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Introduction

Praise be to Allah, who has guided and enabled us to publish the eleventh issue of the ***Gharyan Journal of Technology***. We thank Him for this blessing. As we promised from the very beginning with the release of the first issue in 2016, we have continued our commitment to maintaining the journal's credibility by upholding academic integrity and relying on reviewers with sufficient expertise in their fields. This ensures that the works published in the journal are characterized by rigor and scientific methodology, without favoritism, bias, or leniency in publishing studies that lack scientific and research value. Although we receive a larger number of submissions, we publish only a limited number of research papers in each issue because many are declined by reviewers for not meeting scientific standards. We look forward to ensuring that the published studies contribute to offering proposals and developing effective solutions to the challenges faced by institutions such as companies, factories, hospitals, and other sectors.

Nations strive for progress and for attaining distinguished status through achieving growth, economic advancement, and a decent quality of life for their people. Scientific research is one of the most important means of reaching that noble goal. By employing research in innovative applications that serve humanity in general, this objective can be fulfilled. Developed countries allocate significant portions of their financial resources toward achieving this aim.

We fully recognize that working in peer-reviewed scientific journals is a demanding task, especially under the circumstances our country in particular—and the world in general—are experiencing. However, we accepted this challenge with full confidence that Allah will support us as we endeavor to present valuable work that benefits researchers, specialists, and interested readers. Our aim is for the journal to be one of the scientific platforms for researchers in a world witnessing an intense race in the realms of civilization, science, research, and technology. We strive diligently to carve out a worthy place for the journal, benefiting from the experiences

of those who preceded us in this long path. With God's permission, we hope that upcoming issues will be of even higher quality and that our journal will achieve an impact factor that reflects the value of the research it publishes. What further strengthens our determination and confidence is that the ***Gharyan Journal of Technology*** is issued by a well-established academic institution more than thirty years old, distinguished by its graduates who have joined numerous institutions across the country and have presented a positive image of the educational institution that prepared them.

The eleventh issue of the ***Gharyan Journal of Technology*** contains numerous research papers and scientific articles characterized by creativity and diversity, contributed by researchers from various educational institutions.

The Editorial Board renews its welcome to all researchers and contributors wishing to participate with scientific papers and innovative research in your journal, the ***Gharyan Journal of Technology***, which seeks to achieve distinction among peer-reviewed scientific journals. We open the door to your suggestions, remarks, and constructive criticism, believing that such feedback is the best way to develop the journal, enhance its scientific value, and support its continuity.

The Editorial Board

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The Status of E-learning in Higher Education in Libyan Universities: A Case Study

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الملخص

شهدت طريقة تقديم التعليم في ليبيا تحولاً كبيراً في السنوات الأخيرة. تدعم الآن مختلف الأدوات العملية التعليمية، مما حولها من الحفظ والتلقين إلى الإبداع، والتفاعل، وتنمية المهارات. تهدف هذه الورقة إلى دراسة مدى إمكانية تطبيق التعليم الإلكتروني في الجامعات الليبية. تم إجراء استبيان على حوالي 400 عينة لتحديد الأنماط. وتبرز النتائج أهمية التعليم الإلكتروني في تحسين جودة التعليم من خلال توضيح فوائده وتحدياته. و علاوة على ذلك، تبيّن أن الموظفين يعتبرون التعليم الإلكتروني بديلاً فعالاً عن التعليم التقليدي. وعلى الرغم من هذا التوافق، لا تزال هناك مخاوف بشأن توفر البنية التحتية الكافية.

الكلمات المفتاحية: الإنترنت، الاستخدام، التعليم الإلكتروني، الفوائد، التحديات، الجامعات، ليبيا

Abstract

The approach to delivering education in Libya has undergone a significant transformation in recent years. Various tools now support the educational process, shifting it from rote learning to creativity, interaction, and skill development. This study aims to examine the feasibility of implementing e-learning in Libyan universities. A statistical analysis was conducted on approximately 400 samples to identify patterns. The findings highlight the importance of e-learning in enhancing the quality of education by outlining its benefits and limitations. Moreover, it was found that employees consider e-learning an effective alternative to traditional education. Despite this consensus, concerns remain regarding the availability of sufficient infrastructure.

Keywords: Internet, usage, e-learning, benefits, limitations, universities, Libya

Introduction

The rapid advancements in technology have led to new patterns of learning and teaching, reinforcing the concept of individualized or self-directed education. Learners pursue their education based on their capacity, abilities, learning pace, and prior experience and skills [1].

E-learning primarily relies on computers and networks to transmit knowledge and skills. Its applications include web-based learning, computer-based learning, virtual classrooms, and digital collaboration [2]. Lesson content is delivered through the internet, audio tapes, videos, and CDs. And it is possible to excel beyond the traditional classroom learning environment [3]. E-learning and Open Educational Resources offer an opportunity to meet the global demand for education, particularly in higher education, by providing access to learning materials and experts [4].

E-learning provides adaptable education for all communities, including individuals with special needs. It can be one of the most effective ways to accommodate students with disabilities. Asynchronous access to digital materials, such as email, announcement boards, online lectures, and eBooks, allows students with disabilities to choose accessible email programs and other tools that suit their needs. This asynchronous communication among students, course administration staff, and peers is accessible to everyone, regardless of disability [5].

A reliable internet connection can improve online education by enabling the use of advanced educational tools, such as interactive software. Additionally, high-quality internet access significantly predicts students' learning outcomes. Students with computer devices and a stable internet connection tend to demonstrate higher levels of academic performance [6].

Arab countries in the Middle East have high internet penetration rates. This can be related to the development of infrastructure and the digital transformation process in the region. Additionally, investments in the telecommunications and technology sectors play a significant role in this increase [7].

Based on data from various sources [8, 9, 10], internet penetration in Arab countries has reached approximately 77%, surpassing the global average of about 63%. Arab countries lead the world in terms of internet penetration. Moreover, between 2009 and 2023, the number of internet users worldwide increased by 1,436.4%, while the growth rate in the Arab region was 487%. This significant increase may contribute to greater adoption of online learning.

Since 2009, the Arab region has experienced significant growth in the number of people going online. According to data from the same source [8, 9, 10], which indicates the growth levels of Internet penetration per country in the region between 2009 and 2024, Internet penetration in most Gulf Cooperation Council (GCC)

countries has nearly reached 99% of the population. Among the Arab Maghreb countries (Libya, Tunisia, Morocco, and Algeria), Libya has experienced a substantial increase in Internet penetration, reaching approximately 95%.

The internet was first introduced in Libya between 2000 and 2005 [11]. Since then, its usage has grown rapidly, and the development of telecommunications in Libya is approximately equivalent to that of the United States. In early 2024, there were a total of 12.40 million cellular mobile connections in Libya [12], which is equivalent to 179% of the total population. According to Ookla's findings [13], the average speed of mobile internet connections in Libya increased by 0.64 Mbps (4.4%) at the beginning of 2024. During the same period, fixed internet speeds in Libya grew by 0.44 Mbps, representing a 4.9% increase. Many Libyan universities have established official websites to provide course materials and essential information to students and researchers. Enhancing these websites' services can play a significant role in improving the universities' rankings [14]. However, most Libyan universities still rely on a traditional education system based on face-to-face communication. Some universities, such as the University of Tripoli and the University of Benghazi, provide basic Information and Communication Technology (ICT) infrastructure, including computers and internet connectivity [15].

By early 2024, Libya had 6.13 million internet users; representing 88.8% of the country's population [3, 16, 17] (see Table 1). Although some reports excluded social media data [18], which led to a decrease in user numbers for 2021 and 2022, there was a 6.8% increase in internet users between 2022 and 2024 [19]. From 2019 to 2024, the number of users grew by 66.6%, rising from 1.44 million to 6.13 million [18]. Despite this significant growth, traditional face-to-face methods remain the norm for government services, unlike in many other parts of the world. This reliance on conventional systems may explain why universities and other educational institutions have been slow to adopt e-learning, limiting the population's ability to fully benefit from online education.

Table 1: The Internet Penetration in Libya.

The Internet Usage in Libya.						
Year	2019	2020	2021	2022	2023	2024
Internet users	1,429,000	5,100,000	3,190,000	3,470,000	6,658,900	6,130,000
population	6,569,000	6,654,000	6,735,277	7,000,000	7,024,811	6,930,000
penetration	21,75%	76.64%	47.36%	49.57%	94.8 %	88.4%

The number of students at Gharian University who participated in e-learning during the COVID-19 period was higher than the number who attended traditional learning during other periods [20].

This study's purpose was to evaluate the state of e-learning in Libyan higher education by examining internet accessibility, identifying its benefits and limitations, and evaluating the effectiveness of e-learning platforms.

Material and Methods

An approach was applied to determine whether e-learning is suitable for Libyan universities. The study involved higher education faculty members and was specifically conducted in Libya

Experiment:

Researchers found that the most effective approach to achieving study objectives was to create an online survey. It was conducted at Libyan universities between March 2024 and February 2025 via https://docs.google.com/forms/u/0/?usp=forms_web.The link of the questionnaire was distributed through WhatsApp groups and Facebook pages and groups of university students and staff. It was presented in two languages, English and Arabic, with a final valid sample size of 389 respondents. The questionnaire consisted of 12 items in total. Responses were measured using a 5-point Likert scale: 1 – strongly agree, 2 – agree, 3 – neutral, 4 – disagree, and 5 – strongly disagree. Four items addressed demographic information, two items were to identify the internet connectivity, and six items evaluated students' positive and negative perceptions of e-learning. Data were analyzed using IBM SPSS Statistics version 27 (Package for the Social Sciences) to determine frequencies and valid percentages as part of the descriptive strategy. Cronbach's alpha was run. The value of Cronbach's Alpha comes to 0.773, which is more than the standard value proposed by Nummally [21] of 0.744. This shows that our survey is reliable, and different statistical tests are applied confidently.

Table 2: Cronbach's alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.773	6

Results and discussion

Table 3 presents the descriptive statistics for 389 students who participated in the survey. More than 63% of the participants were female, with the majority of the

participants aged between 18 and 25, accounting for about 92%. Additionally, nearly 68% of the participants were unemployed, while 64% held a Master's degree

Table 3: Demographics and Education level (n = 389).

	Categories	Frequency	Percent%
Gender	Male	142	36.5
	Female	247	63.5
	Total	389	100.0
Age	18-25	357	91.8
	26-35	24	6.2
	+35	8	2.1
	Total	389	100.0
Work Status	Work	126	32.4
	Doesn't work	263	67.6
	Total	389	100.0
Education level	Academic	129	33.2
	Master's Degree	249	64.0
	PHD	8	2.1
	Other	3	.8
	Total	389	100.0

Figure 1 illustrates that more than 60% of the respondents connect to the internet through their mobile phone.

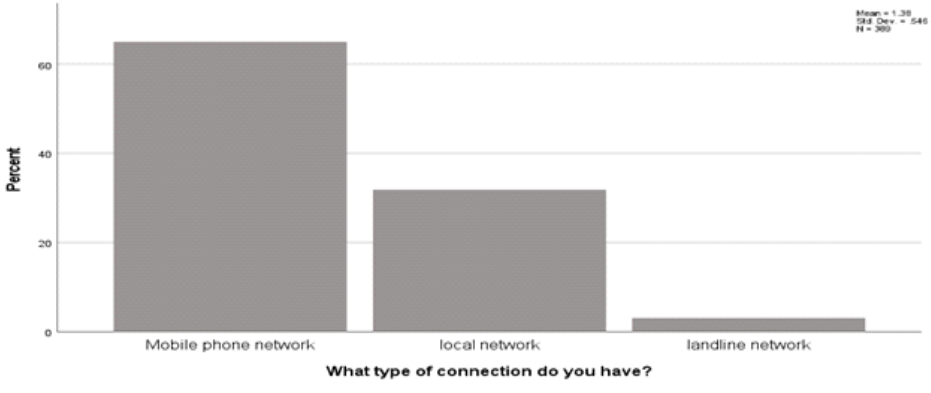

Figure 1 shows the type of connection.

Participants expressed a positive opinion about e-learning based on the results of descriptive analysis and a one-sample test (see Table 4), where the p-value <0.001, the majority of respondents indicated that e-learning can improve the quality of education (M = 2.13, SD = 1.176), is flexible (M = 2.00, SD = 1.005), and is suitable

for people with special needs (M = 1.99, SD = 1.055). Moreover, they agreed that online learning can reduce the cost of education (M = 2.08, SD = 1.124). These findings align with many studies that consider e-learning one of the most effective teaching and learning methods. With distance learning, education can now be delivered across countries rather than just in one location [22]. Additionally, participants agree, but not strongly, that e-learning can be a better alternative to traditional education (M = 2.05, SD = 1.089). However, a study by Wael Osman investigating "Is Online Learning Ready to Replace Traditional Education?" that online learning is unlikely to replace many traditional learning methods [23]. Furthermore, perceptions tend towards neutrality or disagreement about the availability of infrastructure in Libya (M=3.16, SD=1.178). A study by Askar Garad demonstrated that e-learning is positively affected by the quality of infrastructure and the cognitive competence of faculty, students, and staff [24].

Despite the agreement in most responses, the high level of deviation observed in certain questions, such as Q1, Q4, and Q6, indicates significant differences in viewpoints.

Table 4: Shows students' perceptions towards e-learning (N = 389).

No	Question	Responses	N (%)	Mean	Std. Deviation	Std. Error Mean	P-Value
Q1	Do you believe that e-learning will improve the quality of education in Libya?	Strongly agree	150 (38.6%)	2.13	1.176	0.060	< 0.001
		Agree	116 (29.8%)				
		Neutral	68 (17.5%)				
		Disagree	34 (8.7%)				
		Strongly disagree	21 (5.4 %)				
Q2	Do you find e-learning more flexible compared to traditional education?	Strongly agree	136 (35.0%)	2.00	1.005	0.051	< 0.001
		Agree	165 (42.4%)				
		Neutral	52 (13.4%)				
		Disagree	24 (6.2%)				
		Strongly disagree	12 (3.1%)				
Q3	Is eLearning suitable for people with special needs?	Strongly Agree	151 (38.8%)	1.99	1.055	0..053	< 0.001
		Agree	141 (36.2%)				
		Neutral	59 (15.2%)				
		Disagree	24 (6.2%)				
		Strongly disagree	14 (3.6%)				
Q4	Do you believe that e-learning reduces educational costs compared to traditional learning?	Strongly agree	133 (34.2%)	2.08	1.124	0.055	< 0.001
		Agree	156 (40.1%)				
		Neutral	55 (14.1%)				
		Disagree	26 (6.7%)				
		Strongly disagree	19 (4.9%)				

No	Question	Responses	N (%)	Mean	Std. Deviation	Std. Error Mean	P-Value
Q5	Do you believe that e-learning can be a better alternative to traditional education?	Strongly agree	149 (38.3%)	2.05	1.089	0.057	< 0.001
		Agree	141 (36.2%)				
		Neutral	48 (12.3%)				
		Disagree	33 (8.5%)				
		Strongly disagree	18 (4.6%)				
Q6	Do you think the necessary infrastructure to support e-learning is in place in Libya?	Strongly agree	40 (10.3%)	3.16	1.178	0.060	< 0.001
		Agree	75 (19.3%)				
		Neutral	105 (27.0%)				
		Disagree	121 (31.1%)				
		Strongly disagree	48 (12.3%)				

Table 5 presents the analytical results of the Independent Samples Test. The analysis of results is based on work status. As shown in Q1, Q2, Q3, and Q4, the p-value is greater than 0.05, indicating no substantial difference between the opinions of those who work and those who do not. Moreover, in Q6, although the p-value approaches the critical threshold, it still does not indicate a significant difference between the two groups. Conversely, in Q5, the p-value is less than 0.05, indicating a significant difference in opinions between those who are employed and those who are not. The mean difference suggests that those who work tend to support e-learning as a better alternative. Research indicates that e-learning offers unique opportunities for employees to enhance their engagement and satisfaction. By offering personalized learning experiences based on their needs and preferences, organizations can empower employees to take ownership of their development and fully invest themselves in their roles [25]. In contrast, the analysis based on gender indicates that the differences between male and female opinions are not substantial. Yet, as presented in Table 5, there are slight variations in some opinions, such as reducing costs and the suitability of e-learning for people with special needs.

Table 5: Independent Samples Test analysis of perceptions of e-learning and their work status.

No	Question		P-value	Mean Difference
Q1	Do you believe that e-learning will improve the quality of education in Libya	Work Status	.277	.142
		Gender	.800	-.032-
Q2	Do you find e-learning more flexible compared to traditional education?	Work Status	.914	.012
		Gender	.599	-.055-
Q3	Is e-learning suitable for people with special needs?	Work Status	.437	-.086-
		Gender	.062	-.203-
Q4	Do you believe that e-learning reduces	Work Status	.759	-.036-

No	Question		P-value	Mean Difference
	educational costs compared to traditional learning?	Gender	.104	-.181-
Q5	Do you believe that e-learning can be a better alternative to traditional education	Work Status	.001	.409
		Gender	.111	-.181-
Q6	Do you think the necessary infrastructure to support e-learning is in place in Libya	Work Status	.044	.246
		Gender	.456	.093

The One-Way ANOVA test was run to figure out whether there are significant differences in perceptions based on their education level, type of connection, and age. According to the findings presented in Table 6, variables such as connection type, age, and educational level do not have a critical effect on opinions about e-learning in Libya. For most questions, the p-values exceed 0.05, indicating no statistically significant relationship between these variables and participants' opinions. However, ChinaWei indicates that individuals with lower levels of interaction and adaptability are more likely to be mobile-only users and tend to experience poorer internet stability [6].

Table 6: One-Way ANOVA analysis for perceptions of e-learning.

NO	Dependent Variable		P-value
Q1	Do you believe that e-learning will contribute to improving the quality of education in Libya	Type of connection	.724
		Age	.831
		Education level	.250
Q2	Do you find e-learning more flexible compared to traditional education?	Type of connection	.237
		Age	.419
		Education level	.828
Q3	Is e-learning suitable for people with special needs?	Type of connection	.100
		Age	.788
		Education level	.390
Q4	Do you believe that e-learning reduces educational costs compared to traditional learning?	Type of connection	.534
		Age	.674
		Education level	.738
Q5	Do you believe that e-learning can be a better alternative to traditional education	Type of connection	.879
		Age	.550
		Education level	.649
Q6	Do you think the necessary infrastructure to support e-learning is in place in Libya	Type of connection	.799
		Age	.827
		Education level	.273

Conclusion

It concludes that Internet access is available and its speed is increasing significantly. It also illustrates the importance of e-learning, which can improve the

quality of education in Libya and serve as a good alternative to traditional education, especially for those who work. Because of its flexibility, e-learning is well-suited for people with low incomes and disabilities. However, it has not yet been fully adopted by universities in the educational process. Libyan universities continue to favor traditional education over e-learning. Nevertheless, the lack of appropriate infrastructure for e-learning in public universities is another reason that is slowing down the implementation of e-learning.

It is important to continue to study and understand its potential impact on higher education and to develop the infrastructure to ensure that it has full benefits. This may include training educators and learners on how to use this technology effectively and ensuring transparency in the feedback generated.

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