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e-Learning in the Saudi tertiary education: Potential and challenges

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Abstract   The advent of the Internet in the twenty-first century has led to remarkable changes in several aspects of our lives. This advanced technology has become an essential tool of communication and information, thus offering unique advantages to both educators and students. Despite a recent educational revolution in Saudi Arabian educational systems, the issue of access to higher education still remains one of the more enduring challenges. The need for more delivery modes that take education to learners wherever they are, and not within the boundaries of the campus, is thus a necessity. e-Learning could dramatically increase access to tertiary education and training, especially for those learners who were once denied learning opportunities for any reason, such as health, distance or the like. Yet, successful implementation of e-learning requires an understanding of the issues that promote the effective use of the technologies. This article discusses the factors that influence e-learning in Saudi higher education through analysing the perceptions and attitudes of Saudi university students (n = 531). It reports the results of a survey conducted to investigate the acceptance of e-learning in a Saudi higher education institution as perceived by university students. The findings demonstrated that attitudes toward e-learning, subjective norms, perceived behavioural control as well as e-learning systems attributes were critical determinants of students' behavioural intention to use

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e-learning. By explaining students' behavioural intentions, the findings of this study will help to provide insight into the best way to promote e-learning acceptance among students.

1. Introduction

The new advancement in communication and information technologies has made an impact on some aspects of today's societies. Largely, commerce, politics and education have been undeniably influenced (Garrison and Anderson, 2003; Khan, 2005). Terms like the global village, information society and knowledge society symbolize the new realties and change in modern societies. Education facilitated by the new ICT or e-learning is transforming learning and instruction forms (Garrison and Anderson, 2003) in ways "that extend beyond the efficient delivery or entertainment value of traditional approaches" (Garrison and Anderson, 2003, p. 2). For this reason, more and more educational institutions around the world are embracing e-learning systems and investing heavily in this sector. In Saudi Arabia, the government has launched a national plan for the utilizsation of information technology (IT). The plan urges, "the implementation of e-learning and distance learning and all their prospective applications in higher education" (National Centre for e-Learning and Distance Learning, 2008). Furthermore, a national centre for promoting e-learning was established to fulfil the following goals:

To develop infrastructure for e-learning.
To collaborate with higher education, government and corporate partners to solve e-learning problems.
To provide complete e-learning solutions.
To develop QA standards for e-learning.
To develop rules and regulations for e-learning.
To establish awareness of e-learning programs (National Centre for e-Learning and Distance Learning, 2008).

However, effective use of e-learning only occurs "when users choose to migrate or move from less efficient systems to relatively more advanced and more beneficial innovations" (Ndubisi, 2006). Investments in the infrastructure, staff IT training and content development may not be sufficient to ensure a successful adoption and use of e-learning (Ndubisi, 2004). Several studies have highlighted that understanding the factors that influence *users'* acceptance and use of e-learning is important for a better implementation and use of e-learning. The purpose of this study, therefore, is to investigate the factors that influence e-learning acceptance by Saudi

university students. This paper is constructed as follows: first, it will give a brief account of e-learning. Second, it will describe the theoretical framework of this study. Third, it will present the research model and hypotheses. Then a subsequent section on the research methodology will follow. Next, the findings will be presented and discussed in the light of research hypotheses. Finally, some implications are offered.

2. e-Learning

e-Learning refers to "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration" (Holmes and Gardner, 2006). e-Learning can take place totally online in virtual environments or in a mix of virtual and face-to-face environments; a mode entitled 'blended learning'. e-Learning has the potential to impact positively on education. It provides great opportunities for both educators and learners to enrich their educational experiences (Holmes and Gardner, 2006). Individuals who were disadvantaged for geographic, physical or social circumstances have increasingly better educational chances via e-learning. Furthermore, e-learning supports synchronous and asynchronous communications in various formats ranging from text, voice and audio. In addition, supported by the openness and flexibility of the Internet, e-learning provides the teaching and learning transactions with unfathomable amounts of information independent of the pressure of time and the constraints of distance (Holmes and Gardner, 2006).

3. Theoretical framework

Explaining human behaviours have been a topic of vast research. The research conducted by Ajzen (1985) and Fishbein and Ajzen (1975) to understand human behaviour has been of paramount impact in psychology and other social sciences disciplines. The theories of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and Planned Behaviour (TPB) (Ajzen, 1985) have been used extensively to explain numerous behaviours. Among the most prominent extensions of these theories is Davis' (1989) the Technology Acceptance Model (TAM) that addresses technology acceptance and use behaviours. The Technology Acceptance Model (TAM) has attracted substantial attention and found to be robust in explaining the acceptance and use of various technological innovations [e.g. Internet-based courses (Arbaugh, 2000), websites (Koufaris, 2002) and the Internet (Shih, 2004)]. The theoretical framework of this study is based on these prominent theories. The following section gives a brief account of them.

3.1. The Theory of Planned Behaviour (TPB)

The Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen (1975) to explain human behaviours. It postulates that the key determinant

of an individual's behaviour is his or her intention, which is in turn a function of two determinants, attitude toward the behaviour and subjective norm. Attitude toward the behaviour is defined as "the individual's positive or negative evaluation of performing the behaviour of interest" (Ajzen, 2005, p. 118). Subjective norm is defined as "the person's perception of the social pressures to perform or not to perform the behaviour under consideration" (Ajzen, 2005, p. 118). However, Ajzen (1985) others realised that the theory was not sufficient and had a limitation. TRA is capable of explaining only volitional behaviours (Godin and Kok, 1996). If the behaviour is not completely under volitional control, even if the individual is highly motivated by his or her attitudes and subjective norm, he or she may not actually perform the behaviour as a result of some other constraints. Ajzen (1985) proposed a modified version of TRA to deal with this weakness. The Theory of Planned Behaviour (TPB) was proposed to explain behaviours in which individuals have partial volitional control. The new concept of TPB was termed Perceived Behavioural Control and it refers to the person's perceived ability to perform the behaviour of interest (Ajzen, 2005). According to the new theory of Planned Behaviour, individuals' intention to perform a behaviour is a combination of their attitude toward performing the behaviour, their subjective norm and their perceived control of that behaviour. Generally, individuals intend to perform a behaviour when "they evaluate it positively, when they experience social pressure to perform it and when they believe that they have the means and opportunities to do so" (Ajzen, 2005, p. 118). There is a vast literature that applied TRA and TPB to investigate and predict various behaviours. Yoh et al. (2003) examined consumers' intentions to use Internet apparel and found that TRA is a robust model with a strong predictive power. In addition, Ndubisi (2004, 2006) has applied TPB to online learning adoption and found the theory to be a good predictor of adoption behaviours.

3.2. The Technology Acceptance Model (TAM)

Davis (1989) proposed the Technology Acceptance Model (TAM) specifically to explain technology acceptance and usage behaviours. TAM postulates that an individual's acceptance and use of a technology is determined by the attitudes toward the technology. In addition, TAM posits that two basic perceptions of the technology also have influence on the acceptance and usage behaviours, namely, perceived usefulness and perceived ease of use. These two constructs are antecedents to one's attitude. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320)). Perceived ease of use refers to "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320)). TAM has been applied to diverse technologies and has been found to be a robust model (Ndubisi, 2004, 2006; Venkatesh, 2000).
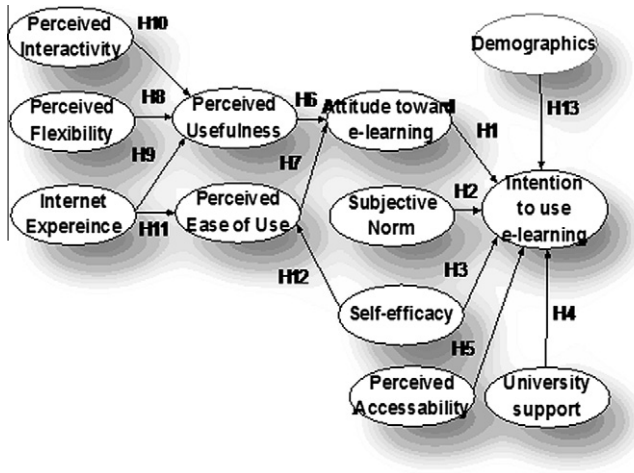
Figure 1   The research model.

4. The research model and hypotheses

This research proposes a model for explaining and predicting students' acceptance of e-learning. Based on the theories of TPB and TAM, the proposed model includes constructs and relationships which may prove to be important in the context of e-learning. These constructs are grouped into four factors: individual, system, social and institutional. The individual factor includes three demographic characteristics of the students (i.e. gender, mode of study, place of residence and faculty), attitude, Internet experience and self-efficacy. The e-learning system factor includes some attributes of e-learning, specifically, usefulness, ease of use, accessibility, flexibility and interactivity. The social factor includes a subjective norm. The institutional factor includes university support. Fig. 1 shows the research constructs and the hypothesized relationships between them.

Based on the abovementioned theories, the following hypotheses were postulated:

H1: There is a relationship between intention to use e-learning and attitude toward e-learning.
H2: There is a relationship between intention to use e-learning and subjective norm.
H3: There is a relationship between intention to use e-learning and Internet self-efficacy.
H4: There is a relationship between intention to use e-learning and university support.
H5: There is a relationship between intention to use e-learning and perceived e-learning accessibility.

H6: There is a relationship between attitude to use e-learning and perceived e-learning usefulness.

H7: There is a relationship between attitude toward e-learning and perceived e-learning ease of use.

H8: There is a relationship between perceived usefulness and perceived e-learning flexibility.

H9: There is a relationship between perceived usefulness and Internet experience.

H10: There is a relationship between perceived usefulness and perceived e-learning interactivity.

H11: There is a relationship between perceived e-learning ease of use and Internet experience.

H12: There is a relationship between perceived e-learning ease of use and Internet self-efficacy.

H13: There are differences between the students in their intention to use e-learning based on their demographics.

5. Methodology

5.1. Data collection method

To collect the data for this research a survey employing questionnaire technique was used. A total of 531 questionnaires were distributed and collected during class hours. Ethical issues, such as respondents' consent and confidentiality were ensured.

5.2. Instrumentation

The questionnaire consisted of three sections. The first section collected information about the students' Internet experience and self-efficacy. The second section elicited information on their perceptions and attitude toward e-learning. The third section gathered some demographic information. The items of the questionnaire were adopted from previously validated instruments (Ajzen, 1985; Davis, 1989; Moore and Benbasat, 1991; Stoehl and Lee, 2003). Respondents were asked to rate their perceptions and attitude using a 7-point Likert scales ranging from 1 = strongly disagree to 7 = strongly agree. Statements measuring self-efficacy used a 5-point Likert scale ranging from 1 = no confidence to 5 = Very high confidence. Experience was captured using three items measuring duration and frequency of using the Internet.

5.3. Data analysis techniques

Descriptive statistics were used to describe and understand the data. Multiple regression analysis was used to test the research model. In addition, *t*-test and ANOVA were employed to examine the differences between the students based on their demographics. Regression analysis assumptions including normality,

Table 1   Reliability of the scale.

	M	SD	#	α
Internet experience	5.145	1.498	2	.85
Internet self-efficacy	3.569	.9428	7	.91
Attitude	5.515	1.283	3	.85
Perceived ease of use	5.558	1.344	4	.93
Perceived usefulness	5.522	1.185	5	.91
Perceived flexibility	5.565	1.282	4	.84
Perceived interactivity	5.641	1.293	3	.88
Perceived accessibility	5.124	1.322	4	.81
Subjective norm	5.213	1.280	4	.87
University support	4.227	1.513	4	.84
Behavioural intention	5.331	1.256	3	.81
Overall scale			43	.97

linearity, multicollinearity and homoscedasticity were examined (Tabachnick and Fidell, 2007). No violations of these assumptions were detected. Similarly, the assumptions for the *t*-test and ANOVA were also met.

5.4. Psychometric properties of the instrument

The reliability of the instrument was measured by using Cronbach's alpha (see Table 1). The instrument had a very high reliability, $\alpha = .97$. The alpha coefficients for the sub-scales were also very good, exceeding the minimum threshold recommended in the literature of 0.70, thus indicating good internal consistency (Tabachnick and Fidell, 2007).

To confirm the validity of the model's key dimensions, principle components analysis (PCA) was carried out. Prior to performing PCA, the suitability of data for factor analysis was examined. The Kaiser–Meyer–Olkin value was .932; exceeding the minimum recommended value of .6 (Hair et al., 2006). The Bartlett test of sphericity reached statistical significance, supporting the factorability of the data (Hair et al., 2006). Guided by conceptual and practical considerations, the study accepted factor loadings of .40 and above which Hair et al. (2006) were considered important. The oblique rotation was used as it represents the clustering of variables more accurately (Tabachnick and Fidell, 2007). Forty-three items out of the original 44 were loaded on 11 factors with a total variance of 70%. One experience item was dropped because of poor loading. Key dimensions, items loadings, Eigenvalues and variances are presented in Table 2.

6. Sample

A stratified cluster sample of students ($n = 531$) was randomly drawn from the population of students at King Abdul Aziz University in Jeddah, Saudi Arabia.

Table 2 PCA results.

Item	Loading	Eigenvalue and variance extracted
PU2	.879	Perceived usefulness $E = 17.96$; $V = 33.2\%$
PU3	.846	
PU4	.734	
PU1	.580	
PU5	.480	
SE2	.836	Self-efficacy $E = 4.552$; $V = 8.4\%$
SE3	.833	
SE5	.777	
SE4	.689	
SE7	.652	
SE1	.649	
SE6	.534	
US1	.886	University support $E = 2.924$; $V = 5.4\%$
US3	.764	
US4	.646	
US2	.908	
SN1	.879	Subjective norm $E = 2.090$; $V = 3.8\%$
SN3	.862	
SN2	.748	
SN4	.640	
BI3	.948	Behavioural intention $E = 1.809$; $V = 3.3\%$
BI1	.929	
BI2	.543	
PA1	.830	Perceived accessibility $E = 1.725$; $V = 3.2\%$
PA2	.764	
PA3	.747	
PA4	.621	
PF3	.685	Perceived flexibility $E = 1.489$; $V = 2.7\%$
PF4	.659	
PF2	.600	
PF1	.422	
PE3	.809	Perceived ease of use $E = 1.324$; $V = 2.4\%$
PE4	.766	
PE2	.763	
PE1	.729	
PI2	.788	Perceived interactivity $E = 1.247$; $V = 2.3\%$
PI1	.759	
PI3	.646	
ATT2	.674	Attitude $E = 1.150$; $V = 2.1\%$
ATT3	.580	
ATT1	.565	
EX2	.771	Experience $E = 1.024$; $V = 1.8\%$
EX1	.720	

7. Results of analysis

7.1. Sample profile

Table 3 presents the demographic profile of the survey respondents. Of those who participated, 39% were male and 61% were female. Eighty-four percent of the respondents were regular students and only 16% were enrolled as external. These proportions mirror reality. Furthermore, the majority of the respondents (76%) were from the city. With regard to their Internet experience, 56% of the students described themselves as having high Internet experience. This is not surprising since the respondents are young university students who had taken earlier Internet and computer courses during high school. Only less than 3% of the sample reported no Internet experience. Table 3 also summarises the type of Internet connection the students reported. DSL connection (54%) is the prevailing type, whilst satellite connection is the least used (3.4%), probably due to its high costs.

7.2. Explaining intention to use e-learning (BI)

A multiple regression analysis was undertaken for intention to use e-learning and its proposed determinants in this research (attitude, subjective norm, self-efficacy, university support and perceived e-learning accessibility). The two constructs of

Table 3 Profile of respondents.

Demographic	Freq.	%
Gender		
Male	209	39.4
Female	321	60.6
Mode of study		
Regular	447	84.2
External	83	15.6
Place of residence		
Jeddah	405	76.3
Outside Jeddah	117	22.0
Experience		
No experience	14	2.6
Little experience	77	14.5
Good experience	139	26.2
High experience	301	56.7
Internet connection		
Dial up	187	35.2
DSL	287	54.0
Satellite	18	3.4
Mobile	29	5.5
No connection	10	1.9

self-efficacy and perceived accessibility constitute the perceived behavioural control (PBC) construct proposed in TPB. As theorized, the research model explained a significant proportion of the variance in BI (Table 4). The model accounted for 43% of BI's variance and this is considered a large effect (Cohen, 1988). Looking at the individual determinants of BI, attitude (β = .32), subjective norm (β = .22) and university support (β = .18) had all significant influence on BI at the .001% level. Perceived e-learning accessibility (β = .12) had a significant influence on BI at the .01% level, whereas Internet self-efficacy (β = .083) was significant at the .05% level. Therefore, hypotheses 1–5 were supported.

7.3. Explaining attitude to using e-learning

As proposed by the Technology Acceptance Model (TAM), the two constructs of perceived usefulness (PU) and perceived ease of use (PEOU) explained a significant percentage of variance in attitude, R^2 = .46% (Table 5). According to Cohen (1988) this is a large effect. PU had a strong significant effect on ATT (β = .33). PEOU had even a stronger influence on ATT (β = .40). Both results of this analysis gave support to hypotheses 6 and 7.

7.4. Explaining perceived usefulness (PU)

Hypotheses 8 and 10 were supported as perceived interactivity (PI) (β = .40) and perceived flexibility (PF) (β = .43) were found to have strong significant influence on the perceptions of e-learning usefulness at the .001% level as shown in Table 6.

Table 4 Regression results for BI.

	B	Std. Error	β	95% CI for B
Attitude	.315	.045	.323[***]	.226–.404
Subjective norm	.215	.045	.219[***]	.128–.303
University support	.146	.031	.177[***]	.086–.206
Accessibility	.115	.041	.122[**]	.034–.196
Self-efficacy	.110	.055	.083[*]	.003–.217

Note: R^2 = .43. CI: Confidence Interval.
[*] p < .05.
[**] p < .01.
[***] p < .001.

Table 5 Regression results for ATT.

	B	Std. Error	β	95% CI for B
Ease of use	.387	.045	.404[***]	.299–.475
Usefulness	.363	.051	.331[***]	.262–.465

Note: R^2 = .46. CI: Confidence Interval.
[***] p < .001.

Table 6   Regression results for PU.

	B	Std. Error	β	95% CI for B
Perceived interactivity	.357	.035	.383***	.289–.426
Perceived flexibility	.396	.036	.428***	.326–.465
Internet experience	.046	.024	.060	−.002 to .094

Note: $R^2 = .56$. CI: Confidence Interval.
*** $p < .001$.

These constructs accounted for 56% of the variance in PU. The effect size of this index is much larger than typical (Cohen, 1988). On the other hand, Internet experience (IE) ($\beta = .06$) was not found to have a significant relationship with PU, thus hypothesis 9 was rejected.

7.5. Explaining perceived ease of use (PEOU)

The model also hypothesises that the perceptions of ease of use (PEOU) are influenced by Internet self-efficacy (SE) and experience of using the Internet. It was found that SE has a strong significant influence on PEOU ($\beta = .36$), whereas IE has a small but significant effect on PEOU ($\beta = .147$) at the .01% level. Both constructs accounted for .23% in PEOU variance (Table 7). This is considered a medium size effect (Cohen, 1988). Thus, hypotheses 11 and 12 were supported.

7.6. Differences between the students

To examine the differences between the students in their intention to use e-learning based on their demographics, a series of *t*-tests and ANOVA were utilised. To see if there is difference between male and female students regarding their intention to use e-learning, an independent samples *t*-test was conducted. Table 8 shows that male students were significantly different from female students on their intention to use e-learning ($p = .002$). Male students demonstrated greater intentions to use e-learning than female students. However, the magnitude of the difference in the means was very small ($\eta^2 = 0.02$). Further, to see if the students are different in their intention to use e-learning based on their place of residence, another *t*-test was carried out. No statistically significant difference was found between the

Table 7   Regression results for PEOU.

	B	Std. Error	β	95% CI for B
Internet experience	.133	.052	.147**	.031–.236
Internet self-efficacy	.519	.083	.361***	.356–.681

Note: $R^2 = .23$. CI: Confidence Interval.
** $p < .01$.
*** $p < .001$.

Table 8   Comparisons between students.

Variable	M	SD	t	df	p
BI					
Males	5.54	1.17	3.09	528	.002
Females	5.19	1.28			
BI					
Jeddah	5.31	1.28	−.67	520	.503
Outside	5.39	1.17			
BI					
Regular	5.25	1.28	4.78[a]	157.60[a]	.000
External	5.85	.91			

[a] The *t* and *df* were adjusted because variances were not equal.

students of the different habitats. Another *t*-test was performed to see if there is difference in intentions based on the mode of study. Table 8 also reveals that external students have greater intention to use e-learning than regular students ($p = .000$). The effect of size was very small ($\eta^2 = 0.03$) (Cohen, 1988). Finally, a one way between groups ANOVA was conducted to see if the students of the different faculties are different in their intention to use e-learning. A statistically significant difference was found among the different faculties, $F(11, 519) = 3.435$, $p = .000$. The effect size calculated using eta squared was .06, which is a medium effect according to Cohen (1988). Post hoc comparisons using Tukey HSD test indicated that the mean score for the students in the faculty of economics and administration ($M = 5.8134$, $SD = .90377$) was significantly different from the students of the faculty of Arts and Humanities ($M = 5.0942$, $SD = 1.29397$), the students in the faculty of Home Economics ($M = 4.9023$, $SD = 1.35078$) and the students in the faculty of science ($M = 4.7353$, $SD = 1.45037$). These significant differences support hypothesis 13.

8. Discussion

This study proposed a model to explain and understand Saudi university students' intention to accept and use e-learning. It adopted Ajzen's (1985) theory of planned behaviour as well as Davis' (1989) TAM as its theoretical framework. Students' intention (BI) was found to be very well explained by the determinants of behavioural intention as proposed by Ajzen (1985). Attitude is an important factor that influences BI to use e-learning. This result is similar to previous findings (Stoehl and Lee, 2003), which have shown that attitude toward performing behaviour has an influence on the intention to carry out this behaviour. In other words, students who hold favourable attitude about using e-learning are more inclined to accept and use this innovation. The results also showed that the influence of important groups such as instructors or peers was significant. This result is in line with the results reported in a previous research (Taylor and Todd, 1995) that

found subjective norm to be important in influencing acceptance and usage of an innovation, particularly in the early stages of adoption when prospect adopters have little experience from which to form attitudes.

Further, self-efficacy, and perceived e-learning accessibility were proposed in this research to represent the construct of perceived behavioural control (PBC). The results revealed that SE has an impact, though very small, on BI. This implies that the students' confidence of using the Internet may have an influence on their intention to adopt e-learning. Ma and Liu (2005) and Rezaei et al. (2008) found similar results, yet, they reported that Internet self-efficacy was found as a strong determinant of e-learning adoption and usage. Perceived e-learning accessibility, which corresponds to the second construct of PBC, was found significant and thus influencing intentions to use e-learning. This implies that if the university students feel that they have ready access to e-learning (i.e. speedy Internet connection with affordable costs, the necessary equipments), they will be more encouraged to use e-learning (Abdel-Wahab, 2008). The final determinant of BI suggested by our model is university support (US), which was found to have a statistically significant influence on students' intention to use e-learning. This result suggests that the students will accept and use e-learning more readily if the university supports the e-learning initiative. This study further confirms the important role of institutional support reported in previous research (Selim, 2007).

The two constructs of TAM, namely PU and PEOU were tested for their influence on ATT and were found to be significantly impacting attitudes. This gives further support to the robustness of TAM. Moreover, in an attempt to understand PU, perceived flexibility (PF), perceived interactivity (PI) and Internet experience (IE) were proposed as antecedents of PU. The two constructs of PF and PI were found to be important in forming PU perceptions. However, PU was not significantly influenced by prior experience with the Internet. Students' experience with the Internet over time will not increase the perceptions of usefulness. Stoehl and Lee (2003) reported similar results. To explain PEOU, IE and SE were postulated as antecedents of this construct. The results demonstrated that Internet experience significantly impacted the perceptions of PEOU. In other words, the students' experience with the Internet over time will increase the perceptions of ease of use (Stoehl and Lee, 2003). In addition, Internet self-efficacy was also found as a strong factor influencing PEOU. This finding implies that students with higher confidence in using the Internet will perceive e-learning as easier to use. This concurs with the findings of Ma and Liu (2005) that users strongly anchor ease of use perceptions to their SE. Finally, in exploring the differences between the Saudi students in their intention to use e-learning, gender, mode of study and faculty emerged as personal characteristics that are associated with intention to use e-learning. A significant gender variation was found for the intention to use e-learning supporting prior research (Ong and Lai, 2006). Saudi male students showed more liking to use e-learning than the female students. In a study conducted by Wagner et al. (2005) the students' status of study (part-time or full-time)

was found to have an impact on perceptions of on-line learning. Similarly, the current study found a significant difference between external and regular students in their intention to use e-learning. External students showed greater intention to use e-learning than regular students. The attractiveness of e-learning for external students is maybe due to the benefits of e-learning systems, such as their flexibility and interactivity (Taylor and Todd, 1995; Ndubisi, 2006). Furthermore, the students were found different in their intention to use e-learning based on their faculty.

9. Conclusion

In summary, this research sought to determine the factors that influence Saudi university students' intention to use e-learning. The findings showed that e-learning acceptance is influenced by several factors. The results indicated that the students' attitude toward e-learning is the most important factor in determining students' intention to use e-learning. The students' decision to use e-learning is also determined by their subjective norm, i.e. the influence of the important people around them. Moreover, perceived e-learning accessibility plays a role in shaping the students behavioural intention regarding e-learning acceptance. University support of the e-learning initiative as well as the students' confidence of using the Internet influence the students' intention to use e-learning. Furthermore, the perceptions of e-learning usefulness, ease of use were found significant in forming an attitude toward e-learning. Similarly, the perceptions of e-learning flexibility and interactivity were found important in shaping the perceptions of e-learning usefulness. In the same way, the perceptions of ease of use were influenced by experience and self-efficacy. Finally, the students showed differences in their intention to use e-learning based on their gender, mode of study and faculty. Male, external and economics and administration students demonstrated stronger intentions to use e-learning.

10. Implications of the findings

As attitude toward e-learning was found to have a strong impact on the intention to use e-learning among the students, policy-makers should attempt to build positive attitudes among the potential e-learners such as male and external students. One way of achieving this goal is by highlighting the usefulness of this mode of learning to potential users. One of the greatest advantages of e-learning as perceived by the students is that it gives university students greater flexibility in time and place (Ndubisi, 2006). Moreover, e-learning enhances interactivity, i.e. communication between the students among themselves and with their tutors. As a result, designers of e-learning systems should pay attention to these benefits and design e-learning programmes that offer flexibility and interactivity. In addition, attitude toward e-learning is influenced by the perceptions of e-learning ease of

use. In other words, potential users are more likely to adopt and use e-learning if they deem it easy to use (Ndubisi, 2006). This suggests that designing easy to use systems can lead to a better adoption of e-learning among the students. Equally important to the acceptance of e-learning is the influence of the society. As e-learning is still new, the students have limited knowledge of this service. The society, thus, may provide the students with an alternative source for judging e-learning. Educating the society (e.g. family and instructors) with the benefits of e-learning can thus facilitate its acceptance.

Perceived e-learning accessibility emerged in this research as an important factor of e-learning acceptance. The students are more likely to accept and use e-learning if they think they have easy access to the system. Thus, e-learning suppliers (e.g. the university) should ensure trouble-free access to e-learning. The university can increase students acceptance of e-learning by providing training for the students on using the Internet as well as by making available Internet access points across the university and also by offering technical support. Finally, since some groups of students (e.g. males and external) showed more demand to use e-learning, attention should be given to these groups and make every effort to meet their requirements and high need for e-learning. Equally important, is to direct attention to the other groups of students who showed less interest in e-learning.

11. Limitations

This study had some limitations. First, e-learning in Saudi Arabia is still in its infancy with a paucity of information on its use at the time of the study. Thus, the greatest part of pertinent literature comes from other nations and may not truthfully explain the situation in Saudi Arabia. Second, the current study relied on one sample that had its unique features and may not be totally representative of the broader population. This may affect generalising the findings. Furthermore, this study utilised only self-reported measures. Although this method has been repeatedly employed in the past as a way of measuring attitude and perceptions, it is necessary to be aware of the weaknesses and issues associated with this method.

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