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Lecturers' Perspectives on Using Virtual Classrooms in Education: Challenges and Opportunities for the Post-COVID-19 Era

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Abstract: Objective: This study examines the perspectives of university lecturers in Palestine regarding the use of virtual classrooms in higher education, focusing on their preferences, satisfaction, perceived effectiveness, and the challenges faced. **Methodology:** A cross-sectional mixed-methods design was employed from January 10 to February 13, 2023. Quantitative data were collected using a structured online questionnaire containing 33 closed-ended questions, targeting 311 university lecturers across Palestinian institutions. Qualitative insights were gathered through follow-up interviews. Statistical analysis was conducted using the R cran program, applying the Mann-Whitney U-test and Kruskal-Wallis test to assess differences based on demographic variables. **Results:** Findings indicate that 71.4% of lecturers preferred virtual classrooms due to their structured nature and alignment with deadlines. Significant differences in preferences were observed among lecturers based on age, technological experience, and participation in training. Lecturers aged 25–30 showed the highest preference and satisfaction levels (mean = 3.96, p = 0.01). Those who received training demonstrated higher satisfaction (mean = 3.6) compared to those who had not (mean = 2.91, p < 0.001). Despite general acceptance, 28.6% of lecturers experienced issues during distance teaching, particularly challenges related to curriculum delivery, student engagement, and technological limitations. These factors contributed to stress for 35.7% of respondents. **Recommendations:** To improve the virtual learning experience, Palestinian universities should invest in reliable internet and electricity infrastructure, provide ongoing digital training for faculty, and adapt curricula for online formats. Additionally, offering technical and psychological support to educators and students is essential for sustainable and effective virtual education.

Keywords: Virtual classrooms, distance education, post-COVID-19 era, Palestine.

وجهات نظر المحاضرين حول استخدام الفصول الدراسية الافتراضية في التعليم: التحديات والفرص في مرحلة ما بعد جائحة كوفيد-19

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الملخص: الهدف: تهدف هذه الدراسة إلى استكشاف وجهات نظر المحاضرين الجامعيين في فلسطين حول استخدام الفصول الدراسية الافتراضية في التعليم العالي، مع التركيز على تفضيلاتهم، ومدى رضاهم، وإدراكهم لفعالية هذه الفصول، بالإضافة إلى التحديات التي واجهوها. **المنهجية:** تم اعتماد تصميم بحثي مقطعي باستخدام أسلوب الدمج بين المنهج الكمي والنوعي في الفترة من 10 يناير إلى 13 فبراير 2023. جمعت البيانات الكمية عبر استبيان إلكتروني مكون من 33 سؤالاً مغلقًا وُزع على 311 محاضرًا جامعيا. كما وجمعت البيانات النوعية من خلال مقابلات متابعة مع عدد من المشاركين. أُجري التحليل الإحصائي باستخدام برمجية أر كران (R CRAN) ، مع تطبيق اختباري مان-ويتني (Mann-Whitney U-test) وكروسكال-واليس (Kruskal-Wallis test) لقياس الفروقات بناءً على المتغيرات الديموغرافية. **أهم النتائج:** أظهرت النتائج أن 71.4% من المحاضرين يفضلون استخدام الفصول الدراسية الافتراضية نظرًا لتنظيمها والتزامها بالمواعيد النهائية. كما وُجدت فروقات معنوية في التفضيلات بناءً على العمر، والخبرة التقنية، والمشاركة في الدورات التدريبية. حيث أظهر المحاضرون الذين تتراوح أعمارهم بين 25 و30 عامًا أعلى مستويات التفضيل والرضا (المتوسط = 3.96، القيمة الاحتمالية = 0.01)، كما ان الذين تلقوا تدريبًا اظهروا رضا أعلى (المتوسط = 3.6) مقارنةً بمن لم يتلقوا تدريبًا (المتوسط = 2.91، القيمة الاحتمالية = 0.001). وعلى الرغم من القبول العام، واجه 28.6% من المحاضرين مشاكل أثناء التعليم عن بعد، خاصةً فيما يتعلق بتقديم المحتوى، وتفاعل الطلبة، والمشكلات التقنية. وأسهمت هذه التحديات في شعور 35.7% من المحاضرين بالتوتر أثناء التعليم عن بعد. **التوصيات:** ينبغي على الجامعات الفلسطينية الاستثمار في تحسين البنية التحتية للإنترنت والكهرباء، وتوفير تدريب رقمي مستمر للمحاضرين، وتكييف المناهج لتناسب البيئة الافتراضية. كما يُوصى بتقديم الدعم الفني والنفسي للكوادر التعليمية والطلبة لضمان تعليم افتراضي فعّال ومستدام.

الكلمات المفتاحية: الفصول الدراسية الافتراضية، التعليم عن بعد، مرحلة ما بعد كوفيد-19، فلسطين.

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Introduction

The spread of the COVID-19 pandemic effect on the education system created unprecedented situations that required quick reactions (Abu Saa & Assaf, 2025). Massive closing of universities was caused by the severe restrictions and lockdowns that were implemented in most countries, which forced educational institutions at all levels to shift from face-to-face education to distance education (Lo et al, 2022). Teachers around the world faced significant challenges due to this temporary shift in instructional delivery to an online mode due to the pandemic crisis conditions (García-Morales et al., 2021). Learning management systems and other digital tools, including virtual classrooms, allowed teachers and lecturers to interact with their students while conducting lessons and other educational activities from home, leading them to make significant changes to their teaching methods (Callaghan et al., 2022; Kemp et al., 2024).

During the lockdown period, teachers made a great effort in providing a combination of asynchronous and synchronous education. Thus, emails, live sessions, and online platforms were used by teachers in many countries such as Sweden, Switzerland, Germany, Austria, Luxembourg, Italy, Palestine, Jordan, and Zambia (Mangiavacchi et al., 2020). Teachers in England, Germany, Sweden, and the Czech Republic were reported to assign tasks, which were sometimes varied to meet individual requirements and send them by online platforms. They sometimes gave feedback or online assessment (Ferdig et al., 2020). It was noticed that teachers in the Czech Republic rarely clarified instructional tasks or contacted students by phone (PAQ, 2020). Teachers in China (Kaur & Singh Bhatt, 2020), Iran (Ahmady et al., 2020), Malaysia (Shin Wan, 2020), Palestine (Marban et al., 2021) and Kosovo (Hyseni et al., 2020), used a variety of TV programs and radio conversations and instructed their students to watch educational videos to obtain information and well understand some lessons in the curriculum (Green, 2020).

A few proportions of students attend synchronous learning (e.g. live lessons through video conferencing or chat rooms) (Penington, 2020; Barham et al. 2023). For example, in the study of Andrew et al. (2020), they found that 59% of secondary and 47% of primary students in England had some form of active learning (such as video conferences, text chats, or online classes). On the other hand, another study conducted in England revealed that 71% of students received no or less than one online lesson a day (Green, 2020). In Germany, 20% of teachers gave online classes at least once a week, whereas the other 70% did not (König et al., 2020). In another study, 10% of students from Austria, Switzerland and Germany said they had never received online lessons (Huber et al., 2020). In Luxembourg, surveys with students showed a variety of practices: some got daily online lessons, while others had one lesson per week (Kirsch et al., 2020b). In schools, online distance education was more restricted and heterogeneous (Mangiavacchi et al., 2020; Penington, 2020). A small percentage of children (9%) also were not obtained any kind of distance learning (Bayrakdar & Guveli, 2020). While distance education expands educational opportunities and study time for students, it is inequitable. Students from lower-income families and those from ethnic minorities have had limited access to educational resources their peers (Bayrakdar & Guveli, 2020).

To ensure students' right to education during the COVID-19 crisis, teachers adopted distance education when the university closed for further notice. To ensure present effective distance education for students, electronic devices, electricity, and a good internet network are required in the education environment. Because not all students have access to these resources or are digitally competent, UNESCO (2020b) warned that current education inequalities could be exacerbated. Moreover, distance education can only be effective if teachers possess the essential digital skills and are capable of assigning appropriate activities, scaffolding learning, and providing feedback (Bonal and González, 2020). In addition, both students and teachers need support from the surrounding environment (principals, colleagues, parents, etc.).

The pandemic of COVID-19 impacted education in Palestine significantly in many aspects. All universities in Palestine were closed from March 2020 and suspended indefinitely as a component of the emergency government effort to reduce the spread of the virus (UNESCO, 2020). Both students and lecturers had to move to remote learning due to these closures, faced with disparate problems such as lack of digital infrastructure, unreliable internet connectivity, and unpreparedness for online teaching (Alkhatlan & Bohannon, 2022). Despite the fact that five months later, in August, the universities reopened partially, there were still broad-ranging challenges, such as uneven access to technology and variance in the qualities of online teaching (Abuhammad, 2020). The massive closure of universities came at a time when technological change and digitalization had been advancing at a very rapid pace; yet, the Palestinian universities, like in most low-income countries, were not in a position to catch up with these advances (Jameel, 2021). Therefore, in the COVID-19 pandemic, "digitalization in higher education institutions" has been a subject of interest. Unfortunately, most institutions in Palestine lag when it comes to the ICT (information and communication technologies) transformation development that is anticipated.

Numerous studies have been conducted to examine the sudden change to virtual classrooms in higher education brought on by the COVID-19 pandemic. Research from all around the world has shown the advantages and disadvantages of online education. Aristovnik et al. (2020), for example, looked at how the pandemic affected online learning in higher education and found that, although it was made essential during lockdowns, there were both possibilities and obstacles. The pandemic presented particular difficulties for higher education in the Palestinian environment. In their discussion of the "bright and dark sides" of online learning in Palestine during the pandemic, Affouneh et al. (2021) emphasized both the challenges faced by higher education institutions and the prospects for technological growth. The use of technology to maintain learning in Palestine amid disruptions was also examined in research by Mukhaimer (2020), which identified obstacles such the growing digital gap and unfavorable perceptions of online learning.

These findings highlight how important it is to comprehend the unique experiences of Palestinian university instructors as they adjust to online learning environments. This study intends to add significant insights to the conversation on online education in higher education, specifically in the Palestinian context, by investigating their preferences, satisfaction levels, perceived efficacy, and difficulties. Despite the rapid shift to distance education during the COVID-19 pandemic, little is known about how university lecturers in Palestine adapted to virtual classrooms, what challenges they faced, and how they perceived the effectiveness of this mode of instruction. This study seeks to address this gap by exploring lecturers' perspectives on using virtual classrooms for higher education in Palestine. To achieve the main objective, the secondary objectives are as follows:

- To examine university lecturers' preferences for using virtual classrooms in education.
- To assess university lecturers' satisfaction with using virtual classrooms in education.
- To evaluate university lecturers' perceptions of the effectiveness of virtual classrooms in education.

- To identify and analyze the challenges and obstacles faced by Palestinian lecturers when using virtual classrooms for remote learning.
- To explore Palestinian lecturers' perspectives on the advantages of virtual classrooms in education, based on qualitative insights gathered through interviews.

Methodology

This study's part contains details on the research model, study group, preparation of data collection tools, data collection and analysis, and data interpretation.

Research Design

This study used quantitative and qualitative data collection tools and analysis methods. It was mentioned that combining specific aspects of different methods to create a mixed structure can increase the strength of a research method (Patton, 1987). Each research method has advantages; when the strategies are used in tandem, the research model is further strengthened and qualitative interpretation can support quantitative research patterns. Therefore, the survey method was used to achieve the objective of this study. A survey method is a research method used to describe an existing instance in its current condition (Karasar, 2007).

The quantitative part of this study evaluated the perspective of university teachers toward using virtual classrooms in education. For the qualitative part, the data was collected through conducting interviews with some lecturers and teachers. The interviews were conducted by the researchers using a questionnaire with two open-ended questions. In the first question, teachers were asked about the advantages of using virtual classrooms in education, and in the second, they were asked about the drawbacks of virtual classrooms. The interviews were conducted online via zoom for 20 min for each teacher and all responses were recorded for analysis.

Study group

The study group consisted of teachers and lecturers (n = 311) who teach in all Palestinian higher education institutions in Palestine (West Bank and Gaza Strip) during the academic year of 2022–2023. In the first stage of the study, 311 teachers and lecturers were involved in assessing their preference for using virtual classrooms in education, and in the second stage, 9 teachers and lecturers participated in the interview where their opinions about employ virtual classrooms in education were recorded. The participants were selected using a convenience sampling technique and the sample size was selected using the following factors:

1. Total population (N=9754), (MOHE, 2024).
2. The confidence level (95%).
3. The margin of error was set at ± 5%.

Data collection

The present cross-sectional study was carried out from January 10, 2022 to February 13, 2023, during the second semester of 2022/2023. An online questionnaire with 33 closed-ended questions was prepared by the researchers (Appendix 1). The questionnaire applied in this study was developed based on the previous studies (Radwan et al., 2022; Almanthari et al., 2020; Muthuprasad et al., 2021). The questionnaire composed of two sections: (1) Demographic characteristics and (2) Perspective toward virtual classrooms. The second section was divided into four dimensions: preference, satisfaction, effectiveness and obstacles.

The online questionnaire was created using Google forms and the link was sent to the teachers and lecturers at the Palestinian universities via email and several digital social media platforms and it took 5 min to complete. The inclusion criteria include teachers or lecturers who work in Palestinian universities and had experience in employing virtual classrooms in education. The survey was translated into the Arabic language since it is the national tongue of Palestinians. After carrying out multiple methods to assess validity, the final version of the questionnaire consisted of 33-item to be valid and trustworthy. In the current study, Cronbach's alpha coefficients for the overall questionnaire were found to have high reliability (Cronbach's alpha=0.921). In the second stage of the study, interviews were organized to collect data from the discussions with participants. The participation in the study was completely voluntary and any participants who want to withdraw it were not needed to complete the distributed questionnaire.

Statistical Analysis

The R cran program was employed for the statistical analysis of quantitative data. The Shapiro–Wilks Test of Normality was used to determine whether data are likely from a normal distribution. The Mann-Whitney U-test and Kruskal-Wallis test were used to determine whether demographic characteristics had a significant impact on teachers' perspective of virtual classrooms in education. The significance level was considered to be 0.05. The responses collected during interviews were presented by frequency and percentage. In order to examine two questions on the interview, the data was initially entered into an MS Excel sheet. The views of the teachers and lecturers were examined and reported. The mean scores for each domain were clarified in Table 1.

Table (1): Mean score interpretation framework.

Mean	Corresponding level
$1.0 < \text{Mean} \leq 1.8$	Very low
$1.8 < \text{Mean} \leq 2.6$	Low
$2.6 < \text{Mean} \leq 3.4$	Medium
$3.4 < \text{Mean} \leq 4.2$	High
$4.2 < \text{Mean} \leq 5.0$	Very high

Results

Demographic characteristics

A total of 311 agreed and responded to the survey, with 181 (58.2%) males and 130 (41.8%) females (Table 2). About 34.73% of the study participants were more than 40 years, 28.62% were in the age group of 31-40 years, and the rest percentage (36.65%) were less than 30 years. About 29.9% of teachers reported an average of more than 15 years of working experience as a lecturer at their universities. Teachers' years of experience 27.97% of them ranged from five to ten years. Demographic data also indicate most teachers attend courses in the field of technology (84.24%) and have previous experience in using virtual classrooms (95.50%) in education.

Table (2): Demographic characteristics of the study participants (n = 311).

Variable	n (%)
Gender	
Female	130(41.8%)
Male	181(58.2%)
Age	
less than 25	59(18.97%)
25-30	55(17.68%)
31-40	89(28.62%)
over 40	108(34.73%)
Previous experience of education	
Less than 5 years	86(27.65%)
5-10	87(27.97%)
11-15	45(14.47%)
over 15	93(29.9%)
Previous experience of using technological tools in education (i.e. PC, laptop, tablet ...)	
no	14(4.5%)
Yes	297(95.5%)
Attending courses related to using virtual classrooms in education	
no	49(15.76%)
Yes	262(84.24%)
Total	311 (100%)

Preference dimension

The first dimension asked about teachers' preferences for using virtual classrooms in education. Participants were asked to rate how much they agreed or disagreed with fourteen questions about their preference for using virtual classrooms in education. Table 3 showed the frequency of answers to these 14 items. The results showed that most of the participants (71.4%) prefer to employ virtual classrooms in education since they are just like in-person education as it is very organized with deadlines. Also, 74.0% of them confirmed that all areas of the courses are covered by the methods utilized in the virtual classrooms. Regarding the smooth transition from traditional education to distance education, 71% agreed with this idea, whereas 14.8% disagreed with this idea and they consider it a difficult transition. Also, the results showed that most participants were more comfortable responding to questions through virtual classrooms (69.4%), faced fewer obstacles in sending and receiving educational materials (79.4%), and got support from their university in dealing with virtual classrooms (74.3%).

Table (3): Participants' responses (n = 311) to the items of the first dimension "Preference".

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1. I prefer using virtual classrooms as they are very structured with set due dates similar to face-to-face teaching	45(14.5%)	177(56.9%)	26(8.4%)	42(13.5%)	21(6.8%)
Q2. The techniques used in the virtual classrooms are more effective and cover all aspects of the courses.	36(11.6%)	194(62.4%)	30(9.6%)	35(11.3%)	16(5.1%)
Q3. There is a smooth transition from classroom teaching to distance teaching through virtual classrooms, as it's more suitable to transition to a new paradigm of teaching.	34(10.9%)	187(60.1%)	44(14.1%)	33(10.6%)	13(4.2%)
Q4. In virtual classrooms, I am more comfortable responding to questions online than orally	34(10.9%)	182(58.5%)	28(9%)	50(16.1%)	17(5.5%)
Q5. In virtual classrooms, sending and receiving educational materials to or from students was with fewer obstacles when compared to other platforms.	32(10.3%)	215(69.1%)	31(10%)	27(8.7%)	6(1.9%)
Q6. The university provides more effective training courses with respect to using virtual classrooms.	32(10.3%)	199(64%)	55(17.7%)	17(5.5%)	8(2.6%)
Q7. My skills in design and produce effective content for students online has increased since I start teaching online classrooms.	43(13.8%)	219(70.4%)	35(11.3%)	10(3.2%)	4(1.3%)
Q8. Virtual Classroom design facilitates the presentation of educational materials in an interesting way for students.	44(14.1%)	212(68.2%)	36(11.6%)	12(3.9%)	7(2.3%)
Q9. Distance teaching through virtual classrooms provides direct communication between the members of the educational system.	41(13.2%)	200(64.3%)	35(11.3%)	28(9%)	7(2.3%)
Q10. The university provides appropriate technical support to facilitate the use of virtual classrooms.	45(14.5%)	191(61.4%)	43(13.8%)	22(7.1%)	10(3.2%)
Q11. Virtual classrooms effectively contribute to the continuity and success of distance teaching and learning.	57(18.3%)	199(64%)	37(11.9%)	13(4.2%)	5(1.6%)
Q12. Logistical support from the university is available to follow up teaching through the virtual classrooms.	51(16.4%)	189(60.8%)	44(14.1%)	17(5.5%)	10(3.2%)
Q13. A guide to using the virtual classrooms has been provided for both students and teachers.	36(11.6%)	196(63%)	41(13.2%)	27(8.7%)	11(3.5%)
Q14. I prefer to be evaluated through virtual classrooms as the university constantly provides constructive feedback to teachers through virtual classrooms.	17(5.5%)	178(57.2%)	37(11.9%)	53(17%)	26(8.4%)

The majority of the participants (84.2%) confirmed that their skills and abilities to develop useful content have improved. The results revealed that 82.3% agreed with the idea that virtual classrooms present instructional materials in an attractive way for their students, whereas a few percentages (6.2%) disagreed with this idea. Most of the participants confirmed that virtual classrooms provide direct communication between their colleagues (77.5%) and contribute to the continuity of distance education (82.3%). More than half of the participants reported that the universities provide logistical support (77.2%), and technical support (75.9%) for their academic members and present a guide that clarifies how to use the virtual classrooms (74.6%). About 62.7% of them prefer to be evaluated through virtual classrooms, whereas 25.4% did not prefer.

A Mann-Whitney U-test and Kruskal–Wallis test was used to identify whether the preference towards using virtual classrooms in education differs by the demographic characteristics of the participants. Lecturers aged 25-30 years were the highest in mean scores of preferences (3.96 ± 0.32) for using virtual classrooms as compared to others ($p = 0.01$). There is a significant difference in the mean scores of the preference toward employing virtual classrooms among lecturers who have experience in the usage of technological tools and those

who have no experience (p = 0.07). This difference is in favour of lecturers who have previous experience. Experienced teachers appear to prefer using virtual classrooms in education more than those without less previous experience (Table 7). Lecturers who attended training courses regarding virtual classrooms were more likely to prefer using virtual classrooms as compared to those who did not attend training courses (p <0.001).

Satisfaction dimension

The second dimension investigated how satisfied teachers were with using virtual classrooms in education. The participants replied to five items on a Likert-type scale that represented the level of satisfaction that teachers have when using virtual classrooms. The frequency of replies to these five items is illustrated in Table 4.

The results showed that 69.8% of the study participants agreed or strongly agreed that remote teaching utilizing virtual classrooms gives equivalent satisfaction to classroom teaching. Only 19.6% disagreed or strongly disagreed, and the remaining respondents were undecided. Similarly, 69.4% agreed or strongly agreed the idea of satisfaction with using virtual classrooms in next year, whereas 19.9% agreed or strongly agreed and the rest teachers were undecided. More than half of the study participants (65.6%) agreed or strongly agreed that they preferred distance teaching to face-to-face teaching. Also, 70.4% of educators agreed or strongly agreed that distance teaching helps them prepare more effectively. About 67.6% stated that they were satisfied with the use of virtual classrooms as an alternative to traditional teaching.

The results showed that lecturers whose age ranges from 25 to 30 years have a higher satisfaction (3.79 ± 0.5) towards using virtual classrooms in education compared to other counterparts (p = 0.01). In addition, teachers who attended courses respecting employing virtual classrooms have a higher satisfaction (3.6 ± 0.78) towards using it in education compared to those who did not attend any course related to virtual classrooms (2.91 ± 1.06) (p <0.001).

Table (4): The of satisfaction of the study participants (n = 311) with using virtual classrooms.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1. Distance teaching using virtual classrooms give similar teaching satisfaction to classroom teaching.	21(6.8%)	196(63%)	33(10.6%)	44(14.1%)	17(5.5%)
Q2. I am satisfied with using virtual classrooms in distance teaching next year.	24(7.7%)	192(61.7%)	39(12.5%)	39(12.5%)	17(5.5%)
Q3. I like distance teaching than classroom teaching.	20(6.4%)	184(59.2%)	38(12.2%)	46(14.8%)	23(7.4%)
Q4. I prepare more efficiently with distance teaching.	16(5.1%)	203(65.3%)	33(10.6%)	44(14.1%)	15(4.8%)
Q5. I am satisfied with the use of virtual classrooms as an alternative tool to the classroom teaching.	17(5.5%)	193(62.1%)	36(11.6%)	46(14.8%)	19(6.1%)

Effectiveness dimension

The third dimension sought answers from lecturers regarding their perceptions of the effectiveness of virtual classrooms in education. Participants were asked to rate how much they agreed or disagreed with four statements regarding the degree of interaction with virtual classrooms for this topic (Table 5). The

Teachers perceived to have more teaching time with virtual classrooms, although technical constraints still occurred when doing distance teaching (Table 5). Only 28.6% of teachers experience problems during distance teaching through virtual classrooms. Teachers face many obstacles related to the curriculum, students, and electronic environment. These obstacles might be contributed to the stress experienced by 35.70% of teachers during distance teaching. More than half of teachers (57.2%) agreed or strongly agreed with the statement of "I have more time to review all of the learning materials after class with distance teaching". The majority of teachers (586%) agreed or strongly agreed that they have more time to prepare learning materials with virtual classrooms.

Virtual classrooms gave teachers the impression that they had more teaching time, but there were still technological difficulties while undertaking distance education. Only 28.6% of lecturers report difficulties when using virtual classrooms. In terms of the curriculum, pupils, and technological environment, teachers encounter numerous challenges. These challenges may have contributed to the stress that 35.70% of teachers report feeling stress during teaching remotely. More than half of teachers (57.2%) agreed or strongly agreed with the idea of having more time to evaluate all of the learning materials presented in virtual classrooms.

Table (5): Teachers' responses (n = 311) about the effectiveness of the use of virtual classrooms in education

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1. I do not experience any problems during using virtual classrooms in distance teaching.	12(3.9%)	175(56.3%)	35(11.3%)	56(18%)	33(10.6%)
Q2. I do not experience stress during distance teaching.	16(5.1%)	150(48.2%)	34(10.9%)	77(24.8%)	34(10.9%)
Q3. I have more time to review all of the learning materials after class with distance teaching	16(5.1%)	162(52.1%)	43(13.8%)	62(19.9%)	28(9%)
Q4. I have more time to prepare learning materials with virtual classrooms.	17(5.5%)	165(53.1%)	42(13.5%)	63(20.3%)	24(7.7%)

To determine whether the effectiveness of using virtual classrooms in education varies depending on the demographic characteristics of lecturers, the Kruskal-Wallis test and Mann-Whitney U-test were applied. The results showed that age and years of experience had a significant impact on how effective using virtual classrooms is in education (Table 7). Lecturers who age rages 25-30 years (p = 0.01) and those who have 5-10 years of working experience (p = 0.03) seem to have a higher attitude towards the effectiveness of virtual classrooms in education than other counterparts.

Obstacle dimension

The last dimension of the study inquired about the challenges and obstacles that Palestinian lecturers faced when employing virtual classrooms for remote learning. The participants were asked to rate their attitudes on the obstacles of adopting virtual classrooms in education by rating 10 items on a Likert-type scale. The frequency of replies to these 10 items is displayed in Table 6. The results showed that 74.6% of lecturers agreed or strongly agreed with the idea that the content of their course is easy to teach using virtual classrooms. However, only 13.8% disagreed or strongly disagreed and the rest percentage were undecided. About 63.3% agreed or strongly agreed with the claim that they do not face hurdles while implementing current teaching practices through virtual classrooms, and 13.2% indicated that there are several difficulties.

Most teachers (72.1%) agreed or strongly agreed that it was challenging to follow up with a large number of pupils in virtual classrooms, 16.4% agreed or strongly agreed with this opinion, and 11.6 % were undecided. About 64.0% of lecturers confirmed that they cannot use the virtual classrooms to deliver lectures because they lack an internet connection or because the connection is of poor quality. Most teachers (75.9%) agreed or strongly agreed that the frequent cutting of electricity stops them from executing tasks and duties required for distance education through virtual classrooms, which is considered a significant concern similar to the problems with internet connections.

Table (6): Lecturers' responses (n = 311) about the obstacles of using virtual classrooms in education.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1. The contents of my subject are easy to be taught using virtual classrooms.	21(6.8%)	211(67.8%)	36(11.6%)	29(9.3%)	14(4.5%)
Q2. I do not face obstacles when applying modern teaching strategies to teach the curriculum through virtual classrooms.	11(3.5%)	186(59.8%)	38(12.2%)	57(18.3%)	19(6.1%)
Q3. Follow-up is difficult for large numbers of students through virtual classrooms.	40(12.9%)	184(59.2%)	36(11.6%)	42(13.5%)	9(2.9%)
Q4. I do not have internet connection, or internet quality is bad and I cannot give a lecture in virtual classrooms.	59(19%)	140(45%)	42(13.5%)	52(16.7%)	18(5.8%)
Q5. The continuous cutting of electricity prevents me from performing tasks and duties required for distance teaching through the virtual classrooms.	73(23.5%)	163(52.4%)	34(10.9%)	29(9.3%)	12(3.9%)
Q6. There is a difficulty in direct communication with my students through virtual classrooms.	48(15.4%)	165(53.1%)	40(12.9%)	51(16.4%)	7(2.3%)
Q7. I face problems related to the preparation of lectures with regard to subjects such as I have not enough skills to design and produce effective content for students through the virtual classrooms.	43(13.8%)	155(49.8%)	40(12.9%)	52(16.7%)	21(6.8%)
Q8. Obstacles related to my students such as they do not have sufficient knowledge and skill in the use of virtual classrooms, a lack of technical support, and they are not interested in using virtual classrooms.	92(29.6%)	162(52.1%)	41(13.2%)	9(2.9%)	7(2.3%)
Q9. I do not have experience in using virtual classrooms in distance teaching.	9(2.9%)	57(18.3%)	40(12.9%)	108(34.7%)	97(31.2%)
Q10. I do not have sufficient knowledge and skill to use virtual classrooms in distance teaching.	7(2.3%)	65(20.9%)	38(12.2%)	109(35%)	92(29.6%)

The majority of teachers (68.5%) agreed or strongly agreed that it can be challenging to have direct communication with their pupils in online classes. Almost 82.2% of the teachers agreed or strongly agreed with the presence of problems with the preparation of lectures and required courses in virtual classrooms. However, 81.7% of the teachers agreed or strongly agreed that there were challenges for their pupils, including a lack of technical assistance (such as a tablet, an internet connection, etc.) and a lack of enthusiasm in learning through the usage of virtual classrooms. A few percentages of the lecturers (21.2%) agreed or strongly agreed that they lacked the experience, knowledge, and skills (23.2%), necessary for using virtual classrooms in education.

Teachers who age ranges between 25 to 30 years (3.64 ± 0.43, p = 0.01) and those who have 5-10 years (3.45 ± 0.46, p <0.001) of work experience seem to face more difficulties and obstacles in using virtual classrooms than other counter parts (Table 7).

Table (7): Results of the Kruskal-Wallis and Mann-Whitney tests on lecturers' perspective on the use of virtual classrooms in education based on the demographic information.

	Variable	n (%)	Mean ± SD	P
Preference	Gender			
	Female	130(41.8%)	3.68 ± 0.64	0.45a
	Male	181(58.2%)	3.74 ± 0.66	
	Age			
	less than 25	59(18.97%)	3.73 ± 0.5	**0.01a**
	25-30	55(17.68%)	3.96 ± 0.32	
	31-40	89(28.62%)	3.7 ± 0.71	
	over 40	108(34.73%)	3.6 ± 0.76	
	Previous experience of education			
	less than 5	86(27.65%)	3.77 ± 0.48	0.12a
	5-10	87(27.97%)	3.82 ± 0.55	
	11-15	45(14.47%)	3.67 ± 0.75	
	over 15	93(29.9%)	3.6 ± 0.8	
	Previous experience of using technological tools in education (i.e. PC, laptop, tablet, ...)			
	no	14(4.5%)	3.35 ± 0.87	**0.07b**
	Yes	297(95.5%)	3.73 ± 0.64	
	Attending courses related to using virtual classrooms in education			
	no	49(15.76%)	3.27 ± 0.74	**<0.001a**
	Yes	262(84.24%)	3.8 ± 0.6	
Teaching satisfaction	Gender			
	Female	130(41.8%)	3.4 ± 0.91	0.11a
	Male	181(58.2%)	3.56 ± 0.84	
	Age			
	less than 25	59(18.97%)	3.44 ± 0.84	**0.01a**
	25-30	55(17.68%)	3.79 ± 0.5	
	31-40	89(28.62%)	3.53 ± 0.91	
	over 40	108(34.73%)	3.33 ± 0.96	
	Previous experience of education			
	Less than 5 years	86(27.65%)	3.47 ± 0.87	0.10a
	5-10	87(27.97%)	3.68 ± 0.67	
	11-15	45(14.47%)	3.44 ± 0.9	
	over 15	93(29.9%)	3.36 ± 1	
	Previous experience of using technological tools in education (i.e. PC, laptop, tablet, ...)			
	no	14(4.5%)	3.31 ± 1.05	0.77b
	Yes	297(95.5%)	3.5 ± 0.86	
	Attending courses related to using virtual classrooms in education			
	no	49(15.76%)	2.91 ± 1.06	**<0.001a**
	Yes	262(84.24%)	3.6 ± 0.78	
Effectiveness	Gender			

	Female	130(41.8%)	3.1 ± 1.03	0.07a
	Male	181(58.2%)	3.31 ± 0.97	
	Age			
	less than 25	59(18.97%)	3.39 ± 0.88	**0.01a**
	25-30	55(17.68%)	3.44 ± 0.95	
	31-40	89(28.62%)	3.27 ± 0.93	
	over 40	108(34.73%)	2.98 ± 1.09	
	Previous experience of education			
	Less than 5 years	86(27.65%)	3.36 ± 0.96	**0.03a**
	5-10	87(27.97%)	3.39 ± 0.93	
	11-15	45(14.47%)	3.08 ± 1.02	
	over 15	93(29.9%)	3.01 ± 1.05	
	Previous experience of using technological tools in education (i.e. PC, laptop, tablet, ...)			
	no	14(4.5%)	3.11 ± 0.88	0.66a
	Yes	297(95.5%)	3.23 ± 1	
	Attending courses related to using virtual classrooms in education			
	no	49(15.76%)	2.99 ± 1.04	0.07a
	Yes	262(84.24%)	3.27 ± 0.99	
Obstacles	Gender			
	Female	130(41.8%)	3.4 ± 0.53	0.53a
	Male	181(58.2%)	3.36 ± 0.54	
	Age			
	less than 25	59(18.97%)	3.41 ± 0.47	**0.01c**
	25-30	55(17.68%)	3.64 ± 0.43	
	31-40	89(28.62%)	3.37 ± 0.54	
	over 40	108(34.73%)	3.23 ± 0.58	
	Previous experience of education			
	Less than 5 years	86(27.65%)	3.5 ± 0.5	**<0.001a**
	5-10	87(27.97%)	3.45 ± 0.46	
	11-15	45(14.47%)	3.26 ± 0.58	
	over 15	93(29.9%)	3.25 ± 0.6	
	Previous experience of using technological tools in education (i.e. PC, laptop, tablet, ...)			
	no	14(4.5%)	3.48 ± 0.8	0.46a
	Yes	297(95.5%)	3.37 ± 0.53	
	Attending courses related to using virtual classrooms in education			
	no	49(15.76%)	3.28 ± 0.53	0.16b
	Yes	262(84.24%)	3.39 ± 0.54	

Opinions of lecturers who employed virtual classrooms in education

The final study question was to learn more about the views of Palestinian lecturers who had engaged in online distance learning. The online interview was used in order to elicit lecturers' ideas and opinions on their initial exposure to using virtual classrooms.

The lecturers (n = 9) were asked to answer to this question: "What do you think the benefits of using virtual classrooms in education are?" The findings revealed that lecturers felt that using virtual classrooms offered significant advantages for both students and lecturers who were learning how to teach remotely for the first time, including flexibility, simple communication, having fun in class, using a variety of sources, effectiveness, accessibility of place and time, affordability, and improved learner attendance.

Some of the responses are mentioned below:

L1: "*I believe it is appropriate that topics that are simple to understand can be taught remotely. Nonetheless, some fundamental disciplines like physics and math must be taught in person. Adopting both of these in teaching is crucial*".

L2: " *I can teach more effectively using virtual classrooms. A 45-minute topic gets condensed into 15 minutes. Several of my students had trouble understanding, but I had no trouble connecting with them because I already knew them. Also, extra inquiries that students are unable to make in person can be made using this method. Even if I'm not at home, I can still impart knowledge on a certain subject*".

There were also comments made by lecturers in response to the question, "What do you think about the constraints of using virtual classrooms in education?" The findings showed that teachers felt there were certain problems with education via virtual classrooms. They also noted additional unfavorable features of engagement, such as improper subject matter that readily diverts pupils' attention and technical difficulties. The following are a few of the lecturers' responses to this query:

L1: " *Depending on the state of our educational system, different methods of distance learning can be applied for some courses. Yet, face-to-face interaction in the classroom is essential since it instills confidence in both teachers and pupils*".

L2: " *Because it must be done face-to-face, it is challenging to impart practical knowledge about some subjects online; yet, in other respects, it is not difficult*".

Discussion

Due to the unexpected closure of universities during COVID-19, educational institutions abruptly switched from traditional education to remote learning, which had an impact on thousands of students in Palestine. To keep the educational lessons moving while reducing crowding and the risk of infection, learning and teaching activities were quickly moved into virtual techniques. The aim of the current study was to assess lecturers' perspective and real experiences of using virtual classrooms in education as well as the challenges associated with meeting the expectations placed on education. This study was the first to focus on lecturers' preferences, efficacy, satisfaction with their teaching, and challenges when using virtual classrooms in the classroom.

The findings revealed a high level of preference among teachers for using virtual classrooms. This result was primarily caused by the fact that using virtual classrooms in education has many benefits that have helped them teach and achieve educational goals, such as the virtual classrooms are very structured with set due dates, techniques used are more effective, skills in design and production of effective learning content are enhanced, and direct communication between the members of the educational system is provided (Oliveira et al., 2021). However, due to a number of factors, including the lack of electronic resources and the incapacity to use this platform and provide

the learning content, some teachers did not prefer to use virtual classrooms as the primary platform for distant learning (Nugroho et al., 2021).

The presence of prior experience using technology tools and virtual classrooms in this study had an impact on participants' preferences for using virtual classrooms for distant learning. The lecturers who favored virtual classrooms have good experience in using virtual classrooms to impart knowledge on learning disciplines. Also, they possess the necessary abilities to assess their pupils through educational assignments and identify poorly comprehended subjects in order to re-teach them utilizing engaging techniques including films, in-person talks with scientists, and hiring specialists. The choice of instructors to use online resources was found to be well predicted by performance expectancy, social influence, effort expectancy, and facilitating condition, with effort expectancy having the biggest influence (Ting and Aziz, 2021).

The findings revealed some lecturers disagreed that teaching remotely using virtual classrooms gave them a similar degree of satisfaction as in-person classroom. Some of them also expressed dissatisfaction with using virtual classrooms for remote learning in the upcoming year. The findings also revealed that more than half of the teachers thought that using virtual classrooms as a substitute for traditional classroom instruction had met their expectations. The results of the current study indicated that lecturers who taught students remotely reported lower levels of teaching satisfaction and more challenging student communications. This finding may be related to various internal factors such as lecturers' preparation to distance teaching, time management and difficulty to stay concentrated for long online teaching duration were mentioned.

The success of distance teaching could be undermined by a number of issues, including distractions, low social engagement, and an increasing difficulty in keeping in touch with pupils. According to the current study, teachers who engaged in distance teaching reported lower job satisfaction and greater communication difficulties with both principals and students. Additionally, various distance teaching challenges emerged during the study, in addition to the teacher's internal characteristics that were previously mentioned. Due to disparities in their interactive pedagogical proficiency, positive outlook, and comfort using digital technology in the virtual classroom, teachers' performances in distant learning varied. In contemporary times, self-efficacy is necessary from teachers and students to ensure the success of distant education. Additionally, infrastructure limitations were reported, including unreliable internet connectivity and the increased financial burden of internet expenses. lecturers ' attitudes toward their teaching methods may also be impacted by the stress that they and their students are under. Lecturers' level of stress during the outbreak was related to their recent level of worry about an economic slowdown, potential academic delays, and disruptions in daily life.

The findings showed that teachers thought the effectiveness of adopting virtual classrooms was medium. This outcome can be the result of obstacles and issues while using virtual classrooms for remote learning. Lecturers have numerous challenges in virtual environments linked to the curriculum, pupils, and electronic environment (Alsadoon and Turkestani, 2020). These issues could be due to the stress that teachers are under, which could lead them to form unfavorable opinions about the efficiency of virtual classrooms in distant learning. The success of distant learning and the efficiency of virtual learning environments are significantly influenced by the lecturer's attitude toward and control over technology (Wang et al., 2021b). Also, the majority of lecturers lacked the time necessary to create electronic teaching aids for use in virtual classrooms. As a result, some lecturers might not be able to use the active learning techniques needed for this platform to facilitate effective learning. According to a report, the use of e-learning techniques and methods in remote education has also been proved to improve instruction in virtual settings (Xu et al., 2020).

According to the study, there are several factors that make it difficult for teachers to adopt virtual classrooms in education, including the lack of infrastructure, the use of new teaching techniques to provide the curriculum, and the need to monitor and guide a large number of students. Furthermore, they are unable to carry out the activities and obligations necessary for distance education through the virtual classrooms due to frequent outages of the electricity and internet networks. Also, the majority of lecturers stated that there were issues with the preparation of lectures and required subjects in online courses. However, the majority of teachers acknowledge that they encounter challenges with their pupils, including the latter's lack of technological assistance (such as a laptop or tablet, an internet connection, energy, etc.) and reluctance in learning through the usage of virtual classrooms. Similar results were mentioned in the study of Diana et al. (2020), Rannastu-Avalos and Siiman (2020), Ghasem and Ghannam (2021), and Morsi and Assem (2021). The mentioned that the main obstacles facing teachers implementing remote learning are their personal ownership and ability to use technology, parental involvement in online learning, a lack of facilities, and internal teacher factors.

Conclusion

For university teachers in Palestine, the COVID-19 pandemic brought about an unprecedented transition from traditional in-person instruction to online learning environments, bringing with it both opportunities and difficulties. With an emphasis on their preferences, level of satisfaction, perceived efficacy, and challenges throughout the transition, this study investigated lecturers' opinions regarding the usage of virtual classrooms. The results show that even while a large number of lecturers successfully transitioned to online instruction, there are still many obstacles to overcome, especially when it comes to infrastructure, technical assistance, and student involvement. Virtual classrooms were preferred by most instructors, who listed advantages like better communication with students, efficient course covering, and set deadlines. Satisfaction levels differed, though, with some lecturers struggling to attain the same degree of participation and contentment with their instruction as in conventional classrooms. Virtual classrooms were thought to be moderately effective, with lecturers pointing out problems such poor internet connectivity, frequent power outages, and challenges with efficiently creating and presenting content.

Notwithstanding these difficulties, the study emphasizes how virtual classrooms might enhance conventional teaching techniques, particularly when backed by sufficient resources and training. Lecturers were more likely to favor and use virtual classrooms successfully if they had prior familiarity with technology and had taken pertinent training courses. This implies that the acceptance and efficacy of virtual learning environments in Palestinian higher education could be improved by making investments in digital literacy and infrastructure.

In summary, the COVID-19 pandemic has brought attention to the necessity of a blended learning strategy that builds on the advantages of both online and traditional academic settings. A more robust and inclusive educational system can be established by Palestinian institutions by tackling the issues that have been highlighted and utilizing the advantages of online education. Developing methods to upgrade digital infrastructure, give instructors continual training, and raise student involvement in online learning settings should be the

main goals of future research. This will guarantee the successful application of the lessons discovered during the COVID-19 pandemic to the development of a future educational system that is more adaptable and flexible.

Recommendations and Future Work

The findings of this study underscore the potential of virtual classrooms to enhance teaching and learning in higher education, particularly in response to emergency situations such as the COVID-19 pandemic. However, several challenges remain that must be addressed to improve the effectiveness and sustainability of virtual learning environments in Palestine.

Recommendations

1. **Invest in Infrastructure:** Institutions should prioritize improving internet connectivity and ensuring reliable electricity to support uninterrupted virtual learning. Providing necessary devices to both students and educators can also bridge the digital divide.
2. **Teacher Training and Professional Development:** Regular and structured training programs on digital pedagogy and virtual classroom management should be offered. These programs must focus on improving educators' technical skills and confidence in online instruction.
3. **Curriculum Adaptation:** Educational content should be redesigned to suit online delivery, incorporating multimedia resources, interactive tools, and adaptable assessments that enhance student engagement and comprehension.
4. **Student Support Services:** Universities should offer digital literacy programs and counseling services to assist students in adapting to online learning and managing associated stressors.
5. **Institutional Support:** Strengthen technical support units within universities to assist lecturers in the preparation, delivery, and troubleshooting of virtual classes.

Future Work

Future research should investigate the long-term impact of virtual classrooms on academic performance and learning outcomes. Comparative studies between different regions and educational levels could provide broader insights. Additionally, exploring the effectiveness of hybrid or blended learning models may offer sustainable solutions that combine the advantages of both virtual and face-to-face education. The role of emerging technologies such as AI and adaptive learning platforms in enhancing virtual classrooms also warrants further exploration.

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