

Effects of Technology Access and Technical Self-Efficacy Changes Attitudes in Lecturers' Readiness

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Accepted: 15 August 2021 | Published: 1 September 2021

Abstract: *One of the evolutions in classroom learning is the use of information and communication technology (ICT) as a source of integrated teaching and learning, whether in the classroom or outside of it. This study intended to examine the readiness of UTMSPACE lecturers towards the implementation of blended learning. Apart from that, 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, technology access, technical usage self-efficacy, lecturers' readiness

1. Introduction

Information and communication technology (ICT) and education can complement, enrich, and transform education for the better picture for knowledge transfer. 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 (Hrastinski, 2019). Blended learning has the ability to help students to use different kind of sources in gaining knowledge and it can help lecturers to transfer knowledgeably, efficiently and effectively.

Blended learning can also facilitate lecturers' in acquiring and transferring information. Therefore, the most important consideration for the successful implementation of blended learning at the university level is the ability to access lecturers' readiness.

2. Literature Review

Inadequate support and training, time for generating online resources, fears of failure, and ideas about the usefulness of technology in education have all been recognised as issues deterring academic staff from teaching in online environments over the last 15 years (Jeffrey et al., 2014). A high-speed internet connection can trigger the success of resources in blended learning (Mohd, et al., 2018). Lecturers who can access information easily by using technology will

have a more positive attitude towards blended learning and Rapanta et al., (2020) found that those with computers will have more a positive attitude towards online learning. Blended learning will be more beneficial if lecturers have basic skills and the capacity to operate computers. Technical usage self-efficacy is projected to have a positive link with a lecturer's attitude toward blended learning based on these arguments.

Factors Affecting Attitude Towards Blended Learning

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 (Rasheed, Kamsin, and Abdullah, 2020). Attitudes towards blended learning may be influenced by a lecturer's concern about not having access to and technological support at the institution (Chen, Chen, and Chen., 2015). Internet speed and connection also play vital roles in the attitudes toward blended learning (Safford and Stinton., 2016). 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.

Ayub, Zaini, Luan, and Jaafar (2018) 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 (Topal,2016). Arguably, Konak, Kulturel-Konak, and Cheung (2018) 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 (Coyné, Fommolt, Rands, Kain and Mitchell., 2018). 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.

The current study, therefore, hypothesised that:

- H1: There is a positive effect of online communication self-efficacy on lecturer's attitude towards blended learning.
- H2: There is a positive effect of technology usage self-efficacy on lecturer's attitude towards blended learning.
- H3: There is a positive effect of technology access on lecturer's attitude towards blended learning.
- H4: There is a positive effect of online media on lecturer's attitude towards blended learning.

Effect of Attitude as Mediator Variable

This research used the theory of planned behavior (TPB) to (i) examine factors considered by the UTMSPACE lecturers to be important in adopting blended learning and (ii) explain the relationship among the factors. The TPB provides a simple and efficient framework to investigate an individual's intent to perform context-specific actions (Russo, D.A., Stochl, J., Painter, M. et al., 2015).

The TPB assumes that most of the human behaviours are goal-directed and socially influenced (Ajzen I., 1985). Conner. M & Sparks. P (2005) also concurred that individuals make behavioural decisions based on careful consideration of available information that they have. There is also a necessity to estimate the extent to which an individual is capable of exercising control over the behaviour in question (Ajzen I., 1986). The TPB also considers that internal (e.g., abilities, knowledge) and external (e.g., opportunity, cooperation of others) control factors in relation to performing a behavior (Armitage C. J & Conner M., 2001) are important in professional contexts, such as educational institutions, both factors may influence a lecturer's behaviour.

Therefore, this study is underpinned by TPB in examining the lecturer's readiness towards the acceptance of new technology of teaching and learning which is blended learning. As mentioned before, TPB can to examine factors that lecturers consider as important in the adoption of blended learning (readiness) and also be used to explain the relationship among the factors (technology access, technical usage self-efficacy, online communication self-efficacy, and online media) that are mediated by attitude. The higher the factors aforementioned, the more positive attitude they will have towards blended learning, hence the increase of lecturer's readiness for blended learning directly and indirectly.

Hence, the following hypotheses were developed:

- H5: Attitude mediates the relationship between technology access and lecturer's readiness for blended learning.
- H6: Attitude mediates the relationship between technology usage self-efficacy and lecturer's readiness for blended learning.
- H7: Attitude mediates the relationship between online media and lecturer's readiness for blended learning.
- H8: Attitude mediates the relationship between online communication self-efficacy and lecturer's readiness for blended learning.

3. Methodology

A combination of quantitative survey methodology with structured questionnaire methods was used as the research design for this study. The researcher employed quantitative analysis to quantify the desired variables; thus, both methods may be appropriate for this study. (Saunders & Thornbill, 2009; Cresswell, 2015). The study included 101 lecturers from UTMSPACE. The researchers employed an online data gathering procedure where all of the questions were answered entirely by the respondents.

The twenty-two indicators used to assess these six characteristics were all adapted from Ong & Puteh (2017). The researchers employed the following statistical technique - structural equation modelling theory by using a partial least square estimation technique (i.e. PLS-SEM) because the researchers wanted to investigate the effect of the three factors on the targeted variables in the suggested 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 (Hair et al., 2017; Hair et al., 2012; Henseler and Chin, 2010). To measure the effect of mediating, the following procedure suggested by Zhao et al., (2010) and Iacobucci et al., (2007) 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 (Rasheed et al., 2020; Monteiro & Morisson., 2014), as for the approach for obtaining the parameter's standard error was dependent on bootstrapping, this procedure was required. If the data contains a large number of outliers and deviates significantly from a normal distribution, this approach can produce confusing standard error of parameter estimations. (Mohammed, 2018).

4. Conclusion

As the method does not require normality assumption and because survey research is generally not normally distributed, SmartPLS 3.2.8 version was utilised as the statistical tool for assessing the measurement and structural model (Ringle et al., 2015; Chin et al., 2003). This study's data was gathered from a single source. As a result, the researchers used a series of tests to look for common method bias, beginning with full collinearity testing, as per suggested by Kock et al., (2012) and Kock (2012). All the variables regressed against a common variable: if the VIF \leq 3.3, then there is no bias from the single-source data. Yielded data had a VIF of less than 3.3, thus single-source bias was not a significant issue.

Table 1: Convergent Validity for Measurement Model

| Attitudes | Readiness | Technical Usage Self-Efficacy | Technology Access |
|-----------|-----------|-------------------------------|-------------------|
| 2.533 | 1.904 | 3.164 | 1.864 |

Researchers used a two-step technique to test the model development., as suggested by Anderson and Gerbing (1988). First, validity and reliability of the instruments were tested based on the guidelines of Hair et al., (2019) and Ramayah et al., (2018). Then, the structural model was running to test the hypothesis developed.

For the measurement model, loadings, average variance extracted (AVE), and composite reliability (CR) were assessed. The values of the loadings should be \geq 0.5; the AVE should be \geq 0.5; and the CR should be \geq 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).

Discriminant analysis had been assessed by using HTMT criterion for step 2 based on Iacobucci et al., (2007) and updated by Cain et al., (2016). HTMT values should be \leq 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 |
|----------------------------------|-------|-------|-------|---|
| 1. Attitudes | | | | |
| 2. Readiness | 0.516 | | | |
| 3. Technical Usage Self-Efficacy | 0.75 | 0.542 | | |
| 4. Technology Access | 0.506 | 0.636 | 0.591 | |

Following the suggestions by Hair et al., (2012) and Cain et al., (2016), the multivariate skewness and kurtosis were assessed. 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 Ramayah et al., (2018), researchers reported the path coefficients, standard errors, t-values, and p-values for the structural model using a 5,000-sample re-sample bootstrapping procedure (Franke and Marko (2018). Hanh and Ang (2017) came with a 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 was found to have a positive significance for attitudes, but not for technology access. 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; 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.

Table 4 indicates that attitude simultaneously mediates the relationship between technical usage self-efficacy toward readiness. The indirect analysis also showed that attitude does not mediate the relationship with technology access, as the paths were not statistically significant.

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) |
| TA-> AT -> RE | 0.029 | 0.484 | 0.314(NS) | (-0.060,0.133) |

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

In conclusion, the technical use of self-efficacy has a significant positive effect on attitudes, but not for technology access. 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.

Blended learning has long been seen as a viable alternative to one-size-fits-all educating. It can be tailored to the needs of students, and lecturers can provide schedule flexibility. Students can benefit from face-to-face guidance and instructions at the same time, allowing them to learn at their own pace. Learners, on the other hand, will be more likely to demonstrate higher levels of interest and concentrate on the subject matter if technology is integrated into the classroom. As a result, instructors will be able to reach all students, regardless of their performance level. Other mediating factors may be used in future studies to evaluate the readiness of blended learning. The findings could lead to a more comprehensive approach to blended learning, which could have an impact on its implementation.

Acknowledgement

This research would convey our deepest gratitude to UTMSPACE for grant no.SP-PDF 2006.

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