

# A Conceptual Framework for Integrating TPB With Context-Relevant Variables to Predict e-Learning Success During the Covid -19 Pandemic

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**Abstract:** The COVID-19 pandemic has necessitated the digitalization of some aspects of our lives including education. However, as we witness a phenomenal rise in the demand for online learning, the decision to migrate to online learning platforms is dependent on the learner's preparedness to embrace it. The objective of this study is to conceptualize a framework that measures the tendency of learners to adopt online learning in an era characterised by so many disruptions. To do this, we adopt document analysis on databases such as SCOPUS, Web of Science, EBSCO and Google Scholar using Boolean search engines; AND, OR, NOT, \*, (), "", +, -, <, >. mainly on current scientific manuscripts through the use of the keywords "e-learning", "theory of planned behaviour", "Covid 19", "distance learning", "environmental factors" and "academic technology adoption". Subsequently, we integrate the theory of planned behaviour with other context-relevant variables as the bases of the study, and conceptualise a framework to predict e-learning success in the covid-19 era. This study contributes to the scientific body of knowledge on e-learning, particularly from the perspective of a forced mass adoption of e-learning occasioned by a global pandemic.

**Keywords:** e-learning, Covid 19, theory of planned behaviour, education services, intention to adopt online learning

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## 1. Introduction

The outbreak of the Corona virus has disrupted life as we know it across the world. The Covid-19 pandemic has impacted various segments of industry and aspects of human society. Many of the studies have focused on how it affected the educational sector, particularly in terms of how the traditional classroom setting is being disrupted. The number of children, youth and adults who had to drop out of school or the university because of COVID-19, kept rising especially between 2020 and 2021. The closure of schools by governments all around the world was an attempt to contain the global pandemic (Chick et al., 2020; Daniel, 2020; UNESCO, 2020).

While there is no medical solution available or drugs for treatment as of 2022, numerous governments continue to institute measures aimed at minimizing direct human interactions and contact as much as possible. This is necessary to ensure that healthcare systems within societies are not overwhelmed by rising number of infections, which in turn leads to higher mortality figures. Subsequently, traditional education, which relies on physical human interactions, has found itself severely challenged by an existential crisis. This scenario has compelled educational institutions to shut down in many countries around the world. Undoubtedly, it is imperative to consider alternative approaches to the delivery of education. This, with the objective of enabling governments and other stakeholders across the educational sector to continue the delivery of high-quality education to learners. Hence, there is a genuine need to explore education alternatives such as e-learning. This tool has the potential to reduce or eliminate the need for physical interactions to the barest minimum, a desired outcome in challenging times like this.

It is pertinent to state that e-learning as a method of delivery of education has its own peculiarities and unique challenges. Further, considering that widescale adoption of e-learning as a result of the Covid 19 pandemic is unprecedented, this makes it necessary for a scientific inquiry into the efficacy of such alternative approaches. Particularly, the need to investigate the efficacy and success of e-learning in terms of factors such as: cost implications for the learners, availability of conducive home environment learning environments and its impact on effectiveness of e-learning. Moreover, it is relevant to study other factors such as the facilitating or mitigating

conditions with the potential to impact learning outcomes for both the service provider and recipient of educational services via the e-learning method.

This research aims to apply the theory of planned behaviour as the theoretical perspective for inquiry into the effectiveness of e-learning. For this purpose, constructs facilitating or mitigating outcomes of educational service delivery via the e-learning method both on the service provider and service recipient were considered. The research adopts a document analysis approach for testing specific hypothetical propositions, which interrogate specific subjective and behavioural factors along with other identified facilitating conditions. It contributes to the scientific body of knowledge on e-learning, particularly from the perspective of a forced mass adoption of e-learning occasioned by a global pandemic.

## **2. Theoretical background and development of hypotheses**

### **2.1 Theory of Planned Behaviour (TPB): An extended version**

The theory of planned behaviour (Ajzen, 1991) is a theoretical perspective which extends from the theory of reasoned action (Fishbein, 1980), and offers a conceptual framework for understanding contextualized human behaviour. The theory of planned behaviour states that attitude, subject norms, and perceived behavioural control, together shape individual's behavioural intentions and behaviours. The theory has been widely applied in predicting and explaining several learning behaviours (Cheng, 2019). Research into the behavioural psychology of human behaviour has led to the development of several theoretical perspectives, which seek to understand the dynamics with a view to accurately predict human behaviour (Judge et al., 2019; Kuiken, 2015; Tornikoski & Maalaoui, 2019).

This is informed by the consideration and assumption that sensemaking is the central determinant of human behaviour. This assumption is derived from the logic that sensemaking in itself is the process of giving meaning to what is happening in the environment, and these meanings inform and constrain identity and action (Armitage & Conner, 2001; Tornikoski & Maalaoui, 2019). In proposing the theory of planned behaviour, Ajzen (1991) drew inspiration from the assumption that there is an objective world in which behaviour is influenced by the attitude, social norms and perceived behavioural control that an individual has towards a certain behaviour. Hence, these three factors combine in determining or influencing the intention to engage in a specific behaviour. Generally, the utilitarian value of the theory of planned behaviour in the field of academic research is based on its value as a tool for explaining the choices that individuals make with regard to leisure activities, health choices, explaining buyer behaviour, and technology adoption intentions of users (Judge et al., 2019; Seow et al., 2017). Several researchers have applied the theory of planned behaviour in scientific inquiries into the adoption of e-learning as an alternative means of delivering education at various levels of learning and in various societal contexts (Kim, 2021). Richard et al. (2016) applied it from a developing country perspective to investigate the determinants of e-learning adoption among students. Results show that perceived usefulness and attitude towards use had direct effects on e-learning adoption, while perceived usefulness and perceived ease of use also had a direct relationship to the general attitude towards use. Evidence from their study also revealed that variables such as computer self-efficacy and perceived ease of use had an indirect relationship on e-learning adoption, though they were found to have an insignificant direct relationship on e-learning adoption. Moreover, Nyasulu and Dominic Chawinga (2019) also applied the theory of planned behaviour in investigating the adoption of WhatsApp messaging platform as an e-learning medium in Malawi. They found that students reported benefits such as instant sharing of information, academic collaboration, and ability to learn beyond classroom hours. However, they also reported challenges faced by them in adopting such medium to include costs of mobile devices, frequent electricity outages and unreliable Internet connection from mobile network service providers. Also, Chu & Chen (2016) applied the theory of planned behaviour in attempting to understand the impact of group influences on e-learning adoption. Results from their research indicates that user attitude, perceived behavioural control, subjective norms, and social bonds, presented significant positive correlations to e-learning intention. In addition, social identity and social bonds could moderate the effect of subjective norms on intention. Finally, their research shows that intention enhances the time for using e-learning technology rather than frequency.

Evidence from academic research indicates that the theory of planned behaviour is versatile in its adaptability in investigating various behavioural phenomena, particularly in relations to e-learning adoption research (Chu & Chen, 2016; Nyasulu & Dominic Chawinga, 2019; Richard et al., 2016). Sutton (2014) justifies the appropriateness

of the theory of planned behaviour as a theoretical foundation for social science research, and its advantages over other ‘social cognition models’. His argument is that TPB is a generalist theory, which makes it preferable to learning or behaviour-specific theories for reasons of parsimony. Sutton (2014) also argues that the theoretical constructs of the TPB are clearly defined and the causal relationships between the constructs clearly specified. Other justifications for suitability are the clarity of recommendations for how the constructs should be operationalised and based on the meta-analyses of observational studies. Results indicate that the TPB accounts for an important amount of variance in intentions and behaviour (Kuiken, 2015; Thoradeniya et al., 2015; Tucker et al., 2019).

In conclusion, a summary of previous TPB research, especially within the online teaching and learning context, can be found in Table 1 and the conceptual framework guiding the current investigation can be found in figure 1.

**Table 1:** A summary of relevant scientific articles on online teaching and learning

Author/objective	Method	Causal variables	Guiding theories	Key findings	Country
Saleem et al., (2021) analysed students’ intention towards e-learning via augmented reality apps during the COVID-19 pandemic.	Structural equation modelling was utilized to analyse data collected from 133 university students.	Attitude, subjective norms, perceived behavioural control, hedonic value, utilitarian value	TPB	Attitude and behavioural control significantly influenced their intention to adopt augmented reality apps for e-learning; and subjective norms showed insignificant results	Pakistan
Jere (2020) explored the factors influencing University lecturers to adopt e-learning platforms	Structural equation modelling was used to assess the data collected from 132 lecturers	Attitude, facilitating conditions, subjective norms, perceived usefulness, perceived ease of use	TAM TPB UTAUT	All constructs had a significantly positive relationship. SNs and PEU showed an influence on PU. Perceived usefulness showed a strong influence on ATU	South Africa
Kim et al., (2021) aim to assess the factors driving greater intention of students to use online learning systems	SmartPLS 3.0 was utilized to analyse the data collected from 187 college students	User innovativeness, attitude, perceived usefulness, subjective norms, PBC	TPB TAM	positive attitudes, perceived ease of use, perceived usefulness, and behavioural intention are significant for the acceptance of online learning systems.	Korea
Anthony et al., (2020) investigated the predictors determining students’ blended education adoption	PLS-SEM was utilized to analyse data from 1811 students	Attitude, subjective norm, perceived behavioural control, self-efficacy	TPB TRA	The results show that the attitude, subjective norm, perceived behavioural control and self-efficacy were found to influence students’ intention to accept blended learning	Malaysia
Sakka (2022) analysed the determinants for student’s acceptance of distance learning at the time of COVID-19	(SEM) was used through smart PLS (version 3.3) to validate the measurement model	Facilitating conditions, social influence, performance expectancy, expected cost, perceived value	UTAUT	The results show that the attitude, subjective norm, perceived behavioural control and self-efficacy were found to influence students’ intention to accept blended learning	Jordania

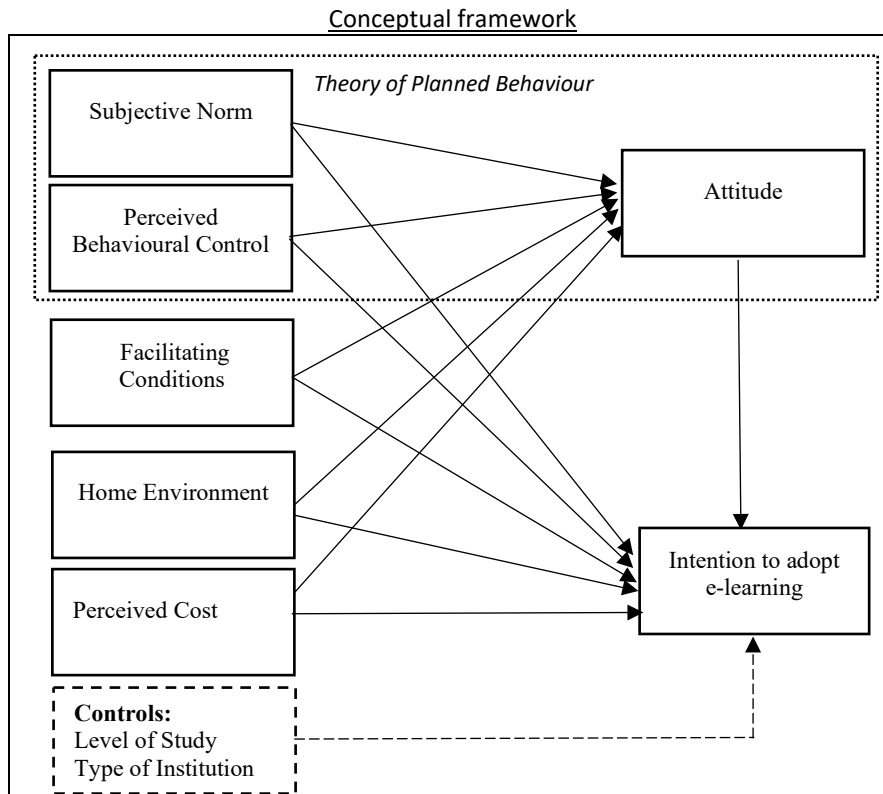


Figure 1: Proposed research model

## 2.2 Development of hypotheses

### 2.2.1 Subjective norms, attitude and Intention to adopt e-learning

The notion of subjective norms is often conceptualized as the degree to which an individual perceives social pressures (friends, family, educators, social gathering) regarding a particular behaviour (Ajzen, 1991). According to the TPB, subjective norms are based on the normative beliefs about individuals' expectations (Cheon et al., 2012). Certainly, heterogeneous social groups might have different opinions regarding the adoption of a new technology, particularly in the field of education (Hadadgar, 2016). Accordingly, a plethora of theoretical and empirical studies have explored the subjective norms' impact on students' attitudes towards e-Learning adoption (Sobaih & Hasanein, 2022; Rajeh, 2021). Empirical evidence shows the positive influence of subjective norms on blended learning (Anthony et al., 2020), social network applications (Sobaih & Hassanein, 2022), mobile learning (Hadadgar, 2016) and e-learning (Dos Santos & Okazaki, 2013). However, there is limited research exploring the influence of subjective norms on students' attitudes and intention to adopt e-Learning in the particular crisis context resulting from the Covid 19 pandemic (Saleem et al., 2021). Therefore, the following hypotheses are developed:

*H1A: Subjective norms positively affects attitude towards e-learning*

*H1B: Subjective norms positively affects intention to adopt e-learning*

### 2.2.2 Perceived behavioural control, attitude and Intention to adopt e-learning

The concept of perceived behavioural control (PBC) refers to an individual perception of the level of difficulty that a determined behaviour requires (Ajzen, 1991). Thus, when students have the impression of not having the complete control of a situation while executing a behaviour, they are more likely to not perform it. Conversely, the TPB posits that if intentions are held constant, a determined behaviour will be more likely to be performed as perceived behavioural control increases. This perception of control can significantly influence students' attitudes towards the adoption of e-Learning (Sobaih & Hasanein, 2022). Accordingly, some academics have showed how behavioural control is increased when students have the confidence and the resources required to adopt a learning technology (Anthony et al., 2020). Moreover, a study carried out by Sarosa (2020) showed the determinant role played by PBC among students' intentions to adopt online learning in a pandemic context. PBC

overcame other relevant variables such as perceived cost and required equipment. Therefore, we posit the following hypothesis:

*H2A: Perceived behavioural control positively affects attitude towards e-learning*

*H2B: Perceived behavioural control positively affects intention to adopt e-learning.*

### *2.2.3 Facilitating conditions, attitude and Intention to adopt e-learning*

In this research, facilitating conditions (FCs) are the extent to which a student believes the resources required by the e-learning behaviour are available. Technical and organizational infrastructure accessibility can impact the intention to adopt a technology and particularly in the e-learning sphere (Hadadgar, 2016). Accordingly, factors such as skills training, administrative support and network convenience are relevant in the adoption of information and communications technology for learning (Sakka, 2022). Similarly, Jere (2020) studied the drivers influencing e-learning adoption among academics and confirmed the accuracy of the facilitating conditions variable in predicting behaviour in a South African university. In the same connection, Weerathunga et al., (2021) posit that students' behaviours regarding e-learning are strongly influenced by conditions such as free access to online information, data packages at accessible prices and time to spend on compute or another device. Furthermore, Teo (2019) investigated the use of technology for learning processes among students and lecturers in a South-Asian country. Results are consistent with previous research to the extent that it was evidenced the impact of variables such as facilitating conditions, subjective norms and perceived ease of use on the attitude towards a learning technology adoption. Depending on the previous literature, the following hypotheses are proposed:

*H3A: Facilitating conditions positively affect attitude towards e-learning*

*H3B: Facilitating conditions positively affect intention to adopt e-learning*

### *2.2.4 Home environment, attitude and Intention to adopt e-learning*

In parallel with the external variables, recent literature indicates that internal variables arising from students' home conditions can also affect attitudes towards the intention to adopt e-learning (Bonanati & Buhl 2021). Undoubtedly, during pandemic times, the home environment acquired more importance to the extent that students must follow classes from their homes or available places with internet connection. Accordingly, Paizan et al., (2021) posit that learning conditions and parental involving are determinant factors influencing adolescents learning process during the pandemic. Thus, environmental characteristics such as a place to study, silence spaces, technical equipment, learning materials, but also parents' strategies aiming to enhance students' participation to school-related tasks can determine the effectivity of distance learning. Indeed, to consider the home environment framework to systemize e-learning adoption intentions is pertinent in the current pandemic context. Furthermore, the use of former and current data can bring new insights that fill an important gap in the field of learning environment occasioned by a global pandemic. Hence, we hypothesize:

*H4a: Home environment positively affects attitude towards e-learning*

*H4b: Home environment positively affects intention to adopt e-learning.*

### *2.2.5 Perceived cost, attitude and Intention to adopt e-Learning*

Certainly, despite a potential delivery cost reduction, the proper adoption of distance learning demands the existence of a laptop/desktop or other smart device and a stable internet connection. For students, the cost of communication and equipment can represent a barrier for e-learning adoption. Accordingly, some scholars have explored the impact of perceived cost on the attitude and the behavioural intention to adopt a technology for academic purposes. Considering the transaction cost theory (TCT), Twum et al., (2021) posit that perceived cost has a negative effect on the behavioural intention to adopt an online learning system. On the other hand, Sarosa (2020) applied the TPB to explore the drivers of distance learning adoption among Indonesian high school students and concluded that perceived costs did not have any impact on e-learning behaviour intention during Covid 19 pandemic. Drawing from the literature review, we propose the following hypotheses:

*H5A: Perceived cost negatively affects attitude towards e-learning*

*H5B: Perceived cost negatively affects intention to adopt e-learning*

### *2.2.6 Attitude and e-learning*

The positive or negative reaction of students towards the use of a technology with academic purposes considering the perceived outcomes can determine the adoption of an e-learning system (Kim et al., 2021). According to the TPB, if a student perceives a technology can be useful and ease to use, it is likely that student's attitude toward that technology will be positive. Thus, this mind state and judgement influences individual behaviour intention and reflects the level to which students formulate rational plans to engage in an online learning process. A study conducted by Teo (2019) states that attitude performs a determinant role in students' intention to use technology in a South-East Asian context. In the same connection, Saleem et al., (2021) explored Pakistan students' intention towards distance learning and concluded that attitude and behavioural control significantly influenced their intention to adopt augmented reality apps for e-learning. Furthermore, Antony et al., (2020) posit that students' intention to accept blended learning is positively affected by attitude during pandemic times. Therefore, the following hypothesis is stated:

*H6: Attitude positively affects intention to adopt e-learning*

## **3. Methods**

Since this research is founded in a qualitative examination, researchers adopted document analysis as research technique in order to achieve the overall aim of the paper. Despite being considered by few as simplistic, document analysis is a pertinent and accurate initial point for explaining current global phenomena, given its broader explanation capacity. The document analysis was grounded mainly on current scientific manuscripts found on databases such as SCOPUS, Web of Science, EBSCO and Google Scholar through the use of the keywords "e-learning", "theory of planned behaviour", "Covid 19", "distance learning", "environmental factors" and "academic technology adoption". In the same connection, with the objective of establishing a clear relation across a wide range of research variables, theme analysis was performed in this instance. This analysis allows academics the opportunity to identify potential relations or patterns across extensive research domains with a deductive preestablished objective. Consequently, the gathered information from secondary sources, the researchers' analyses and understanding of the related fields were established and associated to the primary research construct, i.e. intention to adopt e-learning. Furthermore, the current extraordinary context makes it imperative to carry out a document analysis given the increasing academic interest and the undoubtedly relevance for the future of technology use for academic purposes. Indeed, despite this being an extraordinary context, the academic future of the world might include technological factors, considering its potential benefits.

Therefore, the analysis of the theory of planned behaviour in the context of a pandemic crisis can reveal fundamental drivers of e-learning adoption. Certainly, through the investigation of contexts previous to the Covid-19 spread, it is feasible to carry out comparative analyses in order to find patterns and environmental impacts on behaviour intentions. Through literature analysis and the inclusion of relevant constructs in the TPB framework, the objective of this study has been accomplished and the final outcome of the endeavour was the construction of a conceptual framework (see Figure 1). This proposed model was constructed in order to be suitable in different contexts and realities. Finally, it is also pertinent to state that the authors of this study do not make any claim regarding a systematic documentary analysis and the consequent results emerging from the process. Despite the fact that an effort has been performed to identify significantly related themes of the research, with the objective of opening new prospects in the field of e-learning from the perspective of a forced mass adoption caused by a pandemic.

## **4. Conclusion, implication for theory and practice and limitations**

The technological transformations, motivated and accelerated by the pandemic crisis, have allowed humanity to continue with what we consider as "normal life". In the education field, the consolidation of online learning has challenged the current technology adoption models and a genuine necessity of theoretical and empirical evidence able to elucidate this phenomenon has emerged. Accordingly, this research was set out with the aim of proposing a theoretical framework that could provide a deeper enlightenment of the factors enhancing or hindering e-learning adoption during convulsed times. In order to achieve this objective, this investigation has turned spotlight on relevant constructs which could potentially moderate the students' behaviour intentions towards e-learning.

This article makes a major contribution by extending existing literature related to technology acceptance for educational purposes in a context of global pandemic crisis. A theoretical framework is proposed based on the

theory of planned behaviour, the unified theory of technology acceptance, and considering external factors that have been proved to be significant in the e-learning behaviour intention analysis. Undoubtedly, the inclusion of variables such as home environment, perceived costs and facilitating conditions interacting with attitudes towards the behaviour, can bring more insights into the real factors determining online learning systems adoption. The proposed model has the potential to explain a wide range of behaviours related with technology adoption in learning processes and open new prospects for future research.

The main limitation of this study, due to the recentness of the events, is the lack of empirical evidence supporting e-learning adoption dynamics during and after Covid 19 pandemic, particularly among non-developed countries. The proposed model is expected to predict a wide variety of events related with online learning. Nevertheless, the constructs utilized within the proposed theoretical model may not be described as overly comprehensive considering the limited coverage of extant literature and practical evidence. Furthermore, previous literature has confirmed personal traits and cultural values as important predictors in the context of adopting a technological system for education purposes. Therefore, the inclusion of these variables can expand the explanatory capacity of future models to the extent that they are underrepresented in the extant e-learning literature.

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