



E- Learning Health Sciences: Barriers and Opportunities for Specialized Courses Requiring Practical Training in Palestine Ahliya University

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Abstract: *E-learning has changed education by providing flexibility, cost savings, and easier access, especially during global emergencies. However, its effectiveness for specialized health sciences courses that need practical training is still uncertain. This study aimed to identify the Barriers and opportunities facing students of specialized courses requiring practical training in Palestine Ahliya University (PAU). A cross-sectional, descriptive study design was used with a structured questionnaire that was distributed online. Data was collected from 17 Dec to 23 Dec 2024, resulting in 308 responses, which gives a response rate of 98.7%. The data was analyzed using SPSS Version. The current study found that while electronic learning helps with time management and lowers educational costs, students reported significant challenges with technology infrastructure, platform reliability, and instructor skills. Most respondents (57.8%) felt that electronic learning was less effective than traditional teaching for practical-based courses, especially fourth-year and bachelor's students, who faced more barriers due to the advanced level of their courses. Key findings indicate that technical issues and aligning the curriculum are major challenges. Conclusion, while e-learning has important advantages, its limitations can make it hard to gain practical skills. To improve educational outcomes, we recommend better training for instructors (faculty staff), using interactive technologies, and emphasizing face-to-face instruction for practice-based courses.*

Keywords: *E-learning; Health Sciences; Practical Training; Specialized Courses.*

1. Introduction

E-learning is defined as the use of computer information to enhance learners' awareness and skills, offering various learning and performance improvement solutions [1]. In addition, it utilizes advanced technology and smartphones to improve communication between teachers and students, enabling learning anytime and anywhere. It creates virtual classes that supplement traditional education, helping students grasp complex medical concepts [2]. Also, one significant strengthening in healthcare professional education was the use of electronic learning in healthcare instruction. It is cost-effective, enables self-paced learning, allows quicker progression by skipping familiar material, and

provides consistent content, leading to high satisfaction levels among nursing students [3].

The E-learning experience is improved by the interdependence of the four-core e-learning perspectives: cognitive, emotional, behavioral, and contextual. For successful interaction and vicarious learning [4]. Students' varied computer knowledge and proficiency can occasionally cause them to reject e-learning. Users' views regarding web-based learning systems and their past technological experience are essential variables in the successful adoption of e-learning. Students that have positive opinions about e-learning are more likely to use these resources. According to current research, nursing students frequently have unfavorable or unsure opinions on online learning, and some of them prefer in-person lectures for greater comprehension.

Many countries switched to online instruction for medical and nursing students, adjusting clinical rotations and examinations. Even though a study conducted by stated that, only 20.4% of health sciences students felt that e-learning can replace traditional classroom teaching. While E-learning offers improved access and flexibility in health sciences education, it struggles with issues related to student engagement and the development of practical skills. Which adversely affects the quality of learning experiences [5,6].

Science learners face challenges in experimental learning due to a lack of practical application in online courses, as highlighted by Coman et al. (2020). These courses often focus on theoretical content and external teachings. Consequently, this limits university students' ability to implement their knowledge effectively. Political complexities in Palestine hinder traditional face-to-face education, creating significant barriers for laboratory-based Health Sciences. This results in an impractical transition for students. Consequently, there is a gap between theoretical knowledge and practical application. E-learning has emerged to deliver educational content globally through computer networks, requiring teachers to understand educational technology. Rapid advancements in information and

communication technologies have enhanced distance education's effectiveness [2].

It is crucial to examine student expectations regarding E-learning to manage barriers and design effective strategies. E-learning is increasingly utilized in healthcare to educate large groups of professionals and has shown positive effects on knowledge, skills, and patient outcomes. Moreover, exploring opportunities provided by e-learning, aiming to improve educational strategies for health sciences students in PAU, also understanding the gap in how E-learning based practical affects health sciences students which will provide an insight for improving education strategies. The study aimed to identify the barriers and opportunities facing students of specialized courses requiring practical training in Palestine Ahliya University.

2. Methodology

Study design

A quantitative non experimental, descriptive, and cross-sectional method was used in this research. Data was collected utilizing a self-administered questionnaire in the limited period. We use this design to investigate the barriers and opportunities associated with e-learning for specialized courses requiring practical training at Palestine Ahliya University.

Variables of the study

Independent Variable

- Demographic & background utilize e learning: Age, Gender, Educational level, Specialization, Experience with E-learning, academic year, Academic performance in previous practical class, academic degree: bachelor degree & diploma, and residency.
- Infrastructure, technical problem issues, and curriculum content issues.
- E-learning effectiveness and motivation issues.

Dependent Variable

Background of nursing students on utilizing technology.

Study Setting and Population

The study covered all students of the Faculty of Allied and Applied Medical Sciences. The population includes 1,370 medical sciences specialists' students. Bachelor's degree; Nursing, Radiology, Medical Nutrition, and Physiotherapy. Diploma degree (Nursing, Physiotherapy).

Study Sample and Sampling

This sample was selected using a convenience sample of medical specialties, chosen because it is practical, time-efficient, and cost-effective, allowing researchers to collect data from readily available participants. The study examines all students in medical specialties at the college, including Nursing (both bachelor's and diploma programs), Physiotherapy, Medical Radiology, and Medical Nutrition. We used a sample size calculator application to determine the required sample size, which was 301 students, with a margin of error of 5%.

Exclusion criteria

- First-year students were not exposed to learning electronically because of their face-to-face attendance at the university this year (Fall 2024).
- First-year students specializing in medical

laboratory studies who do not take any practical courses during their studies, online practical.

Instrument:

Part I: Demographic questionnaire

A questionnaire was used to elicit demographic information such as gender, residency, specialization, program, and academic years. As well as background information on utilizing technology, such as devices for e-learning activities, internet access at home, qualification in using a computer and the internet, and the source of support for technology skills.

Part II: Opportunities of E-Learning Questionnaire:

The researchers, based on relevant literature [1], developed it. It consisted of 12 questions. It contained two issues: e-learning effectiveness (7 items) and e-learning motivation (5 items).

Part III: Barriers of E-Learning Questionnaire:

It was developed by the researchers based on relevant literature [1]. It consisted of 22 questions to identify barriers facing nursing students during applying the e-learning system. It contains five issues: learners' characteristics (4 items), academic staff's characteristics (6 items), technical problem issues (4 items), infrastructure issues (5 items), and curriculum content issues (3 items).

Scoring system

Students' responses were graded on a three-point Likert scale ranging from 1= (disagree). 2= (neutral), and 3= (agree). Responses for each item were summed, and the overall score was divided by the number of items to calculate a mean score for each E-learning domain. Mean scores were interpreted as follows: (1-1.67) indicates low level of E-learning opportunities and barriers, (1.68-2.33) indicates moderate level of e-learning opportunities and barriers, and (2.34-3) indicates high level of e-learning opportunities and barriers.

Validity

Three academic experts specializing in nursing were selected to test the content validity of the questionnaire. After translating it from English to Arabic, they reviewed and evaluated the tool for accuracy, clarity, and relevance. Their feedback was incorporated, and necessary modifications were made.

Reliability

By using the Cronbach alpha coefficient method, the tools were tested for reliability. This became ($\alpha = 0.58$) a tool on technological backgrounds; ($\alpha = 0.87$) a tool for e-learning opportunities; ($\alpha = 0.86$) a tool for the use of e-learning obstacles. This means that the study tools are highly reliable [1].

Data collection

The study, approved by Palestine Ahliya University and coordinated with the Faculty of Allied and Applied Medical Sciences, used a structured questionnaire to assess barriers and opportunities. The survey, distributed electronically via WhatsApp groups, Facebook, QR codes, and direct links, within a week, from 17 December to 23 December 2024, received 308 responses, resulting in a response rate of 98.7%. All responses were systematically organized and numbered for analysis.

Data analysis

We conducted the statistical analysis with SPSS Version 23. Individual sociodemographic characteristics, general organizational structures, and item analyses were investigated using descriptive statistics. Expressed were the mean and standard deviation utilized for quantitative data as well as the number and percentage of qualitative data. We used one-way ANOVA and independent sample T-tests to find variations in all research results depending on sociodemographic characteristics. The P-value was utilized to ascertain the degree of significance. The factors demonstrated statistically significant differences at the $P < 0.05$ level.

Ethical Consideration

Approval has been obtained from the Dean of Allied & Applied Medical Science College in Palestine Ahliya University. All participants in this study were given the opportunity to voluntarily participate. Ethical principles were strictly followed, ensuring anonymity (participants' names were not required), confidentiality, and the use of data solely for research purposes. In addition, informed consent was obtained from all participants before they began completing the questionnaire.

3. Results

Four questionnaires were excluded due to incomplete data, yielding a final response rate of 98.7% (304 out of 308). The demographics of the respondents are detailed in Table 1. The majority of respondents were female (62.5%), approximately 45.72% resided in urban areas, and most were classified as fourth-year students (43.42%). A significant portion of participants were studying nursing (75.33%) and were primarily enrolled in bachelor's degree programs (79.28%).

Table 1: Demographic characteristics of the study participants.

Characteristics	Category	Frequency (n)	(%)
Academic year	Second year	98	32.24
	Third year	74	24.34
	Fourth year	132	43.42
Gender	Male	114	37.50
	Female	190	62.50
Residence	City	139	45.72
	Village	131	43.09
	Camp	34	11.18
Specialization	Nursing	229	75.33
	Physiotherapy	52	17.11
	Clinical nutrition	13	4.28
	Medical imaging	10	3.29
Degree	Bachelor	241	79.28
	Diploma	63	20.72

Table 2: Shows that almost all of the students at the Allied & Applied Medical College at PAU had the ability to use fundamental resources for e-learning, with 95.39% having internet connectivity at home and 76.64% possessing a personal computer or laptop. Furthermore, 91.12% express confidence in their proficiency with computers and the internet. The Zoom program is the most successful instrument for e-

learning, with a rating of 73.68%, whilst YouTube serves as the principal resource for skill support, with 65.13%. Laptops are the favored device, with 54.61% of preferences. Nonetheless, obstacles persist, with 33.22% without a designated study location and 23.36% lacking exclusive access to gadgets, underscoring the need for enhancements in accessibility.

Table 2: Background about utilizing technology

Items	Frequency	(%)	
Is there an internet facility at home	Yes	290	95.39
	No	14	4.61
Is there a room or a dedicated place for studying quietly and with focus at home	Yes	203	66.78
	No	101	33.22
Is there a device (computer, laptop) exclusively for the student at home?	Yes	233	76.64
	No	71	23.36
Are you qualified in using computers and the internet?	Yes	277	91.12
	No	27	8.88
Which application tool more effective for e-learning	Zoom	224	73.68
	WhatsApp	35	11.51
	YouTube	45	14.80
What is the source of support of your skills on using technology for e-learning	Video from University (MIS)	25	8.22
	Video From faculty (IT)	81	26.64
	Video From YouTube	198	65.13
Preferred devices used for e-learning activities	Computer	54	17.76
	Laptop	166	54.61
	Mobile	84	27.63

The findings presented in Table 3 reveal insight into what Opportunities E-learning offers in terms of its efficacy and motivating features. Particularly for specialist courses calling for practical training, the mean score for E-learning Effectiveness (2.45) shows that students at PAU view e-learning as quite successful. But the standard deviation of 0.50 points to variation in student experiences, maybe resulting from different degrees of course structure or technological preparation. With a mean score of 2.05 and a larger standard deviation of 0.59, E-learning Motivation shows that students at Allied and Applied medical college at PAU in the e-learning environment give motivation great thought. The aggregate score of 2.28 indicates that although e-learning has some potential, its whole capability has not been achieved, thereby stressing the necessity of policies to improve its attractiveness and efficiency.

Table 3: Average and standard deviation of E-learning Opportunities (effectiveness and motivation) issues

E-learning opportunities	Mean	Standard deviation	Evaluation
E-learning Effectiveness	2.45	0.50	High
E-learning Motivation	2.05	0.59	Moderate
Overall score	2.28	0.48	Moderate

The following table 4 show the opportunities with the highest mean score “E-learning reduces students’ educational cost” with mean 2.69 which represent the most favorable option indicating that E-learning method reduces students educational cost, on the other hand, the item which stated “E-learning is better than face-to-face education in learning process” obtained the lowest mean score 1.56 this could reflect areas where improvement is needed.

Table 4: Average and standard deviation of E-learning Opportunities items (effectiveness and motivation) issues (n=304, Max=3, Min=1)

Opportunities	Mean	Std. Deviation	Evaluation
E-Learning enhances learning efficiency	2.13	.840	Moderate
E-learning gives facilities to manage time efficiently.	2.40	.818	High
E-learning reduces students’ educational cost	2.69	.622	High
E-learning course save time and place	2.63	.677	High
E-learning allows access to educational material easily and at any time	2.68	.626	High
E-learning helps on achieving the cognitive, skill and emotional aspects of students	2.21	.794	Moderate
E-learning gives feedback for students to identify mistakes and learn from them	2.34	.802	High
E-learning is an efficient teaching method in courses that require practical training (laboratory and simulation courses).	1.69	.877	Moderate
E-learning is better than face-to-face education in the learning process in courses that require practical training (laboratory and simulation courses).	1.56	.852	Low
E-Learning encourages search for additional information on the topic of learning	2.42	.784	High
E-learning provides flexible interaction between teachers and students	2.06	.824	Moderate
Student can ask any questions through e-learning	2.44	.777	High

Table 5's findings address the academic staff and student-related difficulties to e- learning. With an average score of 2.10 for obstacles pertaining to learners' characteristics at PAU, problems such as students' different degrees of digital literacy, involvement, or adaptation to online learning situations are highlighted. With a higher average score of 2.30, academic staff members also have problems with attributes related to their lack of knowledge of e-learning tools or the extra effort connected with online teaching. With somewhat low standard deviations and an overall average score of 2.40, these difficulties seem to be regularly important for every participant. These results highlight the importance of giving teachers and student’s tools and training to help to remove these obstacles.

It's worth mentioning that the low percentages from the following survey questions further support these findings: "E-learning is an effective educational method

in courses that require practical training (e.g., laboratory and simulation courses)" where 57.8% disagreed. And "E-learning is better than face-to-face education in practical courses (e.g., laboratory and simulation courses)" where 66.9% disagreed. Because of these results, the overall mean score is high.

Table 5: Mean and standard deviation of learners and academic staff issues regarding E- learning Barriers (n=304).

E-learning barriers	Mean	SD	Evaluation
Barriers related to learners’ characteristics issues	2.10	0.64	Moderate
Barriers related to academic staff’ characteristics issues	2.30	0.55	Moderate
Overall score	2.40	0.56	High

Related to the Barriers of learners’ and academic staff characteristics issues. Table 6 shows moderate mean score for students’ barriers. Besides teacher barriers, the questions “Lack of instructor ' confidence in using e-learning”, “Difficulty contacting academic staff when at home” have high mean score (2.48 SD0.76), (2.37, SD 0.82) respectively which mean the student has negative perception toward the teacher's confidence of using the e - learning method in the courses-based practice, also have difficulty contacting the teacher.

Table 6: Mean and standard deviation of learners and academic staff issues regarding E- learning Barriers items (n=304).

Students/ learner Barriers	Mean	SD	Evaluation
Lack of sufficient knowledge on using e-learning.	2.23	.821	Moderate
Lack of confidence and shyness from online learning.	1.98	.895	Moderate
Lack of typing skills for online learning	2.13	.850	Moderate
Fear of the new tools for online learning	2.00	.869	Moderate
Teachers Barriers			
Lack of sufficient academic advisors online	2.30	.833	Moderate
Instructors do not have sufficient knowledge and skill to use e-learning	2.12	.809	Moderate
Lack of instructor ' confidence in using e-learning in courses that require practical training (laboratory and simulation courses).	2.48	.767	High
Lack of clear instructions from academic staff	2.20	.827	Moderate
Lack of timely feedback from instructor	2.22	.817	Moderate
Difficulty contacting with academic staff when at home	2.37	.822	High

Table 7 highlights technical and infrastructure barriers associated with e-learning. Barriers related to technical problems, such as unreliable platforms or connectivity issues, are notable, with a mean score of 2.26 and a standard deviation of 0.57. Infrastructure issues scored the highest mean (2.72) with a standard deviation of 0.76, underlining widespread challenges like inadequate internet access, hardware limitations, or lack of institutional support. Barriers related to curriculum content scored a mean of 2.21, suggesting challenges in

adapting course materials to suit online delivery, especially for practical training components. The overall score of 2.63 indicates that technical and infrastructure issues are a significant hindrance to the effective implementation of e-learning, requiring immediate attention to improve its feasibility and quality.

Table 7: Mean and standard deviation of technical, infrastructure and curriculum content issues regarding E- learning barriers (n=304).

E-learning barriers	Mean	SD	Evaluation
Barriers related to technical problem issues	2.26	0.57	Moderate
Barriers related to Infrastructure issues	2.72	0.76	High
Barriers related to curriculum content issues	2.21	0.66	Moderate
Overall score	2.63	0.62	High

Table 8 Present the E-learning barriers items regarding technical problems, Infrastructure and curriculum content issues. As shown in the table the barriers related to Infrastructure and curriculum content issues have moderate mean scores,” Lack of proper training before using e-learning platform” “Disproportion of e-learning with curriculum content” with mean (2.30, 2.26) respectively. However, the items related to technical issues have a high mean score relevant to “System errors and lack of access to the e-learning platform” and “The slowness of network” with mean scores (2.40, 2.42) respectively.

Table 8: E-learning barriers items regarding technical problems, Infrastructure and curriculum content issues (n=308).

Barriers related to technical issues	Mean	SD	Evaluation
System errors and lack of access to the e-learning platform	2.40	.799	High
The slowness of network	2.42	.805	High
Lack of support services such as tutors	2.22	.836	Moderate
E-learning system design is not flexible and difficult to use	2.02	.844	Moderate
Barriers related to Infrastructure issues			
Lack of devices to use for e-learning.	2.17	.847	Moderate
Lack of consistent platforms, browsers, software	2.12	.848	Moderate
Lack of proper training before using e-learning platform	2.30	.826	Moderate
The cost of internet fees/charges impede e-learning	2.11 69	.868 92	Moderate
The rules and program directions in using online discussion are difficult	2.16 88	.845 03	Moderate
Barriers related to curriculum content issues			
Disproportion of e-learning with curriculum content	2. 26 62	.8 43 00	Moderate
Difficult to understand the contents of the subject through e-learning.	2. 20 45	.8 46 75	Moderate

Courses delayed in online submission than scheduled time	2. 18 51	.8 16 07	Moderate
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Table 9: Highlights the relationship between E-learning Opportunities particularly in terms of effectiveness and motivation and students’ demographic characteristics. The findings indicate no statistically significant differences across groups, as evidenced by high p-values for all variables. This suggests that students generally perceive e-learning opportunities, including its effectiveness and motivational aspects, similarly regardless of their academic year, gender, residence, specialization, or degree type.

Table 9: Relation between the E-learning opportunities and students’ demographics characteristics.

Characteristics		Mean	SD	Test statistics	p-value
Academic year	Second year	2.28	.48	F=0.20	0.81
	Third year	2.25	.50		
	Fourth year	2.30	.47		
Gender	Male	2.30	.45	T=0.62	0.53
	Female	2.27	.48		
Residence	City	2.31	.42	F=2.15	0.12
	Village	2.29	.51		
	Camp	2.12	.59		
Specialization	Nursing	2.29	.49	F=0.56	0.64
	Physiotherapy	2.20	.49		
	Clinical nutrition	2.30	.34		
	Medical imaging	2.35	.39		
Degree	Bachelor	2.29	.48	T=0.60	0.55
	Diploma	2.25	.48		

Table 10 Shows, depending on Academic year (p-value = 0.021) and Degree type (p- value = 0.004), notable variations in barriers related to learners’ and instructors’ issues. Students in fourth year and bachelor’s degree programs reported more obstacles, most likely related to the complexity and requirements of advanced and theoretical courses related to courses-based practice. By contrast, there were not any significant differences for gender, place of residence, or specialty, indicating these constraints are generally stable across these categories. While upper-year and bachelor’s students require specific help, general solutions should handle common issues for all individuals.

Table 10: Relation between the Barriers related to learners’ and teachers issues and students’ demographics characteristics

Characteristics		Mean	SD	Test statistics	p-value
Academic year	Second year	2.29	53	F=3.90	0.021
	Third year	2.43	57		
	Fourth year	2.49	56		

Gender	Male	2.45	55	T=0.95	0.33
	Female	2.39	56		
Residence	City	2.46	53	F=1.1	0.34
	Village	2.39	57		
	Camp	2.32	60		
Specialization	Nursing	2.41	58	F=0.56	0.64
	Physiotherapy	2.41	50		
	Clinical nutrition	2.51	44		
	Medical imaging	2.35	55		
Degree	Bachelor	2.46	55	T=2.91	0.004
	Diploma	2.23	56		

Table 11 highlights the relationship between barriers related to technical and infrastructure issues and students' demographic characteristics. A significant difference is observed only for degree type ($p = 0.015$), with bachelor's students reporting higher barriers (mean = 2.6785) compared to diploma students (mean = 2.4643). This indicates that bachelor's programs, possibly due to their greater reliance on advanced technological tools and infrastructure, face more pronounced challenges.

For other variables, including academic year, gender, residence, and specialization, no significant differences were observed. Barriers appear to be consistent across these groups, suggesting that technical and infrastructure challenges are universal and not influenced by these demographic factors.

Table 11: Relation between the Barriers related to technical, infrastructure and curriculum content issues and students' demographics characteristics

Characteristics		Mean	SD	Test statistics	p-value
Academic year	Second year	2.54	62	F=2.11	0.12
	Third year	2.74	59		
	Fourth year	2.64	62		
Gender	Male	2.60	60	T=0.72	0.47
	Female	2.65	63		
Residence	City	2.65	59	F=2.15	0.12
	Village	2.59	65		
	Camp	2.71	64		
Specialization	Nursing	2.6302	63	F=0.13	0.94
	Physiotherapy	2.66	61		
	Clinical nutrition	2.67	54		
	Medical imaging	2.53	51		
Degree	Bachelor	2.67	61	T=2.45	0.015
	Diploma	2.46	63		

4. Discussion

As regards the Background of Nursing Students on utilizing technology

The study identified Zoom as the most effective e-learning tool, with a rating of 73.68%, corroborating findings from that highlighted its preference among nursing and medical education students during the COVID-19 pandemic in India [7]. Participants favored laptops for e-learning, with a preference rate of 54.61%,

differing from [8], which noted mobile phones as the preferred device. Additionally, YouTube was rated as the most effective application for enhancing technological skills at 65.13%, despite criticism from [9] regarding its reliability for medical information. Moreover, 66.9% of students reported having a designated quiet space for studying, aligning with Mukhopadhyay et al. (2023), where 93.8% of learners confirmed a comfortable home environment, indicating familiarity with applications like Zoom and YouTube [8].

Regarding E-learning Opportunities

The study at PAU revealed that a significant majority of students (75%) believe e-learning courses save time and provide flexibility, facilitating better time management (61.4% preference ratio), and 78.2% agree that it reduces educational costs. Additionally, 76.9% found easy access to educational materials beneficial. This aligns with [1], which noted a positive perception of e-learning among nursing students, while [10] identified challenges in practical training within e-learning. Factors such as political instability and poor transportation further justify the financial benefits of e-learning. However, 66.9% of respondents felt e-learning was less effective than traditional methods, and 57.8% believed it did not enhance performance, echoing [11]. Conversely, [12] found more positive attitudes towards e-learning. The study emphasizes the importance of practical application in education, as students often learn better through hands-on experience rather than solely through theoretical instruction.

Regarding e-learning barriers related to the characteristics of learner and academic staff issue.

The study revealed significant barriers related to academic staff characteristics, with a mean score of 2.40, indicating challenges in e-learning implementation, particularly in practical training courses like labs and simulations. A substantial 65.6% of participants reported instructors' lack of confidence in using e-learning, while 59.1% faced difficulties contacting academic staff from home, correlating with findings by [4] on educators' limited skills in e-learning platforms. In contrast, [9] noted that student-related obstacles had a more considerable impact, possibly due to positive lecturer attitudes towards e-learning. Additionally, 48.1% of students expressed insufficient knowledge of e-learning, supported by [1], which highlighted students' fears and inadequate typing skills as significant barriers. The newly established PAU College of Nursing faces challenges in creating online courses and teaching due to inexperience, and e-learning complicates communication between instructors and students who may not adhere to scheduled hours.

Regarding Barriers related to technical problems, Infrastructure and curriculum content issues

The current study reveals significant technical issues, infrastructural barriers, and curriculum content problems related to e-learning, with a mean score of 2.63. A majority of participants, specifically 60.4%, reported system errors and limited access to e-learning platforms, while 62.3% noted slow network speeds. Additionally, 54.2% felt inadequately trained for using

the platforms, and 52.3% identified a disconnect between e-learning and the curriculum. These findings are consistent with existing research that highlights technical problems as barriers to online education. Previous studies indicated that inadequate ICT infrastructure and lack of familiarity with e-learning hindered effective integration, particularly in Iraqi higher education. Moreover, challenges such as poverty and limited internet access were identified as significant obstacles for e-learning initiatives, especially in medical professions. The study suggests that instructors accustomed to traditional teaching methods struggle to adapt to e-learning, compounded by the impact of Israel's occupation of Palestine, which restricts access to advanced internet technologies and affects overall internet quality and speed

The relation between Barriers related to technical and infrastructure issues and students' demographic characteristics.

A significant difference was found in relation to degree type ($p = 0.015$). Bachelor's students reported higher barriers (mean = 2.6785) compared to diploma students (mean = 2.4643), indicating that bachelor's programs encounter more challenges. Researchers suggest this may be due to diploma students at PAU having only one practical course, while bachelor's students engage in practical courses throughout their program. This finding contrasts with Thapa et al. [11], which showed no significant association between overall attitudes towards e-learning and selected socio-demographic variables.

The relation between the Barriers related to learners' and teachers issues and students' demographic characteristics

The study revealed significant differences ($p = 0.021$) in the challenges faced by fourth-year bachelor's degree students, who encountered more difficulties with complex online courses compared to diploma students, with bachelor's students reporting higher barriers (mean = 2.642) than diploma students (mean = 2.2353). This [11] found no significant link between barriers and year of study. Researchers attribute the heightened challenges for fourth-year students to a lack of prior e-learning experience and rapid curriculum changes, along with insufficient integration of e-learning by teaching staff prior to its necessity.

5. Conclusion

This research highlights the barriers and opportunities associated with e-learning for students in allied and Applied Health Sciences at PAU, particularly in laboratory-based courses. The study reveals that key barriers to effective online learning include unfamiliarity with e-learning tools, noted by 48.1% of participants, and concerns about instructors' confidence in using these technologies, expressed by 65.6% of students. Additionally, technical, infrastructure, and connectivity issues impact 62.3% of students. The findings also indicate that fourth-year bachelor's degree students face more challenges in e-learning due to the complexity of advanced courses, with programs relying heavily on advanced technology encountering greater difficulties. These findings emphasize the need for

enhanced support and technological integration in practical based courses.

References

- [1] D. Mohamed Mahmoud, N. Mohamed Tantaewy, and H. Mohamed Allam, "E-Learning; Barriers and Opportunities; Nursing Students Perspectives," *Egypt. J. Heal. Care*, vol. 13, no. 2, pp. 202–218, Jun. 2022, doi: 10.21608/ejhc.2022.228551.
- [2] A. A. Jarelnape et al., "Challenges and Barriers of E-Learning in Medical Education during the COVID-19 Pandemic from the Viewpoint of Teaching Staff," *Bahrain Med. Bull.*, vol. 46, no. 1, pp. 1843–1847, 2024.
- [3] A. de las M. M. Sánchez and A. Karaksha, "Nursing student's attitudes toward e-learning: a quantitative approach," *Educ. Inf. Technol.*, vol. 28, no. 2, pp. 2129–2143, Feb. 2023, doi: 10.1007/s10639-022-11226-x.
- [4] V. Nuuyoma, S. S. Lauliso, and L. Chihururu, "Perspectives of nursing students on challenges of e-learning during early stages of the COVID-19 pandemic," *Curationis*, vol. 46, no. 1, pp. 1–10, Jan. 2023, doi: 10.4102/curationis.v46i1.2358.
- [5] A. Mouath D, A. Akram, and A. Muntaser S, "Physical activity and health-related quality of life among physiotherapists in Hebron/West Bank," *J. Nov. Physiother. Rehabil.*, vol. 4, no. 2, pp. 022–027, Jul. 2020, doi: 10.29328/journal.jnpr.1001033.
- [6] A. Alarab et al., "Treatment of Lateral Epicondylitis with Physiotherapy during a Clinical Trial: Comparison of Mobilization Technique and Shock Wave," *J. Med. – Clin. Res. Rev.*, vol. 6, no. 10, pp. 2–6, Oct. 2022, doi: 10.33425/2639-944X.1293.
- [7] H. K. Singh et al., "A survey of E-learning methods in nursing and medical education during COVID-19 pandemic in India," *Nurse Educ. Today*, vol. 99, p. 104796, Apr. 2021, doi: 10.1016/j.nedt.2021.104796.
- [8] Jyotishman Mukhopadhyay, Sughandha Garg, Justin V Sebastian, Kiran Mini Ravi, and D. Mallik, "Perception and attitude of nursing students toward e-learning," *Asian J. Med. Sci.*, vol. 14, no. 11, pp. 298–305, 2023, doi: 10.3126/ajms.v14i11.54463.
- [9] A. Qashou, "OBSTACLES TO EFFECTIVE USE OF E-LEARNING IN HIGHER EDUCATION FROM THE VIEWPOINT OF FACULTY MEMBERS," *Turkish Online J. Distance Educ.*, vol. 23, no. 1, pp. 144–177, 2022, [Online]. Available: <https://dergipark.org.tr/en/pub/tojde/issue/6738/7/1048493>
- [10] F. A. Mojarad, A. Hesamzadeh, and T. Yaghoubi, "Exploring challenges and facilitators to E-learning based Education of nursing students during Covid-19 pandemic: a qualitative study," *BMC Nurs.*, vol. 22, no. 1, p.

- 278, Aug. 2023, doi: 10.1186/s12912-023-01430-6.
- [11] P. Thapa, S. L. Bhandari, and S. Pathak, "Nursing students' attitude on the practice of e-learning: A cross-sectional survey amid COVID-19 in Nepal," *PLoS One*, vol. 16, no. 6, p. e0253651, Jun. 2021, doi: 10.1371/journal.pone.0253651.
- [12] F. Yahiaoui *et al.*, "The Impact of e-Learning Systems on Motivating Students and Enhancing Their Outcomes During COVID-19: A Mixed-Method Approach," *Front. Psychol.*, vol. 13, no. July, Jul. 2022, doi: 10.3389/fpsyg.2022.874181.