READINESS FOR BLENDED LEARNING: UNDERSTANDING ATTITUDE OF UNIVERSITY STUDENTS

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ABSTRACT

Information technology (IT) has provided new means for learning delivery outside of conventional classrooms. Leveraging on IT, blended learning is an approach which takes advantage of the best that both the classroom and online learning can provide. To help institutions of higher learning (IHLs) improve their understanding of how students view blended learning and formulate a strategy to successfully implement blended learning, the main objective of this paper is to examine how the attitude of students towards different learning aspects could influence their readiness for blended learning. We conceptualized six learning aspects in a research model and then collected responses from 201 full-time undergraduate students to validate the model. Analyses revealed three key findings. First, the use of technology in education was not a hindrance to the students. Second, blended learning adaptability, which was modelled as a second-order formative construct and formed by four first-order reflective constructs—attitude towards online learning, study management, online interaction, and learning flexibility—had a

positive relationship with student readiness for blended learning. Third, attitude towards classroom learning had a negative relationship with student readiness for blended learning. An understanding of student attitude towards different learning aspects can be critical in the assessment of student readiness for blended learning, which is a prerequisite for successful implementation of blended learning.

Keywords: Blended Learning, Classroom Learning, Formative Construct, Online Learning, Student Attitude, Student Readiness

INTRODUCTION

Advances in information technology (IT) such as Web applications, mobile devices, and telecommunications have inevitably changed the design and delivery of tertiary education courses. From classroom learning to online learning, institutions of higher learning (IHLs) have experienced a paradigm shift in their teaching practices and in the ways their students learn. To adapt to the changing trends in education, it is paramount for IHLs to constantly look out for innovative solutions to improve the learning delivery environment for lecturers and students (Prinsloo & van Rooyen, 2007).

One innovative solution is blended learning, in which modern technologies are integrated into the teaching and learning process, attempting to overcome some limitations that are experienced in the conventional classroom environment (Wakefield et al., 2008). Lopez-Perez et al. (2011) point out that when IT is adopted to complement traditional modes of classroom teaching, tertiary students seem to prefer this approach. Harris et al. (2009) reckon that blended learning is a resource-effective methodology with the potential to support teaching and to enrich the student learning experience.

On the other hand, Kilmurray (2003) warns IHLs that merely replicating the classroom experience in the Web environment likely may not meet student needs and could result in an unexpected failure. Harris et al. (2009) highlight the importance of the perspectives of such stakeholders as organizations, instructors, and students. Among the perspectives, that of the students is the most vital. Park (2009) stresses the need to do further research about student attitude towards blended learning. Baldwin-Evans (2006), in the same vein, supports the idea of assessing learner readiness prior to full implementation of this novel teaching and learning approach.

Research on blended learning has been done largely in the context of western educational settings. However, little research has been carried out in Malaysia to empirically examine student attitude towards various learning aspects that can affect student readiness for blended learning. This paper aims to address the research gap by proposing a research model to examine how the attitude of students towards six learning aspects, i.e., learning flexibility, online learning, study management, technology, classroom learning, and online interaction, can influence their readiness for blended learning.

The next section provides background about blended learning, followed by individual sections that describe the research model, explain the research method, and present the research findings. The last section concludes the study and suggests some future research directions.

BACKGROUND OF STUDY

Blended Learning

There are different interpretations of blended learning. Generally, most researchers agree that blended learning can be described as a combination of conventional classroom and online learning (Garrison & Kanuka, 2004; Wakefield et al., 2008). Finn and Bucci (2004) provide a more detailed definition that describes blended learning as an effective integration of multiple learning techniques, technologies, and delivery modes to meet specific communication, knowledge sharing, and informational needs of learners.

Sharpe et al. (2006) describe three ways blended learning can be adopted by IHLs. First, learning materials are available online through a learning management system to complement traditional teaching activities. Second, digital technologies and new pedagogies are introduced to the learners for a radical learning experience. The third is the use of digital technologies by the learners themselves.

Blended learning gives the best of both classroom and online learning, facilitating learning delivery by taking advantage of IT yet retaining a good degree of classroom interaction (Thorne, 2003). Classroom learning provides the social interaction required for active learning, while online learning offers some flexibility, which is not commonly found in a classroom environment (Akkoyunlu & Yilmaz-Soylu, 2008a). Blended learning displays a perfect fusion of classroom and online learning to provide an environment that is conducive to learning for today's learners.

Student Attitude towards Learning Aspects

This study suggests that there are six learning aspects through which student attitude can be examined to study their adaptability to blended learning. These six learning aspects are learning flexibility, online learning, study management, technology, online interaction, and classroom learning.

The first learning aspect is learning flexibility. As a growing number of students have multiple responsibilities, such as work and family commitments, learning flexibility allows students to balance their academic, work, and family lives (Vaughan, 2007). Blended learning provides benefits of time efficiency and location convenience for the learners (Brown, 2003). Students are able to access learning materials on the Web as and when needed (Akkoyunlu & Yilmaz-Soylu, 2008b). In addition, blended learning reduces commuting time or minimizes the need to search for a car park space on campus.

The second learning aspect is online learning. Online learning gives learners more time to reflect on their responses in order to express their thoughts better. This online learning aspect meets the needs of students who are introverted or uncomfortable with sharing their views in front of others in public (Howard, 2009). Past studies have reported that students who prefer online learning feel that they have quality time to think about and to respond to asynchronous discussions more effectively (Collopy & Arnold, 2009; Howard, 2009).

The third learning aspect is study management. Tsai (2010) describes this aspect as a self-regulated learning process in which learners make an intended effort to plan, to manage, and to direct learning activities as well as to share learning responsibility with their instructors. This is an important aspect that contributes to stronger learning motivation and better time management when studying online. Blended learning provides autonomy for students to be responsible in their learning, which calls for self-discipline and self-motivation (Smyth et al., 2012).

The fourth learning aspect is technology. IT is a key enabler for blended learning. De L'Etraz (2010) stresses that digital tools can help build online communities across borders and time zones, which are more widespread than traditional face-to-face communities. Easy access to and good familiarity with digital technologies among the learners is a prerequisite for successful implementation of blended learning (Harris et al., 2009). Students embrace the possibilities provided by technology to allow them to engage in learning activities at any time and any place (Glogowska et al., 2011; Lancaster et al., 2011).

The fifth learning aspect is online interaction. Harris et al. (2009) suggest that interaction and discussion are important aspects in the learning process and thus should be incorporated into a blended learning environment. Garrison and Kanuka (2004) propose that online interaction can be carried out in the form of open dialogue or critical debate through an asynchronous Web-based discussion forums and so on. De L'Etraz (2010) reports that blended learning provides a seamless collaboration platform for group-based learning.

The sixth learning aspect is classroom learning. Classroom learning provides another means of learning in which students are involved in spontaneous verbal communication in a permanent physical setting (Garrison & Kanuka, 2004). Scholars agree that the classroom community offers a sense of real, meaningful interaction between the learners and instructors, something online learning is not able to replace. Howard (2009) states that students who have a greater desire for face-to-face interaction with other students and their lecturers are more likely to withdraw from online courses.

Student Readiness for Blended Learning

Besides the advantages of blended learning reported in previous studies (Doiron & Asselin, 2011; Fong et al., 2005; Wakefield et al., 2008; Vaughan, 2007), there are some concerns IHLs should note when planning to venture into blended learning. Some students might not be able to cope with the new responsibility of taking initiative in their learning process (Vaughan, 2007), and others might experience difficulty in adjusting to the online course structure in addition to managing their time and maintaining self-motivation (Fong et al., 2005). These issues will result in student disenchantment with the online environment.

MacKeogh (2003) studied student attitudes towards using technology and reported that about 20% of the students preferred the traditional form of learning, which involved no technology. On the contrary, about 12% opted for e-learning. This result indicated that quite a number of the students were unwilling to forgo face-to-face learning experience, even though they were advocates of technology. In another study, Howard (2009) reported that more than half of the online students surveyed missed the face-to-face interaction with other students and their lecturers. Another challenge encountered by IHLs is the students' inability to work with others in an online environment (Starenko et al., 2007).

While blended learning can help create some flexible learning routes for individuals, it is not always apparent in the literature which learning route suits learners the best or enables them to experience maximum benefits (Wakefield et al., 2008). As suggested by Park (2009), it is essential for IHLs to understand student attitudes in order to assess their readiness for blended learning.

RESEARCH MODEL

Following the discussion of each of the learning aspects that can influence how adaptable to blended learning students are (Brown, 2003; Collopy & Arnold, 2009; de L'Etraz, 2010; Garrison & Kanuka, 2004; Glogowska et al., 2011; Harris et al., 2009; Howard, 2009; Lancaster et al., 2011; Smyth et al., 2012; Tsai, 2010; Vaughan, 2007), we proposed a research model as depicted in Figure 1. A construct was conceptualized for each of the six learning aspects, i.e., learning flexibility, online learning, study management, technology, online interaction, and classroom learning. Of the six learning aspects, we proposed that, when students had a positive attitude towards learning flexibility, online learning, study management, technology, and online interaction, they were more likely to adapt to blended learning. On the other hand, when students had a positive attitude towards classroom learning, they were less likely to adapt to blended learning, as they would prefer to meet with their lecturers and classmates in a physical classroom instead of on the web.

Going further, we suggested that the constructs of attitude towards learning flexibility, online learning, study management, technology, and online interaction could be modelled at a higher level of abstraction (Chin & Newsted, 1995; Kline, 1994; Stewart & Segars, 2002). Chin and Gopal (1995) suggest the molar and molecular approaches to depict a latent construct at a higher-order level. A molar approach describes how the lower-order constructs form a higher-order formative construct, whereas a molecular approach describes how the lower-order constructs are the indicators of a higher-order reflective construct.

Following the molar approach, we conceptualized blended learning adaptability as a second-order formative construct with five first-order reflective constructs. To assess predictive validity, a criterion construct, i.e., readiness for blended learning, was added. The more likely students were to adapt to blended learning, the more ready they were for blended learning. Both the constructs—blended learning adaptability and attitude towards classroom learning—were linked directly to the construct readiness for blended learning. Seven hypotheses were proposed as a result.

Figure 1 Research Model

H1a - H1e: The individual first-order reflective constructs contributed significantly to form the second-order formative construct, i.e., blended learning adaptability.

H2: There was a positive relationship between blended learning adaptability and readiness for blended learning.

H3: There was a negative relationship between attitude towards classroom learning and readiness for blended learning.

Table 1 Summary of the Items of Individual Constructs

Construct	Number of items	Items
Attitude towards learning flexibility (LF)	4	<p>I would like unlimited access to lecture materials.</p> <p>I would like to decide where I want to study.</p> <p>I like to study at my own pace.</p> <p>I would like to decide when I want to study.</p>
Attitude towards online learning (OL)	8	<p>I believe face-to-face learning is more effective than online learning.</p> <p>I am comfortable with self-directed learning.</p> <p>I do not resist having my lessons online.</p> <p>I like online learning as it provides richer instructional content.</p> <p>I would like lecture time in the classroom to be reduced.</p> <p>I would like to have my classes online rather than in the classroom.</p> <p>I get bored when studying online.</p> <p>I find it very difficult to study online.</p>
Attitude towards study management (SM)	6	<p>I am more likely to miss assignment due dates in an online learning environment.</p> <p>I organize my time better when studying online.</p> <p>I can study over and over again online.</p> <p>Online learning motivates me to prepare well for my studies.</p> <p>Online learning encourages me to make plans.</p> <p>Online learning makes me more responsible for my studies.</p>
Attitude towards technology (TE)	4	<p>I believe the Web is a useful platform for learning.</p> <p>I am familiar with Web technologies.</p> <p>I find Web technologies easy to use.</p> <p>I think we should use technologies in learning.</p>
Attitude towards classroom learning (CL)	5	<p>I have a sense of community when I meet other students in the classroom.</p> <p>I like the fast feedback when I meet my lecturer in person.</p> <p>I find learning through collaboration with others face-to-face is more effective.</p> <p>I learn better through lecturer-directed classroom-based activities.</p> <p>I learn better when someone guides me personally.</p>
Attitude towards online interaction (OI)	7	<p>I feel isolated in an online learning environment.</p> <p>I am comfortable in using Web technologies to exchange knowledge with others.</p> <p>I would like to interact with my lecturer online.</p> <p>I would like to interact with other students outside of the classroom.</p> <p>I find it easy to communicate with others online.</p> <p>I appreciate easy online access to my lecturer.</p> <p>I can collaborate well with a virtual team in doing assignments.</p>
Readiness for blended learning (BL)	3	<p>If there is an opportunity, I intend to register for a course that adopts the blended learning approach.</p> <p>If there is an opportunity, I want to join in a course that adopts the blended learning approach.</p> <p>If there is an opportunity, I plan to attend a course that adopts the blended learning approach.</p>

RESEARCH METHOD

Construct Operationalization

To test the hypotheses, we adopted a quantitative research design and developed a survey questionnaire to collect data. Following the recommendations of Churchill (1979), Dunn et al. (1994), and Segars (1997) on scale development, we started with a review of past literature about blended learning and identified an initial pool of 79 items. After carefully removing the items that were highly similar in meaning, a total of 34 items remained. We then applied an item-sort method to match individual items to the respective constructs. In addition, three items were developed to measure the construct readiness for blended learning. Table 1 provides a summary of the items of individual constructs. The items were measured using a five-point Likert scale.

Data Collection

The questionnaire consisted of three sections: Section a examined students' understanding of blended learning; section B had 34 randomly-ordered items which measured student attitude towards the six learning aspects; and section C asked about web and technology usage. A total of 201 valid responses were collected from students of a private university in Malaysia, who were in their final year of various three-year undergraduate business programmes. As this group of students had experienced almost two years in the classroom learning environment and used technologies quite extensively, we reasoned that they were able to provide better insights into the learning aspects.

When asked about the technologies they used, among the 201 respondents, 49.8% had a smartphone, 14.4% a tablet, 32.3% a netbook, 67.2% a notebook, and 50.7% a desktop computer, while 52.7% of them subscribed to broadband Internet access of more than 1.0Mbps and 13.4% of less than 1.0Mbps. Table 2 provides a summary of what the students did when they were online.

Table 2 Summary of What the Students Did When They Were Online

Online activities	Yes	No	Online activities	Yes	No
Send email	88.1	11.9	Download mobile apps from App Store (e.g., Apple App Store, Android Market)	37.3	62.7
Visit social networking sites (e.g., Facebook)	86.6	13.4	Watch streaming videos (e.g., YouTube)	78.1	21.9
Read online news (e.g., The Star)	55.7	44.3	Listen to streaming audio (e.g., radio programmes)	39.3	60.7
Access e-databases (e.g., Emerald)	31.8	68.2	Search for information (e.g., Google)	77.1	22.9
Download files from P2P sites (e.g., songs)	58.7	41.3	Access learning management systems (e.g., e-Advantage)	74.1	25.9
Shop and buy things	29.4	70.6	Send instant messages	46.3	53.7
Just surf the web sites	51.7	48.3	Play online games	42.8	57.2
Do online banking (e.g., check account balance)	36.8	63.2	Others	2.5	97.5

DATA ANALYSIS AND RESULTS

Exploratory Factor Analysis (EFA)

EFA can be helpful in identifying the number of dimensions of a construct (Churchill, 1979). In EFA the number of factors is not specified before the analysis (Anderson & Gerbing, 1988). The analysis attempts to examine individual items across factors, identifying items that load strongly on a particular factor (Gefen & Straub, 2005). Items that load strongly on one factor but not on others are grouped together to form a scale (Gerbing & Anderson, 1988; Segars, 1997). Any item that cross-loads on more than one factor or loads weakly on any factor is considered for deletion (Dunn et al., 1994). After the factors have been extracted, the factors are rotated to reveal a pattern. The most common extraction method is principal components analysis (PCA) (Gefen & Straub, 2005). An EFA is necessary to examine the dimensionality of the scale before a confirmatory factor analysis (CFA) (Gerbing & Anderson, 1988).

We first performed an item analysis to eliminate any item that had an inter-item correlation below 0.3 (Sundin et al., 2008) and an item-total correlation below 0.3 (Dunn et al., 1994). Seven items were deleted as a result of item analysis. One item was deleted from the construct attitude towards learning flexibility ("I would like an unlimited access to lecture materials"); four from the construct attitude towards online learning ("I believe

face-to-face learning is more effective than online learning”; “I would like lecture time in the classroom to be reduced”; “I get bored when studying online”; and “I find it very difficult to study online”); one from the construct attitude towards study management (“I am more likely to miss assignment due dates in an online learning environment”); and one from the construct attitude towards online interaction (“I feel isolated in an online learning environment”).

We then performed a PCA on the remaining 27 items. Assuming that there were correlations among the items, the Promax rotation method was used. The KMO measure (0.847) and Bartlett’s test ($p = 0.000$) provided evidence that the dataset was appropriate for factor analysis. Following the Kaiser’s eigenvalue larger-than-one rule, the PCA suggested seven factors. However, there are claims that conventional methods such as Kaiser’s eigenvalue larger-than-one rule and Cattell’s scree test are not sufficient for the decision on the number of factors to be retained (Fava & Velicer, 1992; O’Connor, 2000). Sampling error can result in inaccurate eigenvalue estimates, while Cattell’s scree test is subjective (Hayton et al., 2004). Thus, to further confirm the number of factors, we performed a parallel analysis with 200 datasets at the 95th percentile (O’Connor, 2000).

Parallel analysis suggested four factors. As parallel analysis tends to under-extract when the first factor has a large eigenvalue (6.902) (Beauducel, 2001), we tried extraction of four, five, and six factors, respectively. The five-factor structure provided a better factor matrix, which was interpretable. Items that loaded below 0.5 on any one of the factors or cross-loaded above 0.5 on two or more factors (Hair et al., 2009) were deleted. Six items were deleted as a result (“Online learning makes me more responsible for my studies”; “I like the fast feedback when I meet my lecturer in person”; “I would like to have my classes online rather than in the classroom”; “I like online learning as it provides richer instructional content”; “I think we should use technologies in learning”; and “I have a sense of community when I meet other students in the classroom”).

After item analysis and the PCA, we had a total of 21 items left. The five factors explained 56.34% of the total variance. Table 3 provides a summary of the items loaded on the respective factors. All factors showed satisfactory Cronbach’s alpha. Although Cronbach’s alpha of factors 4 (0.626) and 5 (0.617) was below the commonly used cutoff of 0.7, Hair et al. (2009) suggest that a cutoff of 0.6 is acceptable in exploratory research.

Table 3 Summary of Factors and Item Loadings

Items	Mean	SD	OL	OI	SM	CL	LF
I believe the Web is a useful platform for learning.	3.67	.796	.732				
I am comfortable in using Web technologies to exchange knowledge with others.	3.39	.854	.717				
I do not resist having my lessons online.	3.39	.805	.656				
I can collaborate well with a virtual team in doing assignments.	3.47	.866	.650				
I appreciate easy online access to my lecturer.	3.71	.830	.615				
I am comfortable with self-directed learning.	3.29	.830	.549				
I find Web technologies easy to use.	3.56	.853		.673			
I would like to interact with other students outside of the classroom.	3.79	.727		.673			
I find it easy to communicate with others online.	3.51	.878		.661			
I am familiar with Web technologies.	3.52	.866		.634			
I would like to interact with my lecturer online.	3.35	.942		.622			
I can study over and over again online.	3.52	.928			.849		
Online learning motivates me to prepare well for my studies.	3.13	.909			.832		
I organize my time better when studying online.	3.21	1.004			.739		
Online learning encourages me to make plans.	3.23	.906			.582		
I find learning through collaboration with others face-to-face is more effective.	3.84	.738				.812	
I learn better through lecturer-directed classroom-based activities.	3.97	.699				.760	
I learn better when someone guides me personally.	4.18	.726				.606	
I would like to decide when I want to study.	3.78	.797					.773
I like to study at my own pace.	3.69	.796					.742
I would like to decide where I want to study.	3.92	.764					.595
% of variance explained			24.815	10.386	7.877	7.218	6.039
Eigenvalue			5.211	2.181	1.654	1.516	1.268
Cronbach's alpha			.784	.717	.786	.626	.617

Note: OL: Attitude towards online learning; OI: Attitude towards online interaction; SM: Attitude towards study management; CL: Attitude towards classroom learning; LF: Attitude towards learning flexibility

Although some of the items had loaded on the factors that were not originally intended, a close examination of the items revealed that these items reflected the factors they were now loaded on well. The construct attitude towards technology no longer existed as its items had been deleted or split among other factors. Thus, hypothesis H1d was not supported.

A PCA was also performed on the three items that measured the construct readiness for blended learning. KMO was satisfactory (0.735), and Bartlett's test was significant ($p = 0.000$). All three items loaded strongly on a single factor which explained 80.40% of the variance. Cronbach's alpha was satisfactory (0.878).

Confirmatory Factor Analysis (CFA)

As latent constructs are unobserved, they are commonly represented by items. The concept of unidimensionality requires the items to represent one and only one latent construct. In other words, the items load strongly on one and only one latent construct, but weakly or nothing on the other constructs (Gefen & Straub, 2005). EFA does not prove unidimensionality. Instead, CFA helps confirm unidimensionality of individual scales (Gerbing & Anderson, 1988; Segars, 1997). This paper conducted a CFA with structural equation modeling (SEM) (Chin, 1998).

Table 4 CR, AVE, and Correlations of Reflective Constructs

Construct	CR	AVE	CL	BL	OL	SM	LF	OI
CL	0.801	0.573	0.757					
BL	0.925	0.804	-0.207	0.897				
OL	0.855	0.663	-0.124	0.344	0.814			
SM	0.863	0.614	-0.175	0.322	0.417	0.784		
LF	0.797	0.567	0.167	0.118	0.168	0.295	0.753	
OI	0.865	0.762	-0.086	0.218	0.457	0.321	0.234	0.873

Note 1: CL: Attitude towards classroom learning; BL: Readiness for blended learning; OL: Attitude towards online learning; SM: Attitude towards study management; LF: Attitude towards learning flexibility; OI: Attitude towards online interaction

Note 2: CR: composite reliability. Internal consistency reliability is satisfactory when composite reliability is above 0.7.

Note 3: AVE: average variance extracted. Convergent validity is considered satisfactory when the AVE is above 0.5.

Note 4: Square roots of average variances extracted (AVE) are shown on diagonal. Correlations between constructs are shown on off-diagonal. Discriminant validity is satisfactory when the square root of the AVE is larger than the correlations between constructs.

There are two different SEM approaches: maximum likelihood approach and partial least squares (PLS) approach (Gefen et al., 2000; Haenlein & Kaplan, 2004; Tenenhaus et al., 2005). The maximum likelihood approach is good for theory testing and development, whereas the PLS approach is good for predictive application. The choice between the two approaches depends on the estimation method and the research model (Anderson & Gerbing, 1988). The maximum likelihood approach intends to examine observed covariances and attempts to examine the fit between the observed and the hypothesised covariance models. Alternatively, the PLS approach aims to examine variances and the significance of relationships and is appropriate for making predictions (Fornell & Bookstein, 1982; Gefen et al., 2000). As this paper aimed to explain the significance of relationships among the constructs, the PLS approach was used.

There are two models in PLS analysis: measurement model and structural model. By assessing both models, PLS provides a CFA (Anderson & Gerbing, 1988; Gefen et al., 2000). The measurement model, also known as the outer model, depicts the latent constructs and their items, whereas the structural model, also known as the inner model, specifies the relationships between the exogenous and endogenous latent constructs (Gefen et al., 2000; Haenlein & Kaplan, 2004; MacCallum & Austin, 2000; Tenenhaus et al., 2005).

Reflective measurement model. To assess the reflective measurement model, we examined internal consistency reliability (composite reliability > 0.7), indicator reliability (item loading > 0.7 , significant at 0.05 level), convergent validity (average variance extracted (AVE) > 0.5), and discriminant validity (low cross-loadings on the unintended constructs and the square root of the AVE is larger than the correlations between constructs) (Urbach & Ahlemann, 2010). Initial analysis showed that three items of each of the constructs attitude towards online learning and attitude towards online interaction did not meet the indicator reliability criterion. Thus, these six items were removed for subsequent analysis. Tables 4 and 5 show the final assessment results of the reflective measurement model that were satisfactory.

Table 5 Factor Loadings and Cross-Loadings of Reflective Constructs

Items/Construct	CL	BL	OL	SM	LF	OI
I find learning through collaboration with others face-to-face is more effective.	0.761	-0.014	0.12	0.025	-0.038	-0.029
I learn better through lecturer-directed classroom-based activities.	0.787	-0.115	0.064	0.017	-0.038	-0.014
I learn better when someone guides me personally.	0.722	0.141	-0.196	-0.044	0.081	0.046
I intend to register for a course that adopts the blended learning approach.	0.023	0.873	0.029	-0.03	-0.069	0.056
I would like to join in a course that adopts the blended learning approach.	-0.037	0.911	0.024	-0.023	0.032	-0.011
I plan to attend a course that adopts the blended learning approach.	0.015	0.905	-0.052	0.052	0.035	-0.044
I am comfortable in using Web technologies to exchange knowledge with others.	-0.078	0.072	0.842	0.1	-0.032	0.029
I believe the Web is a useful platform for learning.	-0.085	0.06	0.803	-0.181	0.067	-0.181
I appreciate easy online access to my lecturer.	0.168	-0.136	0.798	0.077	-0.034	0.151
I organize my time better when studying online.	-0.173	-0.146	0.109	0.784	0.026	-0.132
I can study over and over again online.	0.126	-0.035	-0.047	0.724	-0.221	0.071
Online learning motivates me to prepare well for my studies.	0.024	0.024	0.032	0.88	0.038	-0.057
Online learning encourages me to make plans.	0.032	0.162	-0.109	0.737	0.144	0.138
I would like to decide where I want to study.	0.199	0.029	0.143	0.038	0.712	-0.165
I like to study at my own pace.	-0.152	0.009	0.109	-0.103	0.755	-0.038
I would like to decide when I want to study.	-0.034	-0.034	-0.233	0.064	0.789	0.186
I find Web technologies easy to use.	-0.086	-0.013	0.064	0.029	0.076	0.873
I find it easy to communicate with others online.	0.086	0.013	-0.064	-0.029	-0.076	0.873

Note 1: CL: Attitude towards classroom learning; BL: Readiness for blended learning; OL: Attitude towards online learning; SM: Attitude towards study management; LF: Attitude towards learning flexibility; OI: Attitude towards online interaction

Note 2: All item loadings are significant at 0.01 level. Indicator reliability is considered satisfactory when item loadings are > 0.7, significant at 0.05 level.

Note 3: Discriminant validity is considered satisfactory when items exhibit high loadings on the intended constructs (> 0.5) and low cross-loadings on the unintended constructs.

Formative measurement model. To assess the formative measurement model, we examined item weights (> 0.2, significant at 0.05 level), variance inflation factors (VIFs) (< 3.3), and inter-construct correlations (the correlations between the formative construct and other constructs < 0.7) (Urbach & Ahlemann, 2010). The item weights of the four first-order reflective constructs that formed the second-order formative construct were 0.274, 0.388, 0.377, and 0.376, respectively, significant at 0.01 level (Figure 2).

Multicollinearity among the four first-order reflective constructs was assessed using the VIF, which were 1.122, 1.409, 1.311, and 1.325, respectively. The correlations between the formative construct and other constructs were also low. Thus, the final assessment results of the formative measurement model were satisfactory and provided support for hypotheses H1a, H1b, H1c, and H1e.

Structural model. To assess the structural model, we examined R² (values around 0.670 are strong, 0.333 moderate, and 0.190 weak), effect sizes (values around 0.02 are small, 0.15 medium, and 0.35 large), and path coefficients in terms of sign, magnitude, and significance. Figure 2 shows the analysis results. Both constructs blended learning adaptability and attitude towards classroom learning explained about 21.4% of the variance of readiness for blended learning. Effect sizes of blended learning adaptability and attitude towards classroom learning were 0.16 and 0.054, respectively. The path coefficient between blended learning adaptability and readiness for blended learning was significant ($\beta = 0.386$, $p < 0.01$), thus providing support for hypothesis H2. The path coefficient between attitude towards classroom learning and readiness for blended learning was also significant ($\beta = -0.21$, $p < 0.01$), thus providing support for hypothesis H3.

Figure 2 Results of PLS Analysis

DISCUSSION AND CONCLUSION

Understanding attitude of students towards different learning aspects can be critical for the assessment of their adaptability to and eventual readiness for blended learning. Our findings show that students who have a positive attitude towards online learning, study management, online interaction, and learning flexibility are more likely to adapt to blended learning. The more positive the attitude, the more adaptable the students will be and the more ready they are for blended learning. The findings are congruent with extant literature (Brown, 2003; Collopy & Arnold, 2009; Garrison & Kanuka, 2004; Howard, 2009; Smyth et al., 2012; Tsai, 2010; Vaughan, 2007). In a blended learning environment, students benefit from flexibility in time and place as well as accessibility. Students enjoy greater autonomy over their learning progress and take greater responsibility for their studies. Students who are self-disciplined can advance at their own learning pace, and they tend to be high grade achievers (Owston et al., 2013; Smyth et al., 2012). Active participation, which gives students a feeling of stronger engagement and a perception of better learning quality, is key for students to perform well in blended learning courses (Owston et al., 2013).

On the other hand, there is a negative relationship between attitude towards classroom learning and readiness for blended learning. The stronger the need for classroom learning, the less ready the students will be for blended learning. As reported in a study of health care students' perceptions of blended learning in the UK, there were students who preferred physical meetings to digital ones (Glogowska et al., 2011). In another study of students at a Canadian university, Owston et al. (2013) found that students' perceptions about blended learning courses varied between low and high grade achievers. Low grade achievers who lacked the initiative to learn independently were less satisfied and demanded traditional face-to-face classroom learning, which would have provided them in a scheduled learning environment.

This study also shows that student attitude towards technology does not appear to be a key concern. While technology problems, e.g., broadband internet connectivity and computer skills, could be hindrances to the take-up of blended learning (Smyth et al., 2012), today's technology-savvy generation of students, especially those living in urban areas, do not face such problems. Thus, although modelled as one of the learning aspects in the original research model, a high level of familiarity with and access to technology has made using technology a non-issue from the perspective of the students.

Research Limitations

This study has three research limitations. First, because full-time undergraduate students were used as the only source of data collection, there is a concern as to whether the findings can be generalized to part-time working students who face the challenges of juggling work, family, and studies. The two groups can vary quite differently in terms of their learning needs. Second, today's full-time undergraduate students have had rather significant experience in using technology. It is understood, then, why these students do not think knowing how to use technology is critical to blended learning. However, mature students might not necessarily be tech-savvy. Thus, technology might be an important learning aspect for the mature students but not the undergraduate students. Third, undergraduate students who have not experienced the blended learning environment might not be able to provide good opinions about this learning approach.

Future Research Directions

There are three future research directions. First, as the internal consistency reliability of some constructs is not too strong, it is necessary to replicate and to validate the research with a different group of students. Second, as there can be differences in terms of learning needs between full-time and adult students, it is necessary to test the original research model with a group of adult students for a comparison. Third, as students who have experienced the blended learning environment might provide better opinions, it is necessary to replicate and validate the research with a group of students who have completed at least a blended learning course.

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