questions were formed in order to explore the areas of blog activity established by Deng and Yuen (2011), and consider each of the key activities determined to exist within blogging.

4.6 Perceived learning

Perceived learning (PL) is a dependent variable which measures the amount of learning students believe they have achieved through using blogs. This variable was created from a previous survey instrument used by Halic et al. (2010).

5. Data analysis and results

To test the hypotheses, this study adopts a non-linear regression Partial Least Squares Structural Equation Modelling (PLS-SEM) utilising WarpPLS 4.0 (Kock, 2013). A variance-based technique was deemed appropriate here since the aim of the study was to predict students' perceived learning through the use of blogs. In this regard, the superiority of PLS-SEM when it comes to prediction has been well acknowledged (Hair, Hult, Ringle & Sarstedt, 2017). PLS-SEM assesses both measurement and structural models.

5.1. Measurement model

In the measurement model, the variables' reliability, validity and collinearity are assessed. The variables' reliability was examined using Cronbach's Alpha and composite reliability (CR). For a good reliability, these should be greater than 0.7 (Hair

et al., 2017). Convergent and discriminant validity were evaluated through the indicators' loadings, the Average Variance Extracted (AVE) and the squared root of AVEs. For a satisfactory convergent validity, indicators' loadings and variables' AVEs need to be higher than 0.7 and 0.5 respectively (Schmiedel, vom Brocke & Reckter, 2014). To establish discriminant validity, the squared root of AVEs of each variable should exceed its correlation coefficient with the other variables in the model (Fornell & Larcker, 1981). Finally, to check for multicollinearity issues, the variance inflation factors (VIF) for all variables need to be examined. Their values should not be above the 5.0 threshold. Tables 2-4 confirm these requirements and suggest that the measurement quality meet the required standard.

INSERT TABLES 2-4 ABOUT HERE

5.2. *Structural model*

The results of the SEM data analysis are presented in Figure 2. The arrows and adjacent values illustrate the effects between the variables and their β coefficients, including their p-values. R^2 values show the explained variance of endogenous latent variables for the structural model. These are displayed under the endogenous variables.

INSERT FIGURE 2 ABOUT HERE

This Figure identifies that student perceptions of digital technology has no effect on the degree to which students read or comment both in and out of blogs. Hence, H1b, H1c and H1d are rejected. Perceptions of digital technologies do however have

a weak effect on the rhythm of writing, providing support for H1a ($\beta=0.102$, $p<0.002$). Perceptions of teaching and learning show results whereby there appears to be no effect of perceptions of teaching and learning on commenting out (rejecting H2c); but there are significant effects upon reading ($\beta=-0.262$, $p<0.001$), writing ($\beta=-0.249$, $p<0.001$) and commenting in ($\beta=-0.104$, $p=0.002$). Thus, validating H2a, H2b and H2d.

Previous blogging experience is shown to have a positive effect on blogging rhythm with commenting in ($\beta=0.36$, $p<0.001$) and commenting out ($\beta=0.356$, $p<0.001$), both displaying high levels of influence. Previous blogging experience also has a significant effect on reading ($\beta=0.361$, $p<0.001$) and writing ($\beta=0.376$, $p<0.001$). To summarise, previous blogging experience has a positive effect on all aspects of blogging rhythm. This provides support for H3a, H3b, H3c and H3d.

Lastly, higher positive perceived usefulness levels for blogging appear to indicate a higher rhythm of blogging around reading and commenting but not writing. Higher positive perceived usefulness of blogging affect reading ($\beta=0.17$, $p<0.001$), commenting in ($\beta=0.36$, $p<0.001$) and commenting out ($\beta=0.203$, $p<0.001$). Hence, H4b, H4c and H4d are accepted, and H4a is rejected.

As for the influence of blogging rhythms on perceived learning, the results indicate that higher blogging rhythm around writing, reading and commenting result in a higher perception of individual learning, whereas higher blogging rhythm in commenting out hold no significant influence. Therefore, H5a, H5b and H5d are accepted, while H5c is rejected.

Regarding the explained variance, it could be concluded that blogging rhythm around writing, reading, commenting out and commenting in predicts 20% of students' perceived learning. As for the models' predictive relevance, the Stone-Geisser Q^2

coefficient for perceived learning accounted for 0.20, which indicate a medium predictive relevance.

6. Discussion

6.1. Student perceptions of digital technology and rhythm of blogging

The rhythm of blogging was found to be determined by student perceptions of digital technology only in terms of writing. This result suggests that whilst students find using technology to record their work useful, they do not see a benefit in interacting with others, either by commenting on the blogs of others, receiving comments, or by reading the work of others. This finding suggests that the concept of a Web Generation, which is homogenous and using technology within all aspects of their lives, is not supported. Literature which suggests that the Web Generation wish to learn using the collaborative nature of Web 2.0 tools (Hamid, Waycott, Kurnia & Chang, 2015; Venkatesh, Croteau & Rabah, 2014; Rosen, 2010; Tapscott, 2009) would also not appear to be supported within these results. However, the manner in which these results support writing would suggest that students do have a familiarity and are comfortable with using technology; but perhaps that the move towards collaborative uses of technology is not yet fully understood or embraced by students (Margaryan & Littlejohn; 2008; Salajan, Schonwetter & Cleghorn, 2010; Bond, 2008; Duarte, 2015). This may therefore indicate that the conditions may exist for a Web Generation to form; but that at present, differences between those within the generation are too diverse to make this possible (Perrin, 2015). These results instead point towards the nature of this generation being more akin to the Net Generation who are expected to have a natural affinity with technology and to use the Internet as a first-choice information source (Rahamat, et al., 2017).

6.2. Student perceptions of teaching and learning as constructivist and rhythm of blogging

Rhythm of blogging was also determined by student perceptions of teaching and learning in relation to writing, reading and commenting in on blogs. These results support the view that a constructivist view of teaching and learning will lead to a greater acceptance of blogs and the move towards greater active participation within the learning process by the student (Dikilitaş & Yaylı, 2018). However, whilst learning may be perceived to be a social activity (Tang & Lam, 2014; Alt, 2017), students did not consider that they learn from providing others with feedback through blogging. These results suggest that there has been a rejection of instructionalist models of teaching and learning amongst students who are more likely to use digital technologies within their learning (Tapscott, 2009; Siemens, 2005). Other research reveals that students do see value in the sociocultural context in which they are learning when using blogs (Noel, 2015; Adams, 2006). Respondents have indicated that they derive value from receiving peer support (Robertson, 2011), specifically comments from others as well as reading and writing within a blog. This therefore suggests that respondents do see learning using blogs as a social process (Illeris, 2007; Balakrishnan & Gan, 2016). However, these results indicate that the reciprocal social interaction opportunities blogs provide does not appear to lead students to consider that they create increased opportunities for learning (Halic et al., 2010; Duarte, 2015).

6.3. Student perceptions of previous blogging use and rhythm of blogging

In terms of student previous blog use, it was found that rhythm of blogging was determined by perceptions of previous blogging use in relation to writing, reading,

commenting in and commenting out. These results provide an indication that previous use of blogs for academic purposes by students is likely to lead to future usage. It can be inferred that where students' previous experience of blogs has been positive, a higher rhythm of blogging would be achieved in the future. Students are thereby more likely to derive academic benefits from increased participation with blogs. This suggests that blogs can motivate students to find a voice in their learning (Kerawalla, Minocha, Kirkup & Conole, 2008; Morgan, 2015). The fact that all areas of blogging are enhanced by successful previous experiences also suggests that students are able to develop a better understanding of the benefits of writing, reading and commenting both in and out (Novakovich, 2016). The different activities involved in blogging increases interactivity and can motivate students to sustain their blogging activity (Kitsantas, Chirinos, Hiller & Kitsantas, 2016). This would appear to be supported in the results of this study. Contrastingly, those respondents who face negative issues such as trolling (Lujan-Mora & Juana-Espinosa, 2007; Luo, Millet, Alley & Zuo, 2016); negative, irrelevant, non-credible or unverified feedback (Richardson, 2010; Jiang, Hou & Wang, 2016); extra work or lack of real time interaction, which may result in them being less likely to seek to use blogs in the future (Liu, 2016).

6.4. Student perceived usefulness of blogging use and rhythm of blogging

The findings provide an indication of the importance of the perceived usefulness for rhythm of blogging in terms of reading and commenting in and out. Perceived usefulness for rhythm of blogging may be formed by previous blog experience, wider digital experience or the views of others. The results support previous findings in relation to the critical influence of perceived usefulness on technology adoption (Porter & Donthu, 2006; Schoonenboom, 2014). In this regard, it should be noted that student

perceived usefulness of blogging may be created by the teacher setting the learning activity (Kent & McNergney, 1999; Al-Qallaf & Al-Mutairi, 2016) and the way the activity is created and explained to the students (Andergassen, Behringer, Finlay, Gorra & Moore, 2009; Martín-Rodríguez, Fernández-Molina, Miguel Ángel, Montero-Alonso & Francisco González-Gómez, 2015). Therefore, these results suggest that those HE teachers creating the conditions for purposeful blogging are generating a largely positive learning experience.

6.5. *Rhythm of blogging and perceived learning*

Current results show that higher blogging rhythm in terms of writing, reading and commenting in leads to higher perceived learning. These results suggest that more blogging leads to greater levels of perceived learning, although only in relation to self-expression and self-reflection seen through writing, and social connection and reflection (Deng & Yuen, 2011). Whilst commenting into a blog was considered to have value, the fact that commenting out is not supported indicates that social interaction and reflective dialogue triggered by commenting out is not considered by students to be a significant way in which learning is enhanced. This also suggests that students may not feel they learn from leaving feedback for others, and therefore do not perceive reciprocal learning to have occurred. Students perceive learning value as increasing with commenting in, suggesting that feedback as part of a social constructivist model of teaching and learning is evident from social interaction (Adams, 2006). The increase in learning associated with commenting in but not commenting out would also suggest that Vygotsky & Cole's (1978) concept of "the more knowledgeable other" is once again evident, as students consider value in the feedback given to them by others; but not vice versa (Illeris, 2007). Here, commenting

out is often considered as a way to engage with the community (Kabadayi & Price, 2014) rather than a means to learn. Another explanation would be that students' lack of confidence in commenting out might negatively influence their perceived learning from this activity. In their study, Kuo, Belland & Kuo, (2017) found that students did lack self-efficacy in relation to commenting in blogs.

Furthermore, the results suggest that where students have an existing knowledge and understanding of digital technologies, they are more likely to make greater use of blogs for writing and therefore perceive to have attained higher levels of learning (Rosen, 2010, 2011; Rosen et al., 2013). Likewise, greater blog use will occur with greater perceived learning if an individual has greater perceptions of learning with blogs as a constructivist activity. This therefore suggests that students perceive learning as a process of understanding and comprehension of the world through learning and knowledge (Illeris, 2007), and that blogs will be better utilised as learning tool. Frequency of blog use also appears to lead to a greater degree of perceived learning where previous blogging experiences have been positive. Greater blog use was also found to lead to greater perceived learning where the learning expectations of blogging are higher in the areas of reading, commenting in and commenting out; suggesting that for those activities involving socialisation, higher degrees of learning occur.

7. Conclusion

This research study has explored the use of blogs by students in UK and USA HE. It has been shown that the manner in which students view technology in teaching and learning in terms of pedagogical position, their previous experience of blogs, and the perceived usefulness of blogs all influence the way in which they use blogs.

Furthermore, the research has demonstrated that the greater use of blogs does lead to higher degrees of perceived learning by students in relation to reading, writing and commenting in. There has however been no support for the activity of commenting out as a driver of perceived learning amongst students. Overall, greater use of blogs in teaching and learning activity does lead to higher perceived learning, suggesting that blogs should be promoted within UK and US HE as a teaching and learning vehicle.

7.1. Implications of the research

This study has highlighted the need for HE teachers to encourage students to become familiar and comfortable with technologies such as blogs if they are to work pedagogically. The findings have demonstrated the importance of recognising student expectations when teaching with blogs and the need for the use of blogs to be carefully planned and managed to ensure student expectations and engagement are maintained.

The findings from this study also suggest that HE teachers using blogs in the classroom should ensure that students understand teaching and learning as a constructivist activity and limit the amount of instructional activities undertaken in order for the use of blogs to be successful.

Finally, it must also be recognised that there is a need to be aware of the importance of student perceptions of the usefulness and previous experience of blogs within their learning when teachers are designing and delivering teaching, as poor previous experience and low perceived usefulness will negatively impact on the engagement with such learning tools.

References

- Adams, P. (2006). Exploring social constructivism: theories and practicalities. *Education*, 3(13), 243-257.
- Aguaded Gómez, J.I., López Meneses, E. and Alonso *Innovating with blogs in university courses: a qualitative study. The New Educational Review*, 22(3-4), 103-115.
- Anders, A. D. (2018). Networked learning with professionals boosts students' self-efficacy for social networking and professional development. *Computers & Education*, 127, 13-29.
- Al-Qallaf, C., & Al-Mutairi S. (2016). Digital literacy and digital content supports learning. *The Electronic Library*, 34(3), 522-547.
- Alt, D. (2017). Constructivist learning and openness to diversity and challenge in higher education environments. *Learning Environments Research*, 20(1), 99-119.
- Andergassen, M., Behringer, R., Finlay, J., Gorra, A., & Moore, D. (2009). Weblogs in higher education: Why do students (not) blog?. *Electronic Journal of e-Learning*, 7(3), 203-215.
- Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24, 665–694.
- Balakrishnan, V., & Gan, C. L. (2016). Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics*, 33(3), 808-821.
- Barak, M. (2018). Are digital natives open to change? Examining flexible thinking and resistance to change. *Computers & Education*, 121, 115-123.

- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.
- Berends, M. (2006). Survey methods in educational research. In J. L. Green, G. Camilli, & P. B. Elmore (Eds.), *Handbook of Complementary Methods in Education Research* (pp. 623-640). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Betts, J. D., & Glogoff, S. (2004, July). Instructional models for using weblogs in eLearning: A case study from a virtual and hybrid course. In *Proceedings of the Syllabus 2004 Conference*, San Francisco, CA, July.
- Bista, K. (2015). Is Twitter an effective pedagogical tool in higher education? Perspectives of education graduate students. *Journal of the Scholarship of Teaching and Learning*, 15(2), 83-102.
- Bond, D., Holland, T., & Wells, P. (2008). Podcasting and its relation with student performance. In D. Remenyi (Ed.), *Proceedings of the 3rd International Conference on e-Learning* (pp. 33–42). Reading, UK: Cape Town Academic Publishing Limited.
- Calderwood, C., Green, J. D., Joy-Gaba, J. A., & Moloney, J. M. (2016). Forecasting errors in student media multitasking during homework completion. *Computers & Education*, 94, 37-48.
- Carland, J. W., Carland, J. C., & Ensley, M. D. (2001). Hunting the Heffalump: the theoretical basis and dimensionality of the Carland Entrepreneurship Index. *Academy of Entrepreneurship Journal*, 7(2), 51-84.

- Chan, K., & Elliott, R. (2002). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education*, 20(8), 817-831.
- Churchill, D. (2009). Educational application of Web 2.0: Using blogs to support teaching and learning. *British Journal of Educational Technology*, 40(1), 179-183.
- Ciampa, K. (2014). Learning in a mobile age: an investigation of student motivation. *Journal of Computer Assisted Learning*, 30(1), 82-96.
- Coviello, N. E., & Jones, M. V. (2004). Methodological issues in international entrepreneurship research. *Journal of Business Venturing*, 19(4), 485-508.
- Crook, C. (2012). The 'digital native' in context: tensions associated with importing Web 2.0 practices into the school setting. *Oxford Review of Education*, 38(1), 63-80.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- DeVillers, R. (2007). The six C's framework for e-learning. In N. Buzzetto-More (Ed.), *Advanced principles of effective e-learning* (pp. 1-25), Santa Rosa: CA: Informing Science Press.
- Deng, L., & Yuen, A. (2011). Towards a framework for educational affordances of blogs. *Computers and Education*, 56(2), 441-451.
- Deng, L., & Yuen, A. H. (2013). Blogs in pre-service teacher education: Exploring the participation issue. *Technology, Pedagogy and Education*, 22(3), 339-356.
- Dikilitaş, K., & Yaylı, D. (2018). Teachers' professional identity development through action research. *ELT Journal*, doi.org/10.1093/elt/ccy027.

- Doherty, L. (2005, October 1). Where worlds collide and pupils leave teachers behind. *The Sydney Morning Herald*.
- Duarte, P. (2015). The use of a group blog to actively support learning activities. *Active Learning in Higher Education*, 16(2), 103-117.
- Efimova, L., & De Moor, A. (2005). Beyond personal webpublishing: An exploratory study of conversational blogging practices, *Proceedings of the 38th Hawaii International Conference on System Sciences* (pp. 107- 118). Hawaii: IEEE.
- Eid, M. I., & Al-Jabri, I. M. (2016). Social networking, knowledge sharing, and student learning: The case of university students. *Computers & Education*, 99, 14-27.
- Farmer, B., Yue, A., & Brooks, C. (2008). Using blogging for higher order learning in large cohort university teaching: A case study. *Australasian Journal of Educational Technology*, 24(2), 123-136.
- Farmer, J. (2006). Blogging to basics: How blogs are bringing online education back from the brink. In A. Bruns & J. Jacobs (Eds.), *Uses of blogs* (pp. 91-103). New York: Peter Lang Publishing.
- Ferdig, R. E., & Trammell, K. D. (2004). Content delivery in the "blogosphere". *T. H. E. Journal (Technological Horizons In Education)*, 31(7), 12-20.
- Flanigan, A. E., & Babchuk, W. A. (2015). Social media as academic quicksand: A phenomenological study of student experiences in and out of the classroom. *Learning and Individual Differences*, 44, 40-45.
- Fornell, C., & Larcker, D. F., (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Fulgoni, G. (2014). Numbers, please: Uses and misuses of online-survey panels in digital research. *Journal of Advertising Research*, 54(2), 133-137.

- Fullwood, C., Sheehan, N., & Nicholls, W. (2009). Blog function revisited: A content analysis of MySpace blogs. *Cyberpsychology & Behaviour*, 12(6), 685-689.
- Gašević, D., Mirriahi, N., Dawson, S., & Joksimović, S. (2017). Effects of instructional conditions and experience on the adoption of a learning tool. *Computers in Human Behavior*, 67, 207-220.
- Halic, O., Lee, D., Paulus, T., & Spence, M. (2010). To blog or not to blog: Student perceptions of blog effectiveness for learning in a college-level course. *Internet and Higher Education*, 13, 206-213.
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*, 2nd Ed. Thousand Oaks, CA: Sage Publications.
- Hamid, S., Waycott, J., Kurnia, S., & Chang, S. (2015). Understanding students' perceptions of the benefits of online social networking use for teaching and learning. *The Internet and Higher Education*, 26, 1-9.
- Hill, T. R., & Nance, W. (2016, August). Innovating Business Systems Labs for Engaging iGeneration Students, *Proceedings of the 22nd Americas Conference on Information Systems (AMCIS)*, (pp. 1-10). San Diego, CA.
- Illeris, K. (2007). *How we learn: Learning and non-learning in school and beyond*. 2nd Ed. Oxon: Roskilde University Press.
- Imlawi, J., Gregg, D., & Karimi, J. (2015). Student engagement in course-based social networks: The impact of instructor credibility and use of communication. *Computers & Education*, 88, 84-96.

- Islam, A. N., & Azad, N. (2015). Satisfaction and continuance with a learning management system: Comparing perceptions of educators and students. *The International Journal of Information and Learning Technology*, 32(2), 109-123.
- Jackling, B., Natoli, R., Siddique, S., & Sciulli, N. (2015). Student attitudes to blogs: A case study of reflective and collaborative learning. *Assessment & Evaluation in Higher Education*, 40(4), 542-556.
- Jiao, H., Alon, I., Koo, C. K., & Cui, Y. (2013). When should organizational change be implemented? The moderating effect of environmental dynamism between dynamic capabilities and new venture performance. *Journal of Engineering and Technology Management*, 30(2), 188-205.
- Jiang, T., Hou, Y., & Wang, Q. (2016). Does micro-blogging make us “shallow”? Sharing information online interferes with information comprehension. *Computers in Human Behavior*, 59, 210-214.
- Jonassen, D. H., & Land, S. M. (2012). *Theoretical foundations of learning environments*. 2nd Edition. New York, NY: Routledge/Taylor Francis.
- Jou, M., Lin, Y. T., & Wu, D. W. (2016). Effect of a blended learning environment on student critical thinking and knowledge transformation. *Interactive Learning Environments*, 24(6), 1131-1147.
- Kabadayi, S., & Price, K. (2014). Consumer–brand engagement on Facebook: liking and commenting behaviors. *Journal of Research in Interactive Marketing*, 8(3), 203-223.
- Kent, T., & McNergney, R. (1999). *Will technology really change education? From Blackboard to web*. California: Corwin Press, Inc.

- Kerawalla, L., Minocha, S., Kirkup, G., & Conole, G. (2008). Characterising the different blogging behaviours of students on an online distance learning course. *Learning, Media and Technology*, 33(1), 21-33.
- King, D. B., O'Rourke, N., & DeLongis, A. (2014). Social media recruitment and online data collection: A beginner's guide and best practices for accessing low-prevalence and hard-to-reach populations. *Canadian Psychology/Psychologie canadienne*, 55(4), 240-249.
- Kim, S. (2012). Factors affecting the use of social software: TAM perspectives. *The Electronic Library*, 30(5), 690-706.
- Kitsantas T., Chirinos D. S., Hiller S. E., & Kitsantas A. (2016). An examination of Greek college students' perceptions of positive and negative effects of social networking use. In T. Issa, P. Isaias, & P. Kommers (Eds.), *Social networking and education. Lecture notes in social networks*. Cham: Springer.
- Kock, N. F. (2013). *WarpPLS 4.0 user manual*. Laredo, Texas: ScriptWarp Systems.
- Kreniske, P. (2017). Developing a culture of commenting in a first-year seminar. *Computers in Human Behavior*, (72), 724-732.
- Kung, F. W. (2018). Assessing an innovative advanced academic writing course through blog-assisted language learning: issues and resolutions. *Innovations in Education and Teaching International*, 55(3), 348-356.
- Kuo, Y. C., Belland, B. R., & Kuo, Y. T. (2017). Learning through blogging: Students' perspectives in collaborative blog-enhanced learning communities. *Journal of Educational Technology & Society*, 20(2), 37-50.
- Lai, K., & Hong, K (2015). Technology use and learning characteristics of students in higher education: Do generational difference exist?' *British Journal of Educational Technology*, 46(4), 725-738.

- Lee, L. (2017). Learners' perceptions of the effectiveness of blogging for L2 writing in fully online language courses. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 7(1), 19-33.
- Lee, J., & Bonk, C. J. (2016). Social network analysis of peer relationships and online interactions in a blended class using blogs. *The Internet and Higher Education*, 28, 35-44.
- Liao, H. L., & Lua, H. P. (2008). The role of experience and innovation characteristics in the adoption and continued use of e-learning websites. *Computers & Education*, 51(4), 1405–1416.
- Liaw, S. (2002). An internet survey for perceptions of computer and world wide web: Relationship, prediction, and difference', *Computers in Human Behavior*, 18(1), 17-35.
- Liu, M. H. (2016). Blending a class video blog to optimize student learning outcomes in higher education. *The Internet and Higher Education*, 30, 44-53.
- Lujan-Mora, S., & Juana-Espinosa, S. (2007, March). The use of weblogs in higher education: Benefits and barriers. *Proceedings of the International Technology, Education and Development Conference (INTED 2007)*, (pp. 1-7), Valencia, Spain.
- Luo, H., Millet, A., Alley, R., & Zuo, M. (2016). Dealing with ethical issues in MOOC design and delivery: A case study. In: S. Cheung, L. Kwok, J. Shang, A. Wang, & R. Kwan (Eds.), *Blended learning: Aligning theory with practices. ICBL 2016. Lecture Notes in Computer Science*, vol 9757. Cham: Springer.
- Macduff, I. (2009). Using blogs as a teaching tool in negotiation. *Negotiation Journal*, 25(1), 107-124.

- Maag, M. (2005). The potential use of "blogs" in nursing education. *CIN: Computers Informatics Nursing*, 23(1), 16–24.
- Margaryan, A., & Littlejohn, A. (2008). Are digital natives a myth or reality? University students' use of technologies for learning. *Computers & Education*, 56(2), 429-440.
- Martín-Rodríguez, Ó., Fernández-Molina, J. C., Montero-Alonso, M. Á., & González-Gómez, F. (2015). The main components of satisfaction with e-learning. *Technology, Pedagogy and Education*, 24(2), 267-277.
- Mattar, J. W. (2018). The difference in emotional intelligence in relation to levels of maltreatment of Jordanian secondary school students. *International Journal of Adolescence and Youth*, 23(1), 61-69.
- Menkhoff, T., Chay, Y. W., Bengtsson, M. L., Woodard, C. J., & Gan, B. (2015). Incorporating microblogging (“tweeting”) in higher education: Lessons learnt in a knowledge management course. *Computers in Human Behavior*, 51, 1295-1302.
- Morgan, H. (2015). Creating a class blog: A strategy that can promote collaboration, motivation, and improvement in literacy. *Reading Improvement*, 52(1), 27-31.
- Moran, M., Seaman, J., & Tinti-Kane, H. (2011). *Teaching, learning, and sharing: How today's higher education faculty use social media*. Boston, MA: Pearson.
- Neira-Piñeiro, M. (2015). Reading and writing about literature on the internet: Two innovative experiences with blogs in higher education. *Innovations in Education and Teaching International*, 52(5), 546–557.
- Noel, L. (2015). Using blogs to create a constructivist learning environment. *Procedia-Social and Behavioral Sciences*, 174, 617-621.

- Nowiński, W., Haddoud, M. Y., Lančarič, D., Egerová, D., & Czeglédi, C. (2017). The impact of entrepreneurship education, entrepreneurial self-efficacy and gender on entrepreneurial intentions of university students in the Visegrad countries. *Studies in Higher Education*, 1-19.
- Novakovich, J. (2016). Fostering critical thinking and reflection through blog-mediated peer feedback. *Journal of Computer Assisted Learning*, 32(1), 16-30.
- Park, Y., Heo, G. M., & Lee, R. (2011). Blogging for informal learning: Analyzing bloggers' perceptions using learning perspective. *Educational Technology & Society*, 14(2), 149–160.
- Paul, J., Macedo-Rouet, M., Rouet, J. F., & Stadler, M. (2017). Why attend to source information when reading online? The perspective of ninth grade students from two different countries. *Computers & Education*, 113, 339-354.
- Perrin, A. (2015). *Social media usage: 2005-2015*. Pew Research Center. Retrieved from: <http://www.pewinternet.org/2015/10/08/2015/Social-Networking-Usage-2005-2015/>.
- Porter, C. E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 59(9), 999–1007.
- Prensky, M. (2012). *From digital natives to digital wisdom: Hopeful essays for 21st century education*. Thousand Oaks, CA: Corwin Press.
- Rahamat, R. B., Shah, P. M., Din, R. B., & Aziz, J. B. A. (2017). Students' readiness and perceptions towards using mobile technologies for learning the english language literature component. *The English Teacher*, 16. Retrieved from <https://journals.melta.org.my/index.php/tet/article/view/263/160>.

- Ramsay, C. M., Aman, D. D., & Pursel, B. K. (2014). Blogging pragmatics and pedagogy: An adventure in faculty development. *Education and Information Technologies*, 19(2), 425-440.
- Richardson, W. (2010). *Blogs, Wikis, Podcasts and other powerful web tools for classrooms*. 3rd edn. Thousand Oaks: Corwin Publishing.
- Robertson, J. (2011). The educational affordances of blogs for self-directed learning. *Computers & Education*, 57(2), 1628-1644.
- Rosen, L. D. (2010). *Rewired: understanding the iGeneration and the way they learn*. New York: Palgrave Macmillan.
- Rosen, L. D. (2011). Teaching the iGeneration, *Educational Leadership*, 68(5), 10-15.
- Rosen, L. D., Carrier, L., & Cheeve, N. (2013). Facebook and texting made me do it: Media-induced task-switching while studying, *Computers in Human Behavior*, 29(3), 948-958.
- Saha, N., & Karpinski, A. C. (2018). The influence of social media on international students' global life satisfaction and academic performance. In *Student engagement and participation: Concepts, methodologies, tools, and applications* (pp. 1255-1275). Hershey, PA: IGI Global.
- Salajan, F., Schonwetter, D., & Cleghorn, B. (2010). Student and faculty inter-generational digital divide: Fact or fiction?. *Computers and Education*, 55(3), 1393-1403.
- Schmiedel T, vom Brocke J, Recker J (2014). Development and validation of an instrument to measure organizational cultures' support of business process management. *Information & Management*, 51(1),43-56.

- Schoonenboom, J. (2014). Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others. *Computers & Education*, 71, 247–256.
- Shiau, W. L., & Chau, P. Y. (2012). Understanding blog continuance: A model comparison approach. *Industrial Management & Data Systems*, 112(4), 663-682.
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1) 3-10.
- Sim, J. W. S., & Hew, K. F. (2010). The use of weblogs in higher education settings: A review of empirical research. *Educational Research Review*, 5(2), 151-163.
- Stacey, E. (2005). The history of distance education in Australia. *Quarterly Review of Distance Education*, 6(3), 253-259.
- Stoyle, K. L., & Morris, B. J. (2017) Blogging mathematics: Using technology to support mathematical explanations for learning fractions. *Computers & Education*, 111, 114-127.
- Sun, Y. (2010). Developing reflective cyber communities in the blogosphere: A case study in Taiwan higher education. *Teaching in Higher Education*, 15(4), 369-381.
- Sun, C. T., Ye, S. H., & Hsieh, H. C. (2014). Effects of student characteristics and question design on internet search results usage in a Taiwanese classroom. *Computers & Education*, 77, 134-144.
- Tang, E., & Lam, C. (2014). Building an effective online learning community (OLC) in blog-based teaching portfolios. *The Internet and Higher Education*, 20, 79-85.

- Tapscott, D. (2009). *Grown up digital : How the net generation is changing your world*. New York: McGraw-Hill.
- Teo, T., Yurdakul, I. K., & Ursavaş, O. F. (2014). Exploring the digital natives among pre-service teachers in Turkey: A cross-cultural validation of the Digital Native Assessment Scale. *Interactive Learning Environments*, 24(6), 1231-1244.
- Venkatesh, V., Croteau, A. M., & Rabah, J. (2014, January). Perceptions of effectiveness of instructional uses of technology in higher education in an era of Web 2.0. In *System Sciences (HICSS), 2014 47th Hawaii International Conference* (pp. 110-119). IEEE.
- Venkatesh, V., Rabah, J., Fusaro, M., Couture, A., Varela, W., & Alexander, K. (2016). Factors impacting university instructors' and students' perceptions of course effectiveness and technology integration in the age of web 2.0. *McGill Journal of Education/Revue des sciences de l'éducation de McGill*, 51(1), 533-561.
- Vygotsky, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wang, S. M., Hou, H. T., & Wu, S. Y. (2017). Analyzing the knowledge construction and cognitive patterns of blog-based instructional activities using four frequent interactive strategies (problem solving, peer assessment, role playing and peer tutoring): a preliminary study. *Educational Technology Research and Development*, 65(2), 301-323.
- Williams, J. B., & Jacobs, J. (2004). Exploring the use of blogs as learning spaces in the higher education sector. *Australasian Journal of Educational Technology*, 20(2), 232–247.

Wilson, F., Kickul, J., & Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education.

Entrepreneurship Theory and Practice, 31(3), 387-406.

Zhang, X.S., & Olfman, L. (2010, August). Using blogs to support constructivist and social learning: A case study in a university setting. Proceedings of the Sustainable IT Collaboration Around the Globe. 16th Americas Conference on Information Systems (AMCIS 2010), (pp.12-15.), Lima, Peru.

Table 1

Sample's Characteristics

Gender	% of Respondents
Male	25.74
Female	73.48
Prefer Not to Say	1.09
Age	% of Respondents
18 - 24 years' old	65.99
25 years and over	34.01
Area of Study	% of Respondents
Education	4.99
Arts and humanities	24.02
Social science, journalism and information	16.85
Business, administration and law	12.48
Natural sciences, mathematics and statistics	13.73
Information and Communication Technologies	6.08
Engineering, manufacturing and construction	4.84
Agriculture, forestry, fisheries and veterinary	2.34
Health and welfare	8.11
Services	2.65
Prefer not to answer	3.90
Mode of Study	% of Respondents
Full Time	84.87
Part Time	13.73
Other	1.40
 Blogging Platform	% of Respondents
Blogger	38.53
Tumblr	35.73
WordPress	32.92
Type pad	3.59
Pebble pad	2.34
Mahara	1.87
Other	12.95

Table 2

Composite Reliability, Cronbach Alpha Reliability, AVE and VIF.

Variables	CR	Cronbach's Alpha²	AVE	VIF
PDT	0.900	0.853	0.694	1.102
PTL	0.943	0.935	0.525	1.403
PBE	0.913	0.893	0.546	1.848
EXB	0.876	0.836	0.504	1.827
RYB_WRT	0.865	0.691 ³	0.763	2.283
RYB_REA	0.914	0.813	0.842	3.016
RYB_CMO	0.922	0.832	0.856	3.077
RYB_CMI	0.891	0.757	0.804	2.840
PL_BLG	0.942	0.926	0.731	1.267

³ For this variable, the Cronbach's Alpha value is slightly less than 0.7. According to Hair et al (2017), Cronbach Alpha can be sensitive to the number of items within the variable. In this case, if the CR is higher than 0.70, the reliability is deemed satisfactory.

Table 3

The questionnaire's items, their descriptive statistics and item loadings.

Variable	Items	Mean	Standard Deviation	Item loading
Perceptions of Digital Technology (PDT)	I believe the Internet/WWW has potential as a learning tool	1.540	0.736	0.817
	I believe the Internet/WWW is able to offer online learning activities	1.572	0.695	0.849
	I believe that learning how to use the Internet/WWW is worthwhile	1.508	0.680	0.845
	Learning the Internet / WWW skills can enhance my academic performance	1.674	0.773	0.820
Perceptions of Teaching and Learning (PTL)	Learning occurs primarily from drilling and practice	2.555	1.094	0.642
	During the lesson, it is important to keep students confined to the textbooks & the desks	3.405	1.224	0.813
	Lecturers should have control over what students do all the time	3.174	1.137	0.749
	Teaching is simply telling, presenting or explaining the subject matter	3.178	1.230	0.750
	Good teaching occurs when there is mostly Lecturer talk in the classroom	3.061	1.123	0.764
	Students have to be called on all the time to keep them under control	3.299	1.149	0.791
	Teaching is simply telling, presenting or explaining the subject matter	3.051	1.256	0.785

	Learning mainly involves absorbing as much information as possible	2.542	1.071	0.623
	Good students keep quiet and follow Lecturer's instruction in class	2.637	1.028	0.604
	For me, the traditional / lecture method for teaching is best because it covers more information / knowledge	2.662	1.029	0.686
	It is best if Lecturers exercise as much authority as possible in the classroom	2.934	1.101	0.726
	Teaching is to provide students with accurate and complete knowledge rather than encourage them to discover it	2.891	1.096	0.715
	A teacher's task is to correct learning misconceptions of students right away instead of letting them verify themselves	2.765	1.017	0.710
	Learning to teach simply means practicing the ideas from lecturers without questioning them	3.267	1.255	0.795
	No learning can take place unless students are controlled	2.868	1.120	0.669
Perceptions of Previous Blogging Experience (PBE)	Before this blog, I have previously chosen to write a blog which was not a requirement of my academic studies	2.653	1.466	0.531
	Before this blog, I have previously been required to write a blog as part of my academic studies	2.704	1.401	0.601
	My previous experience of choosing to write a blog when it was not a requirement of my academic studies were positive	2.830	1.692	0.556
	My previous experience of being required to write a blog as part of my academic studies was a positive experience	2.780	1.524	0.701
	When I previously blogged for academic purposes I wrote, read and commented on blogs more regularly than required by my lecturer	3.101	1.504	0.793
	Blogging helped me feel connected to other students in the course	2.662	1.377	0.847

Expectations of Blogging (EXB)	I have been stimulated to do additional readings or research on topics due to my blogging activity	2.534	1.328	0.782
	In comparison to my other classes, the amount of my interaction with other students in this class has increased due to blogging	2.768	1.346	0.871
	In comparison to my other classes, the quality of interaction with other students in this class has increased due to blogging	2.719	1.354	0.871
	When writing a post I will include summaries of other students posts	2.691	1.082	0.716
	When writing a post I will link back (i.e. post the URL) to other post of my own	2.436	0.971	0.673
	It is important I receive comments on my blog	2.650	1.063	0.716
	It is important that I have an audience for my blog	2.434	1.088	0.744
	When writing a post I will link back (i.e. post the URL) to other students posts	2.569	1.067	0.738
	When writing a post I will link to other resources	1.995	0.823	0.563
	It is important that my blog is part of a student blog community	2.571	1.098	0.797
Rhythm of Blogging – Writing (RYB_WRT)	How often during the time you were using the blog for academic purposes did you write on your blog?	2.646	1.033	0.850
	How often during the time you were using the blog for academic purposes did you enjoy writing posts for my blog?	2.564	1.097	0.896
Rhythm of Blogging – Reading (RYB_REA)	How often during the time you were using the blog for academic purposes did you read other students blogs?	2.688	1.104	0.917

Rhythm of Blogging – Commenting In (RYB_CMO)	How often during the time you were using the blog for academic purposes did you enjoy reading other students blogs and posts?	2.590	1.102	0.918
	How often during the time you were using the blog for academic purposes did you receive comments on your blog?	2.974	1.150	0.919
Rhythm of Blogging – Commenting Out (RYB_CMI)	How often during the time you were using the blog for academic purposes did you enjoy receiving comments on my blog?	2.957	1.164	0.932
	How often during the time you were using the blog for academic purposes did you comment on other student's blogs?	2.891	1.094	0.886
Perceived Learning (PL_BLG)	How often during the time you were using the blog for academic purposes did you enjoy commenting on other student's blogs?	2.659	1.122	0.907
	The blog discussions help me to share my knowledge and experience with other students on the course	2.542	1.105	0.851
	Blog discussions have made me think about concepts we have learnt outside of this class	2.521	1.104	0.852
	Overall using the blog has helped me learn	2.473	1.092	0.895
	I believe that incorporating blogs with teaching can enhance my learning experience in general	2.447	1.080	0.853
	Blog discussions help me understand others points of view	2.370	1.088	0.854
Missing	2.492	1.073	0.822	

Table 4

Square Root of AVEs.

	1	2	3	4	5	6	7	8	9
1. PDT	0.833	-0.121	0.138	0.121	0.190	0.181	0.060	0.110	0.158
2. PTL	-0.121	0.724	0.308	0.409	-0.124	-0.090	0.121	0.069	-0.036
3. PBE	0.138	0.308	0.739	0.608	0.345	0.395	0.454	0.430	0.221
4. EXB	0.121	0.409	0.608	0.710	0.191	0.293	0.386	0.341	0.182
5. RYB_WRT	0.190	-0.124	0.345	0.191	0.873	0.690	0.599	0.650	0.393
6. RYB_REA	0.181	-0.090	0.395	0.293	0.69	0.918	0.728	0.694	0.414
7. RYB_CMO	0.060	0.121	0.454	0.386	0.599	0.728	0.925	0.751	0.364
8. RYB_CMI	0.110	0.069	0.430	0.341	0.650	0.694	0.751	0.897	0.386
9. PL_BLG	0.158	-0.036	0.221	0.182	0.393	0.414	0.364	0.386	0.855

