Exploring the Role of Blended Learning for Teaching and Learning Effectiveness in Institutions of Higher Learning: An Empirical Investigation

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Abstract

As the years progress there has been rapid growth in Blended Learning (BL) adoption, but only few research focused on adoption issues related to learners, academic staffs and management. Thus, research is needed to guide universities in strategically examining learners, academic staffs and management adoption of BL. Accordingly, this study develops a model to facilitate university policy makers in their decision making to assess students learning and academic staffs teaching outcome. Furthermore, this study explores on the factors that influence BL adoption in universities, through an empirical study from the perspectives of learners, academic staffs, and management. In particular, it examines the current BL practice adoption effectiveness in universities. Based on extensive review of prior studies, survey questionnaires was designed and distributed to convenience samples of 87 students, academic staffs, and management in 3 Malaysia universities to validate the developed model. Next, Partial Least Square-Structural Equation Modeling (PLS-SEM) was employed to analyze the survey data. Findings reveal that supportive factors, attitude, learning mode, satisfaction, course management, and ease of use positively predict the perception of learners and academic staffs' to adopt BL. Similarly, findings suggest that the perception of management towards BL adoption is positively determined by the strategy, structure, and support factors. Moreover, findings reveal that the impact of BL on learners' effectiveness is positively predicted by achievement, engagement, involvement, retention, and cognitive outcome. Additionally, findings suggest that the impact BL on academic staffs' effectiveness is significantly influence by delivery, performance, evaluation, motivation. Theoretical implications from this study contribute to enhance teaching quality by enriching course management, improving learning content, and facilitate management policies towards effective BL adoption.

Keywords: institutions of higher learning; blended learning; teaching effectiveness; learning effectiveness; partial least square-structural equation modeling.

1. Introduction

The rapid development of Information Technology (IT) has considerably transformed the medium employed by academicians to delivers course materials in utilizing various online environments to improve student learning which has changed how students learn by using innovative mediums such as digital books, mobile devices, vides, social media, etc. (Jani et al. 2018). Blended learning (BL) is one form of learning where the offline mode is integrated with online mode. That is, the lecturer employs face-to-face (F2F) mode of teaching which also extends to the online platforms for further discussions (Edward et al. 2018). BL was first introduced in the late 1990's by several universities in United States and Canada as a hybrid method where the learning process is carried out through F2F and online learning (Ghazali et al. 2018). BL seeks to generate a harmonious and coherent balance between F2F human interaction and online access to learning by considering students and lecturers attitudes and aptitudes. BL therefore remains an

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imperative concept in universities as its complete focus is concerned with the optimum combination to achieve the most effective learning and teaching experience (Ju and Mei 2018).

BL facilitates communication and collaboration among students and lecturers through social networking, it increases ease of use of course materials (Wai and Seng 2015), decrease physical class time, create a student-based learning environment, produce an encouraging learning environment, flexible learning time and location, promotes independent learning skills, and develops individually course solutions (Rahman et al. 2015; Siew-Eng and Muuk 2015). Furthermore, BL plays an essential part in students' learning proficiencies as it equips them with the knowledge and skills required for employment after graduation (Wong et al. 2018). Thus, BL increases learners' interest in embarking on own learning process, facilitates students to study at their own convenient, and further prepare students for future (Owston et al. 2019). For lecturers, BL provides access to global course resources and syllabus materials that help lecturers improve teaching quality (Al-shami et al. 2018). It provides lecturers with more prospects for collaboration for important professional development and also improves lecturers' teaching efficiency (Baragash and Al-Samarraie 2018).

In Malaysia context under the Malaysia Education Blueprint 2015–2025, BL is chosen as the preferred mode of teaching in the 21st century through the utilization IT to enhance teaching in universities towards transforming how students learn and lecturers teach (Chang-Tik 2018). The Malaysia Education Blueprint initiated by Ministry of Higher Education Malaysia (MOHE) planned for all public or private universities in the country to adopt BL tools such as MOOC to improve teaching and learning (MOHE 2015). To improve BL adoption MOHE Malaysia provides IT infrastructure to all universities, to restructure their syllabus and help in the assessments and training of lecturers to improve their knowledge and skills in BL pedagogy (Tahar et al. 2013). Furthermore, findings from Ta'a et al. (2017) indicated that 80 per cent of lecturers in Malaysia universities are already aware of BL policy stipulated by MOHE, where about 90 per cent of universities have their own in-house BL policy, and 70 per cent have enforced compulsory online learning in their universities. Likewise, Kaur and Ahmed (2006) reported that 79 percent of Malaysia universities adopt BL, whereas 17 per cent employs only F2F learning and the remaining 4 percent adopt e-learning platforms.

Currently, institutions of higher learning in Malaysia are moving from merely e-learning into BL. However, Wong et al. (2018) stated that while the advantages of BL have received the most consideration from researchers, fewer studies has focused on investigating the effectiveness of BL especially in Malaysia universities. Furthermore, findings from Haron et al. (2012) stressed that BL is more effective and it offers more benefits than traditional e-learning approach. However, Bentley et al. (2010) mentioned that that a few lecturers are apprehensive regarding adoption BL for teaching. Thus, there is need for a study to examine BL practices and initiatives to be adopted by academic staffs and learners in Malaysia context, and further identify the factors that influence learners, academic staffs, and management perception towards adopting BL approaches (Haron et al. 2012).

Bentley et al. (2010) also noted that while there are studies related to BL adoption, research that emphasis on the effectiveness of BL in teaching and learning are limited, hence this gap needs to be filled. For instance, there are inadequate studies that examined if BL practice can help motivate students learning performance (Wai and Seng 2015). Furthermore, given the important role of lecturers in BL there are limited studies that explores on the effectiveness of BL in teaching (Wong et al. 2018). Besides, very limited research has emphasized on investigating BL adoption by considering the university management in Malaysia. Hence, this article would be one of the few studies that provide empirical evidence on the impact of management in regards to the effectiveness of BL for learning and teaching. Likewise, Garrison and Kanuka (2004) mentioned that it is essential to measure the effectiveness of BL towards assessing the learning and teaching outcomes in attaining more meaningful learning experiences.

Therefore, this study aims to determine the effects of BL on learners' academic effectiveness and further evaluate teaching effectiveness of BL. Researchers such as Deng et al. (2018) argued that persistent study of factors that influence BL in isolation without examining how the factors influence each other does not progress the field of BL. Thus, this study further explores on factors that determine the perception of learners, academic staffs, and management in adopting BL. In order to achieve the aim of this research, the following research questions are formulation to guide this study:

RQ1-What are the factors that influence learners, academic staffs, and management' perception towards BL adoption in universities?

RQ2-What are the BL practices to be adopted by learners in universities?

RQ3- What are the BL initiatives to be adopted by academic staffs in universities?

RQ4-How to assess the outcome of BL adoption in universities to improve teaching and learning effectiveness?

This study provide answers to the research questions by carrying out a review of the literature and develops a model based on innovation adoption model, course redesign outcomes model, and BL approach to exploring the impact of BL for teaching and learning effectiveness. The remainder of the article is organized as follows. Section 2 is the theoretical background and literature review. Section 3 is the model and hypotheses development and Section 4 describes the research methodology. Section 5 is the results and discussion, Section 6 is the implications and Section 7 is the conclusion.

2. Theoretical Background and Literature Review
2.1. Innovation Adoption Framework

To assess the current BL practice in universities, there is need to explore how to facilitate learners, academic staffs, and management in BL adoption. Thus, the role of learners, academic

staffs, and management are important for university in making decision regarding BL, but despite the vital role of these stakeholders little research has been published that simultaneously investigate the role of learners, academic staffs, and management in improving teaching and learning effectiveness. Accordingly, to identify the factors that influence the perception of learners, academic staffs, and management towards, as well as the BL practice to be adopted to improve the teaching and learning outcome. This study employed the innovation adoption framework for institutional BL adoption proposed by Graham et al. (2013) based on Rogers' (2003) innovation adoption that is structured in three stages which includes awareness or exploration, adoption or early implementation, and lastly outcome mature implementation as seen in Figure 1.
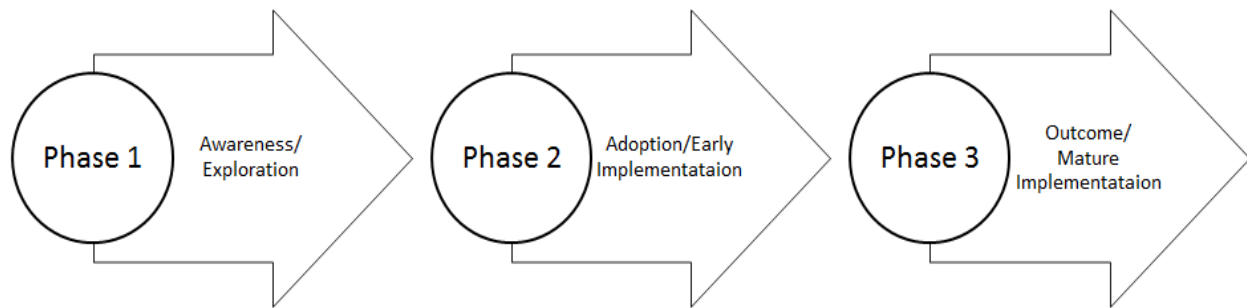

Figure 1 Innovation adoption framework

Figure 1 depict the innovation adoption framework employed in this study to conceptualize the proposed model to examine the role of BL for teaching and learning effectiveness and also provide those interested in adopting BL with information concerning how their university' decisions regarding BL adoption may influence learners, academic staffs, and management adoption (Porter et al. 2016). The innovation adoption framework provides an agenda for universities to strategically adopt BL and also investigates how learners, academic staffs, and management accept, and show how universities move from interest in BL adoption towards effective institutionalization.

Stage 1, awareness or exploration is the input phase which is described by the university's current perception towards BL. This phase is concerned with how learners, academic staffs, and management explore ways of employing BL for teaching and learning (Graham et al. 2013). Stage 2, adoption or early implementation is the phase which is characterized by learners and academic staffs' adoption of BL practice to support teaching and learning effectiveness (Porter et al. 2016). Stage 3, outcome mature implementation is the output phase which is characterized by well-established BL practices that are important to university operations. Stage 3 also aims to assess the overall impact of BL on teaching and learning effectiveness (Graham et al. 2013). Based on the aforementioned discussion the innovation adoption framework is employed to develop the research model in proving answer to the first research question which aims to identify the factors that influence learners, academic staffs, and management' perception towards BL adoption in universities as discussed in Section 3.1.

2.2. Course Re-design Outcome Framework

The course redesign outcome framework was designed by Garrison and Vaughan (2013) to support lecturers in adopting BL practice and it comprises of teaching strategies, technology integration, and curriculum design as shown in Figure 2.
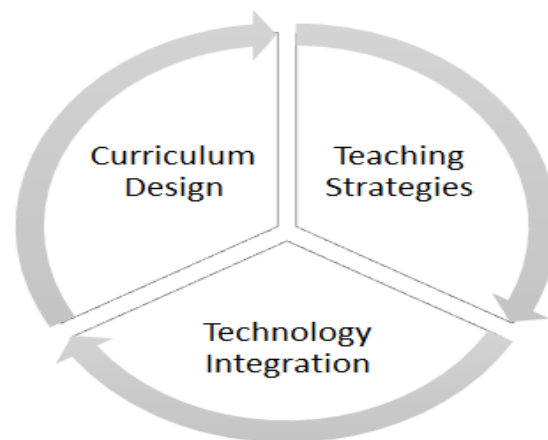

Figure 2 Course redesign outcome framework

Figure 2 depicts the course redesign outcome framework which was designed by Garrison and Vaughan (2013) to support BL adoption for teaching effectiveness in universities. Respectively, teaching strategies component entails the lecturer deploying the most suitable instructional pedagogies that facilitates teaching and learning objectives (Garrison and Vaughan 2013). Such pedagogies aim to ensure that knowledge is transfer in form of student learning (Kaur 2013). Thus, the pedagogical design should support teaching and also simplify the delivery of knowledge to enhance students' learning outcomes (Poon 2012). Technology integration component comprises of hardware and software that lecturers utilize to teach in a BL approach, where the success of BL course inevitably depend on lecturers' access and use of technology (Bowyer and Chambers 2017). Lecturers with strong technical skills can lecture using BL tools that make lectures more interactive, resulting in an improved BL curriculum that supports students' academic needs (Savara and Parahoo 2018). Curriculum design component relates to how organized the teaching platform being utilized by the lecturers are designed and managed to facilitate learning (Hussin et al. 2009). This is because students place great significance on curriculum content design where a well-organized quality content that is visibly presented in an interactive, clearly written medium improves teaching effectiveness (Ozkan and Koseler 2009). Accordingly, the course redesign outcome framework is employed to provide answer to the third research question in identifying the BL initiatives to be adopted by academic staffs in universities.

2.3. Blended Learning Approach

The BL approach is derived from the literature and it comprises of offline and online mode which are adopted by students to improve learning based on six practices which include F2F, activities, information, resources, assessment, and feedback as seen in Figure 3.
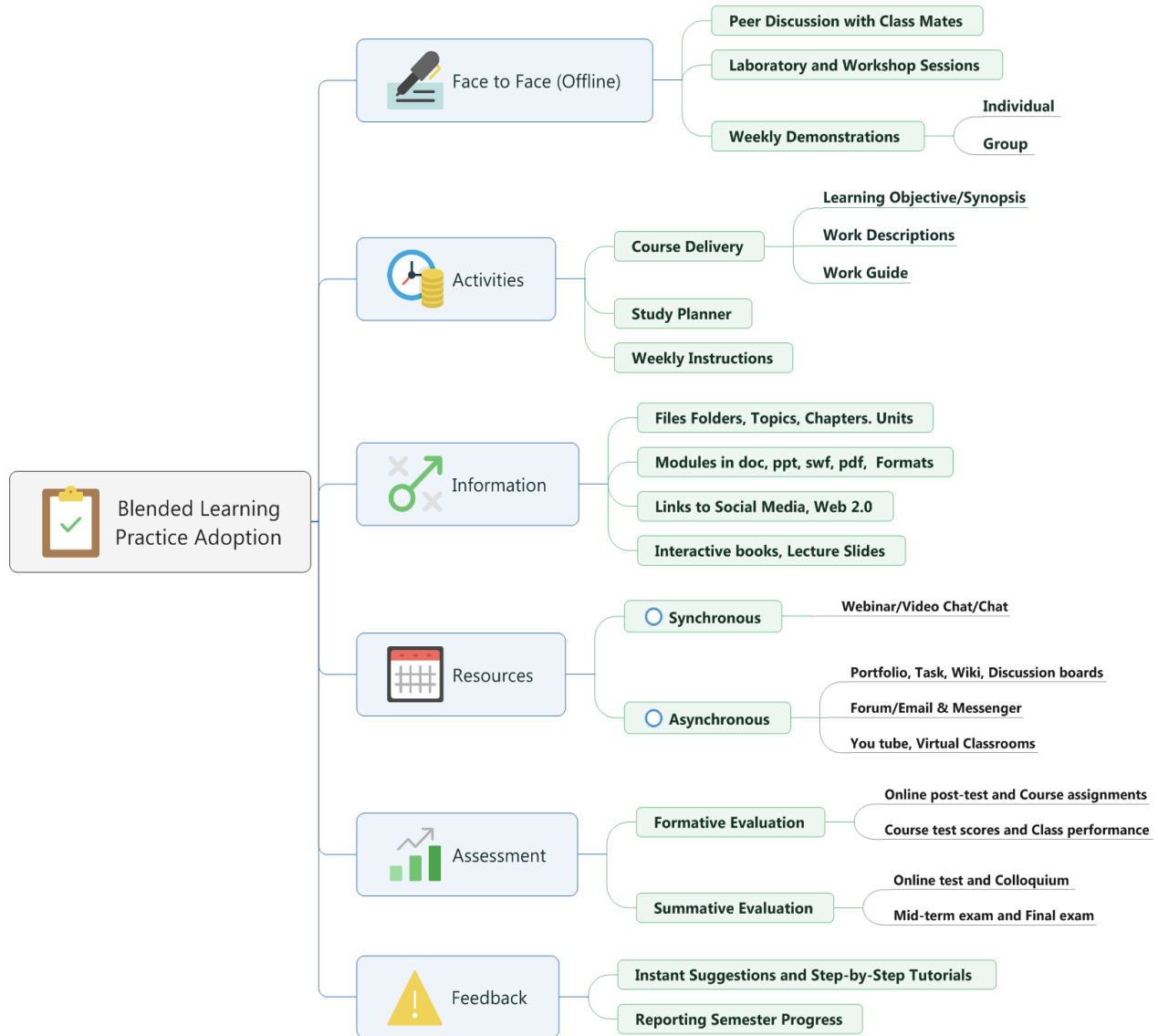
Figure 3 BL practice approach

Figure 3 depicts the BL practice approach developed by the authors based on the literatures to illustrate how BL is adopted by students in universities. Accordingly, F2F offline mode refers to traditional classroom which allows lecturers and students to be in the same place and it supports students with certain educational preferences, especially learners who are used teacher-centered learning methods (Ramakrisnan et al. 2012; Kaur 2013). F2F comprises of lectures, individual and group discussion, presentation activities, laboratory activities, and student progress assessment (Koohang 2009; Sun and Qiu 2017). In F2F mode of teaching the lecturer employs various teaching material to motivate students' in ensuring that learning is well-delivered by using whiteboard, paper, handouts, and flash drives to design and disseminate creative presentation. Also, lecturers utilize offline technologies such as projector and presentation software to facilitate teaching (Ramakrisnan et al. 2012). Furthermore, the online mode refers to web-mediated platforms mostly employed in universities to support lecturers in delivering lessons, making

semester announcements, distributing assignments briefs and grading students, uploading course notes and class tutorials, assessing students' performance and providing feedback for improvement (Arbaugh et al. 2008).

Online mode provides students with available materials and resources in form of interactive e-books, study videos, YouTube, and course information. Students also provide feedback to lecturers to help improve teaching and learning effectiveness (Sun and Qiu 2017). In addition, students utilize synchronous virtual classroom to collaborate with peers and communicate with their lecturer directly through chat room and regular asynchronous medium such as discussion boards and e-mail (Baragash and Al-Samarraie 2018). In this mode, students can freely and exclusively access course resources in multiple formats provided by the lecturers to support their learning. Besides, online mode enable students to be assessed online this include participating in online quizzes and receiving prompt feedback which aids to enhance learning effectiveness of students (Baragash and Al-Samarraie 2018). Therefore, the BL approach as shown in Figure 3 is employed to provide answer to the second research question which aims to present BL practices to be adopted by learners in universities which comprises of F2F, activities, information, resources, assessment, and feedback.

2.4. Related Works

This sub-section reviews prior studies that examine BL adoption in universities. The selected studies are presented in Table 1.

Table 1 Related works

#	Authors and Contribution	Purpose	Identified Factors	Methodology/ Context
1	Al-Rahmi et al. (2018) examined university students' intention to utilize e-learning.	Aimed to investigate students' adoption process.	Self-efficacy content of e-learning, students' satisfaction, perceived usefulness, intention to use e-learning.	106 questionnaires were distributed among students in Malaysia using random sampling.
2	Dakduk et al. (2018) examined the factors the influence the acceptance of BL in executive education.	Aimed to understand the factors that influence the intention to adopt BL in higher education research.	Hedonic motivation, habit, performance, effort expectancy, social influence, facilitating conditions, behavioral intention, age, gender, and experience.	307 responses to an online questionnaire by senior and middle-ranking managers in Colombia.
3	Edward et al. (2018) examined the effect of BL and learners' characteristics on students' competence in learning.	Aimed to investigate the effect of BL and learners' characteristics on students' competence towards BL effectiveness.	BL (digital contents, technology), learners' characteristics (motivation, interaction, attitude, flexibility, time spent), and students' competence.	Employed mixed methods (experimental comprising of 120 respondents, and survey comprising of 109 respondents) in Sri Lanka.
4	Fisher et al. (2018) researched on the significant relationship between flipped BL and student performance, satisfaction and engagement.	Aimed to present the correlation between flipped BL pedagogies in relation to student impact of satisfaction, performance, and engagement.	Time efficiency, personal convenience, BL benefits, perceived performance, engagement with flipped learning, and overall satisfaction.	Data was collected using a survey from 348 samples from an Australian university.
5	Ghazal et al. (2018) examined the effects of critical success factors on students' experience and satisfaction with LMS in a BL setting.	Aimed to provide insights as to how universities can enhance students' experiences and satisfaction of LMS in order to support the BL approach.	Students, instructors, system, classmates, course design, and organization.	Questionnaire data from 174 undergraduate students in three universities in Yemen based on convenience sampling.

6	Prasad et al. (2018) enquired into learners' behavioral intentions towards the use of a BL program designed for post-graduate international IT students.	Motivated to develop a testing mechanism to measure the extent to which international students have built up digital capital.	Economic, social and cultural Social influence (behavioral intention), performance and effort expectancy (attitude), and facilitating conditions (ease and usefulness).	Data was collected from 95 postgraduate IT project management students in Sydney, Australia.
7	Savara and Parahoo (2018) unraveled the determinants of quality in BL centered on gender differences among students.	Aimed to model the factors influencing the quality of learning experiences of students in BL environments and assessed whether these factors differ across gender.	Technology infrastructure quality, learner engagement, faculty technology competence, learner interaction, quality of course design, and student learning experience.	Data was collected from 267 students from 8 different universities in UAE and UK using purposive sampling.
8	Sun and Qiu (2017) developed a BL model in an English Foreign Language (EFL) class.	Aimed to outline an approach of BL model in college English teaching applicable in China EFL class environment.	Mode, model of integration, distribution of learning content and objectives, language teaching methods, involvement of learning subjects, and location.	Employed questionnaire to collect data from 96 students and semi-structured focus group interview to collect data from 10 students in China.
9	Kumara and Pande (2017) analyzed the conceptual and contextual relevance of BL for working professionals.	Developed and operationalizes the learning paradigm through an integrative framework for BL ecosystem.	Institutional, faculty-related, student-specific and pedagogical as variables for effective BL experience.	Study was conducted in India; however no empirical data was reported.
10	Yeou (2016) designed a structural model to explore students' acceptance of Moodle in BL environment.	Aimed to examine university student's attitudes towards the utilization of Moodle.	Perceived usefulness, perceived ease of use, computer self-efficacy, attitude, intention to use, and frequency of use.	Data was collected using a survey questionnaire from 47 students in a Moroccan university.
11	Klentien and Wannasawade (2016) developed a BL model for virtual science laboratory.	Aimed to enhance the analytical thinking skills and evaluation of ability in conducting science projects for students.	Student, instructor, BL, virtual laboratory and assessment.	5 experts selected by purposive sampling who have more than 3-year experiences in Thailand.
12	Sari and Karsen (2016) conducted a study on BL to improve quality of learning in higher education.	Focused to measure and evaluate BL implemented at a private university towards improving the quality of BL.	Learning effectiveness, institutional commitment, user satisfaction (lecturer and student satisfaction), facility and access (facilities).	Data was collected via interviews and questionnaires from 97 respondents consist of 50 lecturers and 47 students in Indonesia.
13	Porter et al. (2016) examined institutional drivers and barriers to BL adoption in higher education.	Determined the degree to which institutional strategy, structure, and support measures facilitate or impede BL adoption among higher education decision makers	Institutional strategy, structure, and support measures	Stratified sample of interviewees of 39 faculty members in a University in USA.
14	Rahman et al. (2015) studied the factors that influence students' satisfaction on BL implementation in a public higher education institution.	Aimed to examine the relationship between individual factors and students' satisfaction on BL.	Perceived ease of use, perceived value, learning climate, student-instructor interaction, and satisfaction on BL.	Data was collected using survey questionnaire and 400 usable samples were utilized.
15	Wai and Seng (2015) measured the effectiveness of BL environment.	Aimed to explore the perception of BL, attitude, effectiveness and efficiency of BL.	Use of BL tools in teaching, use of BL tools in learning, effectiveness of BL, and efficiency of BL.	Data were drawn by employing random sample to select students from 150 university students.
16	Poon (2014) compared the use of BL in property education courses in different countries.	Aimed to gain deeper insight into the successful factors and challenges in the use of BL.	Administrative support, online support, equipment, staff time, relevant specialist software,	91 usable questionnaires from Australia and the UK

Post-print version of the paper by Anthony, B et al. in Education and Information Technologies, 24(6) (2019) 3433–3466 https://doi.org/10.1007/s10639-019-09941-z

			virtual environment platform, financial support.	and 16 interviews from 4 universities.
17	Wong et al. (2014) proposed a framework for investigating BL effectiveness.	Aimed to assess the readiness, intensity of adoption and impact on BL offerings.	Students' attitude, quality of teaching, assessment, workload.	515 usable survey responses in victoria university Australia.
18	Graham et al. (2013) designed a framework for institutional adoption and implementation of BL in higher education.	Investigated institutional adoption of BL to identify the key issues that can guide university administrators interested in this endeavor.	Strategy (purpose, advocacy, definition, policy), structure (governance, scheduling, evaluation), support (technical, pedagogical, incentives).	Employed purposive sampling in selecting three primary cases by interview in a University in USA.
19	Padilla-Meléndez et al. (2013) reexamined determinant of technology acceptance and use in the context of a BL setting in relation to gender differences.	Provided evidence that there exist gender differences in the effect of playfulness in the student attitude toward intention to use BL.	Perceived usefulness, perceived playfulness, perceived ease of use, attitude, and intention to use.	Data was collected from a sample of 484 students in a Spanish university.
20	Tahar et al. (2013) examined students' satisfaction on BL.	Explored the critical factors that affecting students' satisfaction in BL based on the relevant constructs.	Service quality, system quality, intention of use, information quality, user satisfaction, and net benefit.	Employed questionnaire to collect complete data from 61 students in Malaysia university.
21	Haron et al. (2012) examined the factors that influence adoption of BL among Malaysian academicians.	Aimed to provide knowledge to be incorporated into the e-learning training modules to address the problem of low adoption of BL.	Educational technology preference, learning goals and perception, perceived ease of use, perceived usefulness, and adoption of BL.	Data was collected using survey questionnaire from 30 academicians.
22	Lin and Wang (2012) proposed a research framework that motivates learners in continuing utilizing BL instruction.	Aims at investigating the critical features the e-learning system can provide in assisting learning.	Information quality, knowledge quality, system quality, task-technology fit, confirmation of system acceptance, perceived usefulness, system satisfaction, continuance to use intentions.	Collected da at from 88 completed questionnaires from students in a university in south of Taiwan and interview from 8 students.
23	Chong et al. (2010) examined the perceptions of student teachers in a BL environment.	Aimed to evaluates students' perception of their experience in BL environment	ICT usage, tutor support, interaction and collaboration, theory–practice link, student autonomy, enjoyment, asynchronous learning.	Survey was employed to collect data from 29 part-time education programme program in Singapore.
24	Machado (2007) developed an e-readiness model for examining e-learning in higher education institutions.	Focused in revealing the primary model of e-readiness for the specific context of higher education.	Feedback technological, economic, social, internal policies, institutional strategies.	Focus group interview from 5 informants in Belgium.
25	Lai et al. (2005) researched on a study to measure satisfaction in BL.	Aimed to examine the effect of learning behavior and technology quality on learning satisfaction towards a BL course.	Relative advantage of e-learning, student learning, satisfaction with courses, satisfaction, participation, motivation, quality of accessing web-based courses and quality of IS.	257 valid questionnaires from students in four other classes in Taiwan.

Respectively, Table 1 review prior studies that investigated BL adoption in universities. However, none of the reviewed studies has investigated universities to strategically examine learners, academic staffs and management adoption of BL empirically based on statistical data in Malaysia context. Hence, this research would be one of the few studies that provide empirical evidence of learners, academic staffs and management perception towards BL adoption.

3. Model and Hypotheses Development

This section aims to develop the proposed model based on the innovation adoption framework, course re-design outcome framework and BL approach to assess students learning and academic staffs teaching effectiveness. The model further aims to explore on the factors that influence the perception of learners, academic staffs, and management in adopting BL and also examine BL practice to be adopted by learners and how academic staffs can improve BL adoption. Moreover, related hypotheses are presented in this section.

3.1. Awareness/Perception Context
3.1.1. Leaners Perception

This component refers to students' perception towards attaining certain learning objectives (Ghazal et al. 2017). The central theoretical postulation underpinning learner's perception proposes that students, as adopters of BL, have expectations which are value-based and that students play a dynamic role in selecting and using BL resources to achieve their learning goals (Almutairi and White 2018). Hence, the question is no longer whether the learners will adopt BL as a learning approach, but reasonably how and why learners adopts BL approaches to fulfill their didactic needs (Mondi et al. 2007). Therefore, based on the literature (Lin and Wang 2012; Padilla-Meléndez et al. 2013; Poon 2014; Baragash and Al-Samarraie 2018; Ghazal et al. 2018) learners perception is examined based on supportive factors, attitude, and learning mode.

a. Supportive Factors

This includes factors that influence interaction and communication between students and lecturers in relation to course design and the capability of the students to control their individual learning (Bowyer and Chambers 2017). The supportive factors comprises of experience, engagement time, and self-motivation of the students. Respectively, the experience of the student in relation to technology plays a significant role in the acceptance and satisfaction of BL. The more experienced a student is in relation technology, the more comfortable he/she will be to adopt BL initiatives for educational purposes (Ghazal et al. 2018). Thus, Deng et al. (2018) argued that students' engagement and learning outcomes towards BL are based on prior education, where some learners may display different individual characteristics, such as improved self-directed learning skills as compared to learners who are less educated (Deng et al. 2018). Engagement time relates to the duration allocated by the students to accomplish academic activities. Savara and Parahoo (2018) confirmed that engagement time is one of the critical factors that supports student learning in BL environments. Likewise, Ghazal et al. (2017) stated that BL has the prospect to offer more varied engagement opportunities to student as compared to either F2F or online learning modes in isolation.

It was therefore suggested that engagement time is often employed to portray student's willingness to be a part of educational activities. Hence, learner's engagement time correlates to their motivation, passion, and interest to achieve their educational goals (Mohd et al. 2016). Thus, if students have interest in studying via BL environment, they are more likely to direct more time

in the learning process (Lai et al. 2005). However, the engagement time differs among students, thus the engagement time of learners may vary negatively or positively during the learning interaction (Maulan and Ibrahim 2012). Next, is self-motivation which refers to the inner power that influences students to move or take an action toward achieving educational goals. The learners' motivation is defined as willingness of students to learn via BL environment. According to Naziman et al. (2018) self-motivation is perceived as one of the most critical factors that influence learners' achievement. Similarly, Wong et al. (2018) mentioned that learners' motivation provides them with enthusiasm to explore their creative skills. Therefore, Prasad et al. (2018) indicated that learning only occur when students has the motivation to learn, thus motivation has an impact on the learning effectiveness of students.

b. Learners Attitude

In the context of this study the attitude is the combination of what the learners feels and their opinion towards BL. For instance, Wong et al. (2014) stated that learners' attitude towards BL relates to the educational benefits of adopting BL resources. Accordingly the learners' attitude is based on their behavior, capability, and how they manage their academic time in relation to positive or negative frame of mind which impacts learners' decision toward course material, lecturers, and peers involves in BL environment (Sun and Qiu 2017). Precisely, the behavior exhibited by the students when adopting BL approaches is an imperative determinant that influences their learning experience (Sari and Karsen 2016). Students who have positive outlooks toward IT deployment for learning are more eager to adapt to changes in the learning environment. Thus, findings from prior study (Ghazal et al. 2017) showed that changes in students' attitude may influence peers' behavior, cognitive participation with BL approaches.

Additionally, the capability of the student impacts their attitude towards BL. As BL involves usage of technologies there is need to enhance students' BL competence in order to effectively utilize BL to improve learning experience (Lin and Wang 2012). Thus, the capability of students to effectively use different technologies to manage course material is important. If students are equipped with BL competency, they can easily use study materials to better improve learning effectiveness (Ho 2017). In regards to time management students are currently faced with issues related to managing time especially in BL environment where online learning activities are usually time sensitive due to scheduling of online classes (Chong et al. 2010). Thus, students must be willing to allocate time to balance the blend of F2F and online learning schedule (Chong et al. 2010).

c. Learning Mode

According to Ghazal et al. (2017) learning mode is determined by the state of learners' pleasure and effectiveness of students' educational experiences of BL. In a BL environment, learning mode is based on the availability to access, lecturer responsiveness, and communication among students and lecturers (Mondi et al. 2007). Researchers such as Spring et al. (2016) stated that students are faced with issues such as the access to course material in online learning which

is mostly due to limited access to up-to-date technological issues. Thus, the availability to access of learning resources which provides information to student at the right time is paramount (Al-Rahmi et al. 2017), as it influences their perception towards adopting BL (Savara and Parahoo 2018). Likewise, lecturer responsiveness refers to online responsiveness which refers to the learners' perception of the lecturer's prompt reply to requests posted online (Ghazal et al. 2017).

Findings from prior study (Mohd et al. 2016) revealed that lecturers' immediate response to students influences their acceptance and positive experience of BL. Moreover, in BL environment, learners may frequently feel isolated in learning (Ahmed 2010), thus to address this issue, lecturers prompt online responsiveness would support students to perceive BL to be fast and beneficial for their learning (Ghazal et al. 2017). Similarly, for communication among students and lecturers BL often reduces the time that students and lecturers see physically and this may actually hinder communication between them (Mondi et al. 2007; Spring et al. 2016). Hence, the lack of personal interaction with classmates would influence learners' perceptions of usefulness and ease of use of BL (Ghazal et al. 2017). Effective communication in BL process is critical as it relates with the dissemination of information, from which learners' attitude and knowledge are constructed (Poon 2012).

Based on the proceeding discussion, we propose that;

H1: Learners perception significantly influences BL adoption.

3.1.2. Academic Staffs Perception

This construct examines perception of lecturers towards adopting BL to facilitate the improvement, management of course resources and conversion from traditional pedagogical practices (Almutairi and White 2018). Thus, findings from the literatures (Machado 2007; Poon, 2014; Sun and Qiu 2017; Dakduk et al. 2018) suggest that this component comprises of satisfaction, course management, and ease of use of BL approach.

a. Satisfaction

Accordingly, satisfaction indicates the agreement and happiness derived by lecturers in adopting BL (Liaw 2008). It is the assessment of the success of BL adoption in improving teaching pedagogy experienced by the lecturer (Ghazal et al. 2018). Thus, lecturers' satisfaction is an essential factor to measure the quality of BL adoption because of its relation to motivation, accomplishment and the rates of teaching completion in BL environment (Hussin et al. 2009). In order to encourage active teaching, it is required for lecturers to be more involved with the students as this will provide opportunities to improve teaching satisfaction based on student performance (Haron et al. 2012), although, lecturer satisfaction is based their attitude and acceptance of BL (Ahmed 2010). The lecturers' attitude refers to personality's evaluative beliefs about deploying a specific behavior such as adopting BL. Thus, lecturers who display a positive attitude toward technology use possess prospective to adopt BL for teaching (Barnard et al. 2009). Likewise, lecturers' perception that BL is more effective than traditional classroom may influence their

acceptance and use of BL, thus persuading its acceptance. This may also impact lecturers' role towards teaching blended courses (Ghazal et al. 2017). Hence, it is perceived that if the lecturer feels the adoption of BL will produce the anticipated educational objectives, they will accept BL as an effective mode of teaching (Bervell and Umar 2018).

b. Course Management

The course content refers to all physical and digital materials that can be used by lecturers to teach students in alternative format (Hussin et al. 2009), where course management comprises of teaching style and interactive content deployed by the lecturer to facilitate student learning (Ho 2017). In a BL environment, the management of course content refers to the design of teaching method demonstrated by the lecturer. Thus, a lecturer with an interactive pedagogical style may efficiently increase students' cognitive engagement, participation, and involvement (Lai et al. 2005). Accordingly, when students observe that the teaching style of the lecturer in BL is interactive their satisfaction with BL is enhanced. Moreover, findings from prior studies (Ghazal et al. 2017) stated that lecturers who tend to assimilate and use computer mediated teaching usually change students' perceptions and acceptance of BL. Likewise, findings from Mondi et al. (2007); Wong et al. (2018) suggested that the provision of interactive course content in BL would likely motivate students learning. Arguably, lecturers can utilize BL resources in form of visual images, multimedia presentations, and case study simulations, to improve teaching and learning experiences.

c. Ease of Use

The ease of use of BL approaches relates to less complexity of BL approaches adopted to support lecturers in teaching (Ho 2017). Thus, the perceived ease of use of BL approach relates to the extent to lecturers expects adopting BL for teaching without experiencing much difficulty. Thus, BL approaches that are less difficult enable lecturers to teach in a comfortable manner (Ghazal et al. 2018). Findings from the literature (Lin and Wang 2012; Ghazal et al. 2017; Bervell and Umar 2018) revealed that the ease of use is measured based on the clarity and flexibility of the BL approach being deployed by the lecturer. Correspondingly, the flexibility assesses the degree to which BL adoption will require less skills and effort and in achieving teaching goals (Lin and Wang 2012), whereas clarity relates to how BL can support lecturer to present ambiguous content to students (Ho,2017). Accordingly, the clarity and flexibility are factors that provide lecturers with a sense of convenience and ease of use (Bervell and Umar 2018), and further enables lecturers to achieve the benefits of adopting BL to support teaching (Ghazal et al. 2017).

Based on the proceeding discussion in section 3.1.2 and 3.2.2, we propose that;

H2: Academic staff responsiveness significantly influences students' adoption of BL.

H3: Academic staff perception positively influences BL initiatives adopted.

3.1.3. University Management Perception

University management initiates strategies and policies to institutionalize BL approaches (Mercado 2008), and also help to transform theoretical BL policies into actual practical adoption (Machado 2007). University management comprises of strategy, structure, and support provided by the administration toward promoting BL adoption as mentioned by prior studies (Graham et al. 2013; Porter et al. 2016; Porter and Graham 2016; Dakduk et al. 2018).

a. Strategy

Strategy comprises issues concerning the general design of BL in relation to the definition, advocacy, degree and purposes for adoption related to BL policy planning. The strategy involves the levels of planning needed to deploy and progress the strategic operation of BL (Garrison and Kanuka 2004). According to Porter and Graham (2016) the strategy involves specifying the objectives, potential costs and resources required to develop BL. Moreover, the management strategy includes delivery mode and schedules, required human resources (such as administrative staff support, technical assistance, and blended course developers) (Machado 2007), as well as technology and infrastructure (which comprises of office/lecture space, software, hardware, and internet access) (Porter et al. 2016). Respectively, the strategy outlines the overall initiatives required by university administration to translate BL policy into real-time implementation (Poon 2014), and also provides guidance to lecturers on how to establish their teaching pedagogy (Basir et al. 2010).

b. Structure

Structure includes issues relating to administrative, pedagogical, and technological polices deployed to facilitate BL adoption in universities (Porter and Graham 2016). The structure comprises of the governance, scheduling, and evaluation of BL practices (Dakduk et al. 2018). Since, the practice of BL approaches requires a substantial scheduling of courses, there is need for management to re-structure how courses will be blended between F2F and online (Poon 2014). By considering if BL courses will be scheduled such as three days a week for one hour (Porter et al. 2016), or preferably will a more flexible design be adopted to provide time-shift for students and lecturers (Garrison and Kanuka 2004).

c. Support

Support encompasses issues relating to the way in which university management facilitates the implementation and maintenance of BL approaches and it's based on pedagogical support, technical support, incentives provision, and promotion consideration for adopting BL for teaching (Porter and Graham 2016). Thus, for BL to be effectively adopted in any university there is need for effective provision of support for both students and lecturers (Poon 2014). However, the provision of support for BL requires management to understand the BL approach that students and lecturers are using in relation teaching and learning effectiveness (Garrison and Kanuka 2004). More precisely, there is a need for a dedicated service support center to assist lecturers and students

with technology related issues such as software installation, hardware troubleshooting, internet connections configuration, and provision of skills necessary to successfully adopt BL environment (Porter and Graham 2016). Findings from Garrison and Kanuka (2004) suggested that most universities currently provide sufficient support services for their students' technological needs, however lecturers also require such support services, but in contrast to the students these technical supports are frequently not available to lecturers in carrying out pedagogical development.

Based on the proceeding discussion, we propose that;

H4: Management policies positively influence learners' perception towards BL adoption.

H5: Management policies positively influence academic staffs' perception towards BL adoption.

H6: Management policies towards BL significantly influence teaching effectiveness outcome.

H7: Management policies towards BL significantly influence learning effectiveness outcome.

3.2. Adoption Context
3.2.1. BL Practice for Learners

As presented in Section 2.3, Figure 3 the BL practice approach to be adopted by learners in proving answer to the second research question is discussed below;

a. F2F offline

F2F offline mode is the traditional medium of learning between learners and lecturer that typically take places in formal lecture room settings (Sun and Qiu 2017). This mode of learning supports instructor-led learning which allows learners to discuss and understand and provide instant feedback regarding course content (Arbaugh et al. 2008). Baragash and Al-Samarraie (2018) argued that F2F create interaction among students which improves quality of learning proficiencies and learning delivery effectiveness. F2F is also described as an effective method that facilitates interpersonal learning practices (Ghazal et al. 2018), since students are given the opportunity to be present in an actual classroom with each lecture lasting to about two hours for five times per fifteen week semester for each course taken by the student (Kaur 2013). F2F comprises of discussion and presentation of exercise, task, case study, practical lab session, short test, and discussion of assignment (Kaur and Ahmed 2006).

b. Activity

Activity is the first online phase involved in BL environment and it refers to the general term used to describe a group of functionalities in a BL based tool such as a Moodle and typically is an academic task that a student interacts with either individually or in a group with other students and lecturer (Sun and Qiu 2017). BL activities ranges from lessons, assignments, lectures, workshop, chat, access to forum, glossary, study survey, quizzes, wiki, and so on (Kau, 2013). The activity can be carried out in a virtual teaching space which allows lecturers and students to be in

different places at the same time (Arbaugh et al. 2008). Student can raise their hand by clicking a virtual button and all students in the virtual class can be viewable to the lecturer and, students can hear the lecturer speak (Kaur 2013).

c. Information

Information is a learning item or link to knowledge source provided by the lecturer to aid student learning (Padilla-Meléndez et al. 2013), the information can be class calendars, course comments, study completion status, syllabus overview, syllabus description, latest course news, recent course activity, upcoming course events, etc. (Ramakrisnan et al. 2012). Moreover, information in BL is based on precise time table calendar that contains specific links to course schedules, time and venue, links to course material, including submission deadlines of tasks planned to be covered for the semester (Lin and Wang 2012). The provision of information allows students to follow up the course throughout the semester (Roszak et al. 2014).

d. Resource

A resource is a mean by which the lecturer creates shares and exchanges information and course content such as instructional media to students in a virtual environment (Kaur 2013). Resource is also an item similar to information that a lecturer utilizes to facilitate learning, such as a file, label, folder, content package, page, and link (Ramakrisnan et al. 2012). Resources can be disseminated from social application such as emails, Facebook, YouTube, blogs discussion forums, Wikipedia, Twitter, and text chat which are utilized to enhance BL environments (Ramakrisnan et al. 2012; Edward et al. 2018). In BL resources can be synchronous or asynchronous. In synchronous, the lecturer and all students participate at the same time from different locations online, where learning discussion are held synchronously mostly in group chat (BakarNordin and Alias 2013). Thus, synchronous learning is carried out in real-time, when students access the virtual class room at a specified time and converse directly with the lecturers and with their peers via BL systems equipped with audio or video conferencing functionalities (Ramakrisnan et al. 2012). Similarly, the asynchronous mode can be seen as a self-centered learning, in which the students and lectures uses online platforms such as online discussion boards, bulletin boards, e-mail, social media to communicate at different time (Wahyuni 2018). Asynchronous can also be self-based learning with access to reference learning materials or learning material stored in external devices such as CD/DVD (Mondi et al. 2007).

e. Assessment

Assessment is a significant systematic mean of evaluating the knowledge of students (Koohang 2009; Mustapa et al. 2015). Thus, assessment provides the medium for measuring learners' performance and grading their progress and is utilized by the students to make decisions and set individual goals (Klentiena and Wannasawade 2016). Assessment comprises of formative and summative assessment (McKenzie et al. 2013; Liqin et al. 2015). Formative assessments are employed soon after the student finish a course chapter and it normally consists of finishing course

assignments, cooperation projects and performance in class discussion groups, and completion of course assignments (Nguyen 2017; Sun and Qiu 2017). Similarly, summative assessments are carried out at the end or completion of the entire course and it comprises of offline final test and online qualification test to accomplish the final examination (Arbaugh et al. 2008; Liqin and Ning 2015).

f. Feedback

Feedback typically involves the open or close ended suggestion such as scores, comments or views based on student performance or lecturers teaching provided by the students and lecturers (Padilla-Meléndez et al. 2013; Sun and Qiu 2017). Feedback encourages learning development of students and also provides a medium for university management to employ benchmarking to reduce the gap between the current and anticipated performance (Selvi and Perumal 2012). Furthermore, feedback which can be in form of statement provided by the lecturer after assessment offer explanations for students based on selected correct and incorrect alternative (McKenzie et al. 2013). Feedback also provides valuable information on the impact of learning and teaching effectiveness to help lecturers detect how students interpret their teaching pedagogy (Bowyer and Chambers 2017), thereby improving their approach of teaching if needed (Liaw 2008). Similarly, Bentley et al. (2010) mentioned that the collection of feedback from student is an important BL practice that helps to monitor the standards and quality of teaching and learning.

3.2.2. BL Initiatives for Academic Staffs

As presented in Figure 2 in Section 2.2, the course redesign outcome framework to be adopted by the academic staff is discussed below;

a. Teaching Strategies

This practice involves academic staff employing appropriate course design style for successful BL teaching (So and Brush 2008). The design adopted by the lecturer should facilitate teaching and aid the delivery of knowledge to enhance students' learning outcomes (Poon 2012). Consequently, lecturers should adopt the most applicable instructional strategies that support teaching objectives, where such strategies facilitate the transfer of learning and ensures that the learning objectives are achieved (Kaur 2013). Moreover, online course materials provided must be prudently selected to assist effective teaching and learning process (Yusoff et al. 2017). Accordingly, Savara and Parahoo (2018); Deng et al. (2018) maintained that a distinct course structure should include course schedule, purpose of course activities and specifically mention the online and offline mode of delivery to improve students' performance. Thus, academic staffs should employ instructional practices and best strategies that engage their students learning and also deploy required changes in respond to the students' academic needs (McKenzie et al. 2013; Tahir et al. 2013).

b. Technology Integration

Technology which refers to physical hardware, internet access and required software entails the platform that supports teaching and learning between lecturers and student (Garrison and Kanuka 2004). For instance, BL systems such as MOOC offer an open learning platform where students can collaborate with students from other regions of the world (Fleck 2012). These technologies can be utilized by the lecturer to disseminate knowledge and upload course materials (Edward et al. 2018). Lecturers can integrate different interactive technologies and systems such as multimedia technologies and applications for teaching and learning processes (Fleck 2012). Thus, the effectiveness of BL for teaching and learning inevitably relies on lecturers' equitable use of technology (Bowyer and Chambers 2017).

c. Curriculum Design

Curriculum design depends on structure and pattern employed by the lecturer to present and manage course information to students in a BL environment (Hussin et al. 2009). Students' learning is mostly influenced by the content value in which quality course content is well-ordered, efficiently presented in a cooperative, visible format to facilitate learning (Ozkan and Koseler 2009). Moreover, Ozkan and Koseler (2009); Deng et al. (2018) emphasized that course content resources provided to students by lecturers should provide up-to-date information such as displaying student grades, displaying needed announcements on time, providing past exam questions, and marking criteria, as these enables students to feel more contented with the curriculum content.

3.3. Outcome Context
3.3.1. Learning Effectiveness

Learning effectiveness assess the learners' ability based on knowledge gained as a factors to measure the success of BL practice adoption in universities (Poon 2014). Learning effectiveness also measures improvement of students learning quality (Sari and Karsen 2016). The impact of learning has been primarily explored by prior studies (Arbaugh et al. 2008; Dakduk et al. 2018; Prasad et al. 2018) from the perspective of achievement, engagement, involvement, retention, and cognitive outcome. Students' achievement is based on the state of improvement attained by the student in adopting BL practice. Hence, the achievement of learners in a course specifies the magnitude to which they gained and applied knowledge to attain the courses learning outcomes as specified by their grades (Prasad et al. 2018). Evidence from prior study (Fisher et al. 2018) suggested that BL improves the average learners' grades.

Student engagement refers to the time and energy learners devote for academic activities inside and outside of the classroom (Almutairi and White 2018). According to Naziman et al. (2018), learners' engagement refers to the desire of the student to actively partake in educational activity such as attending classes, contributing to class discussion, submitting assignment, and

partaking in other academic related activities (Bowyer and Chambers 2017). Furthermore, assessment of student engagement in BL provides valuable feedback for improving students' interest in BL process (Almutairi and White 2018).

Involvement in BL is a factor that relates to students perception towards learning and is influenced by the direction and choice of the learner (López-Pérez et al. 2011), where involvement has been recommended by Bowyer and Chambers (2017) as a factor that can be employed to measure learning effectiveness because motivated students are known by their motivation in educational activities. Findings from Naziman et al. (2018) indicated that BL adoption increase learners' involvement in relation to their learning activities. Likewise, Mondi et al. (2007) argued that students' performance is increased based on BL practice that motivates students to learn at their own pace. Therefore, it is plausible that BL adoption may reasonable enhance students' motivation (Padilla-Meléndez et al. 2013; Naziman et al. 2018).

Furthermore, retention and cognitive outcome are factors that can be employed to measure the impact of learning (Deng et al. 2018), where learner observe their own actions to provide information regarding the impact of BL practices based on their learning process (Mondi et al. 2007). Likewise, it is proposed that students' cognitive presence is sustained and enhanced when social presence is established. Thus, the exchange of course information and idea, collaboration with peers and lecturers regarding BL improve learning effectiveness (Mondi et al. 2007; Mohd et al. 2016). Consequently, Bowyer and Chambers (2017) argued that online discussion in BL creates a community of inquiries among students, which improves cognitive learning.

Based on the proceeding discussion on Section 3.2.1 and 3.3.1, we propose that;

H8: BL practice adopted by learners positively influences learning effectiveness.

3.3.2. Teaching Effectiveness

Teaching effectiveness has been a significant topic in BL context (Spring et al. 2016), where teaching effectiveness in BL defines the extent to which BL is able to produce an improved teaching outcome (Bervell and Umar 2018). Thus, effective teaching may thrive in BL environment, where lecturers adopt BL initiatives (see Section 3.2.2) that facilitates teaching process (Mondi et al. 2007). Besides, the measurement of teaching effectiveness is an essential feedback for the university to assess the impact of BL (Ginns and Ellis 2007). Based on the literature (Lin and Wang 2012) teaching effectiveness can be measured based on delivery, performance, evaluation, and motivation. The delivery refers to the ability of the lecturer to manage the progression of BL classes and ensure that learners are receiving suitable learning materials and resources (Arbaugh et al. 2008). This may entail adopting BL initiatives to provide prompt feedback on assignments, specifying suitable course content, and stimulating educational activities. In addition, BL approaches should support lecturer to prepare, organize, and update course content (Ghazal et al. 2017).

Performance in relation to teaching effectiveness refers to the impact of BL initiatives on improving the quality of lecturers teaching in using technologies to enhanced lecturers self-efficacy in impacting knowledge to students (Lin and Wang 2012). Furthermore, evaluation measures the teaching effectiveness in relation to the final grade of the students to test if adoption of BL improves teaching and learning experience of student s and lecturers (Baragash and Al-Samarraie 2018). Thus, evaluation is based on the student's achievement in learning and the satisfaction they experience during the learning process (Almutairi and White 2018). The feedback obtained from the assessment experience can be utilized to evaluate a particular lecturer's course's design, pedagogy, and structure (Wahyuni 2018). According to Almutairi and White (2018) it is required to measure lecturers' motivation in relation to BL adoption. Thus, it is possible that BL can increases lecturers motivation by simplifying teaching pedagogy which in turns improve teaching effectiveness (Padilla-Meléndez et al. 2013). Moreover, BL initiatives can facilitate the dissemination of course materials to student and this will motivate lecturers to improve their learning process. Thus, BL enables lecturers to become more involved in teaching and this improves lecturer's perception towards teaching which influences teaching effectiveness (López-Pérez et al. 2011). Based on the discussion on Section 3.2.2 and 3.3.2, we propose that;

H9: BL initiatives adopted by academic staffs positively influences teaching effectiveness.

Accordingly, based on the innovation adoption framework, course re-design outcome framework and BL approach the proposed model is developed to assess the effect of BL adoption on students learning and academic staffs teaching effectiveness in institutions of higher learning as seen in Figure 4.
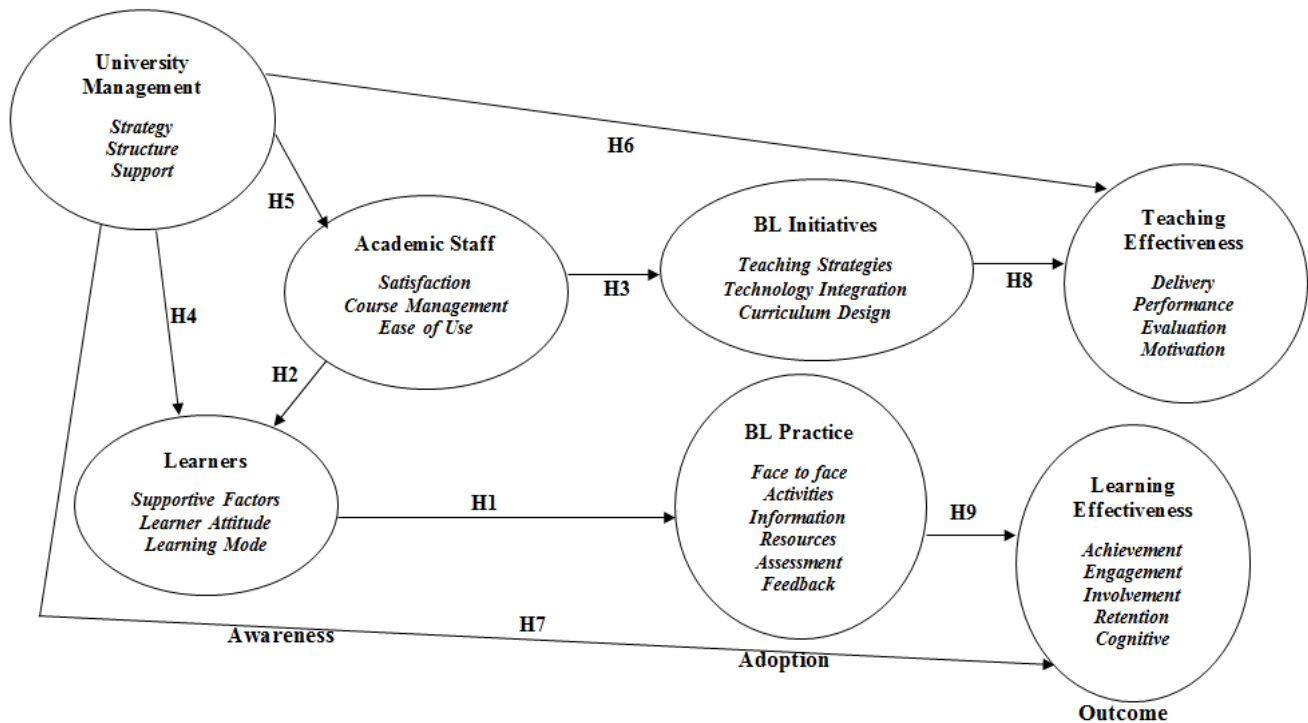
Figure 4 Developed research model

Figure 4 depicts the developed research model and associated hypotheses derived from the literatures. The model is conceptualized based on awareness, adoption and outcome of BL.

4. Research Methodology
4.1. Research Settings and Ethical Consideration

A quantitative research was employed in this study to explore the role of BL on lecturers teaching and students' learning effectiveness. A confirmatory study approach was utilized in this research to present the results which offers freedom and flexibility for reporting survey data. This study was conducted in three Malaysia universities that adopt similar BL approach in their educational process which comprises of about 30% F2F and above 70% online mode. These selected universities employed BL tools such as Moodle which is an open source educational platform that universities utilize to achieve effective online learning. For ethical consideration, implicit consent was provided to the respondents who completed the survey. The aim and purpose of the study and respondent's rights not to partake in the survey was clearly specified. Hence, participation in the survey was voluntary. Moreover, the anonymity of the respondents was guarantee by not disclosing the names of the respondents and their university to the public.

4.2. Instrument Development and Data Collection

The questionnaire instrument was developed from the innovation adoption framework, course re-design outcome framework, BL approach (see Section 2.1 to 2.3), and prior BL studies. In the instrument management factors entails strategy (7 items), structure (12 items), and support (12 items) where all items were derived from (Porter et al. 2016; Porter and Graham 2016; Dakduk et al. 2018). Academic staff variable comprises of satisfaction (2 items), course management (3 items), ease of use (2 items) adapted from (Poon 2014; Sun and Qiu 2017; Dakduk et al. 2018). Learners' variable comprises of supportive factors (7 items), learner attitude (9 items), learning mode (7 items) from (Padilla-Meléndez et al. 2013; Baragash and Al-Samarraie 2018; Ghazal et al. 2018). In addition, BL practice for students variable comprises of F2F and activities (3 items), information and resources (11 items), and assessment and feedback (9 items) and BL initiatives for lectures variable comprises of (23 items) from (Lin and Wang 2012; Padilla-Meléndez et al. 2013; Sun and Qiu 2017; Baragash and Al-Samarraie 2018; Ghazal et al. 2018) Lastly, learning effectiveness variable comprises of (11 items) (Sun and Qiu 2017; Baragash and Al-Samarraie 2018; Dakduk et al. 2018) and teaching effectiveness variable comprises of (19 items) from (Lin and Wang 2012; Prasad et al. 2018; Dakduk et al. 2018).

The questionnaire was developed in English language and to ensure that the questionnaires were suitable for purpose, a workshop was conducted based on a focus group discussion to help refine the questionnaires instruments for face and content validity by 10 experts (7 IT and 3 education domain). After which the questionnaires were updated and sent for another expert review for construct validity by an expert from education domain to verify the correctness of the

questionnaires after which the questionnaires were refined and deployed online and links to the survey sent to prospective respondents. Data was collected from 87 convenience sampled students, lecturers and administrators (in charge of e-learning in each university) from January-February 2019. However 9 samples were partially filled and were removed which resulted to 78 samples. Three questionnaires were developed and were divided into four parts. The first part asked about demographic data of the respondents and their university assessed based on ordinal measurement. The second part measure the perception of management, academic staffs and learners based on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = Not Sure, 4 = agree, and 5 = strongly agree). The third part rates the current adoption of BL practices of academic staffs and learners based on the five-point Likert scale. Then, the last part rates the outcome of BL adoption, also based on a five-point Likert scale.

4.3.Data Analysis

Partial Least Squares-Structural Equation modeling (PLS-SEM) was used for analyzing the survey data because it is a comprehensive statistical method that allows the instantaneous evaluation of a model based on the relationships among the variables (Baragash and Al-Samarraie 2018). Moreover, PLS-SEM requires small number of samples and is more suitable than regression for this study because PLS-SEM can be employed to analyze all of the paths analysis concurrently (Lin and Wang 2012). Thus, Smart PLS version 3 was utilized to carry out PLS-SEM data analysis.

5. Results and Discussion

There are two types of analysis supported by PLS-SEM which comprises of the assessment of measurement model and assessment of structural model.

5.1.Assessment of Measurement Model

The measurement model examines the relationship between the variables and their respective attributes based on convergent and discriminant validity.

5.1.1. Convergent Validity

Hair et al. (2016) suggested that to test the convergent validity that three main criteria should be considered which comprises of the outer loading of all the indicators should be higher than 0.70. Next, the reliability is measured based on the Construct Reliability (CR) which should be greater than 0.70 and the Average Variance Extracted (AVE) which should be greater than 0.5 (Anthony et al. 2018). Accordingly, Table 2 shows that all the outer loading of indicators surpassed the suggested 0.7 benchmark point. The value of CR range in Table 2 is between 0.957 to 0.816 which exceeds the recommended accepted value of 0.7. Besides, results from Table 2 indicate that the AVE values range of 0.841 to 0.521 which exceeded the threshold point of 0.5 (Ghazal et al. 2017). Thus, the criteria of the convergent validity were met. Moreover, the mean values are greater than 2.5 as suggested by Anthony Jr et al. (2018) and between 3.63 to 3.92 which suggest

Table 3 Inter-construct correlation

Constructs	1	2	3	4	5	6	7
Academic Staffs	**0.811**						
Blended Learning Practices	0.017	**0.887**					
Blended Learning Initiatives	0.774	0.116	**0.917**				
Learners	0.109	0.855	0.136	**0.893**			
Learning Effectiveness	0.124	0.674	0.121	0.659	**0.722**		
Teaching Effectiveness	0.747	0.126	0.731	0.191	0.142	**0.825**	
University Management	0.072	0.062	0.177	0.105	0.108	0.180	**0.578**

5.2. Assessment of Structural Model

The assessment of the structural model is carried out to test the relationships in the model in confirming the model hypotheses as seen in Figure 4. The structural model assessment is measured by examining the path coefficients value (β) which evaluates the association between constructs based on their degree of corresponding significant levels (p-value) using PLS path modeling technique. Moreover, the coefficient of determination known as R^2 value which is an assessment of the model's predictive power is calculated based on the squared correlation between the variables in the model. The literature (Baragash and Al-Samarraie 2018) recommended that R^2 values of 0.67, 0.33, and 0.19 were regarded as excellent, average, and low, respectively. Likewise, Salloum et al. (2019) suggested that the R^2 value should be greater than 0.10 to acceptable. Lastly, bootstrapping technique in PLS based on 5000 samples was employed to measure the level of significance of the paths (t-value) which should be higher than 1.96 for two-tail test as previously used by Anthony et al. (2018). Thus, results of path coefficient, standard error, R^2, β, t, and p-value shown in Table 4 is used to validate the hypotheses (H1-H9).

Table 4 Summary of the structural model

Hypothesis	Path Description	Path coefficient	Standard error	Beta (β)	R^2	t-value	p-value	Results
H1	Learners -> BL Practices	0.756	0.148	0.558	0.311	5.073	0.000	Supported
H2	Academic Staffs -> Learners	0.829	0.126	0.489	0.877	7.947	0.000	Supported
H3	Academic Staffs -> Blended Learning Initiatives	0.376	0.281	0.470	0.150	3.004	0.004	Supported
H4	University Management -> Learners	0.998	0.061	0.610	0.690	17.187	0.000	Supported
H5	University Management -> Academic Staffs	0.895	0.050	0.630	0.630	6.117	0.000	Supported
H6	University Management -> Teaching Effectiveness	0.895	0.085	0.550	0.550	11.845	0.000	Supported
H7	University Management -> Learning Effectiveness	0.956	0.060	0.132	0.278	18.273	0.000	Supported
H8	Blended Learning Initiatives -> Teaching Effectiveness	0.933	0.059	0.696	0.696	10.552	0.000	Supported
H9	BL Practices -> Learning Effectiveness	0.875	0.051	0.854	0.854	12.373	0.000	Supported
Notes: *** p= Sig. (2-tailed) >0.05; t-value>=1.96 to be significant								

Results from Table 4 indicates that (H1) path coefficient is 0.756 (t=5.078, β = 0.558, p=0.000), therefore supporting (H1) confirming that learners action influences BL practice implementation since t-value is higher than 1.96. Similarly, results from Table 4 further suggest that (H2) path coefficient is 0.829 (t=7.947, β = 0.489, p=0.000), therefore supporting (H2) which verifies the influence of academic staff on learners awareness regarding BL adoption. Next, (H3) states that the action of academic staff is based on the current BL initiatives being implemented. Accordingly, results from Table 4 disclose that (H3) is significant where path coefficient is 0.376 (t=3.004, β = 0.470, p=0.004). Likewise, results from Table 4 indicate that university management positively influence learners awareness of BL adoption (H4) with path coefficient of 0.998 (t=17.187, β = 0.610, p=0.000), whereas the results statistically confirms that university management effect on academic staffs (H5) have a path coefficient of 0.895 (t=6.117, β = 0.630, p=0.000).

Additionally, considering action of university management polices influence on teaching effectiveness (H6), results from Table 4 depict that (H6) have a path coefficient of 0.895 (t=11.845, β = 0.550, p=0.000). Likewise, (H7) with path coefficient of 0.956 (t=18.273, β = 0.132, p=0.000) which posit that university management influence learning effectiveness is statistically significant. Table 4 further show the results of (H8), revealing that BL initiatives implemented by academic staffs significantly influence teaching effectiveness with a path coefficient of 0.933 (t=10.552, β = 0.696, p=0.000). Lastly, the result reveal that (H9) which propose that BL practices implemented by learners positively determines learning effectiveness is significant with path coefficient of 0.875 (t=12.373, β = 0.854, p=0.000).

5.3. Discussion

This study adapts innovation adoption framework, course re-design outcome framework and BL approach to investigate the role of BL for teaching and learning effectiveness and further examine the factors that influence BL adoption in universities from the perspectives of learners, academic staffs, and management. In particular, it identifies the current BL practice to be adopted in universities and developed a model. Data was collected via survey and PLS-SEM was employed to validate the developed model hypotheses. The study provides support for the validity of applying the awareness, adoption and outcome approach to measure the effectiveness of BL in institutions of higher learning. As shown in Figure 5 our results suggest that (H1) awareness of learners significantly influences their intention to adopt BL. It is assumed that learner's self-judgmental process associates self-observations of how they perceived BL as a learning approach in relation to their beliefs and acceptance of BL practice in improving their own learning activities (Ghazal et al. 2017). This results is consistent with results from prior studies (Wong et al. 2014; Ho 2017), where that authors mentioned that leaners attitudes towards technology usage impacts the educational benefits of BL adoption in universities.

One of the interesting results of the study is that (H2) academic staff responsiveness positively influences students' perception of towards BL adoption. This assumption is supported

by the literature (Almutairi and White 2018), which stated that student perceives instructors teaching in BL based on the lecturers prompt response to online inquires. Similarly, Ghazal et al. (2017) reported that lecturer's feedback is a fundamental factor that has a positive influence on students' learning experience. Similarly, Dakduk et al. (2018) found that lecturer' ability to respond instantly to learners potentially impacts their perception towards acceptance of the technology mediated learning.
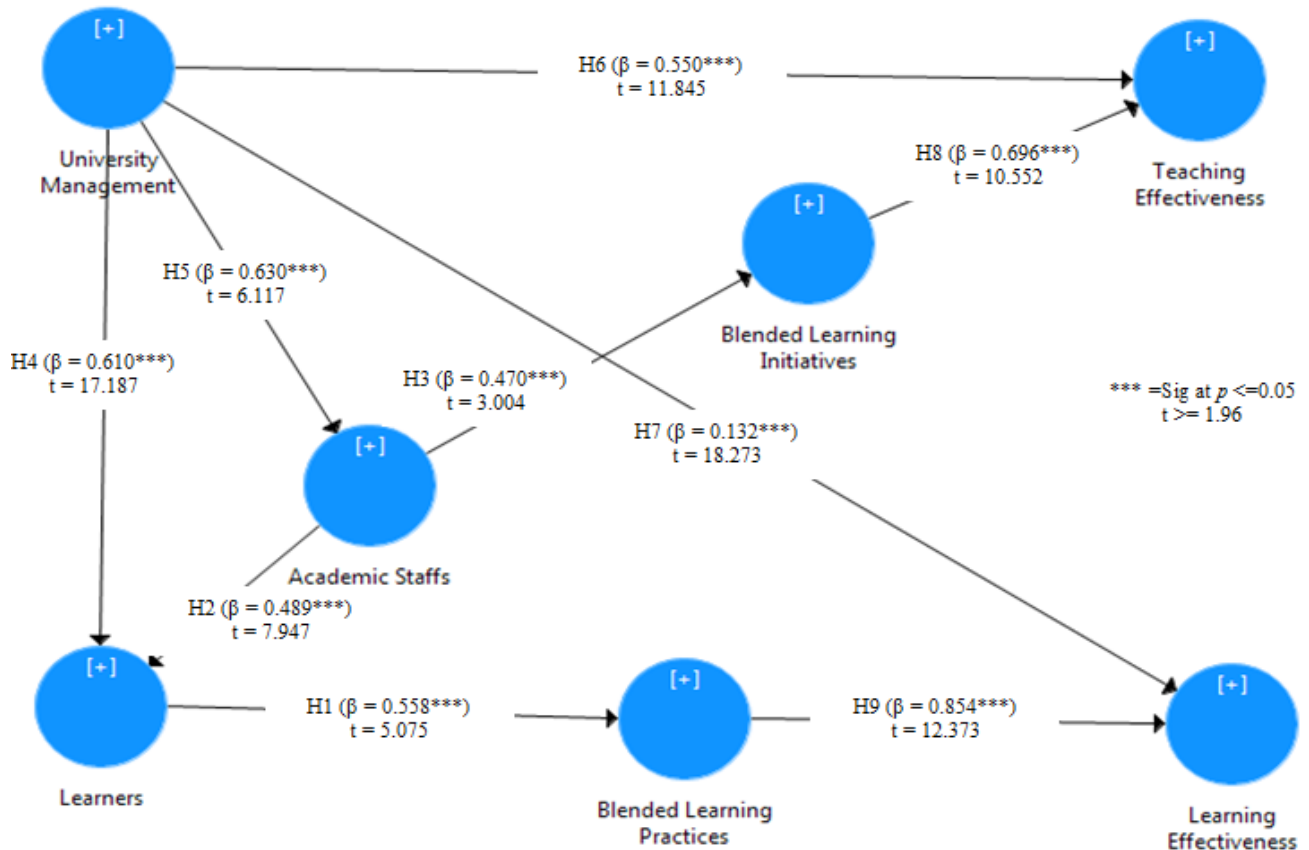

Figure 5 Results of the structural model. Note: ***$p <= 0.05$

Moreover, the study found that (H3) academic staff involvement positively influences BL initiatives adopted. This is in line with the finding of prior studies (Sun and Qiu 2017; Ghazal et al. 2018) who found a significant effect regarding lecturers' commitment as a significant indicator of BL initiative adoption because the involvement of lecturers entails not only the understanding, knowledge, and impact of BL, but also their willingness to implement the theory-related pedagogy for teaching thereby improving BL initiatives. An argument that can explain this result is that lecturers who show a positive attitude toward BL initiatives are more likely to observe its value and further adopt it in teaching (Bervell and Umar 2018). Regarding the significant impact of management policies on learners' awareness towards BL adoption (H4), our results agree with those found by (Wong et al. 2014; Porter et al. 2016). In fact as observed by Porter and Graham (2016), the move from conventional to hybrid approach such as BL requires that commitment

especially from the university management. This is to resolve possible restrictions in resources required to facilitate learners in adopting BL practice.

Thus, our results is also analogous with results from Poon (2014) which mentioned that support systems that provide technical and instructional resources put in place by institution facilitate students adoption of BL practices. Likewise, the results reveal that (H5), management has significant effect on academic staffs' awareness towards BL adoption. This result is consistent with prior studies (Tahir et al. 2013; Yeop et al. 2016) which suggested that the provision of consolidated services to support academic staffs throughout the use and development of course modules by university administration will influence lecturers' attitude and awareness towards the successful adoption of BL initiatives in promoting teaching effectiveness. This includes providing budget for resources to encourage lecturers to become actively aware of BL initiatives (Poon 2014).

Furthermore, the results indicate that (H6), management policies have a positive significant influence on teaching effectiveness outcome. This result was confirmed with findings from the literature (Chong et al. 2010; Porter et al. 2014), where BL for teaching is effective when university management is dedicated to enhance quality of lecturers teaching experience in a cost-effective approach. Thus, BL is viewed as an approach of attaining strategic objective and management is committed to fully adopt it in the institutions culture (Moskal et al. 2013). In addition, the results suggest that (H7), management policies had a significant relationship with learning effectiveness outcome. This result could be due to the fact that institutional inertia and bureaucracy can preclude changes in the current course structures, curriculum, and timetables which are important to learning effectiveness in BL environment (Garrison and Kanuka 2004; Porter et al. 2014). Therefore, managements' initiatives and policies towards BL should encourage students to use and pursue innovative forms of learning formats to enhance learning effectiveness of learners (Basir et al. 2010).

The results reveal that (H8), BL practice adopted by learners significantly influences learning effectiveness. This finding is supported by Mohd et al. (2016); Al-Rahmi et al. (2017); Fisher et al. (2018) in which the researchers found that students' satisfaction, self-efficacy, and enjoyable experience from adopting BL practices is mostly associated with the ease of use of the platform in accessing online content which affects the quality and impact of students' learning outcome. Additionally, findings from Savara and Parahoo (2018) revealed that students' ability to integrate technologies positively influence their learning quality. Finally, in regards to the teaching outcome (H9), the results indicate that BL initiatives adopted by academic staffs positively influences teaching effectiveness. This result is similar to findings from previous studies (Rahman et al. 2015), where finding from the authors showed that effective teaching activities is centered on the lecturers integration of technologies which comprise of equipment and applications that should be usable, available and reliable, to provide adequate teaching functionalities to lecturers (Savara and Parahoo 2018). The adopted BL initiatives should be easy to use in improving teaching effectiveness among lecturers. In this regard, the competence of lecturers to integrate technologies

is significant for the success of BL, because an academic staff with strong technical skills can teach with improves learning designs, therefore making learning more personalized and interactive (Graham et al. 2013).

6. Implications of Study
6.1. Practical Implications

The results from this research offer some practical implications for academicians, practitioners and policy makers in institutions of higher learning. First, this research suggests the significance of providing required management supports for learners to create positive experiences that facilitates teaching and learning effectiveness in BL environment. The results from this research suggest that administrators should make prodigious efforts to promote students' BL self-efficacy and emphasis should be employed on enhancing learners' self-confidence. This can be achieved by organizing training session to help students in familiarizing the adoption of BL practices. As such early training is required in making learners more interested in BL approaches, because if students' perceives that BL approach of complex, they may become unwilling to adopt it, consequently undermining the capabilities of IT integration in higher education. Moreover, results from this research can be utilized as a guide for institutions of higher learning in both developed countries and developing countries such as Malaysia to promote BL adoption practice for student which comprises of F2F, activities, information, resources, assessment, and feedback for effective learning that can shape future trend of BL sustainability.

Practically, the model developed in this study can be employed by university management to design practices and strategies that support continuance effectiveness of BL approach among learners, academic staffs and management. Similarly, university management should also conduct professional development workshops for academic staffs to expand their knowledge and capabilities in adopting BL approaches. Such initiatives can help in building lecturers aptitude regarding course design, pedagogy, teaching delivery of blended courses that is to be personalized to meet the educational needs of students in order to support learning effectiveness. Moreover, in order to improve the overall awareness of BL adoption in universities, findings from this study suggest that BL initiatives which comprises of teaching strategies, technology integration, and curriculum design. Thus, lecturers should provide up-to-date, useful, and user-friendly interactive course contents to students. This study also provide recommendation for university management towards enhancing learning and teaching effectiveness by increasing both tangible and intangible resources for students and lecturers by re-prioritizing funds allocated to promote development of BL courses and curriculum.

6.2. Theoretical Implications

Findings from this study possess theoretical implications to educators, BL designers, and decision makers in institutions of higher learning by providing crucial insights on how BL practice

to be adopted by students to sustain learners' learning performance and BL initiatives to be employed by lecturers to improve learning delivery approaches for promoting lifelong learning. In addition, the attitude and responsiveness of lecturers were significant in influencing learners' perceptions of BL adoption. Therefore, considering pedagogies lecturers should rethink their duty and the role of the students in BL process as this is important for motivating students to fully engage and interact in learning activities in class and off classroom. The study provides new insights into the factors that influence learners, academic staffs, and managements' perception towards BL.

Our results confirms that learners' perception is based on (supportive factors, attitude, and learning mode), academic staffs entails (satisfaction, course management, and ease of use), and managements relates to (strategy, structure and support) which are all important factors required for sustaining positive perception of BL adoption. Our results indicate that the adoption of BL by learners and lecturers is also determines by the ease with which the services provided by BL approaches are accessed. Hence, it is based on the reliability, availability, and durability of the hardware, software, computer communication network deployed to support BL environment. This research also reveals the importance of lecturer's attitude toward BL in motivating student's perception towards BL as compared to conventional teaching. Thus, the lecturers' control and ease of use of the technology is an important factor for the adoption of BL. The findings stressed the importance of management support towards BL initiatives. Accordingly, we argue that management should provide more support to both student and lecturers as such support influence their perception toward adopting BL.

7. Conclusion
7.1.Summary

BL effectiveness in institutions of higher learning may be initiated by lecturers and students, but its sustainability can be attributed to university management involvement. Accordingly, a research model was developed to examine factors that influence learners, academic staffs, and management perception towards BL adoption. Moreover, findings from this study confirms that BL practices to be adopted by learners in universities comprises of F2F, activities, information, resources, assessment, and feedback and BL initiatives to be adopted by academic staffs includes teaching strategies, technology integration, and curriculum design which are required to improve teaching and learning effectiveness outcome. The empirical assessment of BL adoption using PLS-SEM based on innovation adoption framework, course re-design outcome framework and BL approach has been statistically tested and validated and all nine hypotheses were supported.

7.2.Limitations

Like in every study, this research has some limitations. The first limitation relates to sample size, where data was collected from 78 samples. However prior study (Yeou 2016) employed only 47 samples. Secondly, our sample involved data collected from three universities in Malaysia, to generalize these results it is necessary to compare this sample with other universities in Malaysia. Thirdly, the samples was conveniently collected which may imply same behaviors and learning style of students but different pedagogy styles of teaching learning for lecturers. Fourth, whereas this research explored learners, academic staffs, and management awareness in regards to BL adoption for teaching and learning effectiveness, the moderating influence of age, gender, education, IT experience was not examined in this study.

7.3.Future works

In future, it is required to address the sample by collecting data from other geographically distant populations from both developed and developing countries to enhance the generalization of the results. In future research, a sampling frame such as randomly sampling will be employed to collect data. Moreover, future research will investigate the moderating effect of gender, age, education, and IT experience on learners, academic staffs, and management awareness towards BL adoption as a means of improving t learning performance of students and teaching effectiveness of lecturers in universities.

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