

Role of Technology Access and Technical Self-Efficacy Towards Lecturers' Readiness in Blended Learning

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ABSTRACT

Landscape of classroom teaching and learnings has changed Integrating information and communication technology (ICT) as a source of blended teaching and learning, either in the classroom or outside the classroom, has become one of the evolutions in classroom learning. To be part of this evolution, UTMSPACE has started to implement blended learning in teaching and learning. Therefore, the study intended to examine the readiness of UTMSPACE lecturers towards the implementation of blended learning and to explore the current practice of blended learning among the lecturers. The findings confirmed the lecturers' readiness for blended learning implementation. This study also examines how personal factors affected the success of e-learning systems and provided better results. Structural equation models on the data of 101 targeted respondents showed that online communication self-efficacy, attitude, and online media are the multiple mediators between the technology access and technical usage self-efficacy and lead to increased blended learning readiness among the lecturers at UTMSPACE. It appears that despite technological factors, the lecturers with a high belief in their ability and attitude are more prepared to adopt the alternative ways of teaching and learning as they gain more experience.

Keywords: Blended learning, UTMSPACE, readiness.

INTRODUCTION

Integrating information and communication technology (ICT) into education can complement, enrich, and transform education for the better. Accordingly, blended learning has been viewed as a method for creating a better classroom-learning experience. Blended learning has emerged in various methods to suit different learning styles. The key ingredients in blended learning are face-to-face and online learning [1]. The environment in blended learning can help students to use various sources to gain knowledge, which in turn, helps them to increase their research skills. Blended learning can also facilitate students' acquiring information and applying their knowledge in real situations. Therefore, the most important consideration for the successful implementation of blended learning at the university level is the ability to access students' readiness [2].

LITERATURE REVIEW

Attitudes towards the use of technology in the teaching and learning process are influenced by various factors. Blended learning requires lecturers to have access to technology. Thus, the challenges of technological accessibility cannot be ignored [3]. Attitudes towards blended

learning may be influenced by a lecturer's concern about not having access to and technological support at the institution [4]. Internet speed and connection also play vital roles in the attitudes toward blended learning [5]. A high-speed internet connection can trigger the success of resources in blended learning. Lecturers who can access information easily by using technology will have a more positive attitude towards blended learning.

[6] found that those with computers will have more a positive attitude towards online learning. Basic skills and the ability to operate computers will have a positive attitude towards blended learning. Based on these arguments, technical usage self-efficacy is expected to have a positive relationship with a lecturer's attitude towards blended learning.

Blended learning urges lecturers to have the ability to communicate and use communication tools effectively [7]. Arguably, [8] found a significant difference between online group and face-to-face meeting among lecturers and students in terms of their attitudes towards teamwork. The lecturers' lack self-efficacy in online communication with students affected their attitude towards the student-lecturer engagement and blended learning.

Online media also has been recognised as a tool for student-lecturer engagement, particularly with the use of stimulation videos [9]. In the same study, video simulation was found useful in making a teaching-and-learning environment fun and flexible. In return, students can make revisions anywhere and anytime with the online media provided by their lecturer. This tool will also help enhance a lecturer's skills in technology advancement and facilitate them to upskill. Therefore, the availability to have online media will have a positive impact on a lecturer's attitude towards blended learning.

METHODOLOGY

A combination of quantitative survey methodology with structured questionnaire methods was used as the research design for this study. To measure the targeted variables, the researcher used a quantitative analysis; therefore, both methods can be optimal methods for this study [10,11]. A total of 100 lecturers from UTMSPACE participated in the study, and all the questions were answered completely by the respondents since the researchers used the face-to-face data collection method.

All the twenty-two indicators for measuring these six variables were adapted from [12]. As for statistical technique used, the researchers used the structural equation modelling theory by using a partial least square estimation technique (i.e. PLS-SEM) since the researchers intended to explore the effect of the three variables on the targeted variables simultaneously in the proposed conceptual framework. Previous studies have suggested using 5000 replication of samples (i.e. bootstrapping theory) to access the significant influence of variables, particularly by estimating t-statistics and bias-corrected (BCa) confidence interval values [13,14,15]. To measure the effect of mediating, the following procedure suggested by [16] and [17] was adopted:

- 1) If the path of independent variable to dependent variable was not significant, hence the mediating effect was a full mediation effect.
- 2) If the path of independent variable to dependent variable was significant, hence the mediating effect was a partial mediation effect.

Although the PLS-SEM algorithm was based on the free data distribution assumption [3], [18], this procedure was necessary since the procedure to obtain the standard error of the parameter was based on bootstrapping procedure. This procedure can give an ambiguous standard error of parameter estimates if the data present an extremely outliers and are drastically away from normal distribution [19].

DATA ANALYSIS

Measurement Model Analysis

SmartPLS 3.2.8 version [20] was used as the statistical tool for examining the measurement and structural model because the method does not require normality assumption and because a survey research is normally not normally distributed [21].

The data in this study were collected using a single source. Accordingly, a sequence of tests was adopted whereby we first tested for common method bias through the testing of full collinearity, as suggested by [22,23]. All the variables regressed against a common variable: if the $VIF \leq 3.3$, then there is no bias from the single-source data. The analysis yielded a VIF of less than 3.3, thus single-source bias was not a serious issue with our data.

Table 1: Convergent Validity for Measurement Model

AT	OM	OC	RE	TU	TA
2.533	3.030	2.584	1.904	3.164	1.864

Note: AT = Attitudes, OM = Online Media, OC = Online Communication, RE = Readiness, TU = Technical Usage Self-Efficacy, TA = Technology Access

Measurement Model

We tested the model development by using a two-step approach, as suggested by [24]. First, we tested the validity and reliability of the instruments used based on the guidelines of [25] and [26]. Then, we ran the structural model to test the hypothesis developed.

For the measurement model, we assessed the loadings, average variance extracted (AVE), and composite reliability (CR). The values of the loadings should be ≥ 0.5 ; the AVE should be ≥ 0.5 ; and the CR should be ≥ 0.7 . As shown in Table 2, the AVEs are all higher than 0.5 and the CRs are all higher than 0.7. The loadings are also acceptable, with only one or two loadings scoring less than 0.708 (Hair et al., 2019).

In step 2, we assessed the discriminant validity using the HTMT criterion, as suggested by [15] and updated by [27]. The HTMT values should be ≤ 0.85 . The stricter criterion and the mode lenient criterion should be ≤ 0.90 . As shown in Table 4, the values of HTMT were all lower than the stricter criterion of ≤ 0.85 . As such, we can conclude that the respondents understood that the nine constructs were distinct. Taken together, both the validity tests showed that the measurement items were both valid and reliable.

Table 2: HTMT Discriminant Analysis for Measurement Model

	1	2	3	4	5	6
1. Attitudes						
2. Online Communication	0.682					
3. Online Media	0.843	0.842				
4. Readiness	0.516	0.58	0.407			
5. Technical Usage Self-Efficacy	0.75	0.829	0.922	0.542		
6. Technology Access	0.506	0.522	0.609	0.636	0.591	

Structural Model Analysis

Following the suggestions by [13] and [28], we assessed the multivariate skewness and kurtosis. The results showed that the data collected were not multivariate normal (Mardia's multivariate skewness [$\beta = 5.115, p < 0.01$] and Mardia's multivariate kurtosis [$\beta = 62.566, p < 0.01$]). Following the suggestions of [25], we reported the path coefficients, standard errors, t-values, and p-values for the structural model using a 5,000-sample re-sample bootstrapping procedure [26]. Also considered were [29] recommendation that a combination of p-values, confidence intervals, and effect sizes be considered instead of p-values for testing the significance of the hypothesis. Table 4 summarises the structural model assessment.

Based on the t-statistics values, technical usage self-efficacy and online media were found to have a positive significance for attitudes, but not for technology access and online communication self-efficacy. Attitudes were also found to have a significant positive effect on readiness.

Table 3: Structural Model Assessment

Relationship	Std Beta	Std Error	t-values	p-values	BCI LL	BCI UL	f ²	q ²	Remark
OC → AT	0.117	0.090	1.294	0.098	-0.019	0.274	0.253	0.414	Small
OM → AT	0.377	0.092	4.078	0.000	0.228	0.533	0.012	0.001	Small
TU → AT	0.286	0.129	2.221	0.013	0.065	0.490	0.123	0.028	Small
TA → AT	0.064	0.122	0.526	0.299	-0.120	0.266	0.061	0.093	Small
AT → RE	0.450	0.072	6.270	0.000	0.292	0.538	0.006	0.091	Medium

Note: TA = Technology access; TU=Technical Usage Self-Efficacy; OC= Online Communication Self-Efficacy; OM= Online Media; AT=Attitudes; RE= Readiness; BCI LL= Bias Corrected Interval Lower Limit; BCI UL= Bias Corrected Interval Upper Limit; f²=Effect size; q²=Predictive Relevance; Bootstrap samples was 5000 samples.

Mediating Analysis

Table 4 indicates that attitude simultaneously mediates the relationship between technical usage self-efficacy and online media toward readiness. The indirect analysis also indicated that attitude does not mediate the relationship between online communication and technology access, as the paths were not statistically significant [OC; IEC = 0.052, $t = 1.201, p = 0.115$; 95% BCa Bootstrap (-0.014,0.138) and TA: IEC = 0.029, $t = 0.484, p = 0.314$, 95% BCa Bootstrap (-0.060,0.133)]. Figures 2 and 3 show the results of the PLS-SEM analysis.

Table 4: Indirect Effect Assessment

Indirect Path	IEC	t-statistics	p-values	(95% Bca Bootstrap)
TU -> AT -> RE	0.129	2.051	0.020*	(0.027,0.237)
OC-> AT -> RE	0.052	1.201	0.115(NS)	(-0.014,0.138)
TA-> AT -> RE	0.029	0.484	0.314(NS)	(-0.060,0.133)
OM-> AT -> RE	0.169	3.053	0.001*	(0.086,0.261)

Note: IEC= Indirect Effect Coefficient; TA = Technology access; TU=Technical Usage Self-Efficacy; OC= Online Communication Self-Efficacy; OM= Online Media; AT=Attitudes; RE= Readiness; NS= Not Significant; *p<0.05.

CONCLUSION AND FINDINGS

The technical use of self-efficacy and online media have a significant positive effect on attitudes, but not for technology access and online communication's self-efficacy. Attitudes have a significant positive effect on readiness. It is also reported that an increase in the level of attitudes will increase the relationship between technical use of self-efficacy and online media on readiness. Nevertheless, attitude does not mediate the relationship between online communication and technology access.

Blended learning has been perceived as an alternative to the conventional teaching of one size fits all. Blended learning, can be personalized to students, and lecturers can offer flexibility in terms of time. At the same time, students can enjoy the benefit of face-to-face support and instructions, thus enabling them to learn at their own pace.

On the other hand, by integrating technology into the classroom, students will be more likely to show higher levels of interest and focus on the subject matter. Thus, lecturers will be able to reach all students with varying levels of performance.

Future studies may use other mediating factors to investigate the readiness of blended learning. The findings derived can lead to a broadened holistic approach that may affect the implementation of blended learning.

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