

Blended Learning Dependability and Perceived Usefulness: The Mediating Role of Organisational Commitment

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Abstract: To survive in the tight global higher education markets, universities must embrace new technological changes which can transform their education. The use of Information and Communication Technologies (ICTs) has become an integral part and a driver of the development agenda of many universities. Blended learning (BL), integrating face-to-face instruction with online components using Learning Management Systems (LMS), has emerged as a prominent educational model, offering flexibility and enhanced learning experiences in higher education settings. This study reports the adoption of BL among academics at the University of Botswana (UB) before the arrival of COVID-19. Even though technological changes such as BL are recognized as strategic tools used by many organizations, including universities, not much attention has been given to attitudinal behaviours such as Organizational Commitment (OC) despite their contribution to the successful technological adoption. This paper proposes a conceptual framework to explore the perceived usefulness of BL mediated by OC among academics at the UB. The study uses Socio- Technical Systems theory (STS), positing that instructors' perceptions of the usefulness of blended learning are influenced by both individual factors and organizational contexts. The study adopted an explanatory sequential mixed methods approach, involving a quantitative phase in which data was collected using a questionnaire in an online survey, followed by a qualitative case study that involved semi-structured face-to-face interviews. A multiple regression model for determining the mediating role of OC was developed. In the mediation model, OC fully mediated the relationships between Learning Management System Dependability (LMSD) and Perceived Personal Usefulness (PPU) and Perceived Usefulness to Students (PUS). The study used SPSS for its quantitative data analysis and adopted thematic analysis for its qualitative strand as a comprehensive process that allows for identification of numerous cross-references between the data and the research's evolving themes. The study contributes to the limited body of knowledge about the perceptions of BL of academic staff in a middle-income country, Botswana.

Keywords: University of Botswana, Blended learning, Perceived usefulness, Dependability, Organizational commitment, Mixed methods.

1. Introduction

An ever-evolving technology-rich environment has been cultivated as institutions identify and pursue strategies for increasing the use of digital learning tools in teaching and learning to meet students' high expectations (Oladiran and Uziak, 2009; Adekola, Dale and Gardiner, 2017). Delivery of education in these institutions is seen through LMSs that enhance the interaction between content, students and their lecturers beyond the classroom using visual components such as graphics, video and animation (Ismail and Salih, 2017). In short, LMSs are key enabling technology for "anytime, anywhere" access to learning content and administration. Individuals are also given the autonomy to decide where they want to learn, when they want to learn and how they want to learn. Today's students find it boring to listen to lecturers and fill in some worksheets manually in a classroom. Preference is given to other venues such as online learning, video games, home or workplace schooling or web communities and distance learning, all supported by media technologies (Dintoe, 2018).

Today's university learners, affectionately known as "millennials" have special needs (Wahab, Zain and Yunus 2018), they look forward to an engaging educational experience that allows them to explore, interact, collaborate in relevant, active, useful and fun filled ways that face-to-face and other traditional ways of teaching cannot offer. Many institutions of higher learning have therefore explored BL as a method where learners are responsible for their learning while teachers scaffold, coach, support and facilitate learning. LMS such as Blackboard and Moodle provide the opportunity to deliver satisfying BL approaches that combine ICT with various learning resources and delivery methods to provide efficient and seamless access to satisfying learning resources support communication and collaborative learning, as well as to enhance active, flexible and engaged learning that is accessible inside and outside the classroom (Wahab et al, 2018). UB as Botswana's flagship institution of higher learning has set itself out to adopt technology as an enabler with potential to achieve academic excellence to produce "competitive and productive workforce" (NDP 11, 2017: 117).

Even though a number of researchers (Batane and Motshegwe, 2012; Azar and Ciabuschi; 2017; Adekola et al 2017; Wahab et al, 2018; Gunawan, et al, 2023) recognize the importance of technological changes such as BL

as strategic tools used by many organizations to remain competitive, not much attention has been given to attitudinal behaviors such as OC and job satisfaction despite their contribution to the successful technological adoption. Even though OC has been viewed as an important factor to the success of organizational change (Nordin et al, 2013), previous studies have not specifically examined the link between BL as a specific technological change and OC. Similarly, the lack of theoretical or conceptual frameworks in past research dealing with the adoption of BL at UB leaves unanswered questions relating to its potential and what constitutes the determining factors of its adoption by academics. This paper therefore contributes to new knowledge by suggesting a model to explain behavioral intentions to adopt technology outside the influence of the COVID-19 crisis that forced academics to move from the traditional pedagogical approach to e-learning.

2. Literature and Research Model

2.1 Socio-Technical System Theory (STS)

Appelbaum (1997; 454) defines Socio-technical Systems theory as a system approach that focuses on the interdependence between and among people, technology and environment with the aim to optimize both the social and technical elements in organizations. The theory who some such as Baxter and Sommerville (2011) refer to as Systems theory was originally proposed by biologist Ludwig von Bertalanffy in 1928 (Batane and Motshegwe, 2013) and has been developed by many other theorists such as Eric Trist, Ken Bamforth and Frederick Emery (Appelbaum, 1997; Baxter and Sommerville, 2011) with the aim to guide work designing and employee involvement and has been adapted in various organizations. It views an organization as a system that has goals that it is intending to achieve using technology to gain competitive advantage and remain viable. The theory provides a model that helps to explain how the parts make up the unified whole and relate with one another to create a flexible customized model to fit the social network of the specific organization where a technological change such as BL is being introduced. This study aims to investigate how UB manages the use of technology in its teaching and learning. Appelbaum (1997; 452) argues that “*STS theory is probably the most extensive body of conceptual and empirical work underlying employee involvement and work design applications...*”, that is used widely due to its generality and openness allowing easy use and continual improvement and revision. The theory in this study is explored as a guide to understanding how the UB handles different aspects of the implementation of technology from the provision of technical resources to the ultimate outcomes produced because of technology use. The university is a unique institution in terms of location and culture in the local, regional and global educational system requiring that both its internal and external environments are explored to understand them.

2.2 Study Constructs

In this study, the working definition of blended learning (BL) is; the combination of web-based technologies into face-to-face learning sessions used together to present content across a group of diverse learners. Beliefs, perceptions and attitudes have been found to be critical in successful implementation of educational technologies (Lwoga, 2014). Hence this study assesses the relationship between perceptions and beliefs held by academics at UB as they adopt BL, testing whether this relationship is mediated by OC.

2.2.1 The dependent variables (Perceived Usefulness)

Perceived Usefulness (PU) is the most important predictor of behavioral intentions among the many variables that may influence the adoption of LMSs (Siregar, 2023). PU is the degree to which a person believes that using a particular technology would enhance his or her job performance. On the other hand, Lwoga (2014;9) defines Perceived usefulness as a perceptual indicator of the degree to which the stakeholder believes that using a particular system has enhanced his or her job performance, or his or her groups or organization performance. In this study, perceived usefulness relates to the degree to which academics believe that using the e-learning system shall improve the performance of their duties (named Perceived Personal Usefulness (PPU)) and improved the learning performances of students (named Perceived Usefulness to Students (PUS)). PU is often employed as an independent variable within most models that explain e-learning acceptance such as Technology Acceptance Model and Theory of Planned Behavior (Siregar, 2023). The current study similarly positions PU as a dependent variable but provides a new perspective and new insights by testing its influence in a model informed by STS theory.

2.2.2 The independent variable: Learning Management System Dependability (LMSD)

Technological change entails both hardware and software applications that support operations and decision making in the business (Alhomod and Shafi, 2013). The specific technological change that this study focuses on is BL achieved through Moodle and Blackboard LMSs that UB academics use in their teaching operations to supplement their face-to-face teaching. Dependability is one of the measures of user satisfaction (when the e-learning system offers what a user expected) which in turn has a significant positive relationship with continued use of LMSs. Lwoga (2014) suggest responsiveness, usability, availability, reliability, and adaptability are the desired characteristics of an e-learning system that enhance its dependability. In this study a dependable LMS (named Learning Management System Dependability (LMSD), is reliable, stable, secure, easy to use, adaptable and available for users all the time.

2.2.3 The mediating variable: Organizational Commitment (OC)

Organizational commitment (OC) is the degree to which an individual is involved in, and identifies with, an organization with a commitment to be a good worker, and to make maximum efforts in the interests of the organization (Suliman and Lles, 2000). This study adopts a multidimensional approach to the construct, that includes Affective Commitment (AC), Continuance Commitment (CC) and Normative Commitment (NC). The AC component of OC refers an employee's liking or psychological bond for an organization that comprises an affect for the social attachment to the organization, identification with the organization and involvement in the organization (Gunawan et al, 2023). CC assesses the intention to remain with the organization and engage in consistent lines of activities based on the individual's recognition or awareness of the rewards for staying and the cost associated with discontinuing the activity or leaving the organization (Indarti et al, 2017). Normative commitment represents the felt obligation to remain a member of an organization (Nordin et al, 2013; Indarti et al, 2017).

2.3 Proposed Study: The Mediating Role of Organizational Commitment

In the current study, the researcher isolates OC as a key ingredient that influences the successful implementation of BL as technological change initiative adopted by UB using Moodle and Blackboard LMSs. A mediator intervenes to explain the relationship between an independent and a dependent variable (Khan and Rasheed, 2015). Mediation explains how or why two variables are related. A variable may be termed as a mediator "to the extent that it accounts for the relation between the predictor and the criterion" (Baron & Kenny, 1986, p. 1176). A few studies are noted where organizational commitment is used as a mediator especially in the face of organizational change (Jiao and Zhao, 2013; Khan and Rashid, 2015; Garrido-Moreno, et al 2014; Gunawan et al, 2023). The relevance of such studies to the current study is also constrained because they were done outside educational settings (e.g Garrido-Moreno, et al 2014) are not technology related (Khan and Rashid, 2015; Gunawan et al, 2023) therefore, they cannot fully inform important considerations to make in determining acceptability of LMS in a university setting.

3. Methodology

3.1 Research Design

The researcher adopted a pragmatic worldview, suggesting that the pluralist approach enables the application of various methodological approaches (both quantitative and qualitative) to complement one another to generate rich data. The study adopted an explanatory sequential mixed methods approach, involving a quantitative phase in which data was collected using a questionnaire in an online survey, followed by a qualitative case study that involved semi-structured face-to-face interviews. The samples were drawn from academics at the UB's main campus located in Gaborone, the capital city of Botswana. A whole population sampling in which all academics received a link to the online survey instrument was used to collect data in the quantitative phase of the study. A total of 103 participants responded to the survey. Face-to-face interviews were conducted in the follow-up qualitative phase with 19 participants who were selected using convenience sampling. The study was conducted as a doctoral research project, and the data was collected before the onset of the COVID-19 pandemic.

3.2 Measurement of Variables

In the first, quantitative phase of the study, a questionnaire instrument with 100 questions, tagged UB_BL_adoption, was sent to participants via a SurveyMonkey link. The instrument was divided into five (5) sections. The first section consisted of 11 items measuring background information, including gender, age,

marital status, number of dependent children, citizenship, faculty, organizational tenure, employment status, educational level, rank and annual salary, each measured by 1 item. The second section measured three dimensions of OC; affective, normative and continuance commitment. Each dimension was measured with 6 items. The third section consisted of items measuring workload (6 items), work performance (2 items) and experience using blended learning (BL) (5 items). The fourth section measured perceived personal BL usefulness (10 items), perceived BL usefulness to students (7 items) and commitment to BL adoption (9 items) and requested respondents to compare blended learning and face to face learning (6 items) as well as indicate the challenges associated with BL adoption (6). The final section of the questionnaire requested academics to indicate the key factors influencing adoption of BL (20 items). The current study provides analysis relating to items on background information, perceived personal usefulness, Perceived usefulness to students, organizational commitment and the two items that formed the LMSD scale which were derived from the experience using BL scale. The UB_BL_adoption instrument was developed after reviewing literature to help in the framing of different questions that effectively covered the different aspects of the research questions. The items on the instrument included 18 items by Suliman and Lles (2000) measuring OC that have been validated by several research experts and checked for reliability. The items were changed to suit the context.

4. Results

Following data collection through a SurveyMonkey web-link, the responses were exported into the Statistical Package for Social Science (SPSS) 24 for analyses. Most items had loadings that were more than the minimum favorable level of 0.7. Perceived Personal Usefulness achieved 0.914, Perceived Usefulness to Students (0.899) and LMS Dependability (0.853). Even though the overall loading for the OC scale was 0.826, the loading for NC was only 0.496 as compared to those of AC (0.793) and CC (0.833) that were both favorable. A possible explanation for this case could be that suggested by Barclay, Higgins and Thompson (1995), that the loadings may be lower for an instrument developed under a specific context and applied in a different context. Out of the 103 respondents sampled, the majority were female (55.1%), more than half (53.8%) were aged between 40-54 years. Most of the respondents were married (73%), more than half (56.2 percent) were in possession of doctorate degrees, the larger majority (64%) had two, one or no dependent children and 76.4% were citizens of Botswana. Of the seven (7) university faculties, the majority (28.1%) were based in the faculty of Social Sciences and the majority were pensionable employees (63.5%).

4.1 Perceived Usefulness

The results on a 5-point Likert scale (ranging from (1) Strongly Agree, (2) Agree, (3) Neutral (4) Disagree (5) Strongly Disagree) showed that most respondents perceived BL to have personal usefulness for them. In 9 out of 10 items, the average of those who “strongly agreed” and those who “agreed” with the statements was 71.9% with some items having scores more than 80%. For example, a larger majority (86.5%) responded positively that “BL is a good source for teaching and learning” and another majority (84.3%) said that “they will continue using BL”. In addition, respondents were asked to specify their level of agreement with statements on the perceived usefulness of BL to their students. In general, the sub-scale achieved favourable responses to items such as “BL facilitates inside and outside classroom learning” and “BL provides learners with access to knowledge resources very easily” with combined scores of “strongly agree” and “agree” of (86.5%) and (82.0%), respectively. The thematic analysis of participant’s perceptions about BL yielded 110 units which produced twelve categories that were further grouped under 3 themes named (1) “advantages of BL” (2) “disadvantages of BL” and (3) “the future of BL”.

The data on the respondents’ perceptions of benefits of BL to students fell under the theme “Advantages of BL” and was made-up of four sub-categories: (1) independent learning and performance, (2) learning style and efficiency, (3) interaction and accessibility and (4) content delivery. Participants argued that students’ exposure to IT enhanced the skills that students acquired. Hence, they were able to learn on their own and contribute to a successful learning experience. The following words of one of the participants underline this view;

“The use of multimedia certainly breaks monotony associated with the lecturer-centered approach. When using the video clips, the students will be focusing of a certain scenario, and it makes the class very lively, and this is the stuff they can watch repeatedly at their own time”

Even though most participants were optimistic about the BL mode, some complained that the system at times caused inconveniences due to internet interruptions, limited infrastructural resources and malfunction of the system. Inadequate infrastructure, together with other problems, bandwidth and connectivity limitations

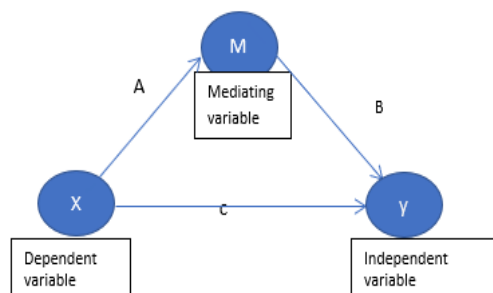
created unnecessary pressure and discouraged both participants and their students from using BL. Despite the highlighted disadvantages, participants were convinced that for BL should be given strategic consideration for UB to reach the goal of becoming a leading center of academic excellence in Africa and the world. Participants said that the tertiary landscape around the world is becoming more and more competitive and said that the UB should join the race given that, even locally there are many institutions that are being established which are already capitalizing on technology. UB as one of the biggest institutions in Botswana, should be looking to adopting BL to be able to compete with or lead other institutions and achieve its vision.

4.2 Learning Management System Dependability (LMSD)

LMSD, which captured respondent’s experiences with BL teaching was measured using 2 items “I do not enjoy using e-learning environment for teaching purposes” which was reverse coded and “I believe using online instruction is useful for teaching”. Results showed that 91% of the respondents either “agreed” or “strongly agreed” that they found online instruction to be useful for teaching while another 76.4% either “strongly disagreed” or “disagreed” to the reverse coded statement “I do not enjoy using e-learning environment for teaching purposes”.

4.3 Mediation

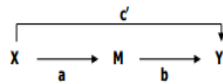
The descriptive analysis revealed that academics at UB were highly committed to the university (OC 64.8%, AC 68.8%, CC 63.4% and NC 62.2%). Exploratory factor analysis using principal component method of analysis was used to determine correlations and factor clustering among variables in the OC scale and varimax rotation for all three scales (AC, CC, and NC) was done as suggested by Joiner and Bakalis (2006). The analysis produced a six-factor model, mostly from the AC scale (4 items) while the other dimensions, CC and NC scales had one item each. The criterion used for extraction was Eigenvalue of .3.5. The results justify the multi-dimensionality of OC as it pertains to the context of UB, hence the three dimensions were used for further regression analysis to test for the mediating role of OC on the adoption of BL as shown on figures 1 and 2 derived from (Baron and Kenny, 1986).



Figures 1: Model of mediation testing

The representations of the mediation relationship can be tested following the four steps proposed on figure 2 and displayed on figure 1 as guided by Baron and Kenny (1986). Several regression analyses are conducted, and significance of the coefficients is examined at each step by testing the relationships. Since the study consisted of two dependent variables and one independent variable, two linear regression analysis models had to be undertaken to test if;

- OC mediated the relationship between LMSD and PPU
- OC mediated the relationship between LMSD and PUS



	Analysis	Visual Depiction
Step 1	Conduct a simple regression analysis with X predicting Y to test for path <i>c</i> alone, $Y = B_0 + B_1X + e$	
Step 2	Conduct a simple regression analysis with X predicting M to test for path <i>a</i> , $M = B_0 + B_1X + e$.	
Step 3	Conduct a simple regression analysis with M predicting Y to test the significance of path <i>b</i> alone, $Y = B_0 + B_1M + e$.	
Step 4	Conduct a multiple regression analysis with X and M predicting Y, $Y = B_0 + B_1X + B_2M + e$	

Figure 2: Mediation testing steps

The results of the first mediation test that examined OC as a mediator of the relationship between PPU and LMSD are presented on table 1. PPU has a statistically significant relationship ($\beta=0.748, p<0.05$) with the mediator variable (OC), lending support for the first condition of mediation. PPU further has a statistically significant relationship with the dependent variable, LMSD ($\beta=0.186, p<0.05$), lending support for the second condition of mediation. The mediator variable, OC has a statistically significant relationship with the dependent variable ($\beta=0.464, p<0.05$), lending support for the third condition of mediation. When using both OC and PPU as independent variables, the effect of OC, mediator (M) on LMSD is statistically significant hence supporting the mediation between PPU (X) and LMSD (Y). A reasonable R^2 value (44.0%) is noted suggesting that the mediation model (Step 4) is a good fit.

Table 1: Results for testing mediation of Organizational commitment between PPU and LMSD

Variable	Step1		Step 2		Step 3		Step 4	
	B	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)
PPU (X)	0.748**	0.096	N/A	N/A	N/A	N/A	0.705	0.097
OC (M)	N/A	N/A	0.186**	0.092	0.464**	0.139	0.232**	0.111
F - Statistic	60.181		4.122		11.154		33.446	
R^2 (Adj R^2)	0.412 (0.405)		0.046 (0.035)		0.114 (0.103)		0.440 (0.427)	

Note: Dependent Variable = Learning Management System ** $p<0.05$, N= 89

The second mediation test examined OC as a mediator of the relationship between PUS and LMSD. The results are presented on table 2. From the above table, PUS had a statistically significant relationship ($\beta=0.534, p<0.05$) with the mediator variable (OC), lending support for the first condition of mediation. PUS further had a statistically significant relationship with the dependent variable, LMSD ($\beta=0.058, p<0.05$), lending support for the second condition of mediation. The mediator variable, OC has a statistically significant relationship with the dependent variable ($\beta=0.464, p<0.05$), lending support for the third condition of mediation. When using both OC and PUS as independent variables, the effect of OC (M) on LMSD is statistically significant hence supporting the mediation of OC between PUS (X) and LMSD (Y). A reasonable R^2 value (34.3%) is noted suggesting that the mediation model (Step 4) is a good fit.

Table 2: Results for testing mediation of organizational commitment between PUS and LMSD

Variable	Step1		Step 2		Step 3		Step 4	
	B	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)
PUS(X)	0.534**	0.099	N/A	N/A	N/a	N/A	0.510**	0.093
OC (M)	N/A	N/A	0.058**	0.083	0.464**	0.139	0.414**	0.121
F - Statistic	29.402		11.154				22.414	
R ² (Adj R ²)	0.343(0.327)		0.114(0.103)		0.114(0.103)		0.343(0.327)	

Note: Dependent variable LMS, p<0.05, N= 89

5. Discussion

Analysis of the results of this study concludes that the respondents hold highly positive perceptions regarding the future of BL at UB. However, a few of the interviews raised contrary views, arguing that BL was overrated since there was never any position of the university that supported its implementation as a proven solution to teaching and learning problems in the institution. It is common throughout the world that academics differ on their perceptions about the value attached to LMSs (Dintoe, 2018). Academics may see technological innovation as an influential change, with positive outcomes for their teaching while others may view it as inherently evil or an inappropriate distraction for learners, promoting disruption and cheating (Shraim and Crompton, 2015). The current study has highlighted several positive perceptions of using BL such as independent learning, improved performance, support of different learning styles, efficiencies, facilitating interaction and accessibility and content delivery. These results confirm those found in a variety of studies where BL was found to facilitate interaction (Wahab et al 2018) improved student performance allowed student centered learning (Page et al, 2017) and sharing of course material (Oladirian and Uziak 2009, Page et al, 2017). This study therefore recommends that the university puts structures such as mobile help desks in place to support academics to fully embrace technology as prescribed by STS theory guiding this study; any change in an organization’s technological system is a precondition for the implementation of technological innovation that in turn requires changes in the administrative system to adjust to the demands created by the new technological system (Azar and Ciabuschi, 2017).

This study found that OC fully mediated the relationship between LMSD and both PPU and PUS. LMS dependability is about an e-learning system’s ability to reliably provide effective, convenient and accessible systems to enhance the overall quality of the educational experiences of students without failure. The results of this study show that the more the participants view LMS as an enabling technology that they can depend on, the more they perceive it to be useful to them and their students and this relationship is enhanced by their commitment to the university. The findings indicated that if most of the participants think using e-learning would improve the quality of learning by their students, their job performance and help them accomplish their tasks faster, they will adopt it. Such results confirm UB’s needs to constantly get evaluative feedback from BL users to improve its technical systems. Batane and Motshwegwe (2013) argue that there are four main elements that make up STS theory which are: inputs, transformation processes, outputs, and feedback. Feedback comes from the human resources carrying out the processes in a system, to understand the impact of the technology that is being adopted, allow modification if necessary and make further considerations of the strengths and weaknesses of each element of the system.

6. Conclusion

This study can assist UB and other educational institutions in Botswana and beyond to make sound and informed ICT and BL investment decisions for the future, especially after COVID 19 has proved the importance of preparedness. The results of the study show a good general impression of the BL system that has been created both for the participant’s own benefit and for the benefit of their students. A study of the perceptions of the students themselves could yield different results. The identification and acknowledgement of the perspectives of students could lead to more usable or desirable e-learning systems because as argued by Dintoe (2018), all stakeholders should be included as ‘successes for one group does not imply ‘success’ for another group. A similar prescription is made by STS theory that the different parts, connections, patterns and

relationships in an organization or system should be brought together in a unified whole to be able to guide any meaningful change in an organization (Batane and Motshegwe, 2012). On the fully mediated relationship between LMSD and both PPU and PUS by OC, the findings of this study point to the importance of considering attitudinal behaviors such as OC as they contribute to the successful adoption of technology. The results of this study confirm the views by Siregar (2023) that the success of new ICTs aimed at enhancing organizational performance is dependent on user perceptions and acceptance of such innovations. Committed employees ready to strive hard against innovations and complex technologies adopted every day are becoming an integral part of modern organizations. Retaining a committed workforce is key to the survival and prosperity of an organization (Suliman and Lles, 2000). This study concludes that e-learning was underutilized in the past at UB, however, the crisis of the COVID-19 pandemic forced the entire world to rely on it for education to take place. New research may reveal different results; however, the current study is important for revealing results that show the behavioral intents towards BL outside a crisis like COVID-19.

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