

# Students' Intention to Use Technology and E-learning probably Influenced by some factors and differences

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**Abstract** - This article examines the effect of some factors and differences on students' intention to use technology and e-learning in Libyan higher education (LHE). Four independent variables examined, computer-internet experience (CIE), computer self-efficacy (CSE), technology-internet quality (TIQ), and attitudes toward use (ATE), whereas the dependent variable used was intention to use technology and e-learning (ITE). Two critical differences inspected, differences based on gender, and differences based on field of study. Regardless the studies had been lead to inspect these factors and differences, not numerous have determined that. It is a key to detect and evaluate the factors and differences that influence instructors' intention to use technology and e-learning. 14 Hypotheses were tested a sample with size of 217. Based on outcomes of this article, our recommendation is a suggestion of strategies for further search by applying statistical analysis on additional sample to validate the stated factors and differences.

**Key Words:** Gender, Field of study, Technology-internet quality, Computer self-efficacy, Computer-internet experience, Attitudes toward using, intention to use

## 1. INTRODUCTION

Newly e-learning systems are becoming an integral part of teaching and learning process in HEIs [1]. As the result of advancement of IT, universities becoming used e-learning systems. Moreover, as a result of the growth of Web application e-learning systems are becoming an important instructional medium in universities[2]. According to [3], e-learning systems have been used in education and learning in numerous universities that caused in changes in education process in those institutions. Furthermore, with the wide spread use of WWW, many higher education institutions (HEIs) are taking the opportunity to develop e-learning courses [4]. Researchers concluded that, E-learning course is helpful because students and instructors can take part in the learning process from any place/time [5]. Researchers mentioned that, distance learning is an excellent method of reaching the adult learner. Because of the competing priorities of work, home and school, adult learners desire a high degree of flexibility. Furthermore, The structure of distance learning gives adults the greatest possible control over the time, place and pace of education [6]. In addition researchers have suggested that human factors (i.e., age, social status, and gender) play a critical role in one's learning experience [7][8].

Besides, The dependent variable, intention to use technology and e-learning, has been employed widely in previous technology acceptance research. Researches stated that [9][10]. As [11] concluded as well as [12], individuals' behavioral intention is a valid predictor of their actual behavior. While [13] said that, use and perceived usefulness of social networking media are considered as the key factors in assessing the students' and teachers' behavioral intention of accepting and using e-learning in LHE.

On the total from our opinion, individuals' intention to use technology and e-learning influenced by some factors and differences. We will concern the greatest serious of these factors and differences in the next piece.

### 1.1 The main and specific questions

Our main research question this article addressed is: to what extent are students' computer self-efficacy, computer & internet experience, attitudes toward e-learning, and technology & internet quality influencing students' intention to use technology and e-learning in LHE. The specific research questions that results from the main research question are as following:

**H1:** Students' computer self-efficacy will positively relate to students' intention to use technology and e-learning.

**H2:** Students' computer and internet experience will positively related to students' intention to use technology and e-learning.

**H3:** Students' attitude toward technology and e-learning will positively relate to students' intention to use technology and e-learning.

**H4:** Technology and internet quality will positively relate to students' intention to use technology and e-learning.

**H5a:** there are differences in students' computer and internet experience pattern based on gender.

**H5b:** there are differences in students' computer self-efficacy pattern based on gender.

**H5c:** there are differences in students' sight to technology and internet quality pattern based on gender.

**H5d:** there are differences in students' attitudes toward technology and e-learning pattern based on gender.

**H5e:** there are differences in students' intention to use technology and e-learning pattern based on gender.

**H6a:** there are differences in students' computer and internet experience pattern based on field of study.

**H6b:** there are differences in students' computer self-efficacy pattern based on field of study.

**H6c:** there are differences in students' sight to technology and internet quality pattern based on field of study.

**H6d:** there are differences in students' attitudes toward technology and e-learning pattern based on field of study.

**H6e:** there are differences in students' intention to use technology and e-learning pattern based on field of study.

## 2. Methods

A 33 items questionnaire had been conducted in five constructs, each of which contains a number of items, then, the questionnaire was translated to Arabic language and distributed to a sample of 273 students LHE (Zawia University, and institutions of the national authority for technical education) in the academic year 2017/2018. The factor analysis identified 27 items in five groups, as Factor1, Factor2, Factor3, Factor4, and Factor5. The questionnaire of 27-item which developed previously was distributed to the target population of this study. The sample was approximately 530, after pre-analysis data screening the responses collected were 413 Students in different academic departments.

pre-analysis data screening deals with the process of detecting irregularities or problems with the collected data [14]. According to [14], there are four main reasons to conduct the data screening prior to data analysis: to ensure accuracy of the collected data, to address the issue of response-set, to eliminate missing data, and to identify data outliers.

### 2.1 Analysis of measurement validity

To analyze our data in this research, SPSS software used, descriptive statistics (means (M), standard deviations (SD)) and alpha reliability of student intention were calculated. Measurement validity in terms of reliability and construct validity also assessed, reliability of the instrument was evaluated using Cronbach's alpha and was to be highly accepted ( $\alpha = 0.92$ ). All the values of different scales were in range from 0.78 to 0.91 (table 1), exceeding the minimum value suggested. The high alpha reliability gives a support for questionnaire content reliability.

A correlation matrix approach was applied to examine the convergent and discriminant validity. The smallest within-factor correlations are: computer and internet experience = 0.36; computer self-efficacy= 0.22; technology and internet quality = .51; attitudes toward technology and e-learning = 0.57; and intention to use technology and e-learning=0.76. In addition, most of the smallest within-factor correlation was approximately considerably higher among items intended for the same construct than among those designed to measure different constructs. This suggests adequate convergent and discriminant validity of the measurement.

The correlation coefficients among the variables are presented in table 2.

The bi-variate relationships indicated that many of the variables significantly correlated with each other, However the values in range from .31 to .55, and in general the correlations between the IVs and DV were higher than the correlations between IVs selves.

**Table 1 :** Descriptive statistics of students' items and

Variables	Mean	SD	Cronbach's alpha
Cronbach's alpha total alpha= 0.92			
Computer and Internet Experience (CIE): 4-points likert scale			0.87
CIE1	2.75	0.85	
CIE2	2.68	0.97	
CIE3	2.82	0.93	
CIE4	2.71	0.94	
CIE5	2.75	0.88	
CIE6	2.86	0.82	
Computer and Internet Self-Efficacy (CSE): 5-points likert scale			0.89
CSE1	3.08	1.15	
CSE2	3.29	1.10	
CSE3	3.05	1.00	
CSE4	3.18	1.05	
CSE5	3.23	1.08	
CSE6	2.99	1.12	
CSE7	3.09	1.03	
CSE8	3.13	1.02	
CSE9	3.08	1.05	
Technology and Internet Quality (TIQ): 5-points likert scale			0.78
TIQ1	3.03	1.06	
TIQ2	3.10	1.06	
TIQ3	3.08	0.96	

Attitudes toward Technology and E-learning (ATE):			0.91
5-points likert scale			
ATE1	3.04	1.04	
ATE2	3.11	1.10	
ATE3	3.05	1.00	
ATE4	3.00	0.98	
ATE5	3.00	0.94	
ATE6	3.12	1.12	
Intention to Use Technology and E-learning (ITE):			0.91
5-points likert scale			
ITE1	3.13	1.07	
ITE2	3.21	1.09	
ITE3	3.05	1.06	

**Table 2:** Correlation analysis of students' intention

	1	2	3	4	5
1-CIE		.39***	.33**	.42***	.55***
2-CSE			.31ns	.37***	.41***
3-TIQ				.37**	.35**
4-ATE					.46***
5-ITE					

\*\* P<.05

\*\*\* P<.001

ns not significant

### 2.2 Regression analysis

Concerning analytic strategy for assessing the hypotheses H1, H2, H3, H4, multiple regression analysis is an appropriate multivariate analytical methodology for empirically examining sets of relationships in the form of linear causal models.

Stepwise multiple regressions were performed to the path associated with the variables and presented in table 3. The regression analysis performed to check the effects of IVs (computer and internet experience, computer self-efficacy, technology and internet quality, and attitudes toward technology and e-learning) on DV (students' intention to use technology and e-learning).

**Table 3:** Regression results of students' intention

DV	IV	B	R <sup>2</sup>	P
ITE	CIE	.18	.51	<.001
	CSE	.07	.19	<.001
	TIQ	.08	.03	<.05
	ATE	.08	.12	<.001

### 3. The result

As in the result of regression analysis, the test shows that, the independent variable computer and internet experience have the biggest effect on intention to use technology and e-learning and they are moderately strong in association (R=.71), (F(6,406) = 70.55, p< .001, R<sup>2</sup>=.50), the variable computer self-efficacy have less effect on intention to use technology and e-learning and moderately associated (R=.43), (F(9,403) = 10.92, p<.001, R<sup>2</sup>=.19), attitudes toward technology and e-learning could be weakly predict intention to use technology and e-learning (R=.35) (F(6,406) =9.35, p<.001, R<sup>2</sup>= .12 ), while the weakest predictor variable on intention to use technology and e-learning is technology and internet quality (R= .18) (F(3,409) = 4.49, p=.004, R<sup>2</sup>= .03 ).

Hence, we can conclude that, the H1,H2, H3, and H4 are supported, we can say that, all the students' IVs (CIE, CSE, TIQ, and ATE) are positively related to the DV (ITE). In fact the IV (CIE) alone can predict the DV (ITE), since explains half of the total variance. The final student intention model is summarized in Figure 1. Heavier lines indicate the stronger effects, thinner lines indicate small effects, while dashed line indicates to very small effect. The arrows show the implied direction of causality in the relationships between factors.

#### 3.1 Differences based on gender

To test the hypotheses H5a, H5b, H5c, H5d, H5e, t- test was carried out from entire data sample (i.e., male and female pooled together) then each of the subsamples (i.e., men taken separately and women taken separately).

Referring to table 4 to show the differences in students' computer and internet experience, computer and internet self-efficacy, technology and internet quality, attitudes toward technology and e-learning, and intention to use technology and e-learning based on gender, there were no gender significant differences found for all the variables CIE, CSE, TIQ, ATE, and ITE. Hence all the hypotheses H5a, H5b, H5c, H5d, H5e, are not supported.

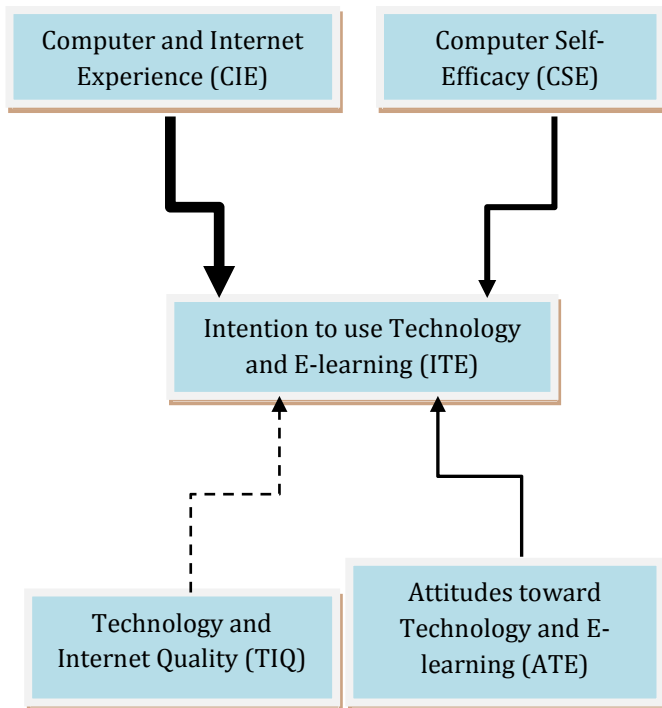


Figure 1 the final student intention model

Table 4: t-test results for Students' differences based on gender

	gender	N	Mean	SD	T	df	P
CIE (1=never, 4=daily)	M	201	2.799	.878	.833	411	.459
	F	212	2.726	.917			
CSE (1=not at all confident, 5=totally confident)	M	201	3.159	1.050	.673	411	.575
	F	212	3.090	1.059			
TIQ (1=strongly disagree, 5=strongly agree)	M	201	3.128	1.045	1.090	411	.300
	F	212	3.017	1.004			
ATE (1=strongly disagree, 5=strongly agree)	M	201	3.121	.991	1.320	411	.225
	F	212	2.986	1.061			
ITE (1=very unlikely, 5=very likely)	M	201	3.199	1.075	1.303	411	.201
	F	212	3.061	1.068			

### 3.2 Differences based on field of study

The test was performed from entire data sample (i.e., all the participants pooled together) then each of the subsamples (i.e., computer & IT, sciences, education & languages, economy & Accounting & Business management, and engineering) taken separately.

The effects of field of study upon CIE, CSE, TIQ, ATE, and ITE were examined using One-way ANOVA test to test the hypotheses H6a, H6b, H6c, H6d, H6e. Sum of squares, and mean of squares together with significant F ratios are shown in table 5. We can said that there were no significance differences

found in pattern in the field of study for all the IVs (CIE, CSE, TIQ, ATE, and ITE).

Table 5: One-way ANOVA results for students' differences based on field of study

	SS	DF	MS	F
<b>CIE</b>				
Between group	2.044	4	.511	.639 ns
Error	331.364	408	1.979	
Total	333.408	412		
<b>CSE</b>				
Between group	4.744	4	1.186	1.047 ns
Error	464.742	408	1.139	
Total	469.486	412		
<b>TIQ</b>				
Between groups	3.652	4	.913	.871 ns
Error	429.954	408	1.054	
Total	433.606	412		
<b>ATE</b>				
Between group	2.881	4	.720	.734 ns
Error	434.117	408	1.064	
Total	436.998	412		
<b>ITE</b>				
Between group	1.946	4	.487	.427 ns
Error	272.440	408	1.158	
Total	474.386	412		

\*\*\*  $P < .001$

ns not significant

As shown in table 6, there was however no significance differences among the means of students based on field of study. For example among the variable Computer and Internet Self-efficacy (CSE) the mean was in ranging from 3.020 to 3.182 (narrow interval) and standard deviation from 0.987 to 1.221. Hence H12a, H12b, H12c, H12d, H12e are not supported. Table 7 summarizes the results of all the hypotheses testing.

Table 6: Mean and standard deviation for students' CIE, CSE, TIQ, ATE, and ITE based on field of study differences.

Field of Study	CIE		CSE		TIQ		ATE		ITE	
	M	SD	M	SD	M	SD	M	SD	M	SD
1	2.88	.87	3.16	.99	3.03	.97	3.12	1.02	3.22	.96
2	2.75	.88	3.02	1.11	3.15	1.09	3.13	1.06	3.09	.15
3	2.71	.94	3.12	1.22	3.17	1.04	2.96	1.00	3.04	1.08
4	2.71	.94	3.04	1.01	2.90	0.97	3.01	1.13	3.06	1.07
5	2.74	.86	3.18	1.08	3.10	1.04	3.02	1.07	3.17	1.10

1= computer & IT

2= Sciences

3= Education & Languages

4= Economy & Accounting & BM

5= Engineering

#### 4. Conclusion and future research

One of the main goal associated with this article as shown in Figure 1, was to assess a theoretical model, to predict students' intention to use technology and e-learning based on the variables computer and internet experience, computer self-efficacy, technology and internet quality, and attitudes toward technology and e-learning. The population of this study was students in Libyan higher education, all of them are at Zawia University, and institutions of the national authority for technical education. In the stage of analysis, from a total population of 530 students, the number of respondents was 413, with response rate of 77.92%.

**Table 7** summary of results

Hypothesis	Variable	Result
1	CIE	Supported
2	CSE	Supported
3	ATE	Supported
4	TIQ	Supported
5a	CIE	Not Supported
5b	CSE	Not Supported
5c	ATE	Not Supported
5d	TIQ	Not Supported
5e	ITE	Not Supported
6a	CIE	Not Supported
6b	CSE	Not Supported
6c	ATE	Not Supported
6d	TI Q	Not Supported
6e	ITE	Not Supported

The main research question that this study addressed was: is the students' computer and internet experience, computer self-efficacy, technology and internet quality, and attitudes toward technology and e-learning related to intention to use technology and e-learning? The multiple linear regression analysis (MLR) indicated that all the four students' independent variables were significantly and positively related to the dependent variable (CIE, CSE, and ATE  $P < .001$ , TIQ  $P < .05$ ).

The first research question was: To what extent does CIE affect students' intention to use technology and e-learning in

LHE? This study identified the significance of CIE in students' intention to use technology and e-learning. Results of multiple linear regression analysis were reliable as counting for the greatest weight to predict students' intention to use technology and e-learning. This result were confirmed by other previous studies and validated strengthens, for instance [15][16][3][17][18] reported, computer and internet experience is an effective variable on individuals' intention to use technology and e-learning.

The second research question was to what extent does CSE affect students' intention to use technology and e-learning in LHE? Computer self-efficacy is an important variable investigated in this study. Findings from our analysis showed that computer self-efficacy was a very important factor to predict students' intention to use technology and e-learning. From MLR analysis we can conclude that the CSE was the second most predictor in students' intention to use technology and e-learning. Previous studies gives findings strengthens. According to [19][20]. Others have found that high CSE is related to the use of a variety of technologically advanced products. CSE has been shown to be an effective predictor of individuals' intention to use and actual use of IT [21].

The third research question was: To what extent does TIQ affect students' intention to use technology and e-learning in LHE? Technology and internet quality has been generally supported in the literature as an effective factor in accepting IT. Even if our MLR analysis in this research, found that the TIQ was the fourth predictor and have the smallest effect for students' intention to use technology and e-learning. But still support other previous studies. Several researchers indicate that technology and Internet quality significantly affect satisfaction in e-Learning [22][23]. Consequently, the higher the quality and reliability in IT, the higher the learning effects will be [24]. According to [3], the most critical factor among the reliability of the information technology infrastructure for e-learning acceptance was the availability of computer labs for practice, Computer network reliability, University support including technical assistance, troubleshooting, library and information availability.

The fourth research question was: To what extent does ATE affect students' intention to use technology and e-learning in LHE?

In the literature, attitude appears a major factor to affect individuals' use of IT, thus, understanding individuals' attitude toward e-learning is important [25].

The MLR analysis in our study found that the ATE was the third most effective factor in students' intention to use technology and e-learning. Hence this finding supports other researches. According to [26], "For a wide range of behaviors, attitudes are found to associate well with intentions".



The fifth research question was: To identify if there are differences in students' CIE, CSE, TIQ, ATE, and ITE based on demographic, professional and technology background (gender, specialization, past teaching experience) in LHE. Previous researches concluded that individuals' differences such as demographic difference (gender), past experience, and field of study or work have an important role in individuals' intention to use and accepting technology and e-learning. Therefore, this factor should be taken in account in designing e-learning systems.

Research findings essentially measured in light of limitations. First, there are various individuals differences may affect students' intention to use technology and e-learning systems, such as age, gender, computer experience, computer anxiety, subjective norms, etc. but in our study we just focused on some of these differences and factors. We propose to study the effects of other possible factors in future research. Hence other extra variables included in future studies may support or affect our results, as well using different sample (size, quality) could influence or strengthens our results. Second, as this study used a snapshot approach, a longitudinal approach should be considered in future research.

#### 4.1 Implications for Research and Practice

Our paper implications are significant. One contribution of this study is the knowledge of intention to use technology and e-learning in LHE by creating a construct CIE, CSE, TIQ, and ATE. As a result this study is expected to contribute in future researches that investigate the intention to use technology and e-learning. The implications of this study for practice are:

The one is to understand the main factors that influence students' intention to use technology and e-learning in LHE, this can be lead the administrators to better understanding for these factors and this lead to capture the motivations to individuals' intention to use technology and e-learning.

The second one is that, the findings of this study will help practitioners in IT to design and develop more likely systems accepted by individuals.

The Third, is that the students' differences in LHE should be taken in account in designing e-learning systems.

#### 4.2 Study Limitations

In this study there are a number of limitations. The first, is that, data have been collected were self-reported by students. So, the reliability of the survey data is dependent on the individuals' honesty and completeness of the responses. The second, to minimize the self-report bias all the data were checked for data accuracy, response set, missing data, and outlier.

#### 4.3 Recommendations for future research

In addition to the predictive variables that investigated in this study (CIE, CSE, TIQ, ATE), future research may focus on other variables as an effort to better understanding for students' intention to use technology and e-learning.

This study investigated the independent variables of students' intention to use technology and e-learning systems. But, a real users' of technology and e-learning systems was not a part of this study. So, future studies may wish to extend this investigation and also measure a real users' of technology and e-learning.

Population of this study was students of Libyan higher education (Zawia University, and institutions of national authority for technical education). Future research may investigate students of other universities (wide range). A bigger and different sample may detect differences in constructs that affect students' intention to use technology and e-learning.

At last, the result of this study verified the positive relationship between independent variables CIE, CSE, TIQ, and ATE and dependent variable students' intention to use technology and e-learning. That is, the better levels of individuals' CIE, CSE, ATE, and better TIQ the better individuals' intention to use technology and e-learning.

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