

## **Predictors of Blended Learning Deployment in Institutions of Higher Learning: Theory of Planned Behavior Perspective**

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### **Abstract**

#### ***Purpose***

Blended learning (BL) has been increasing in popularity and demand and has developed as a common practice in institutions of higher learning. Therefore, this study develops a model to evaluate the critical predictors that determine students' acceptance and deployment of BL in institutions of higher education based on the Theory of Planned Behavior (TPB).

#### ***Design/methodology/approach***

The empirical analysis entails data collected from 1,811 responses from an online survey questionnaire from students in Malaysia universities, colleges, and polytechnics. Partial Least Square-Structural Equation Modelling (PLS-SEM) was employed for data analysis.

#### ***Findings***

The results reveal that the attitude, subjective norm, perceived behavioral control, and self-efficacy were found to influence students' intention to accept BL. Moreover, results suggest that the intention of students to accept BL approach is significantly influenced by actual BL deployment.

#### ***Research limitations/implications***

Data was collected from students in universities, colleges, and polytechnics only. Besides, this research is one of the limited studies that explored BL deployment in Malaysian perspective.

#### ***Practical implications***

Findings from this research not only add scientific evidence to BL literature, but also provide a better understanding of the predictors that may motivate or discourage learners to deploy BL in institutions of higher learning.

#### ***Social implications***

Respectively, findings from this study aid students to acquire and apply knowledge on how to effectively improve BL initiatives in learning activities.

#### ***Originality/value***

This study is one of the fewer studies that investigates students' behavioral intentions towards BL deployment in Malaysia. Additionally, this study contributes to the understanding of the predictors that influence students' intention to accept and deploy BL in their respective institutions.

**Keywords:** Blended learning; Computer mediated learning; Students perspective; Learning effectiveness; Theory of planned behavior; Institutions of higher learning.

### **1. Introduction**

Learning is the gaining of skills or knowledge through being taught, study, or experience. Learning is attained when knowledge is created based on learners' prior experience and understanding of real-world examples (Koohang, 2009). Thus, learning is a process that brings together experiences and cognitive influences for acquiring, enhancing, or making changes in learner's skills (Miniaoui and Kaur, 2014). Accordingly, Blended Learning (BL) is a mode of learning that integrates face-to-face (F2F) and online learning (Ghazal *et al.*, 2017; Anthony *et al.*, 2019). BL offers flexibility of learning for students and improves learners'

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achievement by creating opportunities to improve their knowledge through self-exploration (Padilla-Meléndez *et al.*, 2013; Yeou, 2016). According to Bliuc *et al.* (2007); Owston *et al.* (2008) mentioned that BL entails 20%-30% F2F to 70%-80% online learning.

Respectively, researchers such as Wai and Seng (2015); Wang (2017) posited that BL serve as a medium that improves learning in higher education by providing students with better control over their study and unlimited access to online and physical course content. Hence, students can access online academic materials and communicate with lecturers and peers online and at the same time, attend physical class sessions (Gasevic *et al.*, 2019). Likewise, Garrison and Kanuka (2004) recommended that BL facilitates classroom time to focus on meaningful and more active activities. Also, Miniaoui and Kaur (2014) stated that BL approach increases students' autonomy for learning. The authors stated that the combination of F2F and online learning can result in a transformative academic experience for students. This is because learners can benefit from being associated to a learning community irrespective of whether they are physically together or apart virtually (Bokolo Jr *et al.*, 2020). In addition, findings from Lin and Wang (2012) revealed that student satisfaction is high in BL courses as compared to traditional F2F courses, and withdrawal rates are reduced.

Overall, students tend to attain higher in blended courses than traditional courses. This was corroborated by results from Owston *et al.* (2008) which reported that BL encourages the development of critical thinking skills of students. However, BL brings more challenges to students. For instance, blended courses require higher requirements on learners' course engagement and self-regulated learning while they learn online. Learners need to determine their learning goals, explore course resources, manage time, and apply learning strategies to achieve acceptable learning outcomes (Zhu *et al.*, 2016). But, as demands for BL approach continues to increase, it is significant to determine the influential predictors related to students' acceptance of BL (Tselios *et al.*, 2011). This is because the success of BL relies on both its acceptance and its sustained deployment (Mohammadi, 2015). Hence, it is imperative to understand the relevant predictors essential for improving students' learning (Teo, 2019).

Accordingly, more evidence is required to clearly show how certain predictors can contribute to students' deployment of BL approaches. Similarly, there are limited studies that developed model for examining student acceptance of BL in Malaysia context (Al-Rahmi *et al.* 2018). Thus, there is need to carry out a study on the causal relationship of BL acceptance to investigate the predictors that influence the deployment of BL (Ghazal *et al.*, 2017; Ismail *et al.*, 2018). Therefore, this study aims to investigate students' behavioural intentions towards the use of BL by developing a model based on the Theory of Planned Behavior (TPB) to evaluate the critical predictors that determine students' acceptance and deployment of BL in institutions of higher education. The rest of the paper is organized as follow. Section 2 elaborates on literature review. Section 3 is the proposed model and hypotheses development. The research methodology is presented in Section 4. The findings are given in Section 5. Discussion and implications are presented in Section 6. Finally, the conclusion of the paper is outlined in Section 7.

## 2. Literature Review

This section presents an overview of BL and review of prior studies similar to this study.

### 2.1. Overview of Blended Learning

The development of BL as a pedagogical concept is quite recent and has been aided by the rapid growth of web technologies. Among the most referenced articles on BL is the one from Garrison and Kanuka (2004), which stated that BL is the integration of online learning experiences with classroom F2F learning experiences in order to produce a harmonious impact of learning. BL involves web-based technology such as self-paced instruction, live virtual classroom, streaming text, audio, and video, and collaborative learning with physical instructor-led teaching to achieve educational goal (Fisher *et al.*, 2018). It further entails the combination of various pedagogical approaches to achieve an optimal learning outcome with or without educational technology (Koohang, 2009). Importantly, compared to conventional classroom mode BL has been observed to enhance learner's satisfaction, improve motivation, decrease drop-out rate, increase knowledge retention and growth of analytical skills (Ismail *et al.*, 2018).

In a blended course approach the lecturer and students works together in an integrated delivery mode, typically online and offline to accomplish learning outcomes that are pedagogically aided through learning resources and information (Dakduk *et al.*, 2018). Therefore, BL represents a method of teaching and learning that brings together elements of virtual education and traditional physical classes. Apart from getting F2F teaching, students can self-achieve learning by utilizing computer platform for discussing with lecturers to disseminate information or knowledge and complete academic tasks such as submitting assignments online (Graham *et al.*, 2018). Additionally, findings from Lin and Wang (2012) revealed that BL facilitates relationship building, knowledge co-construction, and supports flexibility in communication.

BL allow students to utilize Learning Management System (LMS) for retrieving course-materials, getting class-related information; transferring knowledge with respect to academic works and related topics (Padilla-Meléndez *et al.*, 2013). Learners can use BL for joining e-discussion, sending e-mail to course instructor, interacting with lecturers and course mate. Likewise, the lecturers can use BL to upload course material, present course syllabus, manage class, announce class schedule, and conduct online assessment (Anthony *et al.*, 2019). Similarly, findings from Padilla-Meléndez *et al.* (2013) suggested that with respect to collaboration and communication BL create a direct link between lecturers and students, without asynchronous and intermediaries.

### 2.2. Benefits and Challenges of Blended Learning

BL pedagogy is based on the postulation that there are intrinsic gains in F2F interaction as well as the understanding that there are advantages to using online method in teaching. Accordingly, the goal of BL approach is to deploy strategies based on the nature of the institution's academic goals, learners' characteristics, lecturers background, and available

online resources (Chong *et al.*, 2010). Respectively, BL has the potential to enhance self-directed learning by increasing learners' access to information, improving interactivity between learners and lecturer, enhancing collaborative efforts, decreasing geographical barriers, and building self-assurance of students (Ho, 2017; Mohamed and Hammond, 2018). In other words, BL is a fundamental shift from lecture-to student-oriented learning in which learners become active. In BL approach the conveniences of online learning are gained without the loss of physical contact with the objective of optimizing learning outcome and cost of teaching delivery (Sun and Qiu, 2017). Conversely, BL still faced with issues such as lack of reduced F2F interaction time with classmates and instructors, high starting costs for preparing online syllabus courses, considerable costs for BL system maintenance and update, and the need for flexible financial, technical, and pedagogical support from the institutions management (Anthony *et al.*, 2019). Accordingly, Table 1 depicts the benefits and challenges of BL deployment in higher education.

Table 1. Benefits and challenges of BL deployment adapted from (Ho, 2017)

| <b>Benefits</b>  | <b>Challenges</b>   |
|--|---|
| <p>Students</p> <ul style="list-style-type: none"> <li>• Provides convenient and flexible learning.</li> <li>• Offers increase in self-efficacy</li> <li>.</li> </ul>  | <p>Students</p> <ul style="list-style-type: none"> <li>• Reduction in learners' motivation, responsibilities, and discipline.</li> <li>• Associated with increased perceived complexity.</li> </ul>   |
| <p>Lecturers</p> <ul style="list-style-type: none"> <li>• Greatly improves the flexibility in arranging of semester classes.</li> <li>• Creates an opportunity to reduce workload via collaborative teaching.</li> <li>• Aids to conduct lessons associated to sensitive topics online.</li> </ul>                                     | <p>Lecturers</p> <ul style="list-style-type: none"> <li>• Sometimes results to potential rise in teaching demands.</li> <li>• May require training to be provided to lecturers on how to deploy BL approach for teaching.</li> </ul>  |
| <p>Institutions</p> <ul style="list-style-type: none"> <li>• Helps the institutions to meet the high educational demands from the increased student population.</li> <li>• Provides an alternate medium for the institution to deliver lessons.</li> <li>• Provide a medium to easily disseminate leaning materials online.</li> </ul> | <p>Institutions</p> <ul style="list-style-type: none"> <li>• Do requires time needed to set-up the BL program.</li> <li>• Difficulty to deploy BL in institutions located in rural areas.</li> <li>• Occasionally requires addressing technical issues such as sound quality and disruption and availability of internet access.</li> </ul> |

Hence, BL environment may be considered as more effective than either traditional F2F environment or a fully e-learning environment, as it combines the best of both learning approaches. This is evident since it creates a medium to meet the challenges of tailoring education and development to the needs of students and lecturers by assimilating the technological and innovative advances offered by web-based systems interaction and participation derived from traditional learning. The online learning approach offers efficacy and flexibility, which is lacking in a physical classroom environment, whereas F2F learning environment offers the social interaction, which is needed for learning (Chong *et al.*, 2010).

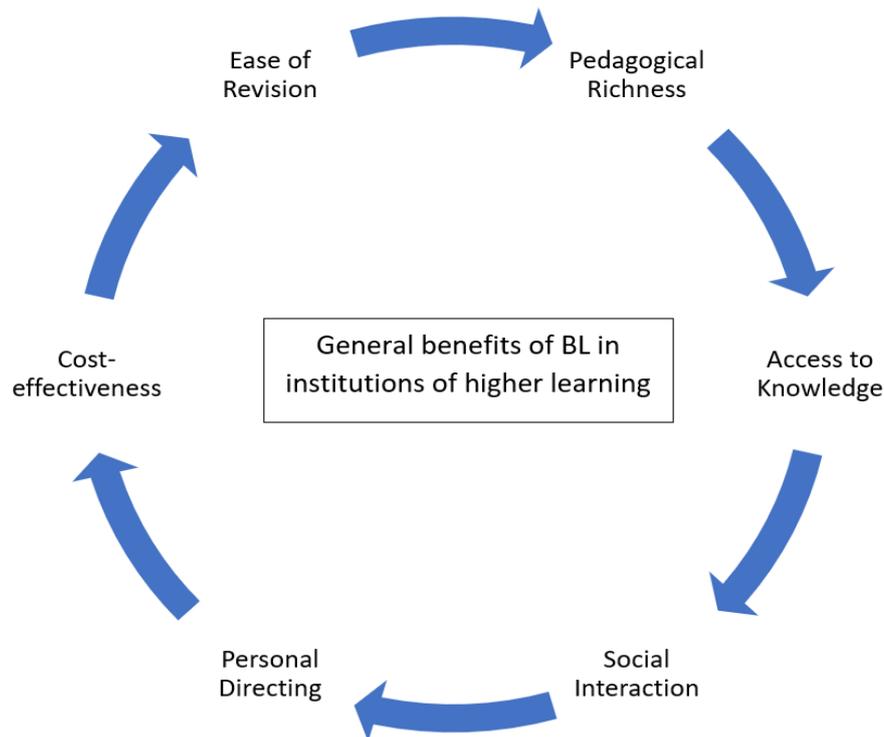


Figure 1 General benefits of BL adapted from Chong *et al.* (2010)

Figure 1 shows six main general benefits of BL in institutions of higher learning. Each of which are briefly discussed below;

- Pedagogical richness: BL approach increase lecturer's pedagogical decisions for the purpose of aiding students to effectively learn course content.
- Access to knowledge: BL approach aids to increase accessibility of course information.
- Social interaction: BL offers an environment for learners to share questions, perplexities and insights, which can help them to reposition and redefine themselves in the world, thus enhancing the opportunities for social contact.
- Personal directing: BL course delivery improve the range of individual choice for students by helping them develop a sense of direction in their learning.
- Cost-effectiveness: BL decreases space requirements and significantly reduces in class time thereby providing space for other course activities. This cost-effectiveness is important to meet increased student populations and further provide lifelong learning.
- Ease of revision: BL has the capability to develop a spontaneous, flexible, and responsive learning environment.

### 2.3. Related Works

This sub-section reviews prior studies that examined students' intention to accept and adopt BL in institutions of higher education. The selected studies are presented in Table 2.

Table 2 Related works on students' intention to accept and adopt BL

| Authors/Contribution  | Purpose  | Predictors  | Methodology  |
|---|--|---|--|
| Teo (2019) investigated students and lecturers' intention to use technology for teaching and learning.  | Aimed to explain the intention of learners and teachers to utilize technology.   | Perceived usefulness, perceived ease of use, attitude, facilitating conditions, computer self-efficacy, and use intention.  | Data was collected using survey from 503 learners and 592 lecturers. SEM was employed for analysis.                        |
| Al-Rahmi <i>et al.</i> (2018) explored university learners' intention to use e-learning.  | Motivated to examine the adoption process employed by students in learning.  | Content of e-learning, self-efficacy, perceived usefulness, students' satisfaction, and intention to use e-learning   | Questionnaire was used to collect data from 106 students and PLS-SEM was employed for analysis.                            |
| Ismail <i>et al.</i> (2018) explored the acceptance of Massive Open Online Courses (MOOC) among students.   | The authors aimed to identify the criteria that enhance MOOC in BL environment and improve the teaching and learning quality.                    | Perceived of usefulness, perceived ease of use, user attitude toward use, and actual system use.  | Used questionnaire to collect data from 60 randomly selected students. Descriptive analysis was employed.                  |
| Ghazal <i>et al.</i> (2017) presented the important factors that determine students' acceptance and satisfaction in a BL environment.                           | Targeted to provide an inclusive examination of the key factors that impact students' usage of Learning Management System (LMS).                 | Technology experiences, information quality, service quality, system quality, perceived ease of use, perceived usefulness, and student satisfaction.                              | Data was collected using online questionnaire from 174 university students. PLS was employed for analysis.                 |
| Yeou (2016) investigated learners' acceptance of Moodle in a BL environment.  | Focused to explored university student's attitudes towards implementing Moodle for learning.   | Perceived usefulness, ease of use, attitude, computer self-efficacy, use intention and use frequency.   | Data was collected using questionnaire from 47 students and PLS for analysis.  |
| Mohammadi (2015) designed a model to investigate students' perspectives of e-learning.  | Aimed to assess the impact of perceived ease of use, quality feature, and perceived usefulness on students' intentions and satisfaction.         | Educational quality, service quality, technical system quality, information quality, perceived ease of use, perceived usefulness, satisfaction, intention to use, and actual use. | Survey data was collected from 390 randomly selected samples and SEM was employed for data analysis.                       |
| Padilla-Meléndez <i>et al.</i> (2013) explored if perceived playfulness has an influence on gender differences in relation to BL acceptance of students.        | Intended to re-examine the impact of gender differences on technology acceptance, use, and perceived playfulness in the context of a BL setting. | Perceived playfulness, perceived playfulness, perceived ease of use, attitude, and intention to use.  | Data was collected using survey from 484 students. Descriptive, dimensionality, and factor analysis was carried out.       |
| Lin and Wang (2012) examined the relationship between system factors and perceived fit factors that motivate students to continue use e-learning in BL setting. | Aimed to investigating the important features that e-learning can offer in improving learning.   | Information quality, knowledge quality, system quality, task-technology fit, perceived usefulness, system satisfaction, continued to use intention, and system acceptance.        | Data was collected using survey from 88 students and focus group interview from 8 students. PLS was employed for analysis. |
| Tselios <i>et al.</i> (2011) assessed the acceptance of BL course based on students' perception of BL in a university.  | Focused to measured university students' attitudes toward BL   | Perceived usefulness, perceived ease of use, attitude toward use, and intention to use technology.  | Data was collected from 130 samples before actual BL use and 102 after BL used. PLS was utilized for data analysis.        |
| Ahmed (2010) examined students' perception towards hybrid e-learning acceptance.  | Studied learner's acceptance of hybrid e-learning based on factors that impacts learners' satisfaction.  | Organizational and technical support, instructor characteristics, IT infrastructure, students' acceptance and usage.  | Data was collected using survey from 538 responses from students and SEM was employed for analysis.                        |

Table 2 indicates that previous studies examined the relationship between predictors that influence student's acceptance of BL. Regardless of these observations, little is still known about how these predictors contribute to the improving students' perception towards BL deployment. Therefore, empirical evidence is required to clearly show how certain predictors can contribute to improve students' acceptance and deployment of BL. Hence, this study fills the gap in knowledge by developing a model grounded by TPB to evaluate the critical predictors that determine students' acceptance and deployment of BL.

### **3. Proposed Model and Hypotheses Development**

In order to investigate BL acceptance in deployment, it is important to adapt one of the theories of technological innovation. Over the years, few studies have examined students' acceptance of BL in institutions of higher learning as seen in Table 2. Theory of planned behavior was developed grounded on the Theory of Reason Action (TRA) by Ajzen (1988), to investigate how people behaviour can be changed. According to the TPB, human actions are guided by three types of considerations which involves behavioural beliefs (beliefs regarding the likely consequences of the behaviour, normative beliefs which entails expectations of others, and lastly control beliefs which are about the presence of predictors that may impede or facilitate performance of the behaviour (Ajzen, 1991).

In this study we opted for TPB for measuring the effects of predictors that influence students' intentions to deploy BL because, according to Cheon *et al.* (2012); Valtonen *et al.* (2015) it is a valid model for explaining the behavioral intentions of learners and lecturers to utilize ICT for teaching and learning. Thus, the predictors of TPB comprises of attitude, subjective norm, perceived behavioral control, self-efficacy, intention to accept, and actual use.

#### **3.1. Attitude**

In the context of this study attitude refers to the measure of a student's favourable or unfavourable appraisal or evaluation of the behavior in question (Ajzen, 1988). Thus, the attitude impacts student' intention to accept BL, which in turn influences their actual deployment of BL (Lu, 2012). Accordingly, when students form positive attitude towards BL, they possess a stronger intention toward accepting BL, and they are more likely to deploy BL (Valtonen *et al.*, 2015). Previous studies (Ahmed, 2010; Dakduk *et al.*, 2018) found that the attitude of student was a strong predictor of their intention towards acceptance of blended e-learning. Thus, the following hypothesis is proposed:

H1: Students' attitude positively predicts their intention to accept BL.

#### **3.2. Subjective Norm**

Subjective norm refers to the perceived social pressure experienced by students to accept and deploy or not to accept and deploy BL (Ajzen, 1991). Thus, subjective norm is based on the normative beliefs about the expectancy of people (Cheon *et al.*, 2012). Moreover, subjective norm can be seen as perceived social pressure towards an individual to perform or not to perform a particular behavior (Ajzen, 1991). Subjective norm refers to student's

perceived social pressure from people, such as friends, lecturers and classmates who are close to him/her that expect or wish him/her to deploy BL (McKinnon and Igonor, 2008). More importantly, subjective norm pertains to student's perception of the social customs surrounding BL adoption. In other words, subjective norm relates to the normative opinions about the expectation from other people (Yeou, 2016). Hence, peers' opinions are significant in shaping learner's individual intention to deploy BL for academic purposes (Wai and Seng, 2015). Thus, students choose to deploy BL because their friends are using BL, and they recommended it to them. Hence, we propose that:

H2: Subjective norm significantly predicts students' intention to accept BL.

### **3.3. Perceived Behavioral Control**

Perceived behavioral control denotes students' perception of ease of use or difficulty in using BL approach for academic purposes. Perceived behavioral control is linked with beliefs about the presence of control influences that may hinder or facilitate BL deployment (Tselios *et al.*, 2011). Besides, it refers to student's perception of difficulty or ease in executing the behavior of interest (Valtonen *et al.*, 2015). Thus, the more ability students have to control these influencers, the more likely their behavioral intention to deploy BL will evolve (Teo, 2019). Hence, behavioral control increased when students perceive that they have more confidence and resources than probable obstacles. Thus, we posit that:

H3: Perceived behavioral control significantly predicts students' intention to accept BL.

### **3.4. Self-efficacy**

Self-efficacy refers to persons' beliefs about their ability and enthusiasm to perform explicit tasks (Ajzen, 1991). Thus, self-efficacy relates to how students' measures their skills and abilities to deploy BL approaches (Lee, 2010). It entails how students' behavior is influenced by his/her self-reliance in his/her aptitude to deploy BL (Tagoe and Abakah, 2014; Yeou, 2016). In relation to BL, self-efficacy relates to how students evaluate their skills and abilities in order deploy BL initiatives (Tagoe and Abakah, 2014). Correspondingly, students who believe that they can master BL initiative tends to have higher intention to deploy BL (Anthony *et al.*, 2019). Thus, we propose that:

H4: Self-efficacy significantly predicts students' intention to accept BL.

### **3.5. Intentions and Actual Use**

Ajzen (1991) posited that intentions measure how individuals are enthusiastic to try or assess how much effort people plan to exert towards performing the behavior. Tselios *et al.* (2011) argued that the foundation of theory of planned behavior is grounded on the fact that behavior is guided by users' intentions. In this study intention to use refers to the decision and interest of students to use BL before they actually use it and it's mostly predicted to occur in future. Moreover, Al-Rahmi *et al.* (2018) argued that when students perceived BL to be useful, this results to a direct impact on their intention to accept and deploy BL. Thus, we propose that:

H5: Students' intention to accept BL will positively influence actual BL deployment.

Although, TPB has been adopted by prior e-learning studies (McKinnon and Igonor, 2008; Lee, 2010; Cheon *et al.*, 2012; Lu, 2012; Tagoe and Abakah, 2014; Valtonen *et al.*, 2015), very few studies have employed the Theory of Planned Behaviour (TPB) in investigating students' acceptance of BL deployment in Malaysia. Hence, the TPB was employed in this study to conceptualize and develop the proposed model to evaluate the critical predictors that determine students' acceptance and deployment of BL. The proposed model is shown in Figure 2.

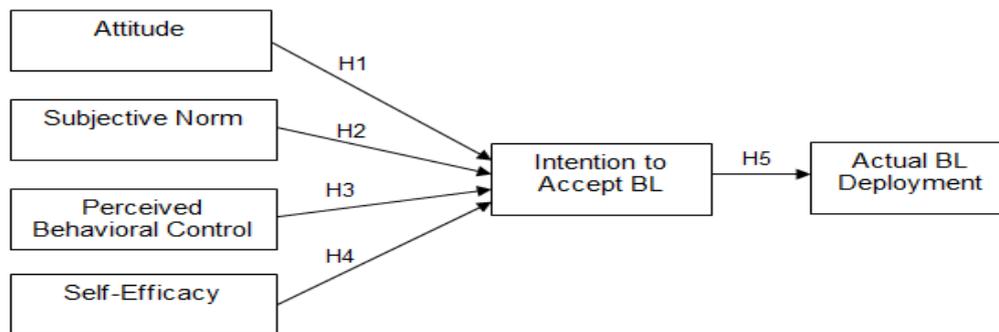


Figure 2 Proposed model

#### 4. Research Methodology

This research employs a quantitative survey method and data was collected from Malaysia universities, colleges, and polytechnics that implement BL approaches via an online survey questionnaire. The questionnaire was developed in English language and was sent to 7 IT and 3 education experts to refine and correct the questionnaire after which the questionnaires were set online and links to the survey sent to respondents for pilot testing. Next, pilot study was carried out and data was collected from 59 students to test the reliability of questionnaires instruments. Results from the pilot revealed that the Cronbach's alpha was higher than 0.7. Then, invitations to participate in the survey, including link to the questionnaire, was distributed to selected students across institutions in Malaysia. The questionnaire included demographic question (gender, age, nationality, enrolled program, year of study, mode of study, area of study) measured using ordinal measurement.

The questionnaire rated the perception of the students regarding BL acceptance based on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). The questionnaire was developed based on existing and verified instruments from prior studies (see Table 2) to measure the attitude (5 items), subjective norm (5 items), perceived behavioral control (4 items), self-efficacy (4 items), intention to accept BL (4 items), and actual BL deployment (7 items). At the end of the data collection a total of 1,811 respondents were received, but a total of 642 samples were removed due to missing values resulting to a total of 1,169 usable samples. The collected data was analysed using Partial Least Square-Structural Equation Model (PLS-SEM) approach which is a variance-based technique that supports path analysis of predictors in a model. SmartPLS software version 3 was utilized to analyse the data. PLS-SEM was used because it is considered as a statistical approach that supports the evaluation of research model by examining the correlation among the predictors.

## 5. Results

PLS-SEM entails two main analyses; the first is the assessment of the measurement model assessed by checking the descriptive, convergent validity, reliability, and discriminant validity. Secondly, it involves the analysis of the hypotheses of the developed model.

### 5.1. Demographic Data

Table 3 depicts the demographic characteristics of the survey respondents.

Table 3 Characteristic of questionnaire participants (n=1169)

| <b>Profile</b>   | <b>Options</b>                         | <b>Frequency</b> |
|------------------|--|------------------|
| Gender           | Male                                   | 451              |
|                  | Female                                 | 718              |
| Age              | Above 1980                             | 5                |
|                  | 1981-1990                              | 14               |
|                  | 1991-2000                              | 1124             |
|                  | 2001 below                             | 26               |
| Year of Study    | 1 <sup>st</sup> Year                   | 393              |
|                  | 2 <sup>nd</sup> Year                   | 425              |
|                  | 3 <sup>rd</sup> Year                   | 224              |
|                  | 4 <sup>th</sup> Year                   | 88               |
|                  | 5 <sup>th</sup> Year and Above         | 33               |
| Nationality      | Malaysian                              | 1137             |
|                  | International                          | 32               |
| Enrolled Program | Doctorate                              | 15               |
|                  | Master's Degree                        | 14               |
|                  | Bachelor's Degree                      | 453              |
|                  | Advance Diploma                        | 253              |
|                  | Others                                 | 173              |
| Institution Type | Public                                 | 1014             |
|                  | Private                                | 155              |
| Mode of Study    | Full Time                              | 1151             |
|                  | Part Time                              | 18               |
| Area of Study    | Education                              | 127              |
|                  | Management/Business/Accounting/Finance | 157              |
|                  | Sciences                               | 18               |
|                  | Technology                             | 4                |
|                  | Engineering                            | 256              |
|                  | Computer science                       | 131              |
|                  | Social science                         | 22               |
|                  | Health & Medicine                      | 11               |
|                  | Arts & Humanities                      | 42               |
|                  | Agriculture                            | 22               |
|                  | Mathematics & Statistics               | 14               |
|                  | Architecture & Building                | 19               |
|                  | General Studies                        | 54               |
|                  | Law                                    | 3                |
| Others           | 289                                    |                  |

## 5.2. Descriptive, Convergent Validity and Reliability

Convergent validity measures if items can efficiently reflect their corresponding predictors which is measured based on the validity and reliability. The validity measures the extent to which a predictor in a model differs from other predictors in the same model assessed based on the Average Variance Extracted (AVE) value which refers to the sum of variance a predictor captures from its items (Yeou, 2016). The AVE should be greater than or equal to 0.5 as recommended by Hair *et al.* (2016); Anthony *et al.* (2020). Whereas, reliability measures the degree to which the predictor gives same results that are consistent and is measured based on the Cronbach's alpha and Composite Reliability (CR) (Yeou, 2016). Similarly, for the reliability the CR and Cronbach's alpha value should be greater than 0.70 (Anthony Jr *et al.*, 2018). The factor loadings of each item are also considered, which provide evidence to measure convergent validity of all items which should be higher than the threshold value of 0.50 as suggested by Al-Busaidi (2012).

Table 4 Item loadings, reliability and descriptive analysis

| Predictors                      | Items | Loadings | Cronbach's Alpha ( $\alpha$ ) | Composite Reliability (CR) | Average Variance Extracted (AVE) | Mean   | Standard Deviation (SD) |
|---------------------------------|-------|----------|-------------------------------|----------------------------|----------------------------------|--------|-------------------------|
| Attitude                        | ATT1  | 0.758    | 0.858                         | 0.898                      | 0.638                            | 4.0063 | 0.56325                 |
|                                 | ATT2  | 0.834    |                               |                            |                                  |        |                         |
|                                 | ATT3  | 0.851    |                               |                            |                                  |        |                         |
|                                 | ATT4  | 0.783    |                               |                            |                                  |        |                         |
|                                 | ATT5  | 0.764    |                               |                            |                                  |        |                         |
| Subjective Norm                 | SUN1  | 0.742    | 0.700                         | 0.833                      | 0.625                            | 4.0972 | 0.55787                 |
|                                 | SUN2  | 0.806    |                               |                            |                                  |        |                         |
|                                 | SUN3  | 0.822    |                               |                            |                                  |        |                         |
| Perceived Behavioral Control    | PBC1  | 0.801    | 0.790                         | 0.864                      | 0.615                            | 4.0077 | 0.57071                 |
|                                 | PBC2  | 0.815    |                               |                            |                                  |        |                         |
|                                 | PBC3  | 0.808    |                               |                            |                                  |        |                         |
|                                 | PBC4  | 0.707    |                               |                            |                                  |        |                         |
| Self-efficacy                   | SEF1  | 0.751    | 0.830                         | 0.887                      | 0.663                            | 3.9311 | 0.59308                 |
|                                 | SEF2  | 0.812    |                               |                            |                                  |        |                         |
|                                 | SEF3  | 0.858    |                               |                            |                                  |        |                         |
|                                 | SEF4  | 0.832    |                               |                            |                                  |        |                         |
| Behavior Intention to accept BL | BIA1  | 0.754    | 0.776                         | 0.856                      | 0.599                            | 4.0118 | 0.57144                 |
|                                 | BIA2  | 0.748    |                               |                            |                                  |        |                         |
|                                 | BIA3  | 0.816    |                               |                            |                                  |        |                         |
|                                 | BIA4  | 0.776    |                               |                            |                                  |        |                         |
| Actual BL Deployment            | ADE1  | 0.649    | 0.867                         | 0.898                      | 0.557                            | 3.7866 | 0.61624                 |
|                                 | ADE2  | 0.766    |                               |                            |                                  |        |                         |
|                                 | ADE3  | 0.808    |                               |                            |                                  |        |                         |
|                                 | ADE4  | 0.775    |                               |                            |                                  |        |                         |
|                                 | ADE5  | 0.780    |                               |                            |                                  |        |                         |
|                                 | ADE6  | 0.690    |                               |                            |                                  |        |                         |
|                                 | ADE7  | 0.744    |                               |                            |                                  |        |                         |

Note: For Mean 1 = least effective; 2 = fairly effective; 3 = effective; 4 = very effective; and 5 = most effective

Results from Table 4 depicts that the predictors constructs' reliability is higher than 0.7 and AVE are higher than 0.5 as recommended. Table 4 also shows the mean and standard

deviations (SD) of the variables, where the mean score should be higher than 2.5 as suggested by Anthony Jr (2019) based on the 5-point Likert scale. Moreover, the SD values are close to 0 and lower than 1 indicating that the responses from the students are not dispersed.

### 5.3. Discriminate Validity

Discriminant validity measures whether two predictors are statistically different from each other (Anthony Jr, 2019). Thus, Fornell and Larcker (1981) recommended the use of AVE to measure discriminant validity by checking the square root of AVE of each predictor which should be higher than the correlations shared between the predictors in the model. Besides, the value should be higher than 0.5 as suggested by Hair *et al.* (2016).

Table 5 Discriminate validity

| Predictors                      | 1            | 2            | 3            | 4            | 5            | 6            |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Actual BL Deployment            | <b>0.746</b> |              |              |              |              |              |
| Attitude                        | 0.708        | <b>0.799</b> |              |              |              |              |
| Behavior Intention to accept BL | 0.662        | 0.720        | <b>0.774</b> |              |              |              |
| Perceived Behavioral Control    | 0.645        | 0.75         | 0.702        | <b>0.784</b> |              |              |
| Self-efficacy                   | 0.712        | 0.719        | 0.677        | 0.673        | <b>0.814</b> |              |
| Subjective Norm                 | 0.548        | 0.684        | 0.697        | 0.730        | 0.566        | <b>0.791</b> |

Results from Table 5 indicate that the predictors satisfy that rule, as the square root of the AVE on the diagonal is higher than the correlations with other variables and each value is higher than 0.5. Therefore, all predictors have a satisfactory discriminant validity value higher than 0.5.

### 5.4. Hypotheses Testing

This sub-section is carried out to test the model hypotheses as seen in Figure 2.

Table 6 Hypotheses testing

| Hypotheses | Path Description   | Path Coefficient Beta ( $\beta$ ) | Standard Error (SE) | R <sup>2</sup> | t-value | Significance Level (p-value) | Results   |
|------------|--|-----------------------------------|---------------------|----------------|---------|------------------------------|-----------|
| H1         | Attitude --> Behavior Intention to accept BL                     | 0.812                             | 0.017               | 0.659          | 47.527  | 0.000                        | Supported |
| H2         | Subjective Norm --> Behavior Intention to accept BL              | 0.688                             | 0.022               | 0.473          | 32.384  | 0.000                        | Supported |
| H3         | Perceived Behavioral Control --> Behavior Intention to accept BL | 0.692                             | 0.021               | 0.479          | 32.759  | 0.000                        | Supported |
| H4         | Self-efficacy --> Behavior Intention to accept BL                | 0.668                             | 0.021               | 0.446          | 30.631  | 0.000                        | Supported |
| H5         | Behavior Intention to accept BL --> Actual BL Deployment         | 0.637                             | 0.024               | 0.405          | 28.197  | 0.000                        | Supported |

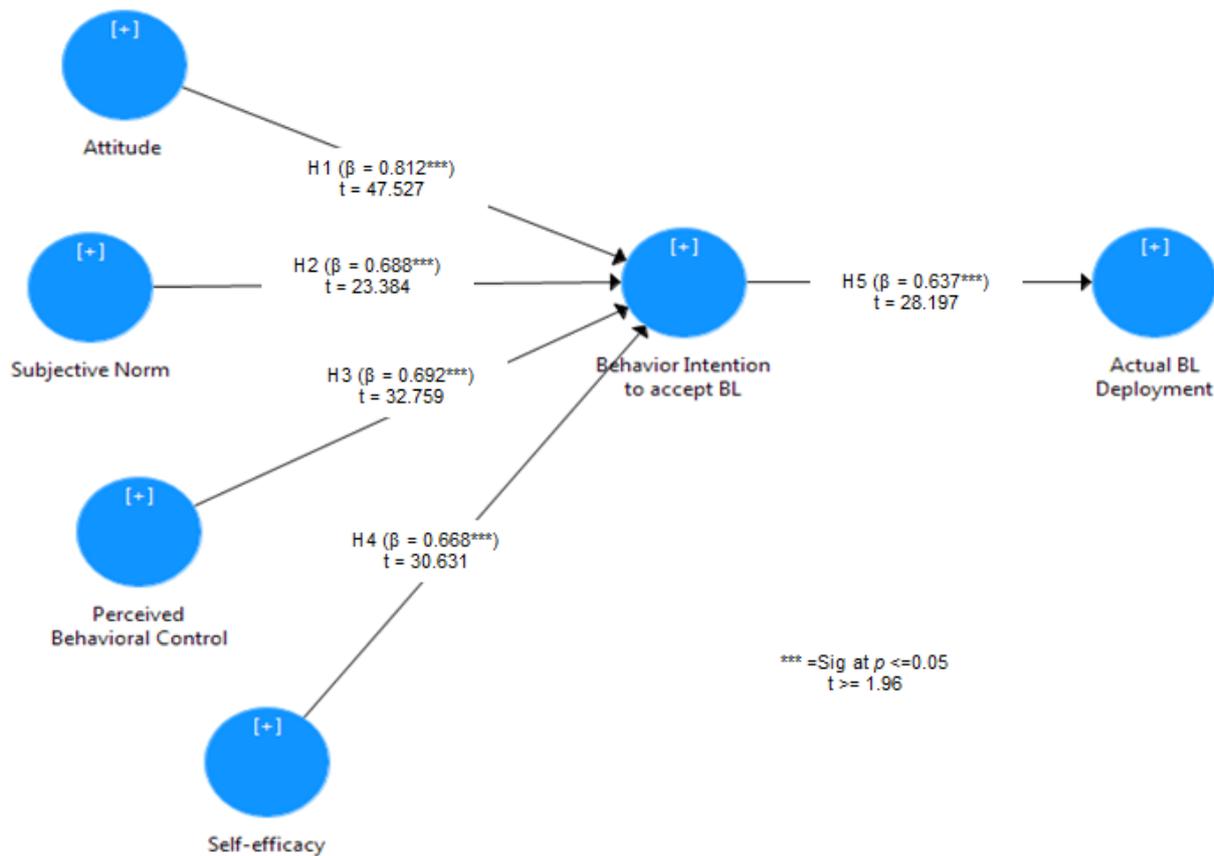


Figure 3 Results of hypotheses testing

The model hypotheses are measured by examining the path coefficients and ( $\beta$ ) value which evaluates the association between predictors based on their degree of significant levels ( $p$ -value) which is significant when  $p < 0.05$  measured using PLS path modelling technique which assesses the effects of the variables. Furthermore, the coefficient of determination termed  $R^2$  value is used to measure the predictive significance of the model hypotheses. Next, the path coefficients  $t$ -value is employed to assess the effects of each hypothesis. A bootstrapping technique of 5000 samples was utilized to measure the level of significance of the paths ( $t$ -value), where  $t$ -value should be greater than 1.96 for a two-tail test (Hair *et al.*, 2016). Results from Figure 3 and Table 6 depict the significance testing of the model hypotheses which show that H1 ( $t=47.527$ ,  $\beta = 0.812$ ,  $p=0.000$ ), therefore supporting H1 since  $t$ -value is greater than 1.96 benchmark and path coefficient is higher than 0 (Anthony Jr, 2019).

Similarly, H2 is given as ( $t=2.284$ ,  $\beta = 0.688$ ,  $p=0.000$ ), therefore supporting H2. Next, is H3 with ( $t=32.759$ ,  $\beta = 0.692$ ,  $p=0.000$ ). Similarly, H4 with ( $t=30.631$ ,  $\beta = 0.668$ ,  $p=0.000$ ) and lastly H5 with ( $t=28.197$ ,  $\beta = 0.637$ ,  $p=0.000$ ). In summary, results reveal that attitude, subjective norm, perceived behavioral control and self-efficacy statistically predicts students' intention to accept BL. The results also confirm that students' acceptance of BL is positively influences the actual BL deployment. In addition, results from Table 6 show that the  $R^2$  values ranges from H1= 0.659, H2= 0.473, H3= 0.479, H4= 0.446, H5= 0.405. The result suggests that all  $R^2$  values are higher than 0.1 as recommended by Bokolo Jr *et al.* (2020). The results empirically confirm that H1 which is the attitude of the student has the strongest effect, thus students' intention to accept BL is mostly predicted by their attitude towards BL approaches.

## 6. Discussion and Implications

### 6.1. Discussion

This article proposes a model to evaluate the critical predictors that determine students' acceptance and deployment of BL in institutions of higher education based on the theory of planned behavior. Data was collected using online survey questionnaire and PLS-SEM was employed for data analysis. Results from the data show a significant relationship between students' attitude and their intention to accept BL. This result is in line with findings from prior studies (Ahmed, 2010; Dakduk *et al.*, 2018), where the authors mentioned that attitude denotes the degree to which a student has a favorable or unfavorable feeling about deploying BL. Finding from Ghazal *et al.* (2017); Anthony *et al.* (2019) also revealed that the more favorable the attitude towards the behavior, the stronger students' intention to adopt blended LMS. Thus, the more positive attitude students have, the stronger their acceptance and intention to deploy BL (Lu, 2012).

Moreover, the study confirms that subjective norm significantly predicts students' intention to accept BL. This result is in parallel with findings from prior studies (McKinnon and Igonor, 2008; Cheon *et al.*, 2012) where the authors suggested that subjective norm relates to student's perceived expectation from other such as their peers who require them to perform a behavior such as deploying BL (Dakduk *et al.*, 2018). Thus, if students observe that other students recommend the use of BL, they are likely to deploy BL (Valtonen *et al.*, 2015). For instance, many students choose to adopt BL because their friends also use BL system, and they suggest it to them. Similarly, findings from other studies (Yeou, 2016; Dakduk *et al.*, 2018) maintained that subjective norm positively influences student's behavioral intention. Thus, if student think that they should employ BL behavior, they will have more intention to use BL because of the heightened measure of social pressure. One of the interesting findings of the study is that perceived behavioral control which relates to perceived ease or difficulty associated with a behavior positively predicts students' intention to accept BL. This result is analogous with results from McKinnon and Igonor (2008) where the researchers maintained that perceived behavioral control is associated with elements that hinders or facilitates BL use. Similarly, Wang (2017) stated that the ease of use of available resources provided to students via BL system is critical in dictating the likelihood of use of BL resources.

Furthermore, our results confirm that self-efficacy significantly predicts students' intention to accept BL. In other words, a student's confidence in performing a BL initiative will significantly influences their behavior towards accepting BL as a mode of learning (Ghazal *et al.*, 2017). In the literature self-efficacy has been revealed to be a vital variable in predicting computer use among learners (Lee, 2010; Lu, 2012; Ismail *et al.*, 2018). Likewise, findings from previous study (Cheon *et al.*, 2012) indicated that higher levels of self-efficacy in relation to computers usage leads to increased behavioral intention towards the usage of IT for learning. Additionally, the results indicate that students' intention to accept BL will positively influence actual BL deployment. This result is consistent with results from Ghazal *et al.* (2017) where the authors stated that intention to accept BL is an essential predictor as it relates to student's intentions to execute a given behavior. Also, findings from the literature (Al-Busaidi, 2012) confirmed that intentions capture the motivational variables that influence student behavior

towards accepting BL for learning. Thus, the higher student intention to deploy BL, the more likely the student is to actually deploy BL.

## **6.2. Implications**

This study has several theoretical and practical implications for decision makers and educationalist in higher education institutions as it provides insights into the usefulness as well as proficiency of BL approach in teaching and learning.

### **6.2.1. Theoretical Implications**

This research contributes to existing BL adoption and propose a theoretical model to understand, explain the predictors or factors that influence student's acceptance and intention to deploy BL. Accordingly, this research has several theoretical implications for learners and academic staffs to support BL use. Theoretically, this study identifies the predictors that influence students' readiness for accepting their intention to use BL. The proposed model of this study examines predictors that influence adoption of BL among students towards technology and innovation, but it also can be adopted by academics, administration, and institutions to determine success predictors for implementing BL in their educational institutions. Specifically, the proposed model aims to support educationalist make pedagogically informed design decisions towards appropriate utilization of digital technologies in improving learning quality of students.

Accordingly, this research gives an understanding of BL and its efficiency in order to improve students' competence, particularly in Malaysia perspective. In addition, the developed model can assist BL implementers and lecturers in designing course syllabus materials that would be more effective for instructional design for online and class room learning environment in Malaysian institutions and other countries in improving the quality of education. Thus, the results provide awareness to institutions' top management on their students' readiness and adaptability for future implementation of BL courses. Additionally, our findings provide evidence that BL can improve learners' knowledge. Consequently, these findings encourage lecturers to utilize digital contents in their teaching for improvising learners' competence. Also, this study is a steppingstone that could be valuable in order to improve students' academic performance expectancy. Moreover, findings from this study provide awareness for BL administrators to be conversant with the procedures for implementing more interactive learning content to ensure that BL become desired and will be accepted by students.

### **6.2.2. Practical Implications**

From a practical perspective this study provides insight as to how future efforts need to be focused towards improving the quality of learning and teaching experience of students in Malaysia institutions of higher learning. Findings from this study helps to guide institutions to truly understand BL concepts and how to enhance educational experience in line with advances in technology that will be valuable to progress learning. Besides, our findings provide

necessary understandings on how F2F and online learning delivery modes are major constituents in sustaining learners' learning performance and promoting lifelong learning. Thus, these findings can be employed by institutions in Malaysia and beyond to design BL strategies, initiatives, and a culture that promotes continuance satisfaction of BL as a mode of learning and teaching among students and academic staffs.

Moreover, our findings provide useful directions for higher education community to better understand how both online and physical learning delivery mode relates to students' academic development. Likewise, outcomes from this research offer beneficial directions for institutional community to redesign their pedagogical instructions with BL approaches and better understand how certain modes of teaching delivery relates to the development of students' learning. Hence, faculties could use the results of this research to enhance their understanding of what makes learners accept and adopt BL methods. Besides our study can be helpful in the designing and implementing best BL innovative approaches that promotes the use of technology to improve learning and teaching outcomes. The findings from this study are significant to develop improvements for current BL approaches and can be used as reference for the designing methodologies to promote BL in Malaysia and beyond.

## **7. Conclusion**

Research on BL has been carried out either in learning design or in pedagogical approaches explored both in technical and non-technical context. However, only a few studies had been carried out in Malaysia to investigate student's acceptance towards BL deployment based on empirical evidence. Therefore, this study examined students' behavioural intentions towards the use of BL by developing a model to explore the critical predictors that determine students' acceptance and deployment of BL in institutions of higher education based on the theory of planned behavior. Data was collected from students in Malaysia institutions and analysed using PLS-SEM. Findings from this research provide empirical support for TPB in confirming the predictors that influences students toward accepting and deploying BL in institutions of higher learning. Findings from this study provide implication that offers invaluable information on students' perception towards BL acceptance to decision makers and instructors in institutions of higher learning. Thus, the results from this study can be used by institutions to improve their understanding of the factors that influence students to accept and deploy BL especially in Malaysia perspective.

In addition, the developed model in this study can also be adopted by administration and academics to determine success factors for adopting BL aimed at providing the necessary insights as to how institutions can enhance students' experiences and satisfaction of BL. Moreover, the model can be employed as a reference tool for educators to design policies and practices that supports satisfaction of BL among students in improving the quality of learning in Malaysia towards achieving self-directed lifelong learning. But, like any other research this study is not without limitations. First, the samples was collected from institutions in Malaysia, thus more research can be conducted in different countries to provide more significant insights into students' acceptance of BL and also increase the generalization of the findings. Secondly,

the study examines BL acceptance from student's perspective. Further research is needed to investigate BL from lecturers' perspective and also employ survey to collect data from other countries to further validate the model with data from different region. Lastly, there is need to collect qualitative interview data that provide more insights on BL practice in Institutions.

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