Journal of Research Administration
Society of Research Administrators International

CHALLENGES OF APPLYING E-LEARNING IN THE LIBYAN HIGHER EDUCATION SYSTEM USING UTAUT AND EXTERNAL VARIABLES

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ABSTRACT

The overall goal of the research is to determine the elements that influence an LHEI's decision to transition to e-learning, assess the significance of these elements through structural equation modeling (SEM), and use an important performance map analysis algorithm to identify the most important element. The study starts with a literature review to clarify key terms such as e-learning adoption, obstacles, and technology adoption models. and acceptability success elements for e-learning that are relevant to LHEIs' use of technology. In the UTAUT framework of this study, favorable conditions had been one of the characteristics taken into consideration for variety. The study requires a quantitative approach and makes use of a survey. The reported questionnaires are distributed electronically and depend on previous research. The findings of this study may prove useful for those who are studying the spread of technology in educational institutions around the world, particularly in developing countries.

Keywords: UTAUT, adoption, Libyan higher education, E-learning, SEM.

1. INTRODUCTION

ICTs, such as computers, internet access, broadcasting media, and telephones, have become increasingly prevalent. have been utilized in educational settings. E-learning and ICTs should be implemented in Libyan higher education. The Libyan Ministry of Higher Education and Scientific Research aims to restructure the education system and promote E-learning. There is a pressing need to conduct studies on the usage of E-learning in Libyan universities to expand knowledge and address gaps in the literature review. Libya intends to play an important role among African countries. Improving ICT projects, inadequate infrastructure, and a lack of competent teachers are important challenges to the reform effort. Due to the continuing conflict in Libya, the government has not prioritized improving the use of E-learning and ICT in the Libyan Higher Education System (LHES). Research on the adoption of E-learning in higher education in industrialized nations is crucial. This paper examines the causes behind the low utilization of ICT in LHES Ismail, M., Khatibi, A., & Azam, S. M. F. (2022).

The objectives of this paper are:

1. To investigate the effect of performance expectancy, effort expectancy, social influence, technology awareness, and technology anxiety on e-learning behavioral intention among students of Libyan Higher Education Institutions.
2. To examine the impact of performance expectancy, effort expectancy, social influence, technology awareness, and technology anxiety on the actual usage of e-learning among students of Libyan Higher Education Institutions.
3. To test the impact of behavioral intention on actual usage of e-learning among students of Libyan Higher Education Institutions.

This study uses a quantitative approach since this is the most appropriate approach for this kind of research. This is to explore the participants' perceptions and perspectives. students from the LHEI have been targeted by the questionnaire to collect the data.

The key that we would like to address are the following:

1. What is the effect of performance expectancy, effort expectancy, social influence, technology awareness, and technology anxiety on e-learning behavioral intention among students of Libyan Higher Education Institutions?
2. What is the impact of performance expectancy, effort expectancy, social influence, technology awareness, and technology anxiety on the actual usage of e-learning among students of Libyan Higher Education Institutions?
3. What is the impact of behavioral intention on the actual usage of e-learning among students of Libyan Higher Education Institutions?

The remainder of this paper is organized as follows. Section 2 describes the operational definitions that will be utilized throughout the article. The literature review about the challenges of E-learning and ICT in the LHES is introduced in Section 3 while the methodology is presented in Section 4. The experimental results and discussion are presented in Section 5, and the conclusion is exhibited in Section 6.

2. OPERATIONAL DEFINITION

ICT encompasses novel equipment and assets for data transmission, storage, and management. ICT refers to a wide range of devices, including computers, handheld devices, intelligent whiteboards, the Internet, database and graphical applications, and broadcasting devices Lashayo, D. M., & Johar, M. G. M. (2018).

E-learning: is defined as education carried out through the use of a program or application to support and motivate students, such as online tests, online courses, online collaboration and remote support. describes e-learning as teaching or learning with the use of information and communication technology (ICT), whereas it classifies e-learning as the delivery of prepared material through any electronic media. This can involve involving students in the design and development of e-learning initiatives, providing opportunities for student feedback and input, and promoting a culture of student-centered learning in Libyan HEIs Gunasinghe, Asanka, J. A. Hamid, Ali Khatibi, and SM Ferdous Azam.

LHEI: refers to Libya's universities and colleges. encompasses both higher professional institutes and public universities. The latter gives teacher training, and the higher education institutions that offer post-secondary school education provide training for trainers and instructors.

Structural Equation Modeling (SEM): is a technique for statistical analysis based on multivariate concepts that analyze structural relationships between variables or latent constructs (Becker, J.-M., Cheah, J.-H., Gholamzade, R., Ringle, C. M., & Sarstedt, M. 2023). The SEM combines factor analysis and multiple regression analysis. This technique will measure the relationships between the IV and DV in this study.

Construct: The term "construct" describes the factors that an experiment cannot detect. The variables are latent variables Lashayo, D. M., & Md Johar, M. G. (2018)., also known as dependent (DV) and independent (IV). Rather, these kinds of variables are measured using objects or indicators. By utilizing an arrow from the IV pointing toward the DV, structural equation modeling (SEM) assigns the IV a cause-and-effect relationship with the DV Ariffin, K., Abdulsamad, A., Al-Zubaidi, R., Leman, Z., & Ahmad, S. (2022).

3. LITERATUREREVIEW

3.1 Teaching and Learning by ICT

In this section, the literature review, together with the state of affairs at LHES and their ambitions to integrate ICT and e-learning.

In higher education, information and communication technology (ICT) is widely used to support instruction. Through ICT, face-to-face instruction can be replaced with blended or online instruction. studying. Through this procedure, courses may be made available and accessible online so that students can enroll in them or retake them whenever they like. It is said that face-to-face instruction may be done without the use of e-learning, but in this scenario, the use of computers and the internet in the classroom would make the instruction known as blended learning. contend that interactions between students and teachers that occur at the same times and in the same online environment are examples of asynchronous learning. ICT is a crucial component of the LHES that may benefit teachers and students alike Azam, S. F., Yajid, M. S., Tham, J., Hamid, J. A., Khatibi, A., Johar, M. G. M., & Ariffin, I. A. (2021).

Mobile phones, laptops, and computers are examples of digital gadgets. Additionally, Boateng et al. (2016) found that e-learning makes use of ICT resources, tools, and knowledge to enhance learning. However, a more contemporary definition, frequently cited by the World Bank, concurs that e-learning is location-specific and employs cutting-edge technology, such as mobile devices and broadband, to give easily accessible materials from any place (Neil, 2023).

3.2 The LHES and the implementation of the ICT

With the use of human capital and the information economy, the LHES has the potential to improve economic growth .Libya is trying to repair its LHES by using ICT and e-learning to impart knowledge. But to do this, an atmosphere that supports and welcomes novel approaches to learning must be established. The primary goal of the LHES policy for ICT use in education

is to make ICT tools and applications more accessible .To ensure the greatest learning tools—including gadgets, materials, tactics, and media—and keep up with international advancements, they must rebuild the infrastructure to meet ICT requirements. However, due to Libya's civil war and ongoing hostilities, internet connectivity is sometimes spotty or intermittent.

Table 1: The challenges facing the application of E-learning in developed countries

Ref No	Country	Challenges
A. Rhema and I. Miliszewska, A. Al-Azawei, P. Parslow, and K. Lundqvist	Libya	- Poor Internet connectivity - Insufficient assistance - Insufficient linguistic competence. - Inadequate training course offerings. - A dearth of academic workers with training. - Internet costs. -Disinterest and social constraints. - The ongoing conflict's effects on instability and insecurity..
A. A. Mirza and M. Al-Abdulkareem	Saudi Arabia	- Internet cost. - Lower esteem for the public of web-based.
M. Al-Shboul	Jordan	- Lack of institutional support and encouragement. - Undeveloped infrastructure.
B. E. Zamani, A. Esfijani, and S. M. Abdellahi Damaneh,	Iraq	- Lack of qualified and prepared scholarly staff. - Lack of specialization. - Lack of ICT framework. - Electricity deficiency, ICTs, and E-learning absence of education.

For academic personnel to provide information and skills online, they must have ICT training. Additionally, Libyan institutions must employ ICT in the classroom to adapt to the advancements prompted by mechanical developments. In addition, two important problems that continue to undermine ICT comprehension are lacking ICT skills and hierarchical support .

The major obstacles that may prevent the successful introduction of e-learning in industrialized nations are compiled in Table 1.

3.3 Challenges and Issues of ICT Adoption and Use in Higher Education Institutions

The adoption and use of information and communication technology (ICT) at higher education institutions (HEIs) raises several obstacles and issues. These vary from technological and infrastructure issues to educational and administrative challenges. These problems are explored in the following subsections.

3.3.1 Technical and Infrastructure Challenges

Limited Access to Technology: Many HEIs, particularly in poor countries, experience considerable challenges in obtaining the essential hardware and software. This might include obsolete computers, inadequate bandwidth, and a lack of dependable internet access.

3.3.2 Infrastructure Development Costs:

Creating and maintaining the necessary technological infrastructure for successful ICT adoption demands significant financial expenditure. This covers the expenditures of hardware, software licensing, networking equipment, and continuous maintenance.

3.3.3 Technical Support and Maintenance:

Regular maintenance is critical to the proper running of ICT systems. Many institutions suffer from insufficient IT staff or experience, resulting in protracted downtime and ineffective use of technology.

Challenges and Issues of LHEIs ICT Adoption and Use.

Libyan higher education institutions recognize the importance of ICT in education, while others have established in-house information systems solutions. However, various obstacles and constraints impede e-learning's development in Libya. The World Bank's "eLearning Africa Report 2014" emphasized the potential for e-learning in African countries, including Libya. The paper underlines the importance of increasing investment in ICT infrastructure and using e-learning platforms to improve educational access and quality. Furthermore, AlGhawail and Alrshah (2019) recognized a lack of awareness about ICT and e-learning among instructors and students as a key barrier to adoption. As a result, the importance of raising knowledge and developing ability to use e-learning technologies properly is highlighted.

In underdeveloped nations, the successful adoption of e-learning is still seen as troublesome and difficult. According to Ghawail et al. (2021), the problems of adopting e-learning in LHEIs include bad internet, expensive training, language concerns, a dearth of competent staff, internet costs, instability and insecurity, and social issues. Their findings are consistent with earlier research, which has uncovered comparable difficulties. These obstacles include a lack of ICT tools and procedures, insufficient infrastructure, restricted access to resources, and a shortage of technical people (Hbaci et al., 2021; Mustafa & Hussin, 2017; Salem & Mohammadzadeh, 2018; Al-Azawei et al., 2016; Rhema & Miliszewska, 2014). Similarly, Almigheerbi et al. (2020) acknowledged that IT assistance is vital for higher education since it may boost teaching and learning.

4. METHODOLOGY

This study uses quantitative methods since they are the most appropriate approach for this kind of research, and they explore the participants 'perceptions and perspectives. Students from the LHEIs have been targeted by the questionnaire to collect the data. The questionnaire

has basic questions to gather information on the participants, Therefore, a total of 576 questionnaires were distributed. The responders were chosen at random from students studying engineering and science, humanities, and medical sciences. The questionnaires were delivered to students by the registration offices at each selected university.

To increase response rates, a cover letter stressing respondent anonymity and secrecy was provided, which matched the study's aims. These efforts resulted in the return of 400 completed surveys, with a total response rate of 69.44%. Sekaran and Bougie (2016) suggested that a 30% response rate is enough for analysis. Additionally, Abdulsamad et al. (2020) and A. M. Al-Sharif et al. (2023) said that Smart PLS 4.0 software required at least 30 replies for analysis. As a result, a response rate of 69.44% is sufficient to complete the study.

5. RESULTS AND DISCUSSIONS

Table 2 shows that infrastructure is vital for implementing E-learning in the LHEIs, as indicated by the participant. Many Libyan colleges lack appropriate infrastructure, including computers, networks, Internet access, and computer laboratories. The results indicate considerable student enthusiasm in adopting ICT and E-learning, which requires assistance from the LHEIs.

5.1 Demographics of Participants

The descriptive analysis was undertaken to highlight the respondents' demographics and preferences, with an emphasis on three important areas: gender, age, and field of study. These complete descriptive data offer a full picture of the participant profile for the study on variables influencing E-learning usage and mediation effects among university students in Libyan Higher Education Institutions Gunasinghe, A., Hamid, J. A., Khatibi, A., & Azam, S. F. (2020).

The gender distribution of the participants reveals a slight predominance of males over females. Out of the 395 respondents, 213 are male, accounting for 53.9% of the sample. Meanwhile, female participants number 182, making up 46.1% of the total (See Table 2 and Figure 1). This indicates a balanced representation of genders, though males slightly outnumber females in this study.

Table 2 Gender of Respondents

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Male	213	53.9	53.9	53.9
Female	182	46.1	46.1	100.0
Total	**395**	**100.0**	**100.0**	

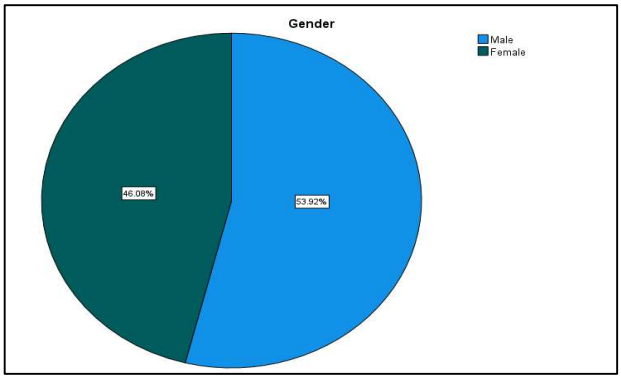

Figure 1 Gender of Respondents

The participants' ages range from young people to senior individuals. As shown in Table 3 and Figure 2, the biggest age group is 18-26 years old, with 125 individuals or 31.6% of the overall sample. The 36-44 age group has 102 competitors (25.8%). Participants aged 27-35 years make up 21.8% of the sample (86 participants), while those aged 45-53 years account for 16.2% (64 persons).

Table 3 Age of Respondents

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
18-26	125	31.6	31.6	31.6
27-35	86	21.8	21.8	53.4
36-44	102	25.8	25.8	79.2
45-53	64	16.2	16.2	95.4
54 and above	18	4.6	4.6	100.0
Total	**395**	**100.0**	**100.0**	

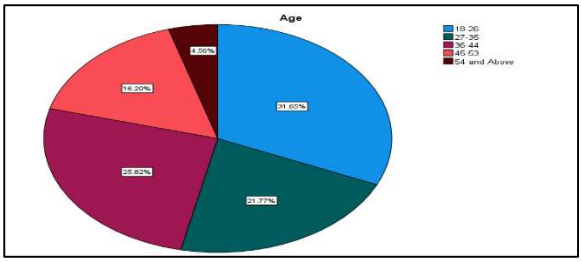

Figure 2 Age of Respondents

Participants in this paper are from a variety of academic areas. As shown in Table 4 and Figure 3, Humanities has the biggest group, with 190 participants (47.9%). Engineers and scientists come in second, with 153 (38.5%). The smallest group is made up of 54 (13.6%) Medical

Sciences participants. This academic diversity enables the study to investigate how different fields of study may influence the use of E-learning among university students.

Table Error! No text of specified style in document. **Field of Study of Respondents**

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Engineering and science	152	38.5	38.5	38.5
Humanities	190	48.1	48.1	86.6
Medical Sciences	53	13.4	13.4	100.0
Total	**395**	**100.0**	**100.0**	

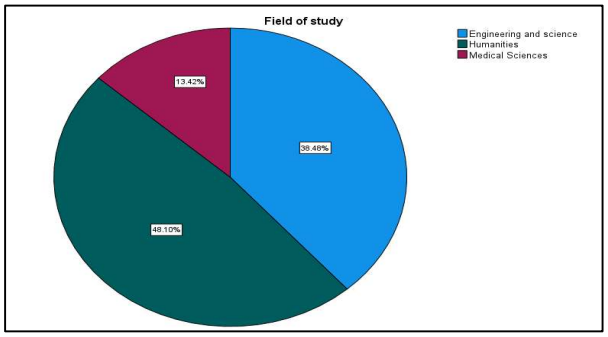

Figure 3 Field of Study of Respondents

5.2 Assessment of Partial Least Squares Structural Equation Path Model

5.2.1 Reliability Measurement

When reviewing the measurement model, it is critical to analyze the reliability of each item within the constructs under consideration, table 5. This is also known as outer loading, as explored by Becker et al. (2023), Hair et al. (2022), and Ringle et al. (2020). The phrase "outer loading value" relates to how much an item contributes to the larger construct being measured. To meet the given conditions, the outer loading value must exceed 0.708, which is calculated by guaranteeing that the average variance extracted (AVE) is more than 0.50 Perera, M. R., Johar, G. M., Kathibi, A., Atan, H., Abeysekera, N., & Dharmaratne, I. R. (2017).

Table 5 Results of the Measurement Model.

Factors	Item	Outer loadings	Cronbach's alpha (α>= 0.7)	Composite Reliability (CR >= 0.7)	Average Variance Extracted (AVE >=0.5)
Performance Expectancy	PE1	0.867	0.941	0.949	0.653
	PE2	0.845			
	PE3	0.864			
	PE4	0.832			
	PE5	0.841			
	PE	0.824			
	PE7	0.806			
	PE8	0.710			
	PE9	0.718			
	PE10	0759			
Effort Expectancy	EE1	0.855	0.926	0.942	0.730
	EE2	0.840			
	EE3	0.846			
	EE4	0.887			
	EE5	0.863			
	EE6	0.833			
	EE7	D			
	EE8	D			

Social Influence	SI1	0.749	0.912	0.928	0.587
	SI2	0.744			
	SI3	0.781			
	SI4	0.749			
	SI5	0.719			
	SI6	0.791			
	SI7	0.790			
	SI8	0.767			
	SI9	D			
	SI10	0.804			

Table 6 Results of the Measurement Model

Factors	Item	Outer Loadings	Average Variance Extracted (AVE >=0.5)	Composite Reliability (CR >= 0.7)	Cronbach's alpha (α>= 0.7)
Technology Awareness	TA1	0.758	0.925	0.937	0.625
	TA2	0.768			
	TA3	0.825			
	TA4	0.809			
	TA5	0.843			
	TA6	0.771			

	TA7	0.741		
	TA8	0.793		
	TA9	0.799		
Technology Anxiety	TAX1	0.850	0.955	0.962	0.737
	TAX2	0.818			
	TAX3	0.857			
	TAX4	0.863			
	TAX5	0.828			
	TAX6	0.884			
	TAX7	0.850			
	TAX8	0.889			
	TAX9	0.882			
Behavioural Intention	BI1	0.882	0.964	0.969	0.774
	BI2	0.897			
	BI3	0.867			
	BI4	0.859			
	BI5	0.880			
	BI6	0.899			
	BI7	0.864			

	BI 8	0.886			
	BI 9	0.884			
Actual Usage	AU 1	D	0.897	0.917	0.581
	AU 2	0.747			
	AU 3	0.758			
	AU 4	0.768			
	AU 5	0.771			
	AU 6	0.763			
	AU 7	0.785			
	AU 8	0.753			
	AU 9	0.755			

Table 7 Hypothesis Evaluation Results

NO. H	H. Direct effect	Path Coefficient	S-Deviation	T-V	P-V	Results
H1	PE -> BI	0.126	0.068	1.871	0.061	Not supported
H2	EE -> BI	0.139	0.039	3.545	0.000***	Supported
H3	SI -> BI	0.187	0.059	3.149	0.002**	Supported
H4	TA -> BI	0.166	0.050	3.336	0.001***	Supported
H5	TAX -> BI	0.105	0.050	2.097	0.036**	Supported

NO. H	H. Direct effect	Path Coefficient	S-Deviation	T-V	P-V	Results
H6	PE -> AU	0.139	0.057	2.427	0.015**	Supported
H7	EE -> AU	0.062	0.045	1.376	0.169	Not supported
H8	SI -> AU	0.074	0.058	1.274	0.203	Not supported
H9	TA -> AU	0.037	0.048	0.755	0.450	Not supported
H10	TAX -> AU	0.152	0.051	2.960	0.003**	Supported
H11	BI -> AU	0.257	0.064	4.017	0.000***	Supported

H1: The hypothesis analysis results in table 7 of the paper examines factors affecting e-learning usage among Libyan Higher Education Institutions' university students. Results show no significant relationship between performance expectancy and behavioral intention.

The relationship between performance expectancy (PE) and behavioral intention (BI) was explored, but the results **(ß = 0.126, t = 1.871, p > 0.05)** indicate that this relationship is not statistically significant suggesting that students' beliefs about e-learning's benefits do not significantly influence their intention to use platforms.

H2: Effort expectancy positively impacts BI, **(ß = 0.139, t = 3.545, p < 0.001),** supporting H2. indicating that students are more likely to use e-learning if it's easy to use, emphasizing the importance of user-friendly interfaces.

H3: Additionally, social influence (SI) also demonstrated a significant positive relationship with BI **(ß = 0.187, t = 3.149, p < 0.05),** supporting H3. Social influence significantly influences students' intentions to use e-learning, underscoring the role of social dynamics in educational settings, as influenced by peers, instructors, and others.

H4: Technology awareness significantly predicts BI, **(ß = 0.166, t = 3.336, p < 0.001),** supporting H4. as students with better understanding of e-learning technologies are more likely to use them, emphasizing the need for effective information dissemination.

H5: Technology anxiety positively influences BI, **(ß = 0.105, t = 2.097, p < 0.05),** supporting H5. suggesting that anxiety may encourage intentional engagement with e-learning to overcome apprehension and familiarize students with the technology.

H6: Performance expectancy (PE) significantly predicts actual usage of e-learning, (**ß = 0.139, t = 2.427, p < 0.05),** supporting H6. suggesting that students who believe e-learning will improve their academic performance are more likely to use it in practice.

H7: Effort Expectancy (EE) did not significantly influence AU (, (ß = 0.062, t = 1.376, p > 0.05), and thus H7. Suggesting other factors may play a more crucial role in the transition from intention to actual use.

H8: Social influence does not significantly affect AU, **(ß = 0.074, t = 1.274, p > 0.05),** and H8, suggesting a potential gap between social encouragement and personal engagement, despite its impact on intention.

H9: Technology awareness does not significantly impact AU, **(ß = 0.037, t = 0.755, p > 0.05),** leading to H9 not being supported. indicating that mere awareness of e-learning technologies is insufficient to drive actual use, emphasizing the need for more engaging and motivating factors.

H10: Technology anxiety (TAX) significantly predicts AU**, (ß = 0.152, t = 2.960, p < 0.05), supporting H10**. Suggesting higher anxiety levels may encourage students to use e-learning to alleviate fears and increase familiarity.

H11: Behavioral intention significantly predicts actual usage of e-learning, **(ß = 0.257, t = 4.017, p < 0.001), supporting H11**. Emphasizing the importance of fostering positive intentions to enhance students' engagement and usage.

6. CONCLUSION AND RECOMMENDATIONS

This research aims to assist LHEIs in creating a more effective E-learning environment by identifying key hurdles to successful implementation. This report identifies linguistic barriers, technological and cultural concerns, and a lack of defined E-learning regulations as major barriers to adoption in higher education.

Consequently, the recommendations of potential solutions for LHES to achieve a successful E-learning implementation are as follows:

1- Developing strategies to implement E-learning in Libyan universities, which currently lack expertise in this area. We advocate collaborating with successful institutions in Malaysia, Singapore, China, and Japan that have pioneered E-learning. We advocate focusing less on collaboration with other nations facing similar difficulties.
2- Developing security policies in all Libyan cities to secure ICT infrastructure and ensure effective E-learning deployment.
3- English proficiency programs aim to enhance language abilities for all Libyan educators and students.
4- Seeking technical help for ICT and E-learning from successful universities in other countries, including training programs for local workers.
5- Encouraging Libyan authorities to launch awareness activities to promote E-learning.

ACKNOWLEDGEMENT

This work was supported mainly by Al Jafra-Waddan University, Libya; Thanks to Management and Science University for the full technical supervision.

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