Empirical Assessment of the Factors that Influence Instructors’ Usage of E-Learning Systems in Saudi Arabia

Full Paper

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Abstract

Educational institutions in developing countries, such as Saudi Arabia, confront distinctive barriers compared to developed countries and it is essential to explore what impacts the instructors’ usage of e-learning systems. While universities in Saudi Arabia are integrating e-learning systems, instructors seem to avoid using it as a learning tool. However, there is a lack of understanding for the factors that impact instructors’ usage of e-learning systems in Saudi Arabia. The aim of this study is to assess the validity of the model and assess the impact of computer self-efficacy, user satisfaction, and user resistance on e-learning systems usage by college instructors in Saudi Arabia. The findings revealed a very strong validity and reliability of the constructs with good overall model predictability. The results supported the study anticipation that CSE and SAT would have a stronger moderating influence on RES. Moreover, the constructs of CSE and SAT demonstrated significant impact on ELSU.

Keywords

E-learning system, Computer Self-efficacy, Resistance, E-learning usage, User Satisfaction

Introduction

The use of digital technologies has grown rapidly throughout the past decades, and these technologies are progressively integrated into the teaching of higher education (Garrison 2011). For example, e-learning system is a common method of delivering educational materials in most universities (Bhuasiri et al. 2012). However, the use of e-learning systems in universities is in an early phase in Arab countries (Khasawneh 2015). The adoption of e-learning systems by universities in the Arab world is still far behind the rest of the developed countries (Rhema et al. 2013). Moreover, universities in Arab countries are incorporating and employing e-learning systems, though instructors do not seem interested in using it either for distance learning methods or for traditional learning methods in the classroom as an assistive technology (Rhema et al. 2013). However, the literature designates that there is inadequate research on the users’ perceptions of e-learning in the Arab world (Rhema et al. 2013). Furthermore, e-learning systems usage in Arab countries by instructors has not been fully researched (Khasawneh 2015). Specifically, in Saudi Arabia, much of the e-learning systems studies focus on students’ perceptions (Alharbi and Drew 2014). As a result, there is a lack of understanding for the factors that impact instructors’ usage of e-learning
Empirical Assessment of the Factors that Influence Instructors' Usage of e-learning Systems in Saudi Arabia (Al-alak and Alnawas 2011). Thus, the impact of computer self-efficacy, user satisfaction, and user resistance on e-learning systems usage by college instructors in Saudi Arabia is still unexplored. This study contends that the usage of e-learning systems by instructors in Saudi Arabia will enrich their capability to improve their technological skills and teach their students the skills necessary to obtain the knowledge they need for emerging economies. The aim of this study is to assess the validity of the model and assess the impact of computer self-efficacy, user satisfaction, and user resistance on e-learning systems usage by college instructors in Saudi Arabia. The significance of the study is that it is one of the early exploratory research, to our knowledge, that investigates the factors that impact instructors' usage of e-learning systems in Saudi Arabia. Moreover, the study contributes to the body of knowledge by adopting and extending a model that may be utilized to enhance the examination of e-learning systems usage in developing countries.

The succeeding section will review the background and related work of e-learning. Then, the research model and hypotheses will be presented. Next, the methodology of this study will be discussed. After, the results and discussion will be presented. Finally, the conclusion and limitations of the study will be discussed, followed by opportunities for future research.

Literature Review

New information systems and learning technologies have prompted a new trend of educational learning tools such as e-learning. E-learning settings provoked the opportunities for communication, interaction, and learning content delivery that enhances the learning process (Wu et al. 2008). Researchers defined e-learning systems as technological tools used to deliver teaching guidelines, supplemental materials, and learning content (Selim 2007).

E-learning systems as learning methods offer many advantages including the facilitation of a reliable delivery of content; it advances learning performance tracking, provides opportunities for interactions, and facilitates the exchange of learning materials among students and instructors, such as online assessment (Cao et al. 2009; Ruiz et al. 2006). However, the adoption of e-learning systems faces some barriers including lack of computer skills, personal vulnerability, high-risk online transactions, and IS complexity (Cameron et al. 2001; Reisig et al. 2009). In this study, instructors' use of e-learning systems was based on the investigation of four constructs: computer self-efficacy, user satisfaction, user resistance, and IS usage of e-learning systems.

Self-efficacy defined as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura 1986, p. 391). Self-efficacy has been examined as a construct in technology acceptance research (Compeau and Higgins 1995). Computer self-efficacy (CSE) denotes to self-efficacy when it associates to computing behavior (Compeau and Higgins 1995). Agarwal and Karahanna (2000) indicated that a user's beliefs about information system have a major impact on their usage behavior. Computer self-efficacy has been widely used as a predictor to measure individuals' beliefs about their capabilities to expertly use computers to perform a task (Bhatnagar et al. 2016; Celik and Yesilyurt 2013; Dicke et al. 2014). Compeau and Higgins (1995) indicated that understanding computer self-efficacy is essential to the successful employment of information systems. Bhatnagar et al. (2016) revealed that computer self-efficacy has a significant positive impact on system usage.

User satisfaction was proposed by Cyert and March (1963) as a surrogate of system success. User satisfaction has been defined as “an affective attitude towards a specific computer application by someone who interacts with the application directly” (Doll and Torkzadeh 1988, p. 261). Prior studies showed that satisfaction associates with higher degrees of information system use (Guo and Zhou 2016). For example, Baroudi, Olson, and Ives, (1986) and Evans and Wason (1976) have confirmed a significant impact of user satisfaction on system usage. Moreover, it is an affective factor representing a reaction to the system usage (Oliver 1992; Zviran et al. 2005). Furthermore, Igbaria and Tan (1997) revealed that satisfaction is a key factor of continued usage; if individuals are dissatisfied with a system, it is challenging to achieve the required degree of the system usage (Nwankpa and Roumani 2014). Also, Bokhari (2005) empirically confirmed a positive relationship between satisfaction and system usage.

Research on IS implementation issues suggested that user resistance shows to be a major construct in the success or failure of information systems (Jiang et al. 2000; Lapointe and Rivard 2005). Resistance is
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categorized by low degree of use or by a lack of use (Martinko et al. 1996). Furthermore, resistance to use IS is defined “as opposition of a user to change associated with a new IS” (Kim and Kankanhalli 2009, p. 568). Bhatnagar et al. (2016) revealed that resistance to use IS has a significant contribution toward system usage. Fjermestad and Romano (2003) found that declining user resistance is an essential factor for the success of a new system.

IS usage is mainly measuring the time that the user will spend using the system (Bajaj 1998). Understanding the factors that impact user usage of information systems remains to be a vital interest for IS researchers (Thompson et al. 2006). Prior research used different factors and methods to measure their impact on IS usage to explore the factors that influence IS users to use the system (Bhatnagar et al. 2016; Hou 2012; Lin et al. 2016). Doll and Torkzadeh (1998) established a multidimensional IS usage measure. They suggested that IS usage is an essential factor in the system success (Doll and Torkzadeh 1998). They revealed that the potential of the IS usage construct relies on how it is conceptualized and operationalized (Doll and Torkzadeh 1998). Their empirical findings approved the instrument’s reliability, validity, and general applicability.

As part of the current development plan undertaken by the Saudi government, education is receiving a major attention to renovate its learning approaches to be a competitive economy by implementing e-learning systems (Ahmed et al. 2011). The budget of Saudi educational system approaches about 40% of the annual national income (Al-Shehri 2013). With great potential from the Saudi government and educational institutions in supporting the implementation of mobile learning in higher education, instructors are an essential key to the success of mobile learning integration into education (Alfarani 2015). Educational institutions in developing countries such as Saudi Arabia confront distinctive barriers compared to developed countries and it essential to explore what impacts the instructors’ usage of e-learning systems (Bhuasiri et al. 2012). While educational institutions in developing countries such as Saudi Arabia are integrating e-learning systems, instructors seem to avoid using it either for online courses or using it as an assistive technology tool to supplement on-campus courses (Rhema et al. 2013). Thus, the purpose of this study was to investigate the impact of computer self-efficacy, user satisfaction, and user resistance on e-learning systems' usage in Saudi Arabia.

Research Model

User satisfaction and self-efficacy are contrariwise to resistance to change (Rastekenari et al. 2013). Do Cho and Chang (2008) indicate that self-efficacy and user satisfaction decrease resistance to change. Hornung and Rousseau (2007) reveal that the proactivity characteristic of workers, such as satisfaction and self-efficacy, promotes their positive reactions to change. Knowledge of an individual’s computer efficacy would be helpful in designing affective involvement to lower computer anxiety and resistance to change (Saleh 2008). Thus, the succeeding hypothesis is proposed:

H1: Computer self-efficacy (CSE) has a negative influence on resistance to e-learning use (RES).

H2: Satisfaction of e-learning systems’ users (SAT) has a negative influence on resistance to e-learning use (RES).

The literature reveals that computer self-efficacy may be one factor of who uses technology (Saleh 2008). In the learning context, learners anticipate that instructors will incorporate technology in classroom instruction and distance learning (Saleh 2008). However, the lack of computer self-efficacy will make instructors less likely to use technology or consider the integration of technology into their instructional activities (Dunlap 2005). Computer self-efficacy is a significant personal characteristic that impacts an individual’s decision to use computers (Compeau and Higgins 1995). Thus, the succeeding hypothesis is proposed:

H3: Computer self-efficacy (CSE) of e-learning systems’ users has a positive influence on e-learning usage (ELSU).

Although many have incorporated evolving technology, there are instructors at most universities who have resisted the changes, who are frightened to depend on e-mail, and who have little self-confidence in using or learning new technology tools (Saleh 2008). While technology is becoming more available to educators, resistance exists (Saleh 2008). This resistance has brought new encounters for institutional leaders enthusiastic to encourage their institutions to be well-equipped with cutting edge technology and
educators who use it efficiently (Saleh 2008). Bhatnagar et al. (2016) indicates that as resistance to use IS declined, the more likely it was that the user would use it. Thus, the succeeding hypothesis is proposed:

**H4**: Resistance of e-learning systems’ users (RES) has a negative influence on e-learning systems usage (ELSU).

The literature acknowledged that user satisfaction and system usage is one of the major determinants of the success of information systems (Hou 2012). User satisfaction is strongly related to system usage as measured by system dependence (Kulkarni et al. 2007). Hou (2012) indicated that as user satisfaction to use IS increases, the more likely that the system usage will increase. DeLone and McLean (2003) suggested that enhanced user satisfaction will result in a higher intention to use, which will consequently impact the use of the system. Thus, the succeeding hypothesis is proposed:

**H5**: Satisfaction of e-learning systems’ users (SAT) has a positive influence on e-learning systems usage (ELSU).

### Research Methodology

This study applied a quantitative research approach to empirically assess the impact of three constructs on the usage of e-learning systems by instructors in Saudi universities. A survey instrument was developed based on validated measures from prior literature (Compeau and Higgins 1995; Doll and Torkzadeh 1988; Jiang et al. 2000). All constructs were measured using a 7-point response scale that ranged from 1 “strongly disagree” to 7 “strongly agree”. A total of 205 responses were received. Pre-analysis data screening was performed and as a result 20 responses were eliminated due to response-set (users marked all answers the same) or multivariate outliers. The sample of this study included 185 participants of university faculty members from Saudi Arabia. Table 1 presents the descriptive statistics and demographics of the study participants. The PLS-SEM statistical method using SmartPLS 2.0 was used to test the hypotheses.

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>114</td>
<td>62%</td>
</tr>
<tr>
<td>Female</td>
<td>71</td>
<td>38%</td>
</tr>
<tr>
<td><strong>Age (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22–31</td>
<td>74</td>
<td>40%</td>
</tr>
<tr>
<td>32–41</td>
<td>69</td>
<td>37%</td>
</tr>
<tr>
<td>42–51</td>
<td>24</td>
<td>13%</td>
</tr>
<tr>
<td>52–61</td>
<td>16</td>
<td>9%</td>
</tr>
<tr>
<td>62–71</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Years of computer use (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Under 1 year</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>2–5</td>
<td>12</td>
<td>7%</td>
</tr>
<tr>
<td>6–10</td>
<td>36</td>
<td>19%</td>
</tr>
<tr>
<td>11–15</td>
<td>54</td>
<td>29%</td>
</tr>
<tr>
<td>16–20</td>
<td>45</td>
<td>24%</td>
</tr>
<tr>
<td>Over 20</td>
<td>35</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching assistance</td>
<td>33</td>
<td>18%</td>
</tr>
<tr>
<td>Lecturer</td>
<td>99</td>
<td>53%</td>
</tr>
<tr>
<td>Adjunct professor</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>
Table 1. Descriptive statistics and demographics of participants (N = 185)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor</td>
<td>38</td>
<td>20%</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>7</td>
<td>4%</td>
</tr>
<tr>
<td>Professor</td>
<td>7</td>
<td>4%</td>
</tr>
</tbody>
</table>

Results

Measurement Model

A confirmatory factor analysis (CFA) was conducted using the partial least squares (PLS) technique to conclude if the overall model is valid and assess if the measures for the proposed latent variables are reliable factors. This study used Cronbach’s Alpha as an indicator for reliability estimates of each construct. According to DeVellis (2016) Cronbach’s Alpha (CA) over 0.7 is acceptable. The Cronbach’s Alpha of CSE, RES, SAT, and ELSU were 0.84, 0.80, 0.94, and 0.95, respectively, (Table 2) which indicates a high reliability for all constructs. In addition, to assess the internal reliability, composite reliability (CR) was used and the results demonstrate that all constructs have high internal reliability values, which are higher than 0.70 as shown in (Table 2).

<table>
<thead>
<tr>
<th></th>
<th>Number of items</th>
<th>AVE</th>
<th>Composite reliability</th>
<th>CR</th>
<th>R²</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE</td>
<td>3</td>
<td>0.756496</td>
<td>0.902705</td>
<td>0.838626</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RES</td>
<td>7</td>
<td>0.465816</td>
<td>0.854112</td>
<td>0.799576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAT</td>
<td>10</td>
<td>0.666933</td>
<td>0.952275</td>
<td>0.944082</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELSU</td>
<td>9</td>
<td>0.693514</td>
<td>0.953178</td>
<td>0.944749</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Results of the reliability and validity tests

The cross loadings were used to assess the discriminant validity (Hair et al. 2016). As a result, the cross-loading values demonstrate that the discriminant validity was met (Table 3). The average variance extracted (AVE) was used to assess the convergent validity (Hair et al. 2016). The values of AVE for CSE, SAT and ELSU were 0.76, 0.67, and 0.69, respectively, and demonstrated an AVE value well above 0.50, while RES was slightly below the threshold of 0.50 (Hair et al. 2016).
Table 3. Cross-loading

The Model Estimation

The model was estimated by using SmartPLS and representing the R² criteria, with path coefficient analysis (Hair et al. 2016). The R² indicates the quality of the structural model. In this study, the value of R² demonstrates the exogenous latent variables’ (CSE, RES, and SAT) collective effects on the endogenous latent variable (ELSU). As shown in figure 1, The R² of ELSU has a value of 0.405, which is well above the threshold of 0.25 of acceptable value and shows that the overall model is acceptable (Hair et al. 2016).

![Figure 1. Results of PLS analysis (n = 185).](image)

A path coefficient is used to measure the relationships between constructs in the structural model (Hair et al. 2016). The results show that there is only one path with no significant relationships (RES → ELSU) and four paths with a higher degree of significance (CSE → RES, RES → ELSU, SAT → RES, and SAT → ELSU) as shown in Table 4.

<table>
<thead>
<tr>
<th>Structural paths in model</th>
<th>PLS path coefficient</th>
<th>t-statistic</th>
<th>p-value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: CSE → RES</td>
<td>-0.382722</td>
<td>3.959559</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>H2: SAT → RES</td>
<td>-0.411119</td>
<td>5.479807</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>H3: CSE → ELSU</td>
<td>0.180720</td>
<td>2.236720</td>
<td>0.013</td>
<td>**</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path Coefficient</th>
<th>t-Value</th>
<th>p-Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4: RES → ELSU</td>
<td>-0.115333</td>
<td>1.166866</td>
<td>0.122</td>
<td>NS</td>
</tr>
<tr>
<td>H5: SAT → ELSU</td>
<td>0.477616</td>
<td>5.753416</td>
<td>0.000</td>
<td>***</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, ***p < 0.001. NS, not significant.

Table 4. Results of PLS analysis

The p-value is used to demonstrate the significance value in the hypotheses testing. A small p-value (typically ≤ 0.05) demonstrates strong evidence to reject the null hypothesis; this indicates that the hypothesis is supported. In this study, bootstrapping was utilized to generate the p-values for all paths. The p-value for H1, H2, H3, and H5 were below 0.01, indicating that H1, H2, H3, and H5 are supported.

Discussion and Conclusion

The findings revealed a very strong validity and reliability of the constructs with good overall model predictability. The results supported the study anticipation that CSE and SAT would have a stronger moderating influence on RES. Moreover, the constructs of CSE and SAT demonstrated significant impact on ELSU. The findings were consistent with what was hypothesized. The results of this study indicated that the impact of computer self-efficacy on e-learning usage is a positive one. Likewise, SAT had a positive significant effect on ELSU, meaning as satisfaction with e-learning systems strengthened, the use of e-learning systems by instructors would increase. Although it was hypothesized that RES would have a significant effect on ELSU, the findings demonstrated that RES has no significant impact on ELSU in the context of the participants in this study.

The purpose of this study was to assess the validity of the model and to investigate the impact of computer self-efficacy, instructors' resistance, and instructors' satisfaction on the e-learning systems usage in Saudi Arabia. The findings of this study demonstrated an overall good model. Moreover, of five hypotheses, four were supported by the results of this study. However, the findings indicated that instructors' resistance did not impose a strong influence on e-learning systems usage. Thus, the reason why resistance was not an important factor to determine e-learning systems usage should be further investigated.

This study includes several limitations. First, the sample size was relatively small and limited to Saudi universities. Moreover, collecting more responses from participants would have been more beneficial to assess the dependability of the results and to enhance the generalization of the results. Second, this study did not cover all factors that may affect e-learning systems usage. Future studies can include other factors, such as enjoyment, instructor personality, actual skill level in using the tool, and their impact on e-learning systems usage.

References


Empirical Assessment of the Factors that Influence Instructors’ Usage


Appendix: Survey Instrument

1. Computer Self-Efficacy
   1.1 I am comfortable working with computers
   1.2 If I am given some training, I can learn to use most computer programs
   1.3 I can learn to use most computer programs just by reading the manuals and help

2. User Resistance of E-Learning Systems
   2.1 I feel that e-learning system is an acceptable supplement to traditional university
   2.2 I feel that e-learning system can solve most of student needs
   2.3 I feel that e-learning system will not adversely alter existing instructor–student relationships
   2.4 I feel the use of the e-learning system will be looked upon favorably by my employers
   2.5 I feel the use of the e-learning system will decrease my absences from my job
   2.6 I feel the use of the e-learning system will not change my outlook on my students’ approach to learning
   2.7 I feel the use of the e-learning system will not negatively degrade my students’ learning

3. End-User Satisfaction
   3.1 E-learning system provides precise information that I need
   3.2 E-learning system content meets my needs
   3.3 E-learning system provides support that seem to be exactly what I need
   3.4 E-learning system provides me sufficient information
   3.5 E-learning system delivers information accurately
   3.6 I’m satisfied with the accuracy of the e-learning system
   3.7 I think the output from e-learning system is presented in a useful format
   3.8 The information presented in the e-learning system is clear
   3.9 The e-learning system user interface is friendly
   3.10 The e-learning system is easy to use

4. E-Learning Systems Usage
   4.1 I use the e-learning system to assist me in my teaching activities
   4.2 I use the e-learning system to help explain the course content to my students
   4.3 I use the e-learning system to help analyze students’ performance
   4.4 I use the e-learning system to control my course content
   4.5 I use the e-learning system to help me manage my course content
   4.6 I use the e-learning system to monitor student progress
   4.7 I use the e-learning system to plan my course activities
   4.8 I use the e-learning system to keep my students informed
   4.9 I use the e-learning system to post course materials and announcements

5. Demographic Information
   5.1 Age
      20 or below
      22–31  52–61
      32–41  62–71
      42–51  72 and over
   5.2 Position
      Teaching assistant
      Lecturer
      Adjunct professor
      Assistant Professor
      Associate Professor
      Professor
   5.3 Gender
      Male
      Female
   5.4 Years of computer use
      None
      Under 1 year
      2–5
      Over 20
      6–10
   5.5 Years of Using E-learning Systems for teaching
      None
      Under 1 year
      2–5
      Over 20
      6–10
   5.6 I Use E-learning Systems for teaching
      Traditional courses
      Online courses
      Both traditional and online courses