



## **Factors Influencing Teachers' Implementation of Online Teaching and Learning Mode during Covid-19**

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Brunei first detected the covid-19 pandemic on March 9, 2020, which closed physical schooling immediately, and schools later continued online in response to the pandemic. This study investigates teachers' feedback on the new school norm of online teaching and learning mode. The objective of this study is to test the conceptual research model derived from the Unified Theory of Acceptance and Use of Technology (UTAUT) for determining how the facilitating factors influence teachers' intentions and their beliefs about their behavioural implementation of online teaching and learning mode. The participant of the study consists of 6,078 teachers in public schools in Brunei Darussalam. An electronic survey questionnaire was developed and disseminated to the teachers. The analyses of the quantitative data involved factor analysis and structural equation modelling (SEM). The significant findings are (i) teachers' Behavioural Intention directly correlates to motivation factor (Satisfaction), facilitating factor (Effort Expectancy), and the belief factors (Risk and Trust); (ii) teachers' Behavioural Intention are indirectly correlated to motivational factor (Perceived Enjoyment) and facilitating factor (Self-efficacy); (iii) teachers' Implementation of online teaching and learning mode relates directly to Behavioural Intention and belief factor (Trust). The study concludes that teachers can be encouraged and supported to implement online teaching and learning mode by addressing the factors influencing their behavioural intentions.

**Keywords:** teachers' intention, teachers' beliefs, teachers' behaviour, teachers' motivation, online teaching and learning

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## INTRODUCTION

Brunei schools were closed like other schools in other countries globally and teaching and learning moved online to respond to the covid-19 pandemic outbreak in early 2020. Although Internet connectivity and personal devices are available for online teaching and learning, not all students and teachers are ready for remote schooling. Teaching online is somewhat the best alternative for most countries, including Brunei, to ensure the continuity of education during the pandemic. The awareness concerning how teachers react and respond to the migration to online teaching and learning is essential. Even though teachers may have better access to technology, they may not expect to deliver online instruction (Scherer & Teo, 2019; Huber & Helm, 2020) and may be reluctant to teach online (Harrell & Bynum, 2018; Murphy, 2020). Teachers may not be ready to conduct online teaching because they may not have the necessary skills to implement online teaching and learning (Murphy, 2020; Teo, 2011).

Promoting teachers to implement online teaching activities and engage their students has become an education priority worthy of investigation (Carrillo & Flores, 2020). Teachers play a significant role in integrating technology in teaching and learning (Huber & Helm, 2020; Teo, 2011). In many situations, the expectation is for teachers to use technology tools successfully, and the extent to which the teacher was implementing technology determines its success (Scherer & Teo, 2019). The demand for technology use in teaching could increase teachers' pressure to balance teaching and technology (Vongkulluksn & Bowman, 2018). However, the research found that teachers' use of technology in the classroom was minimal, and teachers did not use technology successfully (Bordalba & Bochaca, 2019; Zhao et al., 2019). The reported reasons for the underuse and unsuccessful use of technology are attributed to teachers' lack of motivation, confidence, understanding and skills to utilise technology for their teaching and learning, as well as the lack of technical support for them to teach with technology (Backfisch et al., 2021; Harrell & Bynum, 2018). Hence, it is vital to identify the factors that directly or indirectly motivate teachers, ultimately influencing their intentions to implement online teaching and learning based on their own beliefs.

Motivation is an essential factor that may influence teachers' intentions, which drives their beliefs towards implementation behaviour (Bozkurt & Sharma, 2020). Many studies about teachers using technology show that they are motivated to integrate technology because they believe in the benefits and affordances of technology. The motivation to implement online teaching and learning is manifested and observed in teachers' *Enjoyment* and *Satisfaction* when engaging their students during online teaching and learning (Zhang et al., 2020). Belief also plays a central role in encouraging human behaviour, as manifested and observed in their implementation behaviour. There is a need to conduct studies on teachers' pedagogical beliefs to implement online teaching and learning concerning *trustworthiness* and *perceived risks* about their cyber presence (Carrillo & Flores, 2020). Therefore, it is crucial to understand the correlations among these pertinent factors on teachers' implementation behaviour, particularly from a theoretical perspective.

Most of the research in motivation and intention reported the factors influencing teacher integration of technology in teaching and learning (Bozkurt & Sharma, 2020, Carrillo & Flores, 2020, Zhang et al., 2020). Yet, not many describe how these factors affect their beliefs and ultimately influence their implementation behaviour. Moreover, studies that foreground theoretical models that examine the teachers' beliefs, motivation, and intentions mainly focus on the 'what' aspects of those relationships (Bereczki & Kárpáti, 2021; Deci, Olafsen & Ryan, 2017; Sharma & Srivastava, 2020). However, such studies may not be sufficient to identify 'how' these factors of teachers' motivation and intentions impact their beliefs in implementing online teaching and learning to promote effective implementation. Thus, there is a need to research the 'how' aspects of some of these factors, such as how teachers' motivation and intention affect their beliefs and implementation behaviour.

In Brunei, technology use in education is emphasized in the teaching and learning for the 21<sup>st</sup> Century. Although the use of technology is increasing in education in other countries, research has shown that integrating Information and Communication Technology (ICT) in teaching and learning in Brunei is at a slow pace (Salleh et al., 2021). The first wave of COVID-19 pandemic hitting Brunei in early March 2020 resulted in the immediate school closure in the country. The Ministry of Education has devised and activated its Business Continuity Plan (BCP) to continue learning strategies emphasizing "online learning". A research study on the impact of such a sudden move from physical schooling to virtual schooling on Bruneian teachers is crucial. The results would provide practical and theoretical implications for educational professionals to consider the motivations for teachers to plan and address issues relating to teachers' intentions and beliefs.

Like all the schools worldwide, Brunei Darussalam faced many challenges when the Ministry of Education announced schools to use online platforms. Brunei Darussalam is fortunate that as one of the action plans for the SPN21 or Education System for the 21<sup>st</sup> Century, the Ministry of Education has previously taken initiatives to provide all students with Microsoft Office email accounts that allow students to access Microsoft Office 365. So, it appears that Brunei Darussalam was able to move seamlessly onto digital learning via Microsoft Teams. However, during the lockdown, one of the challenges was delivering the curriculum, designed for face-to-face in the physical classroom, to a virtual face-to-face classroom on the online platform. These problems escalated due to students' limited access to digital devices and the Internet and absorbing the cost of internet charges. However, teachers' perceptions and expectations of their ability and efforts in committing themselves to deliver online teaching pose more significant challenges. Hence, this study investigates the facilitating or hindering factors and teachers' perceptions, and expectations influence teachers' motivation and intentions to implement online teaching and learning mode.

The current study hypothesizes that understanding how the facilitating factors, teachers' perceptions and expectations, and motivation and intentions shape their beliefs. Consequently, the effect of these factors on their behavioural implementation on online teaching and learning would be fundamental for future endeavors, as we are now

focusing on digital learning. Therefore, the main purpose of this survey research is to test the conceptual Research Model derived from the Unified Theory of Acceptance and Use of Technology (UTAUT) for determining how the facilitating factors, teachers' perceptions and expectations, and motivational factors, influence teachers' intentions and their beliefs about their behavioural implementation of online teaching and learning.

## **Literature Review**

### **Teachers' beliefs**

Many factors can influence teachers' use of technology in teaching and learning, including teachers' beliefs, motivation, attitude, self-efficacy and performances in technology integration. Research has suggested that teachers' beliefs can influence teachers' decision-making and curriculum implementation (Kilinc, Tarman & Aydin, 2018; Leem & Sung, 2019; Sadaf & Johnson, 2017). Teachers' beliefs comprise tacit assumptions about knowledge, teaching, learning, and curriculum (Thurm & Barzel, 2020). Beliefs provide insights into teachers' thinking of their actions in classroom practices (Sadaf & Johnson, 2017). Teachers will implement changes if they think their beliefs match the educational reforms (Judson, 2006; O'Neal, Gibson & Cotton, 2017). If teachers' beliefs are not compatible with the new educational changes, there will likely be resistance. However, if teachers' beliefs match the innovation in educational changes, therefore it is likely that the new reform will be adopted and integrated into teaching and learning (Leem & Sung, 2019; Thurm & Barzel, 2020). Hence, teachers are more likely to adopt new technology if used according to their existing ideas and practices.

Previous research reveals that teachers' integration of technology in teaching and learning are significantly correlated to their beliefs (Bereczki & Kárpáti, 2021; Kilinc, Tarman & Aydin, 2018). Teachers with traditional beliefs used low-level technology. They had adopted a teaching approach that is more traditional compared to teachers with constructivist beliefs, where they adopted high-level technology uses and more student-centred approaches (Judson, 2006). Hence, if there is a conflict between teachers' beliefs and educational reform, the success of new educational changes will be limited (Tondeur et al., 2017). Yet, according to research, teachers' beliefs are influenced by curriculum reform, where they will change when teachers face challenges in their teaching practices. Hence, teachers are likely to implement technology that can help them plan and deliver their ideas for teaching, resulting in teachers developing their knowledge and skills in technology (Gracia, Rodríguez, & Pedrajas, 2019).

Different aspects of elements could influence technology integration in classroom practices (Heinonen et al. 2019, Zhao et al., 2019). These aspects can be divided into two; internal and external aspects (Heinonen et al., 2019). Internal aspects are when teachers' personal beliefs to use technology for teaching and learning are purposeful. They are likely to be at ease to use technology for classroom practices. Recent studies highlighted that these internal aspects play a pivotal role in technology integration in teaching and learning (Bordalba & Bochaca, 2019, Zhao et al., 2019). Whereas the external aspects refer to the availability of sufficient resources for technology integration and feasible school culture that can support the applicability of technology for teaching

and learning. The success of technology integration in classroom practices is when teachers' beliefs, knowledge, skills and attitudes are aligned with the current needs of technology in education and the resources available to support technology integration is sufficient (Zhao et al., 2019).

### **Teachers' motivation**

Motivation can be defined as a driving force that propels people to act and complete specified goals and behaviours (Sharma & Srivastava, 2020), and become disciplined and self-regulated (Latipah, 2022). Teachers' motivation is very significant as teachers will likely improve results than those not motivated (Deci, Olafsen & Ryan, 2017; Sharma & Srivastava, 2020). Teachers' motivation can be intrinsic as well as extrinsic. Yet, previous research reveals that teachers with intrinsic motivation find teaching more rewarding than the rewards from the job itself (Deci, Olafsen & Ryan; Sharma & Srivastava, 2020).

Studies show that teachers' motivation indirectly improves teaching and learning (Sharma & Srivastava, 2020). When teachers communicate their beliefs to students, this will impact students' attitudes in learning. Students are motivated when teachers design courses that focus on task-oriented learning and technology can assist students' learning. The simple use of technology and its appropriateness for teaching and learning will influence teachers' motivation to adopt technology for classroom purposes (Teo & van Schaik, 2012).

Many factors affect technology integration in education, such as teachers' motivation, supportive school culture, resources availability, teachers' beliefs, and social influence (Lai & Bower, 2019; Salleh & Laxman, 2013; Watson & Rockinson-Szapkiw, 2021). Behavioural Intention (BI) plays a significant predictor in the use of technology. The technology acceptance model (TAM) informs the BIs use of technology in teaching and learning. Teachers are motivated to use technology if they know how to use it and that technology is appropriate for their teaching and learning. The TAM model informs two specific beliefs: perceived usefulness and perceived ease of use (PEOU). Both are determinants to explain the users' behaviour for technology integration. In recent studies that used TAM as the model, perceived usefulness and PEOU describe the users' behaviour for technology integration in the classroom context (Scherer & Teo, 2019).

### **Theoretical Framework**

For this study, we develop a conceptual research model to explain the factors influencing teachers' behavioural Intention and Implementation behaviour of online teaching and learning mode. The conceptual research model includes five additional factors such as self-efficacy, perceived enjoyment, satisfaction, trust and perceived risk to the well established UTAUT model.

The UTAUT (see Figure 1) suggests that four core constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) are direct determinants of behavioural Intention, and ultimately behaviour. In turn, these core constructs are also correlated through the moderating variables: gender, age, experience, and voluntariness

of use (Venkatesh et al., 2012). By examining the potential correlations among these influencing factors on teachers' intention and behaviour; researchers, practitioners and policy makers will be able identify and understand how these key influences on teachers' acceptance in delivering online teaching and learning.

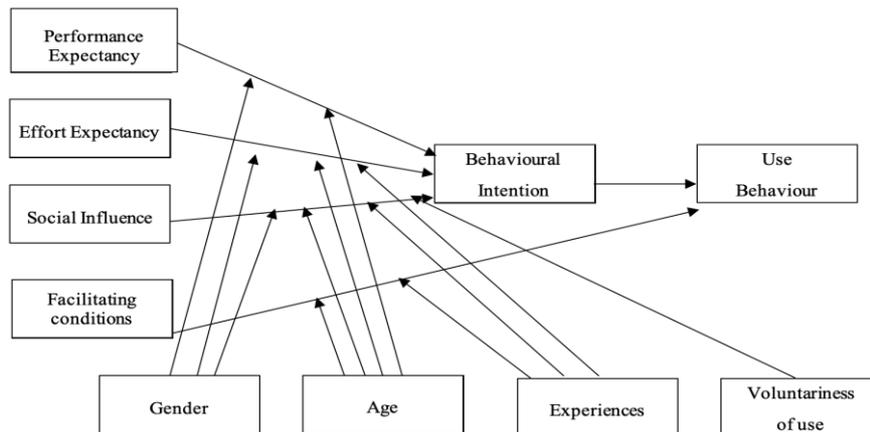


Figure 1

The unified technology acceptance and use of technology theory (adapted from Venkatesh et al., 2012)

The study's conceptual model is derived from an extended UTAUT proposed by Chao (2019). Chao proposed and tested the extended UTAUT Model to determine the behavioural Intention of University students to use Mobile learning. Chao modified the UTAUT model by adding new variables, mobile self-efficacy, perceived Enjoyment, Satisfaction, perceived Risk, and Trust to predict the adoption of m-learning. The questionnaire items for the current study were adapted and modified versions of Chao's questionnaire items where the Cronbach's Alpha values for all the variables exceeded the threshold value of 0.7 to indicate the construct reliability of the questionnaire. In the current study, the modified UTAUT model (shaded rectangles in Figure 2) presented as the conceptual research model was statistically analyzed to test the associated hypotheses (see hypotheses H1 to H 15 in Table 1).

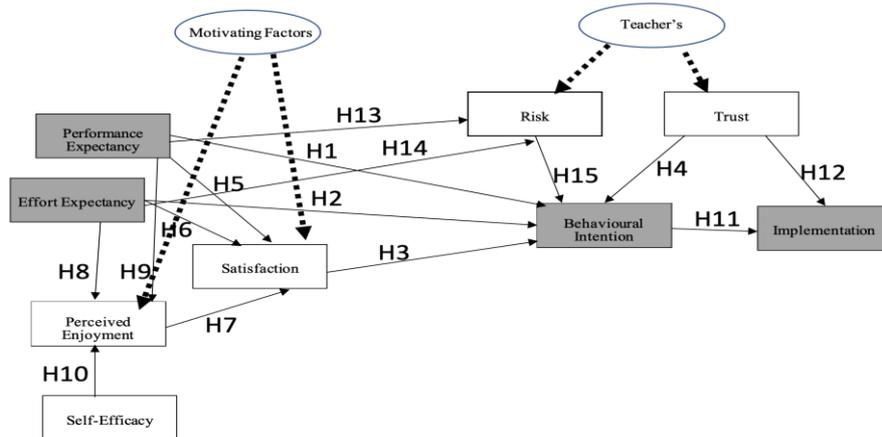


Figure 2  
 Concept of research model, with the original constructs in the shaded boxes, and the latent variables in oval

**RESEARCH HYPOTHESES**

We formulate research hypotheses regarding the relationships among the latent variables, draw inferences on their significance at probability values of less than .05 (5% probability), and then derive conclusions from these statistical justifications. Table 1 shows the research hypotheses were proposed for the current study.

Table 1  
 Research hypotheses of the study

Hypothesis	
H1	Performance Expectancy has a significant influence on the Behavioural Intention of teachers' implementation of online teaching and learning mode.
H2	Effort expectancy has a significant influence on Satisfaction.
H3	Satisfaction has a significant influence on Behavioural intentions of teachers to implement online teaching and learning mode.
H4	Trust has a significant influence on the Behavioural intentions of teachers to implement online teaching and learning mode.
H5	Performance expectancy has a significant influence on Satisfaction.
H6	Effort expectancy has a significant influence on Satisfaction.
H7	Perceived Enjoyment has a significant influence on Satisfaction.
H8	Effort Expectancy has a significant influence on perceived Enjoyment.
H9	Performance Expectancy has a significant influence on perceived Enjoyment.
H10	Self –efficacy has a significant influence on perceived Enjoyment.
H11	Behavioural Intention has a significant influence on the implementation of online teaching and learning mode.
H12	Trust has a significant influence on the implementation of online teaching and learning mode.
H13	Performance expectancy has a significant influence on Risk.
H14	Effort expectancy has a significant influence on Risk.
H15	Risk has a significant influence on Behavioural Intentions to implement online teaching and learning mode.

## **METHOD**

A survey questionnaire was developed to examine the research hypotheses of the Research Model of the study (see Figure 2). The questionnaire consists of 40 statements extracted from previous survey studies using the UTAUT model (Venkatesh et al., 2012). These items are modified to suit the objectives of the survey, which are to elicit participants' responses regarding the various constructs of the Research Model. The participants chose their responses to the statements from a seven-point Likert scale ranging from strongly agree (coded as 7) through agree (coded 6), somewhat agree (coded 5), neutral (coded 4), somewhat disagree (coded 3), disagree (coded 2) to strongly disagree (coded as 1).

The questionnaire consists of 5 sections. The first section consists of items to draw responses regarding facilitating factors such as perceived performance expectancy, effort expectancy and self-efficacy. The second section consists of items regarding motivational factors such as Perceived Enjoyment and Satisfaction. The third section draws participants' responses to belief factors such as Trust and perceived Risk. The last two sections consist of items seeking participants' responses to Intention and Behavioural implementation, respectively. The demographic information was also obtained in the demographic section of the questionnaire, such as the school level (primary, secondary or sixth form), the subjects taught (ranging from sciences (pure physics, chemistry, biology), social studies, history, geography, languages (English language, Malay language, Arabic language), Arts, social sciences (psychology, sociology) and others (those subjects not listed).

There were 40 items in the questionnaire, and the reliability based on Cronbach Alpha is .93. The questionnaire was created using Qualtrics and distributed online to all 6,078 teachers in all 117 primary schools (Year 1 to Year 6), 31 secondary schools (Year 7 to Year 11) and 6 Sixth Form centres (Year 12 to Year 13) in Brunei via WhatsApp and emails. The questionnaire was distributed at the end of the third school term from 23<sup>rd</sup> to November 28 2020. We received 2,740 responses (45% response rate). The questionnaire data were analysed using factor analysis and structural equation modelling (SEM) to generate a good fit SEM model. The data were analysed using SPSS and AMOS software. Factor analysis was run in SPSS for a priori nine-factor components. Table 2 shows the definitions of the respective constructs of the Research model.

Table 2  
Label and definition of constructs of the research model

Component	Label	Definition of Construct
1- Facilitating factor	Self-efficacy	The teachers: personal belief that they possess the aptitude and skills to succeed in engaging in online learning.
2- Motivational factor	Perceived Enjoyment	The extent to which the activity of using online learning to be enjoyable.
3- Motivational factor	Satisfaction	Teachers' sense of gratification or fulfilment in using online learning.
4- Facilitating factor	Effort Expectancy	A crucial predictor of technology acceptance is the degree of ease associated with the use of online learning.
5- Facilitating factor	Performance Expectancy	The degree to which an individual believes in the use of online learning helps to improve teaching performance.
6- Believe factor	Trust	The teachers' perceptions about the Reliability and trustworthiness of the system
7- Believe factor	Perceived Risk	The teachers perceived the likelihood of teachers suffering a loss in the implementation of online learning.
8- Intention	Behavioural Intention	The teachers' preparation and planning for online learning and teaching.
9- Behaviour	Implementation (Behaviour)	The actual delivery of online learning and teaching.

## FINDINGS

The research objective is to test the significance of the proposed 15 hypotheses (H1 to H15) on the Research Model (refer to Figure 3). The data was subjected to structural equation modelling (SEM) by using the AMOS software. The SEM is a multivariate statistical analysis of the relationships between the indicator (or observable variables) and latent (or unobserved variables). The hypotheses were verified by checking the significance of the regression coefficients set at  $p < .05$ . The regression coefficients are measures of the correlation of the indicator variables and the latent variables. Table 4 shows that all the research hypotheses confirmed significant relationships between the respective constructs at probability level set to be less than .05 except for H1, which is not significant at  $p = .27$ ; and H13 where  $p = .90$ . Therefore, all hypotheses except H1 and H13 are accepted at  $p < .05$ .

Figure 3 shows the results of the testing for the hypothetical model of the current study, which consists of 15 hypotheses (H1 to H15) regarding the relationships of the respective constructs. Figure 3 illustrates the direction (indicated by the arrow) and strength (size of the regression coefficients of the relationships between the constructs of the research model. Figure 3 also shows that the squared multiple correlation (R) for Behavioural Intention is .38, and Implementation is .049. The squared multiple correlation determined the proportion of the total variation explained by the model. Therefore, the Research Model explains 39% by Behavioural Intention, and 4.9% by Implementation.



Table 4  
Regression coefficients ( $\beta$ ) and probability values ( $p$ ) of the research hypotheses

Hypotheses	Research Hypotheses	$\beta$	$p$
H1	Performance Expectancy has a significant influence on the Behavioural Intention of teachers' implementation of online teaching and learning mode.	-.033	.27
H2	Effort Expectancy has a significant influence on Behavioural intentions of teachers to implement online teaching and learning.	.16	.0001
H3	Satisfaction has a significant influence on Behavioural intentions of teachers to implement online teaching and learning.	.26	.0001
H4	Trust has a significant influence on the Behavioural intentions of teachers to implement online teaching and learning.	.33	.0001
H5	Effort expectancy has a significant influence on satisfaction.	.20	.0001
H6	Performance expectancy has a significant influence on satisfaction.	.29	.0001
H7	Perceived Enjoyment has a significant influence on Satisfaction.	.45	.0001
H8	Effort Expectancy has a significant influence on perceived Enjoyment.	.30	.0001
H9	Performance Expectancy has a significant influence on perceived Enjoyment	.48	.0001
H10	Self-efficacy has a significant influence on perceived Enjoyment.	.11	.0001
H11	Behavioural Intention has a significant influence on implementation of online teaching and learning.	.19	.0001
H12	Trust has a significant influence on implementation of online teaching and learning.	.054	.05
H13	Performance expectancy has a significant influence on risk	-.03	.90
H14	Effort expectancy has a significant influence on Risk.	-.11	.0001
H15	Risk has a significant influence on Behavioural intentions of teachers to implement online teaching and learning	.05	.009

Table 5 shows the model fit indices for the conceptual Research Model. Most of the fit indices (except chi-square over degrees of freedom) fall within the accepted values. Therefore, it is confirmed that the conceptual Research Model is a satisfactory fit model to explain Bruneian teachers' behavioural Intentions and Implementation of online teaching and learning mode.

Table 5  
Fit indices of the conceptual research model

Index	Perfect Fit	Accepted values	Model result
Chi square	Chi square<3	3<chi square<5	6.8
RMSEA	0<AGFI<0.05	0.05<AGFI<0.08	0.046
CFI	0.97<CFI<1	0.95<CFI<0.97	0.96
IFI	0.95<IFI<1	0.09<IFI<0.95	0.97
TLI	0.90<TLI<1	0.90<TLI<0.95	0.96

## **DISCUSSION**

This study statistically shown that the Research Model is a fit model to explain how the factors such as facilitating factors (effort expectancy, perceived performance expectancy, and self-efficacy), an motivational factors (perceived enjoyment and satisfaction) influence their intention and shaped by their beliefs (trust and perceived risks) about the implementation of online teaching and learning mode during the COVID-19 outbreak. Statistical evidence from the accepted hypotheses concludes that teachers' motivation (as measured by perceived enjoyment, and satisfaction) influences teachers' Behavioural Intention to implement online teaching and learning mode. This finding corroborates past study that teachers' work motivation was influenced by external sources which in turn positively influence the internal motivation based on teachers' success and immaterial goals (Börü, 2018). This study revealed that teachers perceived enjoyment, and satisfaction are the internal factors affecting teacher motivation to implement online teaching and learning.

The Research Model also shows that teachers' perceptions about their effort expectancy, but not their perceived performance is significant facilitating factor influencing teachers' intention to implement online teaching and learning. This finding echo similar finding that teachers need to make the efforts to provide verbal positive reinforcement for students studying remotely from home during the COVID-19 pandemic (Mantasiah et al., 2021).

Lastly, the Research Model explains that teachers' belief (as measured by perceived risks and trust) are significant direct factors that influence teachers' Intention and Implementation of online teaching and learning during COVID-19 pandemic. This finding supports that teachers' belief is an important factor that shapes their intention and teachers' professionalism (Luján, 2021).

## **CONCLUSIONS AND RECOMMENDATIONS**

The conceptual Research Model shows a satisfactory model fit and has high internal consistency and reliability, indicating that the proposed research model derived from the extended UTAUT model possesses substantial explanatory power. From the research model, we can understand how facilitating factors, motivation and beliefs directly affect teachers' behavioural Intention, and Trust is a direct effect on behavioural Intention. Whilst Self-efficacy is a significant indirect effect on behavioural Intention. Behavioural Intention and Trust have a significant direct effect on Implementation behaviour. Determining what motivates teachers (effort expectancy, Satisfaction and Risk) and addressing teachers' intentions to implement online teaching and learning mode can improve the future direction of online teaching and learning and digital learning.

The findings imply the need to focus on developing, influencing, and encouraging teachers' beliefs through awareness about online education having the affordances to improve teaching performance, and motivate them to increase their satisfaction about the usefulness of online teaching and learning to overcome difficulties during the COVID-19 pandemic. Stakeholders such as the ministry of education need to show and

facilitate teachers to enhance their efforts when using or implementing online teaching and learning mode. Stakeholders and policymakers need to create a safe and trustworthy environment for online teaching and learning platforms. Digital literacy and regulations are essential for both teachers and students. Teachers need positive reinforcement to elevate their Self-efficacy, Satisfaction, and Perceived Enjoyment to promote teachers' behavioural Intention. Teachers can gain knowledge from professional development on using design frameworks to create self-developed curriculum and resources.

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