A FRAMEWORK FOR ACCEPTANCE OF E-ASSESSMENT BY
STUDENTS IN SAUDI ARABIAN UNIVERSITIES

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Abstract
Assessment is a very important part of the learning process. With the increase of using information
technologies in higher education, the need of adopting E-assessment is rising. E-assessment which uses
several technologies to assess students provides many benefits for educational organizations, staff and
students compared to paper based assessment. Understanding students’ attitudes towards E-assessment
plays a key role in the success and acceptance of E-assessment systems. In fact, a number of studies
investigated students’ perceptions and attitudes toward E-assessment in different countries such as the UK.
However, no research has been conducted in the context of Saudi Arabian universities. Therefore, the main
contribution of this paper is the investigation of the factors that affect students’ attitudes towards using E-
assessment in Saudi Arabian universities. In order to make effective use of E-assessment, the possible
factors that affect students’ attitude towards E-assessment are used in developing a conceptual framework.
The framework includes factors related to Individual, social, organizational and systems issues.

Keywords: Students’ attitudes, E-assessment, E-exam, Saudi Arabian Universities

1. INTRODUCTION
Nowadays, technology has become an essential part of the learning process which led to prove that it is
going to be also an essential of the assessment process (Bennett, 2002; Gipps, 2005). E-assessment
systems can offer new forms of teaching and learning activities in this digital age (Whitelock, 2009). The term
E-assessment is defined by Ridgway et al. (2004) as electronic assessment processes which involve the
implementation of ICT to use it in the presentation and processing of the assessment materials. E-
assessment provides a number of advantages for educational organizations, staff and students. The most
valuable benefits of E-assessment are as follows: it can reduce the time of marking for staff, decrease
administrative loads and manage large numbers of students for the organization, enhance a good quality of
feedback and improve students’ performance (Bull & McKenna, 2003; Gilbert, Whitelock, & Gale, 2011).

In recent years, there has been an increasing focus on the state of E-assessment in different countries
where these researches are still limited. A number of studies on the acceptance and adoption of E-
assessment have listed different factors that act as barriers to the adoption of e-assessment in the higher
education sector, namely cultural, infrastructural, support, policy and personal limited awareness (Bull, 1999; Whitelock & Brasher, 2006; Tomas et al., 2015; McCann, 2010). E-assessment projects have been growing in the UK recently. However, they are not widely adopted in Saudi Arabian higher education. The UK government has invested in many projects to extend the use of E-assessment in higher education (Ridgway et al., 2004). This paper focuses on Saudi Arabia where E-assessment has not gained much popularity in Saudi universities.

2. LITERATURE REVIEW

2.1. E-assessment

Information and communication technology (ICT) has become central in education. Ridgway et al. (2004) assert that the adoption of ICT in education provides a link between learning, teaching and assessment. In fact, using technology to assess learners can be driven by educational goals (Ridgway et al., 2004). While E-learning has been a part of higher education for some time, however, E-assessment is a fairly new term (Buzzetto-More & Julius, 2006). E-assessment refers to the use of electronic technologies to assess students in the learning process (Tomas et al., 2015). The term E-assessment is defined by Ridgway et al. (2004) as electronic assessment processes which involve the implementation of ICT to use it in the presentation and processing of assessment materials. They argue that E-assessment would encourage the rethinking of the whole curriculum and learning process (Ridgway et al., 2004).

There are different advantages of using e-assessment for organizations, staff and students depending on their goals. Ridgway et al. (2004) justify the benefits of E-assessment in many ways. They believe that e-assessment can assess valuable skills for learners and provide more accurate results with immediate feedback (Ridgway et al., 2004). Whitelock (2007) discusses the findings from two formative E-assessment projects in the UK higher education. She clarifies that E-assessment methods have contributed to ease of administration, time and flexibility and have also improved accessibility for students. The feedback which offered by these systems enhances better learning environment and outcomes for students by encouraging them to be independent thinkers (Whitelock, 2007).

There is now a growing body of literature about the role of electronic assessment in the UK higher education. (Warburton & Conole, 2003) report that there was a clear increase of the integration of E-assessment across the UK higher education sector since 2003. The Joint Information Systems Committee (JISC) is an organization concerned with the importance of digital technologies for UK education and research (JISC, 2007). JISC supports UK post-16 and higher education and research by supplying leadership in the use of ICT in support of learning, teaching, research and administration (JISC, 2007). JISC’s Organisational Committee has funded a number of projects on E-assessment practice in the UK.

In contrast, the developing countries have received little research attention in E-assessment than developed countries such as the UK. However, E-assessment is becoming one of the important topics in many universities in the Arab countries. Regarding E-assessment, very few universities in Saudi Arabia have started using the E-assessment system for their exams. Alsamarai et al. (2014) investigated the use of E-assessment systems in different universities in Arab countries. They found that King Khalid University in Saudi Arabia is one of the first Saudi universities that integrated technology in their assessments. It has introduced electronic exams in the colleges of education and it has used iPads to deliver E-assessment (Alsamarai et al., 2014). It is clear that most higher education institutions, especially in developing countries, are facing limited research on E-assessment. Many factors still negatively influence the acceptance of e-assessment in these counties. Thus, this study is conducted to investigate students’ attitudes towards E-assessment in Saudi Arabian universities.

2.2. The Importance of Students’ Attitude in This Study

Attitudes are important for study; it is a reflection of an individual’s personal perspective towards an action and can be strongly predictive of behaviour (Tella & Bashorun, 2012; Delcourt & Kinzie, 1991). Assessing students’ attitude towards computer testing is very important as a positive attitude may decrease the negative connotations linked with the examination process. Consequently, that results in a more comfortable testing environment for students (Ogilvie et al., 1999). Student beliefs and attitudes play a key part in driving information technology usage and its success (Bhattacherjee & Premkumar, 2004). In fact, attitudes can be affected by different external factors such as a person, a physical object, a behaviour, or a policy (Ajzen & Fishbein, 1977).
3. THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

It is important to understand students' attitude as they are the end-users for the systems. In order to make any system accepted and widely used by the end-users, the organisations should understand factors that influence individuals to use a system before the actual development of the system (Imtiaz & Maarop, 2014). This paper proposes a framework for acceptance of E-assessment by students in Saudi Arabia universities.

3.1. Framework Construction

The framework for the acceptance of E-assessment by students in Saudi Arabian universities was constructed in three stages: Stage one: It reviewed models and theories for technology acceptance. Stage two: It reviewed previous study on acceptance models in E-assessment. Stage three: It reviewed students' perception and attitude of E-assessment in universities in different countries.

3.1.1 Review of Factors Influence on acceptance Technology

A large and growing body of literature has investigated the usage of ICT in higher education. They explain and predict the individual's attitude by applying acceptance of technology models. The Theory of reasoned action (TRA) is proposed by Fishbein and Ajzen (1975) which measured the behaviour intention in two determinations: The attitude toward behaviour and the subjective norms. Later on, the Theory of Planned Behaviour (TPB) was developed by Ajzen (1985) to tackle the limitations which appeared in the (TRA). The person's intentions in the (TRA) can be determined by just two factors: the personal factor and the social influence. The Technologies Acceptance Model (TAM) was developed by Davis (1989) to explain and predict technology use. TAM adapted the TRA but in the view of computer acceptance behaviour. It is hypothesized that two specific variables perceived usefulness and perceived ease of use, are the fundamental determinants of user acceptance of technology (Davis, 1989). Unified Theory of Acceptance and Use of Technology (UTAUT) theory was developed by Venkatesh and others in 2003 (Venkatesh et al., 2003). The UTAUT was formulated by integrating elements across eight models. This theory is constructed in four variables which are: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC). The three variables (PE), (EE) and (SI) have an effect on Behavioural Intention while (FC) has a direct impact on User Behaviour. In addition, UTAUT included moderate variables which are: Gender, Age, Experience and Voluntariness of Use.

3.1.2 Review acceptance models in E-assessment

In order to identify the factors that affect students when adopting E-assessment in Saudi Arabia universities, the related literature about technology adoption and the previous experience in different universities around the world are investigated. The table (1) below summarises these studies.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Sample</th>
<th>Model used</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Schneberger et al., (2007)</td>
<td>Students in Appalachian State University in Boone.</td>
<td>(TAM) + external variable</td>
<td>TAM Constructs</td>
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<tr>
<td></td>
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<td>Experience</td>
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<td>Level of support</td>
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<td>Age / level in the university</td>
</tr>
<tr>
<td>2 Alkiş, (2010)</td>
<td>Students in Middle East Technical University in Turkey.</td>
<td>(TAM) + Individual differences factors</td>
<td>TAM Constructs</td>
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<td></td>
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<td>Self-efficacy</td>
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<td>Computer Attitude</td>
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<tr>
<td></td>
<td></td>
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<td>Anxiety</td>
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<tr>
<td>3 Terzis &amp; Economides, (2011)</td>
<td>Students in University of Macedonia, Greece.</td>
<td>(TAM), (TPB) and (UTAUT)</td>
<td>TAM Constructs</td>
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<tr>
<td></td>
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<td>Computer Self Efficacy</td>
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<td>Facilitating Conditions</td>
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<td>Goal Expectancy</td>
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3.1.3 Review Students' perception and attitude of E-assessment

More recent attention has focused on the students' perception of adopting E-assessment in the learning process. Table (2) below presents and summarizes different studies which aimed to investigate and identify students' perception and attitude towards E-assessment.

Table 2: Review of factors influencing students' attitude towards E-assessment in literature.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Findings</th>
<th>Sample</th>
</tr>
</thead>
</table>
| 1 Dermo, (2009)                | • Positive feelings towards E-assessment, especially with regard to stress and learner expectations.  
• Students think E-assessment will contribute to their learning such as feedback.  
• No significant difference in responses between gender and age between students. | Students at the University of Bradford - UK |
| 2 Tella & Bashorun, (2012)     | • Student attitudes were generally more positive toward computer based exams.  
• Increase students' performance in learning.  
• Not comfortable with technical problems. | Students at the University of Ilorin-Nigeria |
| 3 Wen & Tsai, (2006)           | • Male students have more positive attitudes towards E-assessment than females.  
• The importance of experience in reducing the anxiety of E-assessment. | University students in Taiwan |
| 4 Sheader, Gouldsborough, & Grady, (2006) | • Training for the e-assessment was very helpful.  
• Over half of the students prefer E-assessment than paper based exams.  
• E-assessment is less time consuming and easier to submit the answers.  
• Some technical problems in logging in to the systems.  
• General lack of confidence in using computers for assessment. | Students at the University Of Manchester - UK |
| 5 Ogilvie et al., (1999)       | • Students have positive attitudes towards computer based exams.  
• Enjoyment and efficiency.  
• Reduces the exam time.  
• Much more comfortable testing environment for students. | Students at the Medical University of South Carolina - USA |
| 6 Walker, Topping, & Rodrigues, (2008) | • E-assessment enhances the effectiveness of student learning. | Students at the University of Dundee, UK |
| 7 Ricketts & Wilks, (2002)     | • User interfaces of E-assessment affect the students' performance and their attitudes.  
• Screen design is an important factor that influences students to accept E-assessment.  
• Students appreciate the speed of marking and feedback of E-assessment. | Students at the University of Plymouth - UK |
| 8 (McDonald, 2002)             | • Impact of individual factors in the performance in E-assessment.  
• Computer experience and familiarity.  
• Computer anxiety, confidence and attitudes. | Students in UK |
3.2. The Proposed Framework

The inspiration to develop a comprehensive framework of E-assessment is derived from the challenges facing universities in Saudi Arabia in adopting E-learning and E-assessment systems effectively (Alebaikan & Troudi, 2011; Alkhalaif, Drew, & Nguyen, 2010). This research focuses on students' attitudes as they are the end-users for the system. In order to make any system accepted and widely used by the end-users, the organisations should understand factors that influence individuals to use a system before the actual development of the system (Imtiaz & Maarop, 2014). In fact, the research about acceptance of E-assessment systems in the context of Saudi universities is very limited and especially regarding students' attitudes which require more investigation. Thus, this research tries to seek a solution to the research gap by adopting different factors as a framework to predict students' intention to use E-assessment in Saudi Arabian universities. These factors have been chosen based on previous studies and the researcher's background.

Based on the literature review, a total of eight factors within four context are used in developing the framework:

3.2.1 Individual Context

I. Perceived Usefulness

This is defined as the degree to which an individual believes that using the system will help him or her to enhance their performance, and was proposed by Davis (1989). It means that students are likely to accept E-assessment if they think that this type of assessment will enhance their performance, improve their knowledge and better understanding for the course.

II. Perceived ease of use

This is defined as the degree of ease associated with the use of the system, and was proposed by Davis (1989). This factor means that if students feel using E-assessment does not require an effort and it is easy to use, it is expected to have a positive effect on behavioural intention to use it (Alkiş, 2010; Imtiaz & Maarop, 2014; Schneberger et al., 2007; Terzis & Economides, 2011).

III. Computer self-efficacy

This refers to a judgment of the individual's capability to use a computer which focuses on the judgments of what could be done in the future (Compeau & Higgins, 1995). Computer self-efficacy is an important factor which influences students' willingness to use E-assessment in different aspects. Students with high self-efficacy are more likely to believe that they can deal with the computer efficiently, so they might perform better in exams. Thus, they will be much more confident and less anxious than others (Imtiaz & Maarop, 2014; Maqableh et al., 2015; Terzis & Economides, 2011).

IV. Perceived Playfulness

This is defined as the individual's subjective experience of interaction with the situation, which was proposed by Moon & Kim (2001). Perceived playfulness included three dimensions (Moon & Kim, 2001):

- Concentration: describes a user's attention and interaction with the system.
- Curiosity: the user is curious during the interaction with the system.
- Enjoyment: the user finds the interaction with the system is enjoyable or interesting.

In the E-assessment acceptance research, the three dimensions of perceived playfulness are very important factors. This is because the E-assessment systems should hold the student's concentration, curiosity and enjoyment to be successful (Terzis & Economides, 2011; Maqableh et al., 2015).

3.2.2 Social Context

I. Social and Cultural Influence

This is defined as the degree to which an individual perceives that importance of others' opinions that he or she should use the new system (Venkatesh et al., 2003). In this study, the role of social influence in student opinion about the E-assessment system plays a significant part in the success of it. Some researchers emphasise that university culture is a critical factor in successful implementation of E-assessment (Warburton, 2009; McCann, 2010). Regarding university culture in Saudi Arabia, Alebaikan and Troudi
(2011) point out Saudi Arabian universities find it challenging to change learning strategies and move to blended learning. Students find difficulty in adopting a new approach of learning that requires a high level of student discipline and responsiveness (Alebaikan & Troudi, 2011). ICT in an education system has to be built onto the national cultural context which is more important than the technical aspects of the technology (Li & Kirkup, 2007). It is important to understand how cultural factors might affect an organization in adopting and utilizing IT successfully (Straub et al., 2002).

3.2.3 Organizational Context

I. Facilitating Examination

The organization plays a key role to make any new technology successful by providing various types of help and support for the users (Venkatesh et al., 2003). The help and support can vary depending on the technology's requirements. This study used the term 'Facilitating Examination' to refer to the degree to which an individual believes that help and support to use E-assessment systems will be available before and during exams. Students will feel much more comfortable when provided with support during exams when they need it. The importance of training for using E-exam systems is mentioned in a previous study by Sheader et al. (2006). A training session has to be given for students to teach them how to use the system to decrease the anxiety associated with exam time. It is assumed that the availability of help (such as a lecture or IT staff) and training for the systems are necessary to increase students' confidence to take E-exams.

3.2.4 System context

I. Content

Terzis & Economides (2011) have used the 'Content' variable to develop a Computer Based Assessment acceptance model in two dimensions, which are course content and question content. They remark that 'Content' is an important variable that impacts students’ behavioural intention to use computer based assessment. In this research, Content is a factor used to describe the effect of the assessment content in three areas: Firstly, 'Course type' is used to examine the effect of course content (difficult or easy, interesting or boring, useful or not useful) in accepting E-assessment (Terzis & Economides, 2011). Secondly, 'Questions style' e.g. questions should be clear, understandable and related to the course's content to be accepted by students (Davies, 2001; Terzis & Economides, 2011; Nicol, 2007). This research proposes 'Feedback process' as a third dimension to assess how feedback can affect students' perception and attitude toward E-assessment. Feedback should be clear, comprehensive, fair, balanced and relevant to the assessment to be accepted by learners (Denton et al., 2008; Howard, 1987; Lahad et al., 2004; Ypsilantis, 2002).

II. Accessibility

Accessibility has been combined in different technology acceptance models as one of the important factors that influence the technologies success (Lin & Lu, 2000; Thong et al., 2002; Green et al., 2008). A lack of computers or the necessary software in universities will be tended to be perceived as difficulties in using a system. The accessibility of an E-assessment is described as the extent to which the E-assessment system (including the physical environment, test software, and the administration system) can be accessed by people with disabilities or special access requirements by using appropriate assistive technologies (such as Screen Readers, Screen Magnifiers, Braille readers and Speech Recognition Software) (Ball, 2006).

The factors and sub-factors in the proposed framework are summarised in the table (3) below.

Table 3. Initial Framework for acceptance of E-assessment by students in Saudi Arabia universities.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Sub-factors</th>
<th>Factor description</th>
<th>References</th>
</tr>
</thead>
</table>
| Individual               | Perceived usefulness                  | • Effectiveness
• Improves the quality of learning
• Saves time | Individual believes that E-assessment can enhance performance, improve knowledge and better understanding of the course. | (Alkiş, 2010; Imtiaz & Maarop, 2014; Schneberger et al., 2007; Terzis & Economides, 2011) |
## Perceived ease of use
- Easy to learn and free of effort
- Clear and understandable
- Controllable

Individual believes that taking exam on computer is easy, free of effort and does not required specific skills. (Alkiş, 2010; Imtiaz & Maarop, 2014; Schneberger et al., 2007; Terzis & Economides, 2011)

## Computer self-efficacy
- Ability to perform specific task
- Feel confident to use computer

Individual believes he or she can accomplish tasks using a computer. (Imtiaz & Maarop, 2014; Maqableh et al., 2015; Terzis & Economides, 2011)

## Perceived playfulness
- Concentration
- Curiosity
- Enjoyment

Systems should hold users’ attention, interaction, concentration, curiosity and enjoyment. (Maqableh et al., 2015; Terzis & Economides, 2011)

## Social and Cultural Influence
- Friends’ impact
- Seniors’ support University culture

Considering opinions and beliefs between their friends, colleagues. The impact of seniors’ actions and support. The influence of University culture in accepting a new technology. (Terzis & Economides, 2011; Warburton, 2009; McCann, 2010)

## Facilitating Examination
- Support students during exam time
- Training before exam

Experts have to be available during e-exams to overcome students’ queries. Training session should be given to the students to increase their confidence to take e-exams. (Terzis & Economides, 2011; Sheader et al., 2006; Maqableh et al., 2015)

## Content
- Course Type
- Question Style
- Feedback Process

Course content (easy, difficult, interesting or boring). Question style (clear, understandable and related to the course’s content). Feedback (immediate, useful and sufficient). (Terzis & Economides, 2011; Denton et al., 2008; Iahad et al., 2004; Davies, 2001; Ypsilandis, 2002; Nicol, 2007)

## System
- Question presented in different formats
- Assistive technology

Multiple forms (e.g. written, graphics, sound) Screen Readers, Screen Magnifiers and speech recognition software. (Ball, 2006; Green et al., 2008)

## Accessibility

### 4. CONCLUSION AND FUTURE WORK

The reviewed studies show a need to conduct more research into E-assessment in Arab countries and particularly in Saudi Arabia due to social and cultural effects. Factors to be considered within the framework based on the literature review and some of the researcher’s background includes: individual, social and cultural influence, organizational and system context. The future work for this framework aims to validate the initial framework through both experts and students in Saudi Arabian universities. A framework has been constructed as a basis for development of an instrument for measuring students’ attitudes towards E-assessment systems in Saudi Arabian universities.
5. ACKNOWLEDGEMENT

This research is supported by University of Southampton, School of Electronics and Computer Science and the Fundamental Research Funds for Saudi Arabian Culture Bureau in London.

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