Effect of Distant Learning and Face-To-Face Learning on Student Performance and Perception in the Psychiatric Undergraduate Educational Module at King Abdulaziz University

Faten Al Zaben, MD, Hind Fallatah

Department of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

Correspondence
Dr. Faten Al Zaben
Department of Medicine
King Abdulaziz University
P.O. Box 80205, Jeddah 21589
Saudi Arabia
e-M: faten_zaben@yahoo.com

Abstract

Background: The outbreak of the COVID-19 global health crisis raised significant challenges in medical education due to the disruption of academic institutions' educational systems. The emergency lockdown instigated the closure of conventional educational activities and encouraged electronic portal learning as an alternative strategy. Tremendous efforts have been made by the dedicated and determined faculty of medicine at King Abdulaziz University to include distance learning as part of the educational process and face-to-face learning for the past few years. Considering the pandemic scenario, many policies were postulated at King Abdulaziz University to generate flexible, convenient, standardized, and modern modes of education. Therefore, this study examined students' perception of distance learning and how teaching methods and curriculum design affect students' performance.

Method: This cross-sectional survey study enrolled a total of 126 students who participated in this study from January 2020 to April 2020.

Results: The results showed higher mean total satisfaction in the E-learning group compared to face-to-face learning with no statistically significant difference ($p > 0.05$). Comparison between E-learning and face-to-face learning regarding course objectives showed a highly statistically significant difference ($p < 0.05$). The teacher feedback provided during the course also showed statistically significantly improved results in the E-learning group ($p < 0.05$).

Conclusion: It is recommended that both types of learning be blended as a "blended learning or hybrid learning" model, which will have advantages for both types of learning systems and can solve problems that may arise by using only one kind of learning. This field requires more research, especially longitudinal studies, to determine long-term effectiveness.

INTRODUCTION

The outbreak of the novel coronavirus 2019 (COVID-19) in Wuhan City, Hubei, created chaos globally by infecting over 16 million people[1]. The estimated mortality rate was 18.2 million worldwide, with a 95% uncertainty interval (17.1 to 19.6) till December 2021[2,3]. This public health emergency also raised significant challenges in medical education due to disrupting academic institutions' educational systems. Emergency preventive strategies were adopted, including social distancing and lockdown of interactive activities at educational institutions, such as the closure of classrooms and staying at home to contain disease spread. Enactment of crisis contingency plans to facilitate students' complete studies remotely through distance learning to assure their health and safety by limiting physical contact aided in mitigating the number of infected patients daily[4].

Distance learning (DL) is an academic electronic learning (E-learning) concept that utilizes approaches, tools, and digital technology to educate students who are physically unable to engage in a typical school atmosphere such as a classroom. It was defined as creating and accessing learning when information sources and learners are distinguished by time, distance, or both[5]. Educational institutions in the Middle East implemented successful DL models during the unprecedented pandemic by utilizing gadgets and tools, including Moodle, a digital library, online registration, Edugate, and Microsoft Teams for students and faculty members[6]. An essential aspect of DL implementation is its continuous assessment of quality through the evaluation of the effectiveness of learning methods, accessibility to students, student satisfaction, cost effectivity, and faculty satisfaction[7].

During the crisis of COVID-19, the government imposed a lockdown due to a soar in the number of cases; all universities in the Kingdom of Saudi Arabia (KSA) shifted to an education system using distance learning, including King Abdulaziz University (KAU). A 'quarantine program' was launched by the National Neuroscience Curriculum Project, and was well-received by trainees. It constituted lectures on complex trauma and borderline personality disorder to childhood psyche and insanity. The educational methodology used for the E-learning program proved that desirable constructive learning concepts could be applied from a distance to broaden learners' knowledge of critical psychiatric subjects. In addition to educational activities, studies have effectively used multimedia and video conferences to retain instructional fields such as psychotherapy[8].

During COVID-19, all faculties and departments at King Abdulaziz University shifted their curriculum and modules to an E-learning method. The Faculty of Medicine also shifted their psychiatry undergraduate modules to distance learning. The module included both theoretical and clinical skills material. Faculty members were required to provide quality learning experiences using effective teaching and learning models during distance education to ensure students, faculty, and program success. However, evaluating the effectiveness of distance learning versus face-to-face learning remains challenging as many factors influence distance learning. Therefore, this study examined the students' perception of distance learning and how teaching methods and curriculum design affect students' performance.

MATERIALS AND METHODS

Study design and participants

This comparative cross-sectional study was conducted at the Faculty of Medicine, King Abdulaziz University, Kingdom of Saudi Arabia, from January 2020 to April 2020. The study initially recruited 150 students, and the sample size was calculated using the "RaoSoft" calculator with a 5% margin of error, 95% confidence interval, and 50% response distribution. The samples were recruited using a convenience sampling technique. The study included psychiatric undergraduate students from the Faculty of Medicine, both genders, who were willing to provide informed consent. All other students from different departments were excluded. After the initial dropout of 24 participants, the final sample size of 126 students was recruited. After the researcher provided a detailed explanation of the study objective, informed consent was obtained.

Data collection

One hundred twenty-six students enrolled in the study were divided into two groups: 1) 63 students in the E-learning group; and 2) 63 students in the face-to-face learning group. The course for both groups consisted of 3 weeks, including didactic lectures with case activities in the first week. The second week, they included physical clinical sessions at a mental hospital for the face-to-face learning group and the introduction of video interviews and presentations in the e-learning

group. In the third week, students had to prepare a case with history, diagnosis, and management. This was changed during lockdown to writing five multiple choice questions (MCQs) and completing a brochure for patient education.

Study Questionnaire

This study used a fifteen-question questionnaire after reviewing literature based on learning goals, objectives of the learning materials, and evaluation of the learning outcomes among students. The questionnaire used a 5-point Likert scale ranging from 0 to 5, where "0" represents "strongly disagree", and "5" represents "strongly agree" (Appendix A). Three experts in psychology revised the questionnaire to ensure its content validity. The data collected did not include any demographic description; thus, it could not be analyzed. A pilot study was conducted with 23 participants to determine the face validity of the questionnaires. Alpha Cronbach estimated the reliability of the questionnaire to assess its internal consistency. The questionnaire had adequate internal consistency (Cronbach's α: 0.80).

Statistical Analysis

Tje data was analyzed using the Statistical Package for the Social Sciences (SPSS), version 21 (IBM Inc., Armonk, NY, USA). Agreement scales were presented as numbers and percentages and compared using chi-square or the Fisher exact test. Scores were presented as mean ± SD and were compared using the student t-test. Percentages of the agreement were calculated. All tests were 2-tailed, and a p-value < 0.05 was considered statistically significant.

RESULTS

The reliability of the study questionnaire was examined using Cronbach's alpha, and the results showed high internal reliability (0.779). Factor analysis revealed five factors with an Eigenvalue greater than 1, which accounted for 72.41% of the total variance (Table 1, Figure 1).

E-learning and face-to-face learning was compared regarding course objectives, and results demonstrated a highly statistically significant difference in the percent of agreement regarding covering the objectives of the psychiatry course sufficiently in both E-learning (73%) and face-to-face (11.1%) groups, respectively (p < 0.001). 74.6% of the E-learning group and 90.5% of the face-to-face group agreed that an orientation/instruction lecture was helpful and provided directions and explanations of what to be expected on assignments (p < 0.001). This study also reported a highly statistically significant difference in the percent of agreement that the technological infrastructure used was appropriate and served the purpose of learning: 69.8% and 0% for E-learning and face-to-face groups, respectively (p < 0.001) (Table 2).

Table 1. Factor analysis components (total variance explained)

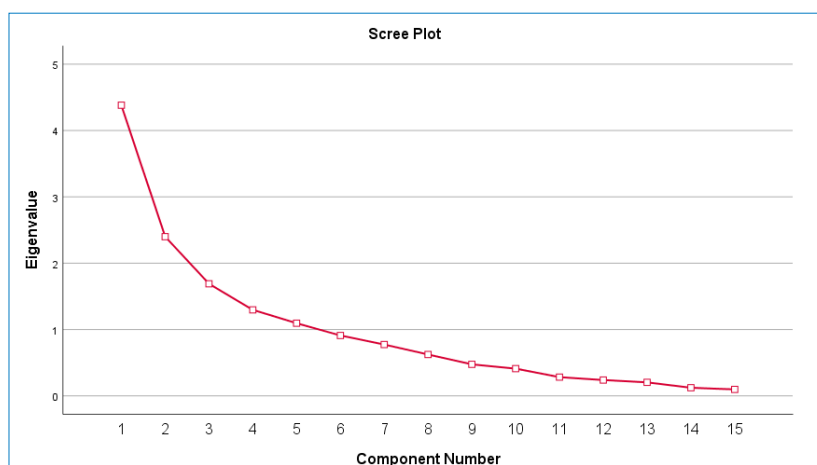| Component	Eigenvalue	Variance (%)	Cumulative (%)
1	4.382	29.211	29.211
2	2.399	15.997	45.207
3	1.689	11.263	56.470
4	1.296	8.642	65.112
5	1.095	7.302	72.414

Figure 1. Scree plot representing Eigenvalues accounted by the principal components analysis.

The comparison between E-learning and face-to-face learning regarding course curriculum reported a statistically significant difference between the E-learning group (60.3%) and the face-to-face group (100%) in terms of the agreement that the curriculum was organized ($p < 0.001$), and regarding the diversity of teaching methods and activities ($p < 0.001$) (Table 3).

The comparison between the E-learning and face-to-face groups regarding feedback and assessment showed that providing feedback was significantly different between the two groups ($p = 0.001$). 71.4% of the E-learning group, with mean ± SD (3.86 ± 0.95), showed a higher percent of agreement than 47.6% of the face-to-face group, with mean ± SD (3.27 ± 1.00) (Table 4).

The assessment of teacher communication and clinical skills in both groups only showed a statistically significant difference in opinion related to the management of time ($p < 0.001$) (Table 5).

The mean total satisfaction score was compared for both groups in Table 6, and the results showed that satisfaction with the E-learning group is higher than that of the face-to-face learning group (56.37 ± 9.33 and 54.05 ± 7.57) with no significant difference ($p > 0.05$) (Table 6). Table 7 compares the mean grade point average (GPA) scores between the two groups, and the results demonstrate no significant difference between them ($p = 0.238$) (Table 7).

Table 2. Comparison between E-learning and face-to-face learning regarding course objectives (n = 126)

	E-learning (n = 63)		Face-to-face Learning (n = 63)		p-value
	Mean ± SD	% of agreement	Mean ± SD	% of agreement	
The objectives of the psychiatry course were covered sufficiently	3.75 ± 1.05	73.0%	1.44 ± 1.27	11.1%	<0.001
An orientation/instruction lecture given at the beginning of the course was helpful	3.81 ± 1.11	74.6%	4.40 ± 0.66	90.5%	<0.001
The technological infrastructure used served the purpose of learning	3.65 ± 1.12	69.8%	1.00 ± 0.00	0.0%	<0.001

Table 3. Comparison between E-learning and face-to-face learning regarding course curriculum (n = 126)

	E-learning (n = 63)		Face-to-face Learning (n = 63)		p-value
	Mean ± SD	% of agreement	Mean ± SD	% of agreement	
The curriculum was organized	3.37 ± 1.26	60.3%	4.70 ± 0.46	100.0%	<0.001
The course was diverse in terms of teaching methods and activities	3.57 ± 0.96	60.3%	4.29 ± 0.94	88.9%	<0.001
Audio-visual aids were used effectively during the course	3.83 ± 1.06	73.0%	3.73 ± 1.30	77.8%	0.652
The quality of teaching was satisfactory	3.75 ± 0.98	68.2%	3.90 ± 0.82	80.9%	0.326
Reading material was provided during the course	4.06 ± 1.06	79.4%	4.10 ± 0.71	79.4%	0.844

Table 4. Comparison between E-learning and face-to-face learning regarding feedback and assessment (n = 126)

	E-learning (n = 63)		Face-to-face Learning (n = 63)		p-value
	Mean ± SD	% of agreement	Mean ± SD	% of agreement	
Teacher feedback was provided during the course	3.86 ± 0.95	71.4%	3.27 ± 1.00	47.6%	0.001
The course was diverse in terms of assessment methods	4.02 ± 0.94	77.7%	4.25 ± 0.93	88.9%	0.156

Table 5. Comparison between E-learning and face-to-face learning regarding teacher communication andclinicalskills (n=126)

	E-learning (n = 63)		Face-to-face Learning (n = 63)		p-value
	Mean ±SD	% of agreement	Mean ± SD	% of agreement	
Student-teacher interaction and communication during the course were sufficient	4.16 ± 0.75	85.7%	3.83 ± 1.24	81.0%	0.070
It was easy to communicate with the teacher about objects and inquiries	4.02 ± 0.92	77.7%	3.71 ± 1.34	60.3%	0.143
I was engaged during the course through discussions	3.94 ± 0.86	66.7%	3.79 ± 1.10	69.9%	0.417
The teacher managed the time well	3.22 ± 1.36	54.0%	4.13 ± 0.83	71.5%	<0.001
clinical skills were taught in a satisfactory way	3.38 ± 1.18	55.6%	3.51 ± 1.50	60.3%	0.599

Table 6. Comparison between E-learning and face-to-face regarding mean total satisfaction score (n = 126)

	E-learning		Face-to-face Learning		p-value
	Mean	Standard Deviation	Mean	Standard Deviation	
Score	56.37	9.33	54.05	7.57	0.128

Table 7. Comparison between E-learning and face-to-face regarding mean GPA score (n=126)

	E-learning		Face-to-face Learning		p-value
	Mean	Standard Deviation	Mean	Standard Deviation	
GPA score	81.85	9.76	79.93	8.33	0.238

Student T-test was used; GPA: grade point average

DISCUSSION

This study analyzed students' perception of distance learning and how teaching methods and curriculum design affect students' performance, and results reported improved percentages of agreement among E-learning students than face-to-face learning students with high significant differences regarding objects 1, 3, 9, and 10. The E-learning group reported an equal percentage of agreement as the face-to-face learning group concerning object 15 (reading material was provided during the course). E-learning showed good percentages of agreement among students but less than face-to-face learning, with significant differences in objects 2, 4, 5, 6, 7, 8, 12, 13, and 14. E-learning also reported a good percentage of students' agreement but less than face-to-face learning with no significant difference regarding object 11 (The quality of teaching was satisfactory). Overall, the study demonstrated students' positive attitude towards E-learning. Isik et al.[9] also examined postgraduate students' attitudes towards web-based distance learning, and revealed a general positive attitude toward distance learning.

The satisfaction of the E-learning group was non-significantly higher than that of the face-to-face learning group. Both E-learning and face-to-face learning provided the same degree of satisfaction among students. Similar studies found no significant difference between E-learning and face-to-face learning[10,11].

GPA scores showed no significant difference between E-learning and face-to-face groups. This may suggest that E-learning can be as effective as face-to-face learning. A previous study in Colorado showed no significant difference between online versus traditional learning in cumulative GPA in the biological sciences; however, most other classes showed significant differences with higher grades among online learning groups[12]. This can be explained by the fact that the biological sciences need clinical skills that require

attendance and traditional learning more than the other sciences. In contrast, a study at Fayetteville State University noticed higher failure rate, withdrawal rate, and more trouble completing assignments before the deadline in online classes. They recommended that students who fail or withdraw from online classes join traditional courses for at least one semester[13]. This important recommendation encouraged students to develop more online learning efforts or change teaching and assessment strategies.

This provides a persuasive argument to those who oppose distance learning and believe that effective learning can also take place through E-learning[14]. Currently, people are more conscious of and trust in the necessity of e-learning. So, this might be the best time to approve the technology that facilitates E-learning. The opposition of people to E-learning will be history, as they learned from the COVID-19 crisis how important it is to work online. It is essential to improve information technology infrastructure and services related to e-learning and increase the number of servers that provide many lectures. At the same time, institutions must adopt learning management tools that can help provide asynchronous and synchronous distance learning[4].

It is time for teachers, students, and administrators to learn from and resolve this crucial situation. Owing to this crisis, online learning could be a more significant opportunity. Students are young and enthusiastic and can learn from online sites. The faculty can inspire and engage younger minds. University authorities could allow students and faculties in this incredibly challenging moment to remain linked online or via social media sites. To promote instructional stability, students should be provided with courses and other resources in an online format[15]. The preparation curriculum for the faculty members to handle the online learning platform should be planned as soon as possible. This force experiment would lead universities worldwide to update their digital infrastructure, and to make education a fundamental feature online. Students are concerned amid widespread fears that the outbreak will adversely affect their exam performance. They should be presented with specific instructions on mid-term analyses, assignments, and project management procedures[16]. Faculty members could devise a versatile appraisal guideline with their respective heads that does not disadvantage students. Suppose students cannot attend online sessions because of an injury or

disruption, in that case, universities can be as flexible as possible so that they do not see any detrimental consequences regarding the certification.

The well-being of students and staff must be prioritized when we observe the epidemic internationally. Universities could emphasize resources for mental well-being by reviewing health recommendations and offering online guides and lectures to alleviate tension in the face of the pandemic. Any student with elevated COVID-19 anxiety should obtain proper psychological assistance on time[17]. Moreover, it is important to concentrate on disadvantaged international students and provide them with systemic support[18]. Students who cannot return to their homes can remain available in hostels and residences. Universities could consider financial aid and the overall livelihood of students in need.

RECOMMENDATIONS

We recommend more research in this field, especially longitudinal studies, to determine long-term effectiveness, as our analysis of the study is cross-sectional. Further extended studies will aid the government in cooperating with telecommunication companies to expand its 4G services across the country, as internet connectivity issues adversely affect the online learning process and the development of strategies. This study provides baseline data, and future studies involving more departments and demographics are required to see the differences between students' satisfaction with different courses so that results can be generalized.

CONCLUSION

Our study concludes that the perception of students toward the E-learning educational model is flexible and adaptive. It is recommended that both types of learning be blended as a "blended learning" or "hybrid learning" model, which will have advantages for both types of learning systems and can solve problems that may arise by using only one kind of learning. More research in this field, especially longitudinal studies, is required to determine long-term effectiveness.

Acknowledgment

Conflicts of Interest

The authors have no conflicts of interest to declare. All co-authors have seen and agreed with the contents of the manuscript, and there is no financial interest to report. We certify that the submission is an original work and is not under review at any other publication.

Disclosure

The authors did not receive any form of commercial support, either in the form of compensation or financial assistance, for this case report. The authors have no financial interest in any of the products, devices, or drugs mentioned in this article.

Ethical Approval

The research ethical committee at the Faculty of Medicine KAU waived the ethical approval for the project.

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Appendix A. Questionnaire

The objectives of the psychiatry course were covered sufficiently during distant learning
An orientation/instruction lecture given at the beginning of the course was helpful and provided directions and explanations of what is expected on assignments and tests
The technological infrastructure used during distant learning course was appropriate and served the purpose of learning
The curriculum was organized
The course was diverse in terms of teaching methods and activities
Audio -visual aids were used effectively during the course
The course was diverse in terms of assessment methods
Student-teacher interaction and communication during the course was sufficient
It was easy to communicate with the teacher for questions and inquiries
Teacher feedback was provided during the course
The quality of teaching was satisfactory
clinical skills including mental status examination were taught during the course in a satisfactory way
I was engaged during the course through discussions
The teacher managed the time well
reading material was provided during the course