

Review Theories of E-Learning

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ABSTRACT

There are several theories, which can be adopted and integrated to investigate the adoption of technology from learners and instructors' perceptions in education environment. However, little of research were conducted to provide a comprehensive review of these theories. This study will present a comprehensive review of the essential theories such as Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Social Cognitive Theory (SCT), Diffusion of Innovations Theory (DIT), Motivational Model (MM) ,Model of Personal Computing Utilization (MPCU) ,Unified Theory of Acceptance and Use of Technology (UTAUT) Model Technology Acceptance Model (TAM). Also, this paper attempt to provide some justifications about why the TAM model has used in research more than others theories.

Keywords: Theories, E-Learning and Technology.

INTRODUCTION

Most research that conducted about exploring and illustrating the use of technology from users' perceptions adopted theory in the research in order to support in enterprising and explain the findings of the study. The researchers can construct the tools of their study based on theory. This can help and support to interpretive the results from their study. As the result, this paper came to review the theories that can be adopted in research to assist for explaining and enterprising the outcomes.

THEORIES OF E-LEARNING IMPLEMENTATION

In this section, the crucial theories that can be adopted in research in order to examine and investigate users' perceptions about the use of technology in their educational environment will be reviewed and presented.

Several models and frameworks have been developed to explain the implementation, acceptance and adoption of new technologies, including the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Social Cognitive Theory (SCT), Diffusion of Innovation

(DIT) theory, Motivational Model (MM), Model of PC Utilization (MPCU), Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology Acceptance Model (TAM). In addition to technologies and eLearning, these models have been used to predict and better understand behaviours across a variety of domains, including education, health and consumer behaviours (Taherdoost, 2017). The following section provides an overview of the aforementioned theoretical models, concluding in a more detailed overview of the TAM, including its strengths and weaknesses and the rationale for the selection TAM as a framework for studying the acceptance and integration of technology by users.

THEORY OF REASONED ACTION (TRA)

The Theory of Reasoned Action (TRA) model was developed by Fishbein and Ajzen in 1975 (Ajzen, 1985; Ajzen et al., 1980). The TRA is considered to be the foundation for subsequent theories and models that aim to investigate and explain behaviours (Taherdoost, 2017). The TRA posits that behaviour can be predicted and explained via cognitive domains including attitudes (positive and negative feelings towards a behaviour), social norms and influences, and behavioural intentions (Taherdoost, 2017). According to the TRA, behaviour is determined by an individual's intentions to perform the behaviour. In addition, behavioural intentions are a function of attitudes towards the behaviour and subjective norms (Ajzen et al., 1980; Silverman et al., 2016). It is considered that the best predictor of behaviour is intention or instrumentality, which is the belief that a particular behaviour will result in the intended outcome.

THEORY OF PLANNED BEHAVIOUR (TPB)

The Theory of Planned Behaviour (TPB) was introduced by Ajzen and colleagues in 1985, and is one of the most frequently cited influential models for predicting and understanding human behaviours (Ajzen, 1991; 2011). TPB extends upon the TPA (Ajzen, 1985; Ajzen et al., 1980), with the addition of a new variable, namely, perceived behavioural control (PBC). PBC is an individual's expectancy that undertaking the behaviour is within their control (Conner, 2001). Understandably, PBC is also determined by the availability of resources, opportunities and skills, in addition to the perceived significance of these in achieving certain outcomes (Taherdoost, 2017). Whilst both TRA and TPB assumes that behavioural intentions are a primary predictor of an individual's behaviour, TPB posits that behaviours are determined by intentions, but under certain circumstances PBC (Kan & Fabrigar, 2017). According to the TPB, behavioural intentions are governed by attitudes towards the behaviour, subjective norms, and PBC (Kan & Fabrigar, 2017). Subjective norms are an individual's perception of social pressures to perform or not perform a behaviour. It is assumed that individuals are more likely to carry out the procedure if it is regarded as desirable by significant others (Ajzen, 1991; Ham et al., 2015).

SOCIAL COGNITIVE THEORY (SCT)

Social Cognitive Theory (SCT) is a theoretical framework for analysing human motivation, thought and action, via a model of causation in which behaviour, cognition, and environmental influential factors interact with and influence each other (Bandura, 1997; Shu et al., 2011; Taherdoost, 2017). SCT is a widely accepted model that is used in predicting both individual and group behaviour, and identify ways and methods in which behaviour can be modified or changed (Shu et al., 2011). Moreover, SCT recognises that behaviour may not just be controlled by situations but also an individual's perception of the situation. Thus, the same stimuli may provoke different responses from different people at different times (Shu et al., 2011).

According to SCT, the concept of self-efficacy is considered to be a primary determinant of an individual's performance of a task or behaviour, and has several psychological and behavioural impacts on psychosocial functioning (Bandura, 1997; 1986). The concept of self-efficacy has been used in research to examine acceptance and utilisation of technologies (Compeau & Higgins, 1995; Marakas et al., 1998).

DIFFUSION OF INNOVATIONS THEORY (DIT)

The diffusion of innovation theory (DIT) (Rogers, 2003) is a model that seeks to explore factors that affect how an individual adopts new technologies. DIT aims to explain how, why and at what rate new ideas and technologies extend across cultures (Al-Jabri & Sohail, 2012). According to Rodgers (2003), there are factors that are key influencers of the adoption of a behaviour. These include relative advantage (the degree to which an individual perceives relative advantage or usefulness of a new technology over an old one, i.e. increased efficiency, and economic and social benefits); complexity (the extent to which a technology is considered to be difficult to understand or use); compatibility (the degree to which a technology is considered to be consistent with an individual's existing values, beliefs, habits and experiences); trialability (the capacity to experiment with new technologies before adoption); perceived risk (the degree of the risks in using a new technology); and observability (the extent to which a new technology is viable to the members of a social system) (Al-Jabri & Sohail, 2012). Several studies have examined the aforementioned DIT factors in the adoption of internet-based technologies, and have concluded that particularly the variables relative advantage, ease of use, and compatibility are salient factors for the adoption of internet and mobile technologies (e.g. Koenig-Lewis et al., 2010; Liu & Li, 2010; Papies & Clement, 2008; Vijayasarathy, 2004).

MOTIVATIONAL MODEL (MM)

The Motivational Model (MM) is a theoretical model built on concepts of extrinsic and intrinsic motivational factors (Abduljalil & Zainuddin, 2015; Romano et al., 2010; Taherdoost, 2017). Extrinsic motivation relates to the performance of an activity because the individual perceives it to be instrumental in achieving valued outcomes, i.e. improved performance at work (Davis, 1989; Davis et al., 1992; Davis & Bagozzi, 1989). It is thought that extrinsic motivation influences behaviour due to the reinforcement of tangible outcomes, whilst intrinsic motivation refers to the undertaking of an activity for no other external reinforcement other than the process of performing the activity itself (Davis, 1989; Davis et al., 1992; Davis & Bagozzi, 1989). In accordance with the application of an MM in the acceptance and application of technologies, perceived usefulness (i.e. a person's expectation that using the technology will result in improved performance) would be an example of extrinsic motivation, whereas enjoyment would be an example of intrinsic motivation (Davis, 1989; Davis et al., 1992; Davis & Bagozzi, 1989). Research has shown that perceived usefulness is particularly influential in the voluntary use of technologies and as a variable it exhibits strong and consistent relationships with usage behaviour and intentions (Davis et al., 1992; Taherdoost, 2017).

MODEL OF PERSONAL COMPUTING UTILIZATION (MPCU)

The Model of Personal Computing Utilization (MPCU) was developed by Thompson et al. (1991), building on Triandis' (1980) theory of interpersonal behaviour and their theoretical framework to describe how human behaviour occurs and determine the factors that influence behaviour. According to Triandis (1980) behaviour is determined by attitudes (what an individual would like to do), social norms (what they think they should do), habits, and

expected consequences of the behaviour. Thompson et al. (1991) refined Triandis' theoretical framework with the intention of predicting personal computing utilisation. The MPCU comprises of six core domains including affect (feelings towards the use of PC), social norms related to using PC, habits relating to PC usage, expected consequences of PC usage, and the extent of facilitating conditions available to assist the individual (Alkhwaldi & Kamala, 2017)

UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) MODEL

The UTAUT model is typically employed in ICT and it provides a tool for assessing the likelihood of success of technology introductions and examining the drivers of acceptance (Venkatesh et al. 2000; Alkharang 2013). This model was originally formulated by Venkatesh and colleagues (2003), following a review of user acceptance literature and an empirical comparison of eight common models in technology acceptance (i.e. theory of reasoned action, technology of acceptance model, motivational model, theory of planned behaviour, a model combining the technology acceptance model and the theory of planned behaviour, the model of PC utilisation, the innovation diffusion theory, and the social cognitive theory). The findings from this comparison were synthesised and utilised to formulate and empirically validate a unified model, which integrated elements of all the common models of technology acceptance. The formulated UTAUT model outperformed all the eight aforementioned models, when tested against core determinants of intention and usage, and moderators of key relationships. The final UTAUT model developed by Venkatesh and colleagues (2003) posits three determinants of intention to use (performance expectancy, effort expectancy and social influence) in addition to two determinants of usage behaviour (intention and facilitating conditions).

TECHNOLOGY ACCEPTANCE MODEL (TAM)

The TAM falls under the category of theories that aim to understand how individuals form attitudes towards new forms of technology. The TAM was originally developed by Davis (1986; 1989; 1993), as an adaptation of the theory of reasoned action (Fishbein and Ajzen, 1975), to examine user acceptance of information systems and technologies and to explain computer usage behaviour (Lai, 2017). This original model consisted of two tested domains: perceived usefulness (PU) and perceived ease of use (PEU). PU relates to an individual's subjective likelihood that the use of a system or technology will improve their actions and outputs, and PEU relates to the individual's expectations of the degree of effort required in the use of a system or technology (Chen et al., 2011). The original TAM also purports that an individual's beliefs towards a system or technology may be influenced by other external variables.

Subsequently, the TAM was developed further by Venkatesh and Davis (1996), who discovered that PU and PEU directly influenced behavioural intention. Venkatesh and Davis (2000) also provided explanations for why users find a given system useful at pre-implementation, one month post-implementation, and three months post-implementation. In developing the TAM 2, the researchers hypothesised that an individual's assessment of the match between work goals and the consequences of performing the work with a certain system, forms the basis for perceptions regarding the usefulness of the system (Venkatesh & Davis, 2000). Later, Venkatesh and Bala (2008) developed the model further into an integrated model coined TAM 3, which defined determinants of PU and PEU (individual differences, system characteristics, social influence and facilitating conditions). In the TAM 3, PEU to PU, system anxiety to PEU, and PEU to behavioural intention were all moderated by experiences (Lai, 2017).

The TAM remains one of the most influential and commonly used models for assessing the use of and attitudes towards the use of different technologies and systems amongst various stakeholders (i.e. educators, students and staff) (Asiri et al., 2012; Venkatesh & Bala, 2013). The model has been adapted for use in a number of studies across various disciplines (e.g. Stoel and Lee, 2003; Masrom, 2007; Park, 2009; Liu, Liao and Pratt, 2009; Traye and Hassan, 2013; Alharbi and Drew, 2014; Seleviciene and Burksaitiene, 2016). Furthermore, the model has also been utilised to specifically investigate learners' perceptions of eLearning and LMS systems such as Blackboard (Masrom, 2007; Park, 2009; Ng, 2011). Therefore, given its validity and robustness, the TAM was adopted for several studies.

APPLICATION OF TECHNOLOGY ACCEPTANCE MODEL (TAM) IN RESEARCH

Many studies have used and adopted the TAM in order to investigate learners' perceptions of the integration of technology into their learning. For instance, Shroff, Deneen, and Ng (2011) conducted a study in Hong Kong. The aim of the study was to examine students' perceptions of the use of Blackboard for one course. The sample was only 72 participants. The results revealed that there was a strong relationship between the perceived ease of use and the students' attitudes towards the use of technology, whereas there was no relationship between usefulness and the attitudes towards the Blackboard system. However, Masrom (2007) and Park (2009) found there was a relationship between the PEU and PU, and attitudes towards the use of eLearning.

TECHNOLOGY ACCEPTANCE MODEL (TAM) STRENGTHS

As a flexible, cost effective and easy-to-administer research instrument, which is suitable for use with large and diverse sample sizes, the TAM confers several advantages and has been widely used as a research instrument in many empirical studies (Chuttur, 2009; Flavian & Gurra, 2007; Stoel & Lee, 2003; Szajna, 1996). In addition, the TAM has been refined and adapted extensively to improve validity, and is therefore a reliable and robust predictive model for examining the factors that may determine the success or failure of the implementation and integration of particular technologies within institutions (Ahn et al., 2015; Brangier & Hammes-Adel , 2011). Moreover, TAM has been shown to have highly reliable measures, that can be used in a variety of contexts, to increase understanding about how individuals form attitudes (perceived use; perceived ease of use) towards the use of technologies, and behavioural intentions towards the acceptance and use of technologies (Asiri et al., 2012; Chen et al., 2011; Flavian & Gurra, 2007; King & He, 2006; Szajna, 1996; Venkatesh & Bala, 2013).

TECHNOLOGY ACCEPTANCE MODEL (TAM) LIMITATIONS

Nevertheless, whilst the TAM confers several advantages as a research instrument, there are also a number of limitations, associated with the theoretical underpinnings and its methodology, measures and variables. A primary criticism of TAM are the gaps in the proposed linkages between attitudes towards using technology, intentions to use technology, and actual usage of a particular technology (Bagozzi, 2007). Firstly, the TAM only specifies two factors (PEOU; PU) to be taken into account in the formation of an intention to act. However, it is claimed that there are numerous factors, motivations and influences for acting on assumed reasons for action (Bagozzi, 2007). In terms of PEOU and PU, a critique is that whilst an individual may be able to recognise and accept these as favourable, this may not result in motive to act (Bagozzi, 2007).

Secondly, the role of intention as a predictor of behaviour is a well-established variable in the TAM, and other behavioural models including the Theory of Planned Behaviour (TPB) (Ajzen, 1991, 2011) and the Theory of Reasoned Action (TRA) (Ajzen et al., 1980). The intention-behaviour linkage assumption has been critiqued because it treats behaviour as the end goal and thus fails to consider the various intermediary actions and influences (Venkatesh et al. 2003). The gap connecting behavioural intentions and the actual undertaking of an action is difficult to measure, with many intervening steps and barriers, both anticipated and not anticipated (Bagozzi, 2007). Moreover, behavioural intentions are also influenced by various psychological, behavioural, environmental and socioeconomic attributes and traits, in addition to factors such as social and cultural norms and values, which could influence acceptance of and willingness to use technology (Bagozzi, 2007; Flavian & Gurrea, 2007; Zahid et al., 2013). Therefore, a key limitation of TAM is the lack of explicit focus on the steps taken (storing, processing and using of information), and neglecting to account for influential factors and barriers involved in gaining behavioural intention and reaching actual end goals (Zahid et al. 2013).

From a methodological perspective, the TAM is criticised for a reliance on qualitative methods and measures, which fail to take into account for participants' feelings and perceptions towards the use of a particular technology, beyond PEOU, PU and BI (Brewer and Hunter, 2006; Tashakkori & Teddlie, 2003; Willis, 2008).

TECHNOLOGY ACCEPTANCE MODEL (TAM) RATIONALE

TAM was originally developed as an adaptation of the TRA (Fishbein and Ajzen, 1975), as a means for examining usage and acceptance of ICT systems and technologies. TAM was developed with a specific focus on behaviours towards, and factors influencing, behaviours in terms of e-learning and technology, as opposed to other models of behaviour and behaviour change, which examine behaviour and behaviour change in a much broader sense and using general scales; that is, TPB, SCT and MM. Unlike some theoretical models such as SCT and TBP, which integrate perceived outcomes in predicting behaviour, TAM focuses solely on beliefs about the technology (Taherdoost, 2017).

According to a recent review of technology acceptance and adoption models and theories, TAM, DOI and UTAUT are the most commonly used models in research (Taherdoost, 2017). Moreover, technology Acceptance Model (TAM) was selected and used in studies by many researchers as the most appropriate and efficient theoretical model for gaining information on the implementation and utilization of eLearning.

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