

Students' perceived impact of learning and satisfaction with blogs

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Abstract

Purpose – Students' use of blogging tools in learning environments is increasing across the world. The purpose of this paper is to contribute to the literature by examining the effects of relevant factors that engender satisfaction and positive impacts of the technology for learning.

Design/methodology/approach – A cross-sectional survey was used to collect data from 108 undergraduate students taking a management information systems course. The partial least squares technique of structural equation modelling was used to test the reliability and validity of the data, and the study's hypothesised relationships or paths.

Findings – This study revealed that perceived enjoyment, compatibility, usefulness, ease of use, and confirmation have positive influence on students' satisfaction with blog use. Perceived enjoyment had the greatest influence on students' satisfaction with blog use for learning. Perceived impact on learning was positively influenced by perceived ease of use, enjoyment, and satisfaction.

Originality/value – A limited amount of empirical research has focussed on students' perceptions of satisfaction and perceived impact on learning through blog use in higher educational contexts. This study adds to the growing literature in this area of study.

Keywords Information technology, Students, Education, Customer satisfaction, Colleges

Paper type Research paper

1. Introduction

In recent years, there has been an increase in the use of emerging internet technologies such as Web 2.0 applications (e.g. social networks, blogs, and wikis) in higher education (Oravec, 2003; Martindale and Wiley, 2005; Ng'ambi, 2013; Ifinedo and Usoro, 2016). This trend is expected to continue in the coming years on a global scale (Newland and Byles, 2014). The focus of this study is on blogs, which are websites maintained by a user (blogger) who provides regular entries, i.e., commentaries and or descriptions of events that are arranged in reserve chronological order. Previous studies have indicated that blogs enhance teaching and learning in higher education (Ellison and Wu, 2008; Kim, 2008; Sim and Hew, 2010; Halic *et al.*, 2010; Lai and Chen, 2011; Chen *et al.*, 2015).

Research on students' use of blogs in educational contexts continues to grow (Sim and Hew, 2010; Halic *et al.*, 2010; Liu, 2016). For example, researchers have provided insights on students' participation in blogging (Goldman *et al.*, 2008; Leslie and Murphy, 2008; Liu, 2016; Ifinedo and Usoro, 2016), attitudes towards blogs (Ellison and Wu, 2008; Pardamean and Susanto, 2012; Lin and Shen, 2013), and advantages of blog use in higher education (Sim and Hew, 2010; Cakir, 2013). The paucity of research on students' assessment of perceived or actual performance outcomes has been noted (Goldman *et al.*, 2008; Sim and Hew, 2010; Osman and Koh, 2012; Liu, 2016). Similarly, specific studies focussing on factors influencing students' satisfaction with blog usage for learning purposes (Wang *et al.*, 2012, 2014; Zhang *et al.*, 2014) and the perceived impact on learning with blogging tools are limited (Goldman *et al.*, 2008; Mansouria and Piki, 2016; Liu, 2016).

This study is motivated by this gap in the literature. It is worth mentioning that this study is different from the study by Wang *et al.* (2012, 2014) who attempted to develop a scale for assessing students' satisfaction with blog use, and Mansouri and Piki's study that



investigated blog impacts on postgraduate students. In this study, attention will be on undergraduate students' satisfaction with, and the perceived impact on learning with blogs.

It is critically important to study satisfaction with blog use and the perceived impact of blogging tools on student learning outcomes. Adopting technologies such as blogs, in the classroom, is one thing, knowledge of the changes, impacts, and satisfaction students perceive from such tools is another. Understanding these differences is an important first step for practitioners and educators to take in formulating strategies that can enhance the use of technologies such as blogs in learning environments. Others have made a similar argument. For example, Means (2010) stressed that "how to implement technology in ways that produce student learning gains is integral to efforts to use technology as a lever for education change" (p. 287).

Specifically, the purpose of this study is to investigate the effects of relevant antecedents to satisfaction with blog use and the perceived impact on learning with such tools for students. The findings of this study will be of value to researchers and practitioners who may wish to gain an understanding of potential factors that stimulate students' perceptions in the matter. The theoretical underpinnings of this study are the technology acceptance model (TAM) (Davis, 1989), innovation diffusion theory (IDT) (Rogers, 2003), expectation-confirmation model (ECM) (Bhattacharjee, 2001), and flow theory (Csikszentmihalyi, 1977, 1997). Relevant constructs from these theoretical frameworks will be used to propose the study's research model.

2. Background information and theoretical backgrounds

2.1 Summary of students' use of blogs

A summary of students' use of blogs in higher educational contexts is available in the literature (e.g. Sim and Hew, 2010; Halic *et al.*, 2010; Liu, 2016). A few examples are provided here. Notably, Robertson (2011) found that "blogs enabled students to express their emotional experiences of learning and to exchange social and cognitive support with their peers" (p. 1643). Students use blogs in courses to communicate with peers and critically reflect on subject materials (Xie *et al.*, 2008; Yang, 2009). Blog use in learning spaces facilitates reflective thinking (Xie *et al.*, 2008; Robertson, 2011; Mansor, 2011; Osman and Koh, 2012). Reflective thinking allows a student to turn a subject over in their mind and give it serious consideration (Yang, 2009). Students using blogs are able to elaborate and generate new ideas and solutions to problems (Loving *et al.*, 2007; Ifinedo, 2017). Students noted that blogs helped them better understand topics, organise ideas, and consolidate knowledge (Sim and Hew, 2010). In general, blogging enhances interaction, collaboration, and cooperation (Ellison and Wu, 2008; Sim and Hew, 2010; Deng and Yuen, 2013; Halic *et al.*, 2010; Chen *et al.*, 2015; Liu, 2016; Ifinedo, 2017).

2.2 TAM

TAM was proposed by Davis (1989) to understand an individual's voluntary information systems (IS) acceptance intentions. TAM has been widely used to explain and predict students' acceptance of learning technologies, including blogs (Hsu and Lin, 2008; Tajuddin *et al.*, 2012; Pardamean and Susanto, 2012), due to its simplicity and parsimony (Venkatesh and Davis, 2000). TAM postulates that user acceptance of a technology is directly determined by the user's behavioural intention to use the technology (Davis, 1989). The two core components of TAM are perceived usefulness and perceived ease of use. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Perceived ease of use refers to "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320).

2.3 ECM

The ECM of IS continuance was proposed by Bhattacherjee (2001). This model seeks to explain users' intention to reuse an IS. The premise of the model is that a satisfied user of a technological product will reuse it. Satisfaction has a central role in ECM and was deemed relevant to this study's focus. Satisfaction refers to the extent to which a user is pleased with using a technology for a particular purpose (Liao *et al.*, 2015). Other ECM constructs included in this study are perceived usefulness and confirmation. Bhattacherjee borrowed perceived usefulness from TAM. Confirmation refers to the extent to which a student's initial expectations about the performance of using blogs to learn are confirmed after experiencing such tools (Bhattacherjee, 2001; Lee, 2010).

2.4 IDT: *perceived compatibility*

IDT refers to the process that occurs as people adopt a new idea, product, or practice (Rogers, 2003). Compatibility is one of the five significant characteristics of innovation. It was selected for this study as prior studies have consistently demonstrated its pertinence to the discourse on students' acceptance of technologies (e.g. Chen, 2011; Lai *et al.*, 2012). According to Rogers (2003), compatibility refers to "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" (p. 15).

2.5 Flow theory: *perceived enjoyment*

To better understand motivation, Csikszentmihalyi (1977) proposed flow theory. Flow experience is defined as "the holistic experience that people feel when they act with total involvement" (Csikszentmihalyi, 1997). Based on the flow theory, when people are engaged in the state of flow they become absorbed in their activities, concentrating only on the ongoing activity (Lee, 2010; Hung *et al.*, 2016). Flow experience has been measured by a variety of sub-concepts. One positive dimension or feeling from flow experience commonly used is enjoyment. In this study, perceived enjoyment refers to "the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (Venkatesh and Davis, 2000).

3. Research model and hypotheses development

The research model is shown in Figure 1. Constructs and theoretical frameworks are delineated, so are the formulated hypothesised paths. Discussion of the hypotheses is presented next.

As indicated, perceived ease of use and usefulness are key determinants of user acceptance of a new technology (Davis, 1989). With respect to learning performance, achievement, and impact, the literature implies that students' assessment of the ease of use and usefulness of learning technologies, including blogs, is associated with students' learning impact, achievement, and performance (e.g. Tao *et al.*, 2009; Bae, 2011; Lin, 2012; Mansouria and Piki, 2016). Bae (2011) found that an appropriately designed class blog had positive influence on undergraduate students' learning achievement. Tajuddin *et al.* (2012) showed that students' perceived usefulness and ease of use impacted their acceptance of blogs. Therefore, the following hypotheses are proposed:

H1. Perceived ease of use positively influences perceived impact on learning.

H2. Perceived usefulness positively influences perceived impact on learning.

A number of studies on students' acceptance of learning technologies have shown that perceived ease of use and usefulness are positively related (e.g. Lee *et al.*, 2005; Abdullah *et al.*, 2016). These studies indicate that students who do not perceive implemented

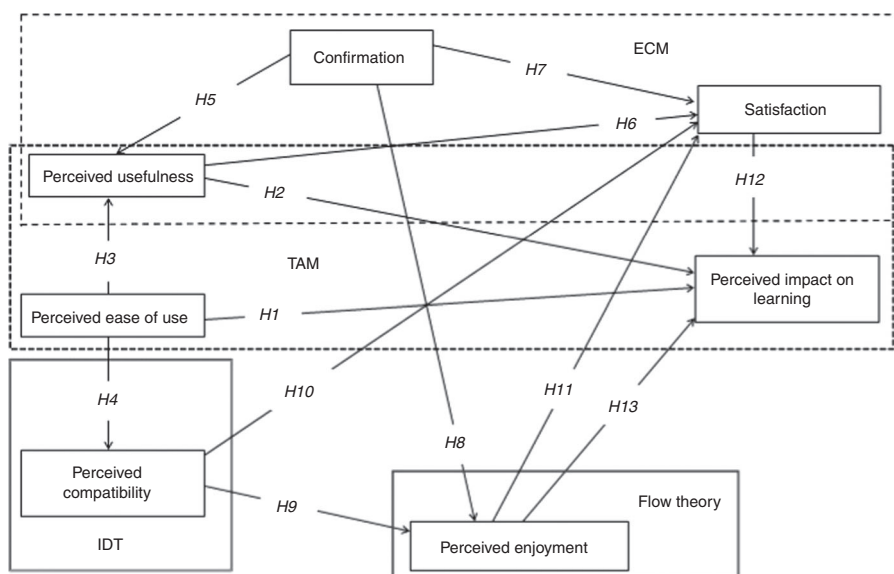


Figure 1. The research model

technologies as difficult to use are able to appreciate the advantages of such tools for their learning purposes. Students with favourable beliefs about how well adopted technologies fit their learning needs often develop positive attitudes towards using such tools for learning purposes (Au and Enderwick, 2000; Chen, 2011; Lai *et al.*, 2012). It is logical to expect that when adopted technologies are perceived to be easy to use, compatibility with such tools will equally be high. Previous studies have shown that perceived compatibility and ease of use are positively related (Lai and Chang, 2011; Lane and Stagg, 2014). Therefore, the following hypotheses are proposed:

H3. Perceived ease of use positively influences perceived usefulness.

H4. Perceived ease of use positively influences perceived compatibility.

An individual is better placed to determine if a tool has met its initial expectations after interacting with the technology (Bhattacharjee, 2001). ECM posits that perceived usefulness increases with confirmation of expected benefits of using such systems. Past studies found that confirmation positively affected the perceived usefulness of technologies in learning contexts (Chiu *et al.*, 2005; Limayem and Cheung, 2008). Tang *et al.* (2014) and Chen *et al.* (2015) found that confirmation strongly influenced the perceived usefulness of blog use for learning. Therefore, the following hypothesis is proposed:

H5. Confirmation positively influences perceived usefulness.

In line with ECM, students' satisfaction with IS use is high if they appreciate the perceived advantages of such tools. Findings from previous studies of technologies used in learning environments showed that perceived usefulness and satisfaction with such technologies are positively associated (e.g. Sørenbø *et al.*, 2009; Stone and Baker-Eveleth, 2013). ECM also postulates that satisfaction with a technology will be high if students are able to confirm their initial expectations of the benefits of using the technology. Confirmation has been shown to be a key determinant of students' satisfaction with IS-enabled learning systems, including blogs (e.g. Limayem and Cheung, 2008; Sørenbø *et al.*, 2009; Lee, 2010; Chen *et al.*, 2015). Furthermore, a user who is able to confirm the benefits of a technology is more likely

to continue in his or her flow experience by enjoying the product. A number of studies have shown that users' confirmation positively influenced perceived enjoyment (e.g. Lin *et al.*, 2005; Shiau and Luo, 2010). Therefore, the following hypotheses are proposed:

H6. Perceived usefulness positively influences satisfaction.

H7. Confirmation positively influences satisfaction.

H8. Confirmation positively influences perceived enjoyment.

The way individuals use web-based technologies to learn differ (Felder, 1993). Thus, students with favourable beliefs about how well technologies fit their learning needs and goals are more likely to be pleased with utilising such tools to learn (Au and Enderwick, 2000; McGill and Hobbs, 2008; Chen, 2011; Lai *et al.*, 2012; Lin, 2012). Al-Gahtani and King (1999) showed that compatibility has a positive impact on enjoyment. Tan and Chou (2008) found that compatibility has a positive influence on the flow dimension of playfulness (akin to enjoyment). Indeed, the study by Islam (2013) revealed that students who used an e-learning system frequently reported high satisfaction with the application perhaps due to its fit with their learning needs. Therefore, the following hypotheses are proposed:

H9. Perceived compatibility positively influences perceived enjoyment.

H10. Perceived compatibility positively influences satisfaction.

It is reasonable to believe that students who enjoy using blogs for learning purposes will likely be satisfied with such technologies in learning environments. The foregoing claim has been supported by prior studies indicating that intrinsic motivation (i.e. typically represented by flow theory variables such as playfulness) has a significant effect on user satisfaction with technology use (e.g. Lin *et al.*, 2005; Shiau and Luo, 2010). Therefore, it is predicted that:

H11. Perceived enjoyment positively influences satisfaction.

Past studies found that students' performance and quality of learning experiences, and the construct of user satisfaction are related (e.g. Yukselturk and Yildirim, 2008; Paechter *et al.*, 2010; Chang and Chang, 2012). In fact, Tao *et al.* (2009) showed that students' learning performance positively influenced their satisfaction. Chang and Chang (2012) found that learning satisfaction strongly correlated with learning motivation and impact. Consistent with prior insights, it is expected that the relationship between satisfaction and perceived impact on learning will hold in the context of students' use of blogging tools. Therefore, it is predicted that:

H12. Satisfaction positively influences perceived impact on learning.

Regarding students' perceptions, research has linked enjoyment to perceived impact of learning with computing technologies, including blogs (e.g. Pintrich and DeGroot, 1990; Heafner, 2004; Mansouria and Piki, 2016; Ifinedo, 2017). These studies imply that increased enjoyment leads to more positive impacts being obtained from computer-based instruction. For instance, Heafner's (2004) study reported that students experienced more positive impacts on their learning outcomes because the computing technologies they used made their work easier and more enjoyable. Others have indicated that students who found blogging to be fun and interesting usually reported increased impacts of such tools on their learning (Goldman *et al.*, 2008; Mansouria and Piki, 2016). Therefore, it is predicted that:

H13. Perceived enjoyment positively influences perceived impact on learning.

4. Research method

4.1 Procedure

Data were collected in a cross-sectional survey of students who had experienced using blogs to learn in an undergraduate-level management information systems (MIS) course at a small Canadian university (i.e. 25 being the average class size). Blog use for students taking the course was quasi-voluntary (i.e. students' blog use accounted for a small fraction of the final course grade). Students were asked to give serious thought to any of the topics or concepts contained in the course textbook. Examples of blog topics that students chose include "enterprise resource planning systems", "virtual reality", "e-commerce", "neural networks", among others.

Given the capability of blogs to enhance reflective thinking, each student was then asked to create a blog that highlighted their insights. Assumptions about the given task were that students can use blogs to critically reflect on subject material, better understand topics in the course, and generally consolidate knowledge of course concepts (Sun, 2010; Sim and Hew, 2010; Robertson, 2011). As indicated, blog use encourages students' engagement with teaching materials and communication with peers (Ellison and Wu, 2008; Halic *et al.*, 2010; Liu, 2016).

Students were instructed to review the blogs of peers and provide appropriate feedback or comments. The instructor read all the posts and provided feedback as well. Uniqueness in blog postings was emphasised; the addition of information not included in the course textbook was highly valued. To motivate active blogging, students were informed that the multiple-choice section of class tests would include items taken from students' blogs. Marks were awarded for the following: quality of blog content, and quality of comments and feedback provided to peers.

4.2 Participants

A survey was self-administered at the end of the course after clearance was obtained from the instructor's university research ethics board. Participation in the survey was voluntary. Candid opinions on the issues covered in the questionnaire were sought. The average response rate for the MIS classes used for the study is 94 per cent. Data were collected from four classes taught by the researcher (instructor). The results of a χ^2 test (significant at $p < 0.5$) on several of the study's variables did not indicate differences in students' opinions on the issues under investigation across the four classes. The study's participants were mainly third and fourth year students. Participants were all Bachelor of Business Administration students. Excluding baldly completed responses, usable data from 108 undergraduate students were used for data analysis. Of the participants surveyed, 81.5 per cent (88) have eight years' experience or more using the internet. Table I shows the complete demographic profile of all participants.

4.3 Instrument development

Previously validated scales were used to represent this study's constructs; this approach ensures content validity for the study's variables. Items used to represent perceived ease of use were adapted from Lee (2010) and Davis (1989). Measuring items taken from Bhattacharjee (2001), Davis (1989), and Lee (2010) were used to operationalise the constructs of perceived usefulness, satisfaction, and confirmation. Items used to represent perceived compatibility and perceived impact on learning were adopted from McGill and Hobbs (2008) and Lin (2012). For the construct of perceived enjoyment, measures were obtained from Lai and Chen (2011) and Lee (2010). All questionnaire items used a seven-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). Table II shows the items used in the questionnaire and descriptive statistics.

Measure	Category	Number	%
Gender	Male	51	47.2
	Female	57	52.8
Age	Less than 18 years	0	0
	19-21 years	55	50.9
	22-24 years	36	33.3
	25-27 years	5	4.6
	Above 27 years	12	11.1
Year of study	Year 1	2	1.9
	Year 2	13	12.0
	Year 3	53	49.1
	Year 4	39	36.1
	Missing	1	0.9
Familiar with blog use for learning before taking the course	Yes	60	55.6
	No	48	44.4
Blogging platform used for the assignment	Blog.com	35	32.4
	Blogger.com	1	0.9
	Blogspot.ca	4	3.7
	Tumblr.com	2	1.9
	Webs.com	1	0.9
	Weebly.com	1	0.9
	WordPress.com	64	59.3

Table I.
Participants'
demographic profile

5. Data analysis

The partial least squares (PLS) technique of structural equation model (Hair *et al.*, 2011) was used to test the study's hypotheses. The PLS technique places less minimal restrictions on measurement scales, sample size, and residual distribution (Hair *et al.*, 2010, 2011). The analysis of PLS consists of two stages, i.e., assessments of the measurement and structural models.

5.1 Measurement model assessment

Reliability is usually assessed according to the loadings of measures on their associated constructs (Hair *et al.*, 2010). It is generally accepted that individual measures are statistically reliable if their loadings are larger than 0.7 on the expected latent variable (Hair *et al.*, 2010, 2011), and significant, at least, at the 0.05 level (Fornell and Larcker, 1981). Item loadings for the research model were above 0.7 on their respective constructs, and were significant at the 0.001 level. Table AI shows items loadings and cross-loadings. Convergent validity was assessed by examining Cronbach's α , composite reliability, and average variance extracted (AVE) for the study's measures (Hair *et al.*, 2010). A threshold value of 0.7 is generally accepted for both Cronbach's α and composite reliability coefficients (Hair *et al.*, 2010). AVEs greater than 0.5 are considered acceptable for a construct (Fornell and Larcker, 1981). Table III shows that the composite reliabilities and Cronbach's α s for the measures were consistently above the threshold of 0.7, and constructs' AVEs ranged from 0.628 to 0.875, which were above the recommended value of 0.5.

For discriminant validity, the square root of AVE for each construct was compared with the correlations between the construct and any other constructs in the model. It is also recommended that the AVE for each construct should be higher than 0.5, and the square root of AVE for each construct should exceed the correlation between any pair of distinct constructs in the model (Fornell and Larcker, 1981; Hair *et al.*, 2010, 2011). Table III shows that the results obtained for the measurement model have sufficient psychometric properties and meet required standards.

5.2 Structural model assessment

Upon establishing the reliability and validity of the measurement model, the relationships between constructs were then tested. The structural model presents information on the

Construct	Item no.	Item description	Mean	SD	Item loading
Perceived compatibility (PCMT)	PCMT_1	Using blogs fit well with learning MIS	5.370	1.181	0.884
	PCMT_2	Using blogs fit well with helping me to be efficient in learning MIS	5.028	1.443	0.882
	PCMT_3	Using blogs is compatible with my learning MIS	5.130	1.305	0.971
	PCMT_4	Using blogs has provided me with a good opportunity to learn MIS well	4.972	1.424	0.827
Perceived ease of use (PEOU)	PEOU_1	My interaction with blogs to support my learning MIS is very clear	4.991	1.343	0.296 ^a
	PEOU_2	Learning to use blogs is easy for me	5.500	1.418	0.872
	PEOU_2	I found it easy to use blogs for learning concepts in MIS	5.361	1.450	0.925
Perceived usefulness (PUSS)	PEOU_3	Overall, I believe that it is easy to use blogs to support my learning of MIS	5.482	1.397	0.976
	PUSS_1	Using blogs for my MIS course improved my learning performance in that subject	5.139	1.363	0.944
	PUSS_2	Using blogs for my MIS course increased my learning effectiveness in that subject	5.148	1.338	0.941
	PUSS_3	Using blogs helped me learn MIS better	5.009	1.469	0.876
Satisfaction (SATI)	PUS_4	Using blogs in my MIS course are helpful in preparing for quizzes/tests	5.084	1.591	0.915
	SATI_1	I am satisfied with blogs as learning tools	5.176	1.359	0.967
	SATI_2	I am satisfied with blogs as tools for creating and sharing knowledge	5.449	1.305	0.943
	SATI_3	I feel satisfied using blogs for my MIS course	5.352	1.396	0.982
	SATI_4	I am happy I used blogs for learning in my MIS class	5.352	1.356	0.818
Confirmation (CONF)	SATI_5	I am pleased with the experience of using blogs for my MIS course	5.528	1.322	0.935
	CONF_1	My experience with using blogs was better than what I expected	5.028	1.463	0.914
	CONF_2	Using blogs for learning in my MIS class was better than I expected	5.111	1.543	0.882
	CONF_3	The service provided by blog sites was better than what I expected	4.718	1.599	0.811
Perceived impact on learning (PIML)	CONF_4	Overall, most of my expectations regarding using blogs in my MIS course were confirmed	5.140	1.232	0.825
	PIML_1	The use of blogs for my MIS course has positive impacts on my learning the subject	5.333	1.547	0.957
	PIML_2	The use of blogs for my MIS is an important and valuable aid to me	5.074	1.471	0.924
Perceived enjoyment (PENJ)	PIML_3	I gained a clearer understanding of some MIS concepts from peers' blogs	5.417	1.505	0.83
	PENJ_1	Using blogs to learn MIS is pleasurable	4.602	1.606	0.968
	PENJ_2	I had fun using blogs to learn MIS concepts and topics	4.722	1.503	0.937
	PENJ_3	Using blogs to learn MIS is pleasant	4.639	1.694	0.964
	PENJ_4	I found blogs to be interesting for my MIS course	4.741	1.525	0.982
	PENJ_5	I found the use of blogs in my MIS course to be enjoyable	4.731	1.604	0.946

Table II.
The questionnaire's items and descriptive statistics

Note: ^aRepresents an item with poor loading and was removed from subsequent data analysis

regression coefficient, i.e., beta (β), path significance (p), and coefficient of determination (R^2), which shows the model's ability to explain variation in the dependent variable. R^2 values of 0.20 and higher indicate substantive influence. Figure 2 presents a graphical depiction of the PLS analysis. In all, 12 out of the 13 formulated hypotheses were significantly supported. The exogenous factors in the model explained 80 and 57 per cent of the variance in satisfaction and perceived impact on learning, respectively.

6. Discussion

Overall, the results show that the research model demonstrated good predictive power and explained students' perceptions of satisfaction and perceived impact on learning with blogs (i.e. over 50 per cent of variance was explained by the exogenous constructs).

The result shows that students who perceived blogs to be easy to use experienced positive impacts on their learning with this tool ($H1: \beta = 0.29, p < 0.01$). This finding is consistent with previous studies indicating that easy to use blogs significantly affected students' acceptance of the technology (e.g. Tajuddin *et al.*, 2012; Mansouria and Piki, 2016). It is somewhat surprising that students' perceptions of the usefulness of blog use did not positively influence their views of the positive impacts of the tool on their learning ($H2: \beta = 0.05, p = 0.31$). Extraneous factors in the study location might be the reason for the lack of support for this prediction. Indeed, Cakir (2013) noted that students need to know why they are engaged in a blogging activity and how it benefits their coursework. This study did not ascertain if participants fully appreciated the usefulness and impact of blog use on their learning. It is to be noted that information from the study shows that 44 per cent of participants were not familiar with blog use for learning

Table III.
Composite reliability,
Cronbach's α , AVEs,
and inter-construct
correlations

	COM	CRA	AVE	CONF	PUSS	PEOU	PCMT	PENJ	SATI	PIML
CONF	0.869	0.794	0.628	<i>0.793</i>	0.705	0.566	0.674	0.741	0.751	0.595
PUSS	0.964	0.95	0.87	0.705	<i>0.933</i>	0.475	0.838	0.774	0.784	0.523
PEOU	0.934	0.902	0.836	0.566	0.475	<i>0.914</i>	0.572	0.452	0.5	0.487
PCMT	0.946	0.928	0.823	0.674	0.838	0.572	<i>0.907</i>	0.749	0.797	0.537
PENJ	0.972	0.964	0.875	0.741	0.774	0.452	0.749	<i>0.935</i>	0.815	0.589
SATI	0.969	0.959	0.86	0.751	0.784	0.5	0.797	0.815	<i>0.928</i>	0.615
PIML	0.93	0.887	0.816	0.595	0.523	0.487	0.537	0.589	0.615	<i>0.903</i>

Notes: COM, composite reliability; CRA, Cronbach's α ; AVE, average variance extracted. Variables' abbreviations are provided in Table II. Off-diagonal elements are correlations among constructs. The italic fonts in the leading diagonals are the square root of AVEs

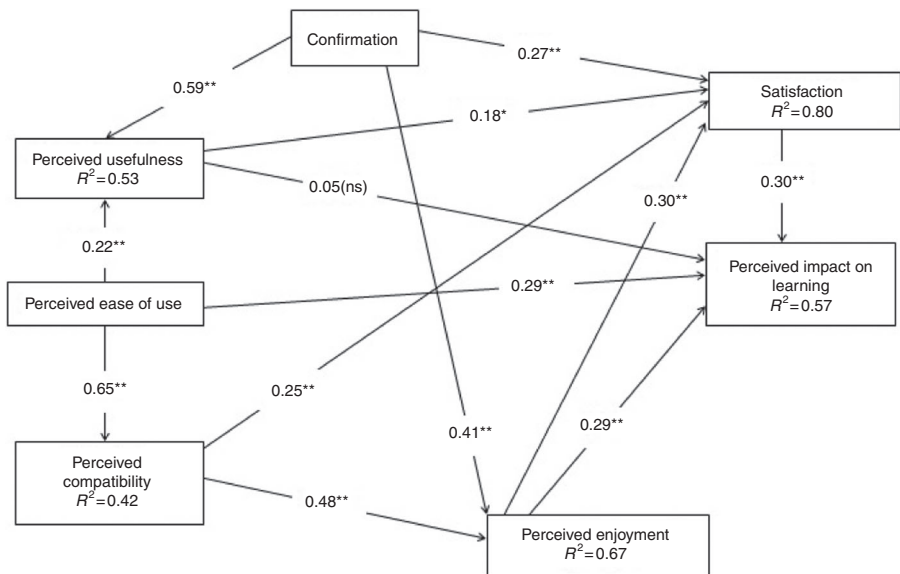


Figure 2.
Results of PLS
analysis for the
proposed research
model

Notes: ns, not significant. *, **Significant at $p < 0.05$; $p < 0.01$ level

before taking the course. This suggests that many might not be cognizant of blog's relevance to learning outcomes. Prior studies have shown that some students are not overly enthusiastic about the benefits or impacts of learning technologies used in educational environments (Lam *et al.*, 2011; McNaught *et al.*, 2006).

It was found that students' perceptions of the usefulness of blogs positively benefitted from how easy or difficult blogs were deemed ($H3: \beta = 0.22, p < 0.01$). The data suggest that students who do not perceive blogs to be difficult to use are more likely to appreciate the advantages of these tools for learning. This result is congruent with past studies that linked perceived ease of use to usefulness in the context of students' acceptance of learning technologies (e.g. Park, 2009; Lee, 2010; Abdullah *et al.*, 2016).

Perceived ease of use was found to positively influence perceived compatibility ($H4: \beta = 0.65, p < 0.01$). This means that students' views of how well blogs fit their learning needs benefitted from favourable perceptions about how easy it is to use these tools. Other previous studies affirmed the positive relationship between perceived compatibility and ease of use (e.g. Lai and Chang, 2011; Chen, 2011).

The result shows that confirmation positively influenced perceived usefulness ($H5: \beta = 0.59, p < 0.01$). That is, students who believed that blog use met their initial expectations after using the technology were likely to appreciate the advantages of blog use in their learning. This observation is analogous to findings from other studies that found that confirmation positively affected the perceived usefulness in the context of learning technologies and blogs (e.g. Lee, 2010; Tang *et al.*, 2014). It was found that where students' perceived usefulness of blogs was high, satisfaction with blog use for learning was also high ($H6: \beta = 0.18, p < 0.05$). Others presented a similar result (e.g. Sørebo *et al.*, 2009).

Students who were able to confirm their initial expectations of the benefits of using blogs to learn were satisfied with the technology ($H7: \beta = 0.27, p < 0.01$), and enjoyed using the tool for learning purposes ($H8: \beta = 0.41, p < 0.01$). The result for $H7$ is consistent with past studies (e.g. Sørebo *et al.*, 2009) that showed that confirmation and satisfaction are positively associated in the context of learning technologies. The result for $H8$ also mirrors the finding in prior IS research that showed a positive relationship between confirmation and perceived enjoyment (e.g. Lin *et al.*, 2005).

The data supported the viewpoint indicating that students with favourable beliefs about how well blogs fit their learning needs and goals were more likely to enjoy using the technology to learn ($H9: \beta = 0.48, p < 0.01$). Prior studies have affirmed the link between perceived compatibility and perceived enjoyment (Chen, 2011; Lin, 2012). It was also found that higher levels of students' perceived compatibility with blog use led to increased satisfaction with the use of the tool for learning ($H10: \beta = 0.25, p < 0.01$). Studies by Tan and Chou (2008) and Islam (2013) provided support for this relationship.

As predicted, students' enjoyment with blog use positively influenced their satisfaction levels in learning environments ($H11: \beta = 0.30, p < 0.01$). This result is in line with findings reported in previous studies that revealed a positive association between enjoyment and satisfaction in the context of learning tools (e.g. Lin *et al.*, 2005; Shiau and Luo, 2010). This study produced a result that mirrors views expressed by other researchers who showed that students' satisfaction with learning systems has a positive impact on perceived learning outcomes and performance ($H12: \beta = 0.30, p < 0.01$) (e.g. Tao *et al.*, 2009; Chang and Chang, 2012). The study showed that students' enjoyment with blog use positively influences their perceptions of the impact of these technologies on their learning outcomes ($H13: \beta = 0.29, p < 0.01$). The literature supports the foregoing confirmed result (e.g. Mansouria and Piki, 2016).

6.1 Implications of the study

The main contribution of this study to research can be summarised as follows. First, the results of this research contribute to the understanding of factors influencing undergraduate

students' perceptions of satisfaction and perceived impact on learning with blogs. Not many have examined the issue as this exploratory study did. Second, this research validates an integrative model that combines constructs such as perceived usefulness, enjoyment, compatibility, satisfaction, and so forth. The combined model can be used to study students' acceptance of similar tools in higher educational contexts. Notably, all of the study's seven distinct constructs were not treated in isolation; rather, they were considered collectively because of the capability of PLS to model the effects of exogenous (independent) and endogenous (dependent) variables in the model. Third, as a result of the foregoing point, this study indicates that the construct with the greatest impact on perceived impact on learning was satisfaction. Insights such as this benefit future work in the area.

For practitioners, the results have useful implications, some of which are noted as follows. First, it is advisable for instructors to implement easy to use blogging platforms and host services when introducing blog to students (Sturgeon, 2008). Initial hands-on classes could be provided to students planning on taking courses where blogging is a component. Feelings of uneasiness can be doused with initial practical use of the technology. Second, communicating the tangible benefits of blog use for learning could be encouraged to enlighten students about the advantages of blog use for learning purposes and future endeavours. For example, information on how blogs can enhance self-reflection of topics discussed in class and the opportunity to receive peer comments could be passed on to students lacking knowledge on such matters. Third, instructors could provide orientation classes and training to students using blogging tools to learn. Such awareness will provide initial information on how to align their own beliefs, learning needs, and approaches with blog use in learning spaces. Lai *et al.* (2012) noted that it is only when students feel that the use of a particular technology is compatible with their learning styles, expectations, and beliefs, they will be initially inclined to adopt the technology for learning and continued use.

Fourth, to increase students' satisfaction with blog use, instructors could encourage fun, enjoyable, and playful activities in learning spaces where blogs are used. It is worth noting that students in this study linked their blogs to online resources, e.g., videos and other materials (academic and otherwise) that supported concepts from the course textbook. The participating students reported that they enjoyed using blogs in such a manner as it enhanced their imaginations and creativity. An environment where play, fun, and learning are well-integrated into blog assignments is promising for increasing satisfaction with blog use in learning environments. Millennials tend to use online resources for pleasurable experiences; instructors can use this information to better serve learning with blogging tools.

Fifth, as favourable perceptions of variables such as perceived compatibility, usefulness, and satisfaction matter for perceived impact on learning through blog use for students, university administrators could consider managing learning environments in ways that students feel supported by proactive measures that may enhance their attributes in the noted aspects. For example, integrating blog use into the instructional design of relevant courses in higher educational contexts may provide opportunities for students to further enhance their perceptions of the impacts on learning with blogs.

6.2 Limitations of the study and future research avenues

There are several limitations in this study. First, the study used a convenience sample, which was constrained by conditions in the research location. A larger sample of students' views could offer more insights. Second, non-response bias cannot be ruled out as the researcher did not compare the views of students who used blogs with those who did not. Third, the research subjects, who were undergraduate students, came from one location; thus, the findings reported in the study cannot be applied to all contexts, including postgraduate students and working professionals.

Future research may address the noted limitations in this study. The proposed research model did not include all possible factors that could serve as potential antecedents to satisfaction and perceived impact on learning. Future studies might consider the impact of factors such as instructors' characteristics, personal outcome expectations, and perceived self-efficacy. It would also be worthwhile for future studies to explore antecedents of other flow experience dimensions on satisfaction and perceived impact on learning. Future research could explore the impacts of demographics on the study's main constructs.

7. Conclusion

This study was designed to shed light on salient factors influencing undergraduate students' perceptions of satisfaction and perceived impact on learning with blogs. To that end, elements from relevant theoretical frameworks such as TAM, ECM, IDT, and flow theory were used to guide this study. The results showed that perceived enjoyment, compatibility, usefulness, ease of use, and confirmation have positive influence on students' satisfaction with blogs used for learning, and perceptions of the impact of blogs on learning outcomes. Research on students' use of blogging tools for learning in higher education contexts is enriched by this effort.

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Appendix

	CONF	PUSS	PEOU	PCMT	PENJ	SATI	PIML
CONF_1	0.914	0.222	-0.066	0.021	-0.285	0.144	0.095
CONF_2	0.882	-0.25	-0.136	0.198	0.242	0.193	0.081
CONF_3	0.811	-0.084	0.172	-0.459	0.246	0.024	-0.184
CONF_4	0.825	0.106	0.018	0.31	-0.217	-0.404	0.021
PUSS_1	-0.125	0.944	0.032	-0.179	-0.087	0.221	0.058
PUSS_2	-0.189	0.941	0.051	-0.206	0.063	0.17	-0.021
PUSS_3	0.302	0.876	-0.09	0.321	0.096	-0.131	-0.066
PUS_4	0.126	0.915	-0.025	0.188	-0.046	-0.33	0.009
PEOU_2	0.279	0.087	0.872	-0.158	0.073	-0.346	-0.066
PEOU_2	-0.287	-0.106	0.925	0.108	-0.035	0.168	0.098
PEOU_3	0.023	0.028	0.976	0.055	-0.043	0.201	-0.042
PCMT_1	-0.293	-0.25	0.096	0.884	0.195	-0.045	0.143
PCMT_2	0.25	0.35	-0.031	0.882	0.06	-0.152	-0.101
PCMT_3	0.04	-0.23	-0.017	0.971	-0.039	-0.04	0
PCMT_4	0.082	0.383	-0.07	0.827	-0.263	0.283	-0.095
PENJ_1	0.007	-0.033	0.046	-0.242	0.968	0.006	-0.027
PENJ_2	-0.3	0.033	0.107	0.017	0.937	0.121	0.067
PENJ_3	0.167	0.013	-0.062	-0.056	0.964	-0.174	0.07
PENJ_4	0.009	-0.01	0.062	0.163	0.982	0.058	-0.053
PENJ_5	0.12	0.002	-0.164	0.241	0.946	0.014	-0.077
SATI_1	0.147	0.091	-0.11	-0.077	-0.117	0.967	0.055
SATI_2	-0.005	0.132	0.062	-0.078	-0.287	0.943	0.041
SATI_3	0.037	-0.13	-0.017	0.042	0.114	0.982	-0.043
SATI_4	0.249	-0.213	-0.022	0.421	0.211	0.818	0.029
SATI_5	-0.279	0.027	0.056	-0.129	0.151	0.935	-0.062
PIML_1	-0.042	-0.189	-0.03	0.054	0.177	-0.112	0.957
PIML_2	0.136	0.087	-0.101	0.059	0.194	-0.263	0.924
PIML_3	-0.081	0.12	0.125	-0.11	-0.365	0.36	0.83

Table A1.
Item loadings and cross-loadings

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