

FACTORS THAT IMPACT THE ACCEPTANCE AND USAGE OF E-ASSESSMENT BY ACADEMICS IN SAUDI UNIVERSITIES

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Abstract

As assessment is one of the important pillars of the learning process, and E-assessment has become an essential part of education systems. E-assessment developed to address some of the limitations and problems of a paper-test. In last 10 years, E-assessment has improved in developed countries such as UK. In contrast, in Saudi Arabia, one of the developing countries, less attention is still paid to the usage of E-assessment and research which discusses E-assessment issues in Saudi Arabia is limited. Consequently, this paper will investigate the factors that impact on academic's use of E-assessment in Saudi universities. In order to examine these factors, this paper adopts the Decomposed Theory of Planned Behaviour model (DTPB) with slight modification. Age and gender are added to the proposed model as moderating factors that affect attitude, subjective norms and perceived behavioural control. IT support is also added as a factor under perceived behavioural control and technology facilitating conditions are included under resources facilitating conditions.

Keywords: E-assessment, E-exam, electronic exam, online exam, online assessment.

1. INTRODUCTION

Learning begins at an early age in human life, and assessment is considered as a vital part of learning (Gilbert, Whitelock, & Gale, 2011). Assessment is a measure used to evaluate the performance and progress of an individual (Llamas-Nistal et al., 2013). Assessment based on using information technology, which called "E-assessment", has become one of the systems introduced to address some problematic issues in traditional assessment. E-assessment has successfully provided direct results and feedback, reducing tutor's time and effort, facilitating the assessment of problem-solving, and improving students' performance (Gilbert et al., 2011; Ridgway et al., 2004; Crews & Curtis, 2010; Way, 2012; Gikandi et al., 2011; Sorensen, 2013).

Research into E-assessment applications has been increased in some countries to gain more understanding of its impacts on the education sector. The UK government has been increasing the usage of E-assessment on a very inspirational project (Ridgway et al., 2004). From the 1990s, the Joint Information System Committee (JISC) in the UK has recognized the importance of E-assessment in the UK education sector, and the requirements of research and education communities in this area (McGill, 2006). JISC support many

research and project in E-assessment in UK. As a result, a large number of research studies are introduced to cover E-assessment issues in UK.

In contrast, in Saudi Arabia, the focus region of this study, there is a shortage of research and studies that investigate the E-assessment issues. One of these issues is the acceptance and usage of E-assessment in Saudi Universities. This paper will investigate the factors that impact on academics accepting and using E-assessment in Saudi universities.

2. LITERATURE REVIEW

The use of technology in assessment began in the 1920s', when Sidney L. Presses designed a machines for automatic testing (Skinner, 1958). Moreover, at the same time the schools started to use standardized assessment, and automatic scoring technology, which helped to make large-scale testing convenient and cost-effective (Audette, 2005).

A massive change in many sectors, especially in education, occurred when the World Wide Web was introduced in the 1990's (Llamas-Nistal et al., 2013). From that time onwards, many companies introduced their own E-assessment system. In England, Wales and Northern Ireland principles and guidance for E-assessment were introduced by JISC (Joint Information System Committee) to clarify the different qualifications regulators in United Kingdom (JISC 2007). In 2009 IMS Global Learning Consortium produced IMS Question and Test interoperability Specification (IMS, 2008). In 2009 Cisco, Intel and Microsoft produced Transforming Education: Assessing and Teaching 21st Century Skills (Cisco, Intel & Microsoft 2009).

Since E-learning and E-assessment have been introduced the learning process has developed. E-assessment has enhanced the measurement of learner outcomes and made it possible to obtain immediate and direct feedback (Gilbert et al., 2011). It is essential to create a system to assess students, which take into account the educational goals and help students to develop their skills which will be useful for the society in the long-term (Ridgway et al., 2004). JISC (2007) defined E-assessment as the end-to-end electronic assessment process, where ICT (Information Communication Technology) is used for the whole assessment processes from the presentation of questions to the saving of the learners responses. E-assessment has advantages comparing with paper-tests. The paper test consumes time for the tutor to correct each paper, but using E-assessment can save the tutor time, (Crews & Curtis, 2010; Donovan et al., 2007; Eljinini & Alsamarai, 2012; Gikandi, Morrow, & Davis, 2011; Gilbert et al., 2011; Ridgway et al., 2004; Sorensen, 2013), for example, in research in Leeds Metropolitan University it was found that E-assessment saved up to £3000 per cohort in staff time (Gilbert et al., 2011). E-assessment, also, provides immediate feedback, which helps to improve the learning level (Crews & Curtis, 2010; Gilbert et al., 2011; Ridgway et al., 2004; Way, 2012). Moreover, it helps the students in remote areas to learn and be assessed in their locations and it can be taken at any time, which provides flexibility for the students (Ridgway et al., 2004; Gilbert & Gale 2007; Williams & Wong 2009; Way 2012).

3. E-ASSESSMENT IN SAUDI UNIVERSITIES

The Saudi population has significantly increased, and half this population is under university age (Ministry of Economy and Planning, 2007). As a result, thousands of students are left without a place at universities. Therefore, the Ministry of Higher Education has introduced technology into education. In 2006, the National Centre for E-learning and Distance Learning (NCEDL) was established under the management of the Higher Education Ministry, to offer E-learning courses throughout the Kingdom (Almegran, Al-Yafei, & Ahmad, 2007). According to Madar Research, the Saudi government spent USD 125 million in 2008 to set up the E-learning system (Gazette, 2008).

This centre provides nationwide E-learning development in the universities with the assistance of the Open University in Malaysia and Multimedia Technology Enhancement Operations (Almegran et al., 2007). It is, also, responsible for research and development to facilitate E-learning in higher education, which includes the National Learning Management System (Jusur), and the National Repository (Maknaz) to save, manage, and share learning objects between Saudi universities (Alkhalifa, 2010; Al-fahad, 2009). Furthermore, NCEDL operates a project call Tajseer (in English: Bridging), that helps to improve the traditional methods of teaching and learning using technology (Alkhalifa 2010; Al-fahad, 2009).

The Saudi government has integrated E-learning and E-assessment systems within its educational systems (schools and higher education) (Hakami et al., 2014). However, while there are many studies about E-learning in Saudi Arabia (Alebaikan & Troudi, 2010; Al-fahad, 2009; Alkhalfaf, Drew, & Alhussain, 2012; Almegran et al., 2007; Al-Shehri, 2010; Malek & Karim, 2010; Mirza, 2007; Yushau, 2006), few studies

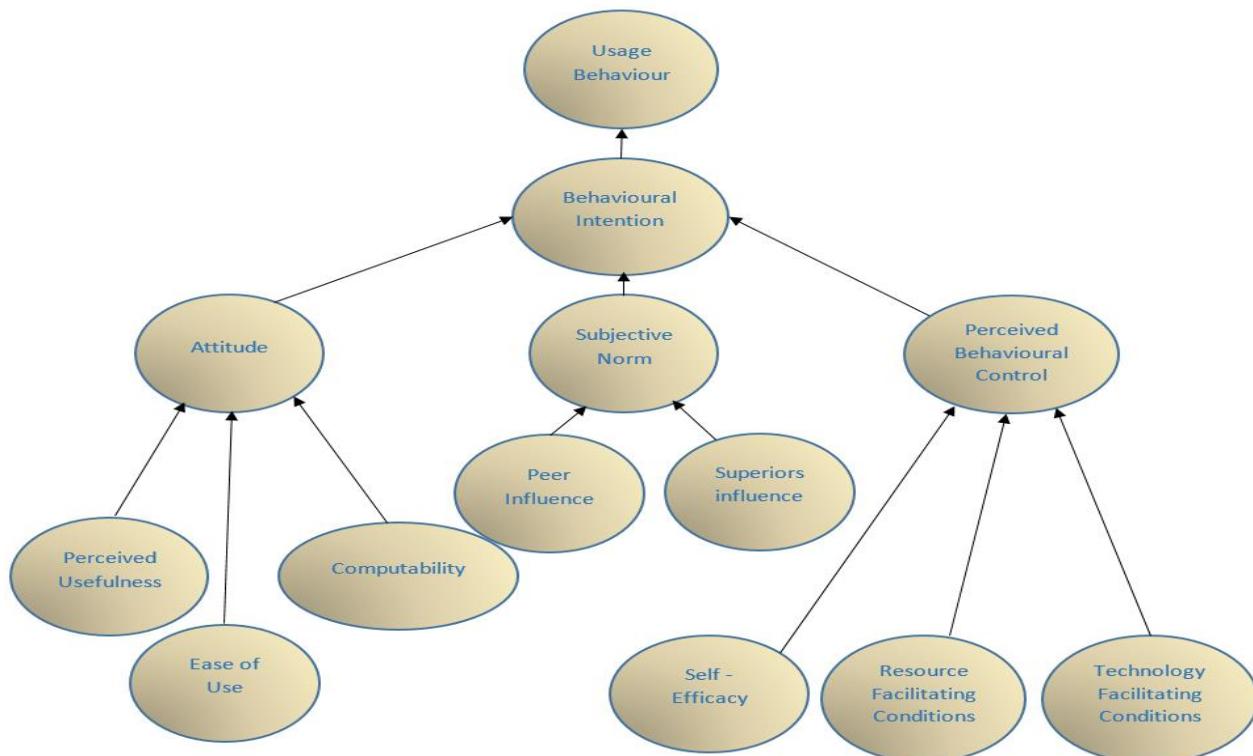
mention E-assessment. Moreover, there is no research which has investigated the factors that impact on the use of E-assessment by academics in Saudi universities. Therefore, this paper attempts to identify the factors that affect the academics' willingness to accept and use E-assessment.

4. THE MODEL OF ACCEPTANCE AND USAGE OF E-ASSESSMENT

Many researchers and practitioners have attempted to explain and introduce a theoretical perspective for a user's acceptance and adoption of ICT (Information Communication Technology). For example, the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1985), Technology Acceptance Model (TAM) (F D Davis, 1985), and the Decomposed Theory of Planned Behaviour (DTPB) (Taylor & Todd 1995).

DTPB is similar to TAM; it is used for predicting user intentional behaviour towards using technology. DTPB is created from TPB and was introduced by, Taylor & Todd (1995) to address the weakness of TPB. DTPB identifies salient beliefs that may affect adoption and use of technology, which can be used across different settings (Taylor & Todd 1995; Ejaz 2014). In this model Taylor & Todd (1995) keep the three determinations of behavioural intention in TPB: attitude, subjective norm and perceived behavioural control (Figure.1). They decompose the determination 'attitude' into three elements: perceived usefulness, perceived ease of use and compatibility. This model is a combination of the best elements of TAM and TPB (Mathieson, Peacock, & Chin, 2001). Furthermore, the decomposition of these beliefs within one model (DTPB); make it able to predict the behaviour under investigation and also have the power to provide explanations (Shih & Fang, 2004). As a result, the model becomes more valuable, understandable and applicable (Ejaz, 2014).

Figure.1 Decomposed Theory of Planned Behaviour (DTPB) (Taylor & Todd, 1995)



The DTBP model includes the most significant factors that can affect user behavioural intention towards using ICT. DTPB, also, provides a complete picture to understand user behavioural intention to accept and use ICT. Figure. 2 illustrates the three models (TAM, TPB, DTPB) and how DTPB contains all the important factors from the TAM and TPB models (Chien, Wu, & Hsu, 2014). In addition, Table.1 shows the factors in each model, in order to select the best model that includes most of the factors that may have an impact on the use of E-assessment by lecturers in Saudi universities.

Figure. 2 TAM, TPB and DTPB (Chien et al., 2014)

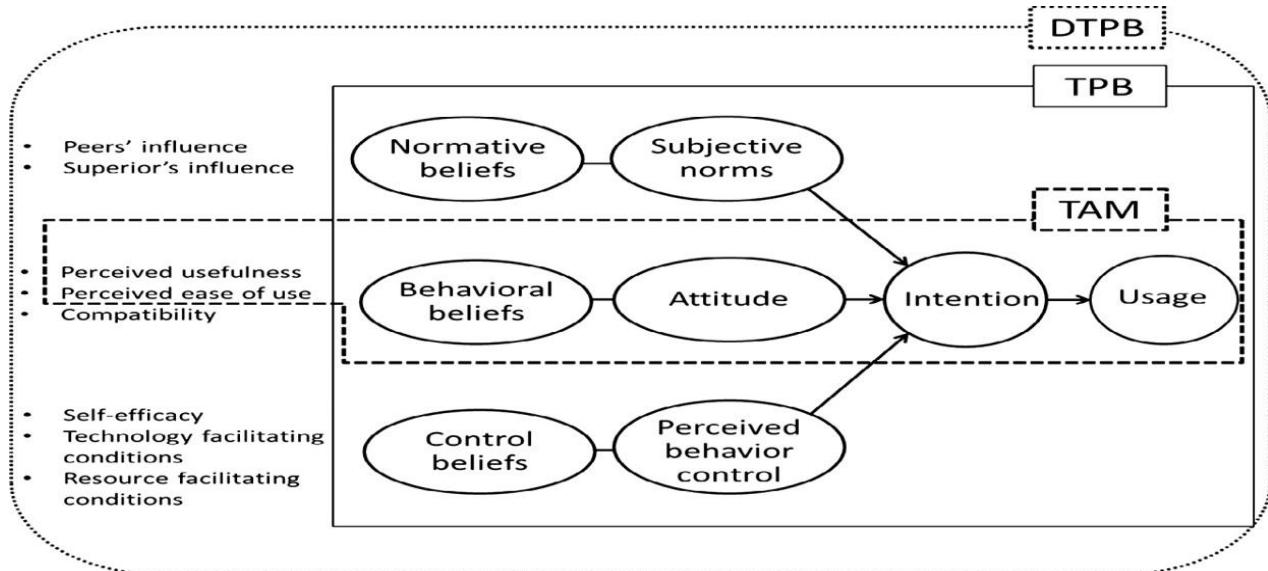


Table. 1 Table.1 Factors in each model

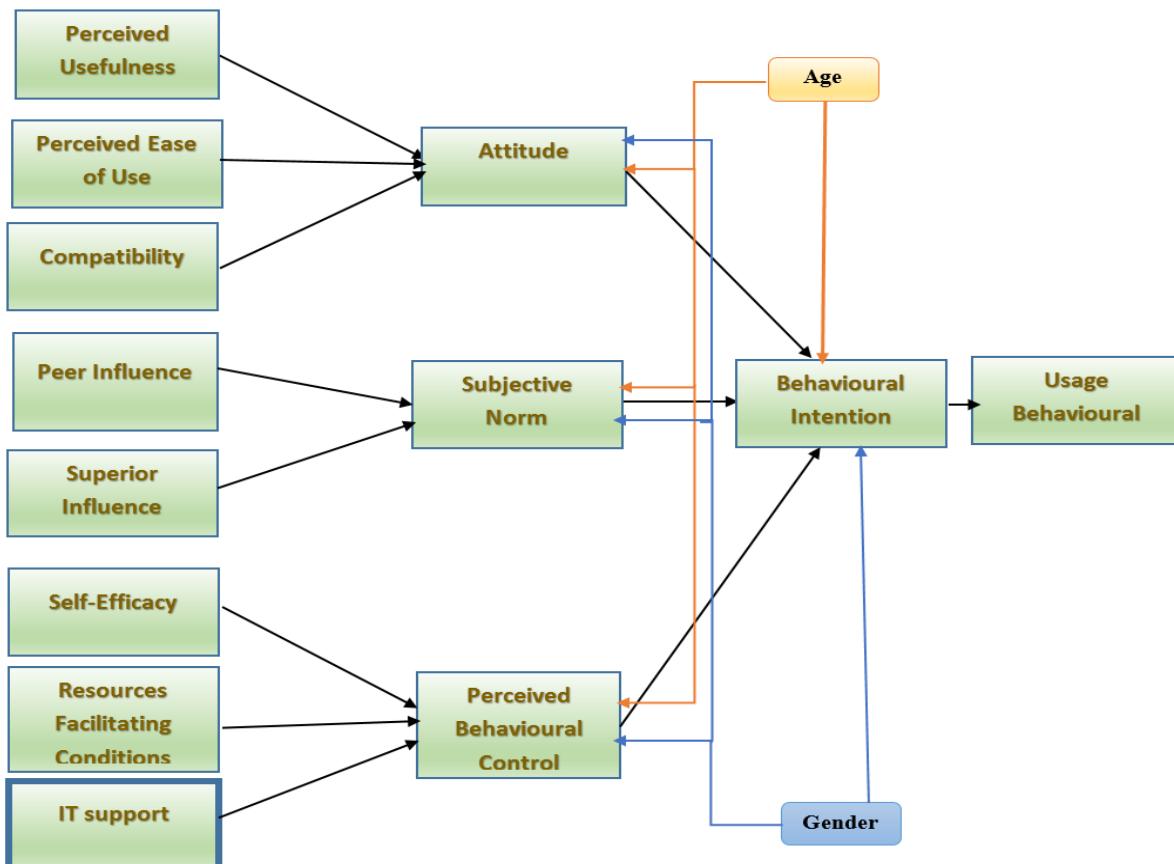
Models/ factors	Subjective Norms (SN)			Attitude				Perceived Behavioural Control(PBC)			
	SN	Peers' influence	Superiors influence	Attitude	Perceived usefulness	Ease Of use	Compatibility	PBC	Self-Efficacy	Resource facilitating	Technology facilitating
TAM	✗	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗
TPB	✓	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
DTPB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The DTPB model has been used widely to explain individuals' behaviour towards using technology (Ejaz, 2014). Many research and studies have applied DTPB in different domains, including: finance, business and education (Ejaz, 2014). In the education domain, Chien et al. (2014) used the DTPB model to investigate

teachers' intention to use technology-based assessments and their actual use. They found that the DTPB model can describe and predict the actual usage of a system. Sadaf et al. (2012); also; explored teachers' intentions to use Web 2.0 technology in their classrooms, and found that the three constructs (attitude, subjective norm and perceived behavioural control) had a significant impact on the teachers' intentions. Consequently, this paper adopted the DTPB model, with some editing, to produce the Model of Acceptance and Usage of E-assessment to examine the acceptance and utilisation of E-assessment by staff (lecturers) in Saudi universities. This model includes all the factors in DTPB except technology facilitating conditions, which is transferred to resource facilitating conditions. This is because technology is considered as one of the resources (Taylor & Todd, 1995) . IT support is added as a factor under perceived behavioural control, because some studies have insisted on the importance of availability of IT staff to support lecturers and students using E-assessment (Eljinini & Alsamarai, 2012; Sitthiworachart, Joy, & Sutinen, 2008; Way, 2012). Age and gender are added in this study as moderating factors, because some studies have provided evidence that age and gender impact attitude, subjective norm and perceived behavioural control (Venkatesh et al., 2000; Morris & Venkatesh, 2000; Venkatesh et al., 2003). The Model of Acceptance and

Usage of E-assessment (Figure. 3) will investigate the factors that impact academics' intention towards using E-assessment in Saudi universities. Moreover, this model will identify the strongest factors, that affect the usage of E-assessment in Saudi universities, and it will clarify the relationships between these factors.

Figure. 3 The Model of Acceptance and Usage of E-assessment



5. The MODEL OF ACCEPTANCE AND USAGE OF E-ASSESSMENT

The conceptual model of this study is shown in Figure 3. It consists of the constructors described in the following sections:

5.1 Behavioural Intention: It is the degree to which the individual perform or not perform certain behaviour (Fishbein & Ajzen, 1975). It is divided into three determinations: attitude, subjective norm and perceived behavioural control.

5.1.1. Attitude: This means the positive or negative evaluation indicated by the individual to undertake certain behaviour (Icek Ajzen, 2005). It is decomposed to three factors:

- I. *Perceived usefulness:* This is the degree to which the person believes that using a specific system will enhance his/her performance (Fred D Davis, 1989). In this study it is used to mean the belief that using E-assessment for a member of the academic staff will enhance his/her performance. Perceived usefulness is an important factor that can indicate user intention to use technology (Anandarajan, Igbaria, & Anakwe, 2002; Ghorab, 1997).
- II. *Perceived ease of use:* This is defined as the degree to which using a specific system will not need an effort (Fred D Davis, 1989). In the current study it is used to mean that, if the E-assessment does not need more effort and it is easy to use, member of staff is likely to accept and use it. Davis (1989) stresses the importance of this factor in user technology acceptance. Other studies have indicated that perceived ease of use play a key role in user intention to accept new technology (Anandarajan et al., 2002; Ghorab, 1997).

III. **Compatibility:** This is the degree to which the current system matches past experience and current requirements of the user (Moore & Benbasat, 1991). E-assessment should fit with the lecturers' needs and their past experience to motivate them to use it.

5.1.2. Subjective norm: This is defined as the individual perception, which is influence by other people, towards performing particular behaviour (Fishbein & Ajzen, 1975). Subjective norm addresses the impact of social influences. It consists of two factors:

- I. **Peer influence:** This is defined as the effect of family, friend and peers in individual intention to perform certain behaviour (Icek; Ajzen & Fishbein, 1980). In this study, peer influence means the impact of the others' opinions on lecturers in using E-assessment.
- II. **Supervisors' influence:** This means the influence of the supervisor such as the head of school, in encouraging lecturers to use E-assessment.

5.1.3. Perceived behavioural control: According to Ajzen (1991) perceived behavioural control "refers to people's perception of the ease or difficulty of performing the behaviour of interest". In other words, the user should have control over the influences that may affect performing certain behaviour. This constructor is decomposed into three factors:

- I. **Self-efficacy:** This is defined as the degree to which the individual has the ability to perform specific behaviour (Todd & Model, 1995). It is important that lecturers feel that they have the ability to use E-assessment and be confident to deal with it. Some studies have highlighted the effectiveness of self-efficacy in users accepting technology (Compeau, A. Higgins, & Huff, 1999; Taylor & Todd, 1995b).
- II. **Resource facilitating conditions:** This influence includes the external factors that affect a user's decision to perform particular behaviour (Ejaz, 2014). Taylor & Todd (1995) explain that resource facilitating conditions include sufficient time, money and technology, and if one of these resources is inadequate or absent that will impact the user technology acceptance. Lecturers should have adequate time to use E-assessment, and have the money and technology that they need to use E-assessment. Eljinini & Alsamarai (2012) found that the availability of infrastructure impacts the success of E-assessment implementation. Way (2012) also highlights the importance of the infrastructure factor in establishing an E-assessment system.
- III. **IT support:** This is defined as the presence of supportive IT staff, who help lecturers to use E-assessment and design flexible E-assessment applications. The successful implementation of E-assessment depends on supporting IT staff to provide training courses (Sitthisak, Gilbert, & Davis, 2008), and to implement the system correctly (Eljinini & Alsamarai, 2012; Way, 2012).

5.2 Moderate Factors:

- I. **Gender:** The gender can affect attitude, subjective norm and perceived behavioural control (Morris & Venkatesh, 2000; Viswanath Venkatesh et al., 2003). Researchers have pointed that there are differences between males and females, and the male tends to be more highly task-oriented (Minton & W. Schneider, 1980).
- II. **Age:** The age of an individual has an influence on attitude, subjective norm and perceived behavioural control (Morris & Venkatesh, 2000; Viswanath Venkatesh et al., 2003). Morris & Venkatesh (2000) point out that its effect on attitude is more noticeable for younger users, whereas its effect on perceived behaviour control is more noticeable for older users.

6. FUTURE WORK

To validate the Model of Acceptance and Usage of E-assessment, the next step will be interviews with 10- to 15 experts to ensure that these factors are likely to have an influence on lecturers' use of E-assessment. This step will also check if there are other factors that may affect lecturers to use E-assessment. These experts will be a group consisting of: heads of deanships E-learning, E-assessment experts, and the electronic service supporters. Later, the result of the interviews will be analysed, in order to identify the factors that really affect E-assessment usage. After that, a questionnaire will be designed and delivered to lecturers from different universities in Saudi Arabia. To validate this factors and identify the factors which have the strong effect on the lecturers' intention to use E-assessment.

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