The Satisfaction of Online Learning on Dentistry Students during COVID-19: The Faculty of Dentistry, Srinakharinwirot University

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Abstract

Objectives: To assess the level of satisfaction with online learning during the COVID-19 pandemic among dental students and lecturers at the Faculty of Dentistry, Srinakharinwirot University, Thailand.

Methods: A cross-sectional study based on an e-questionnaire (Google Forms®) distributed to dental students (n=427) and lecturers (n=67) from September to November 2022. Demographic data, experience and satisfaction with online learning were surveyed. Cronbach's alpha was calculated using the validity test of the questionnaire. Statistical analysis was descriptive and a t-test and ANOVA were performed (SPSS, $p<0.05$).

Results: The response rate was 53.43%. There was a statistically significant difference in the level of satisfaction with online learning during COVID-19 between students and lecturers ($p<0.01$). There was a statistically significant difference in satisfaction scores for the interactive aspects of online learning ($p<0.01$). Satisfaction scores of postgraduate students tended to be the highest of all groups while the lecturer's scores showed the least satisfaction. Perceptions of the advantages of online learning were at a good level in all groups.

Conclusions: Online learning was beneficial for learning continuity during the COVID-19 pandemic, particularly as a replacement for in-person lectures. The causes of dissatisfaction among lecturers should be further studied.

Keywords: COVID-19, dentistry students, online learning, satisfaction

Introduction

Since the start of the SARS-COV-2 outbreak in 2019, the high prevalence of the novel coronavirus disease 2019 (COVID-19) has been considered an international public health concern.[1] To prevent viral transmission by airborne droplets and close personal contact[2], during the pandemic, UNESCO estimates that 1.5 billion students globally did not attend school.[3] The virus affected clinics and dental schools in countries across the world.[4] The state was in lockdown for several months and dental staff, lecturers and students were instructed to remain in their homes to limit the spread of SARS-COV-2. The Faculty of Dentistry at Srinakharinwirot University (SWU) was closed during the COVID-19 lockdown. From February to August 2021 online education replaced onsite learning for the continuity of education in dental schools.

Successful online learning relies significantly on teaching perspectives, digital platforms, the experiences and attitudes of students and the technology and technical capacity of dental schools.[5,6] Studies of e-learning have demonstrated multiple benefits; classes can be arranged at any place and time and are accessible to many students or audiences.[7,8] However, there are limitations to the effectiveness of e-learning. All students are required to invest in equipment, including a personal computer, webcam and a stable internet connection[9], and the software and/or hardware used can also affect the learning process.[10] Technological skills training may be required for staff and students and the benefits of e-learning may be limited by the obsolescence of technology.[11] Traditional modes of teaching in dental schools includes lectures and involves learning clinical skills and practical work in clinics and the dental laboratory.

This study assessed the practical aspects, limitations, and satisfaction levels associated with online learning in addition to how the e-learning trend influenced satisfaction among dental students and lecturers in the SWU Faculty of Dentistry. No prior investigation or survey of satisfaction with E-learning among dental students and lecturers during the COVID-19 pandemic in the Faculty of Dentistry at SWU has been conducted.

Objectives

This study aimed to assess satisfaction with online learning among dental students and lecturers during the COVID-19 pandemic in the Faculty of Dentistry at SWU.

Materials and Methods

This cross-sectional study surveyed the level of satisfaction with online learning among dental students (preclinical, clinical and postgraduate level) and lecturers at the Faculty of Dentistry at SWU during the COVID-19 pandemic in Thailand. Ethics approval was granted by the Strategies Wisdom and Research Institute at SWU (SEC-336-2564). The sample size was calculated using the following formula[12] $n = N/(1+N(e)^2)$[12] where n denotes sample size; N denotes population; e denotes error $= 0.05$ and reliability is 95% ($\alpha=0.05$). The total population (N) was 496 (Student=429, lecturer=67). The sample size was estimated to be 273, purposive sampling was used, and 265 subjects (53.43%) responded to the questionnaire. The inclusion criteria for purposive sampling were all levels of dental students or all lecturers at the Faculty of Dentistry, SWU who had experienced online learning during the COVID-19 pandemic. After the questionnaire was designed, the validity and reliability were approved by professionals in Education and Behavioral Sciences. Item-Objective Congruence (IOC) was used to evaluate the items on the questionnaire. Cronbach's alpha, α (or coefficient alpha), (developed by Lee Cronbach in 1951) measured the reliability or internal consistency. The IOC was greater than 0.8, and Cronbach's alpha was 0.82. The questionnaire was revised following trials by dental students and lecturers. The questionnaire was created online using Google Forms (www.google.com/forms/about/). The Google Form was distributed via LINE and social media for a duration of 1-3 months (September to November, 2022). The participants comprised dental students and lecturers at the Faculty of Dentistry at SWU (n=265). The undergraduate students invited to participate were at the preclinical level (the first to third year of study, total=193, respondents=103) and the clinical level (the fourth to sixth year of study, total=167, respondents=90). Postgraduate dental students (total=69, respondents=17) and lecturers (total=67, respondents=55) were also invited.

The questionnaire was divided into three parts: demographic information, the experience of online learning and satisfaction with online learning in the Faculty of Dentistry at SWU. A five-point Likert scale was used for assessment purposes. A score of five indicated the respondent was very satisfied, and a score of one indicated strong dissatisfaction. Descriptive statistical analysis was applied to demographic data using IBM SPSS Statistics

(Version 24 IBM Corp., Armonk, NY, USA). The significance level was set at less than 0.05. The satisfaction score of the Likert scale was compared between the groups and variables with the independent t-test and ANOVA.

Results

Student characteristics

210 dental students and 55 lecturers were surveyed. The dental students were undergraduates and post-graduates. The response rate for the preclinical level was 53.3%, clinical level 53.9% and postgraduate level 24.6%. Demographic data were obtained for age, gender, and level of education. The age distribution was 18-21 years 51.4% (n=108), 22-25 years 40.4% (n=85) and ≥26 years 8% (n=17). The gender distribution was 55 males (26.2%) and 155 females (73.8%), 49.9% (n=103) of students were at the preclinical level, 41.7% (n=86) were at the clinical level and 8.2% (n=17) were at the postgraduate level, as shown in Table 1.

Lecturer characteristics

55 lecturers were surveyed and demographic data were obtained for age, gender, and department of work. The age distribution was 24-33 years 16.3% (n=9), 34-43 years, 32.7% (n=18), 44-53 years 40% (n=22) and ≥54 years 10.9% (n=6). The gender distribution was 13 males (26.6%) and 42 females (76.4%). Of the lecturers 20% (n=11) were in the General Dentistry Department, 21.8% (n=12) were in Conservative Dentistry, 16.4% (n=9) were in Pedodontics, Orthodontics and Dental Public Health, 18.2% (n=10) were in Stomatology and Pharmacology and 23.6% (n=13) were in Oral and Maxillofacial surgery, as shown in Table 2.

Online learning in dental schools

Computer skills and online platforms. The self-reported computer skills of students were excellent (50%), good (47%) and poor (3%). The self-reported computer skills of lecturers were excellent (44%) and good (56%) (Figure 1). Overall, students reported higher confidence in their computer skills than lecturers.

Table 1: Participant characteristics (student group)

Variables	Number	% of individual
Age		
18-21	108	51.4
22-25	85	40.4
26+	17	8.0
Gender		
Male	55	26.2
Female	155	73.8
Year of the students		
Preclinical level		
The first-year	31	14.8
The second-year	28	13.3
The third-year	44	21
Clinical level		
The fourth-year	36	17.1
The fifth-year	20	9.5
The sixth-year	34	16.2
Postgraduate/		
Field of education		
Advanced general dentistry	5	2.4
Prosthodontics	2	1.0
Restorative	1	0.5
Endodontics	5	2.4
Maxillofacial surgery and Implant	2	1.0
Periodontics	2	1.0
Total	210	100

Table 2: Participant characteristics (lecturer group)

Variables	Number	% of individual
Age		
24-33	9	16.3
34-43	18	32.7
44-53	22	40
54+	6	10.9
Gender		
Male	13	26.6
Female	42	76.4
Department		
General dentistry department	11	20
Conservative and ProsthodonticDentistry	12	21.8
Pediatrics, Orthodontics and Dental Public Health	9	16.4
Stomatology and Pharmacology	10	18.2
Oral and Maxillofacial surgery	13	23.6
Total	55	100

Of online platforms, Microsoft Teams (MS Teams) was the most popular platform used by lecturers (52.9%), followed by Zoom (33.3%), Google Meet (2.9%) and other (4.9%). In the student groups, MS Teams (37.9%) and Zoom (33.7%) were the most popular, followed by Google Meet (15.1%), e-learning (12.6%) and other (0.8%).

Characteristics of learning in dental schools. At the preclinical level study, studies were primarily based around lectures relating to basic knowledge of human and dental sciences. At the clinical level, studies comprised clinical practice (80%), lectures, seminars and research projects (10%) and dental fieldwork (10%). Learning at the clinical level integrated clinical knowledge and skills for dental professionals. Postgraduate students learned higher specialty clinical skills via integration of lectures and clinical practice and dental research projects.

Satisfaction of students and lecturers. Dental students (n=210) and lecturers (n=55) were surveyed regarding their satisfaction with online learning. The mean satisfaction level with interactive learning was 3.5 and 3.1 respectively, learning activity 3.8 and 3.4 respectively, evaluation 3.6 and 3.9 respectively, technical support 3.2 and 3.4 respectively, academic support 3.2 and 3.4 respectively and advantage of online learning 4.5 and 4.1 respectively. There were statistically significant differences between the groups for learning activity ($p<0.01$) and evaluation ($p<0.05$) (Table 3). The dominant

differences were in interactive learning and learning activities. Satisfaction levels were the same for technical and academic support. The advantages of online learning received a good satisfaction score in all groups. Analysis of the question related to satisfaction in all dimensions of learning and teaching was completed (Table 4) and Cronbach's alpha value exceeded 80%, which indicates reliability.

Satisfaction with interactive online learning. The statistical analysis was conducted using One-Way ANOVA. The mean satisfaction score for all participants on the topic of interactive learning (Figure 4) showed that students at the postgraduate level were most satisfied. There was a statistically significant difference in the mean satisfaction score of the lecturers compared to the other respondents ($p<0.001$). For the question-and-answer aspect of online learning, there was a statistically significant difference in mean satisfaction scores at the postgraduate level in comparison with students at the clinical level and lecturers ($p<0.01$). For class participation, there was a statistically significant difference in the mean satisfaction score of the postgraduate group in comparison with the students at the clinical level and lecturers ($p<0.01$). For sharing ideas, there was a statistically significant difference in the mean satisfaction score of lecturers compared to preclinical level and postgraduate students ($p<0.01$) (Table 5). The mean score of satisfaction was highest in the group of postgraduate students and lowest in the group of lecturers.
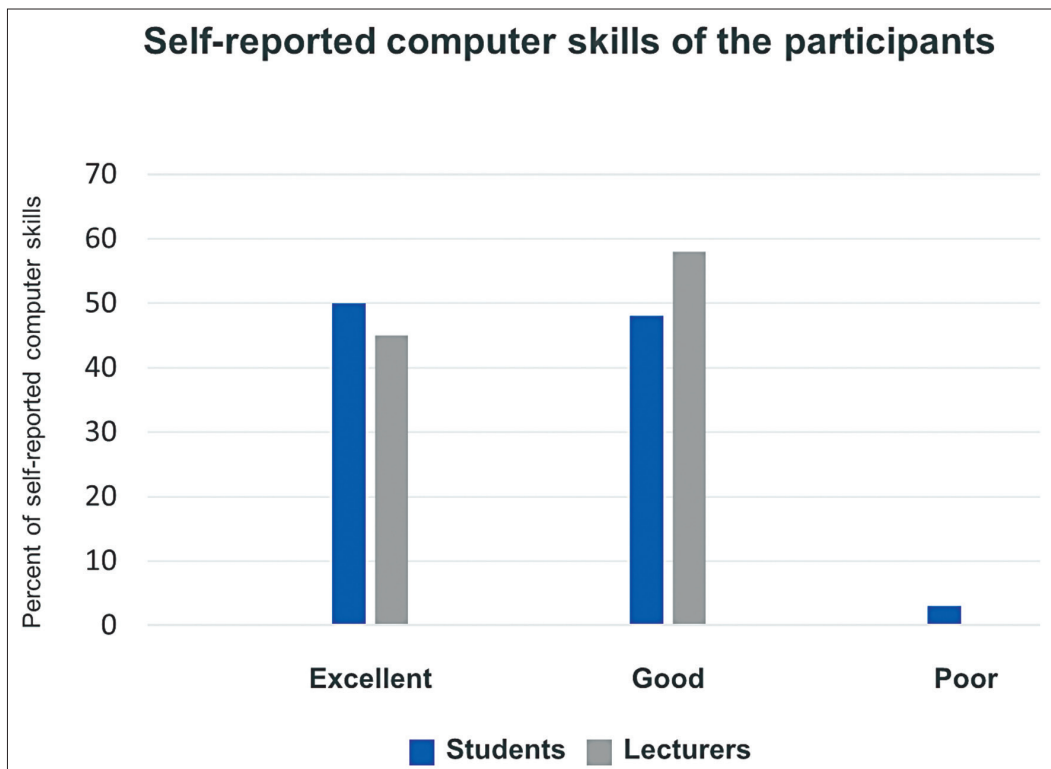
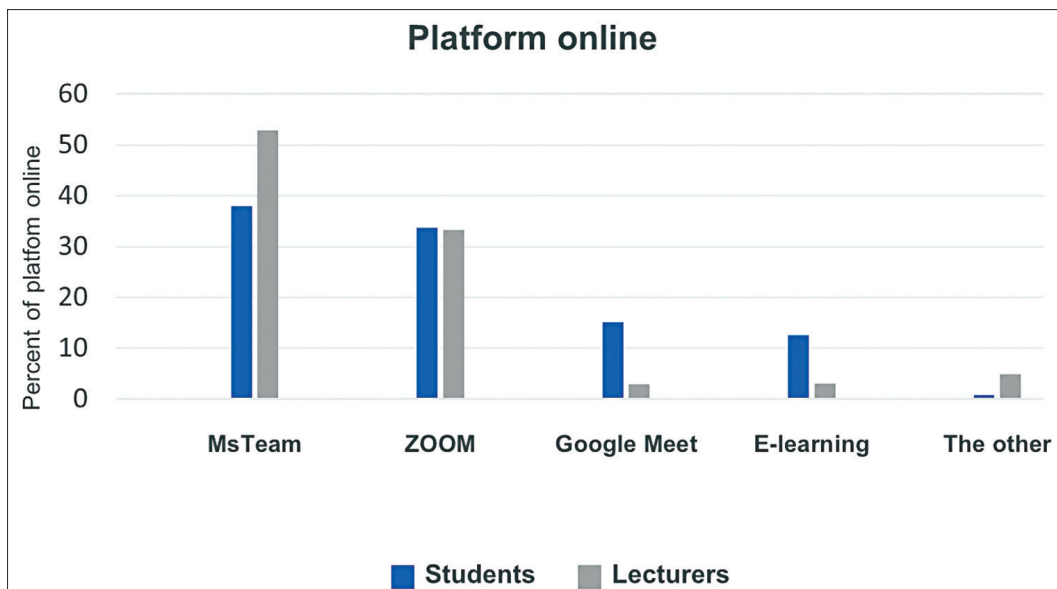**Figure 1:** Self-reported computer skills of participants

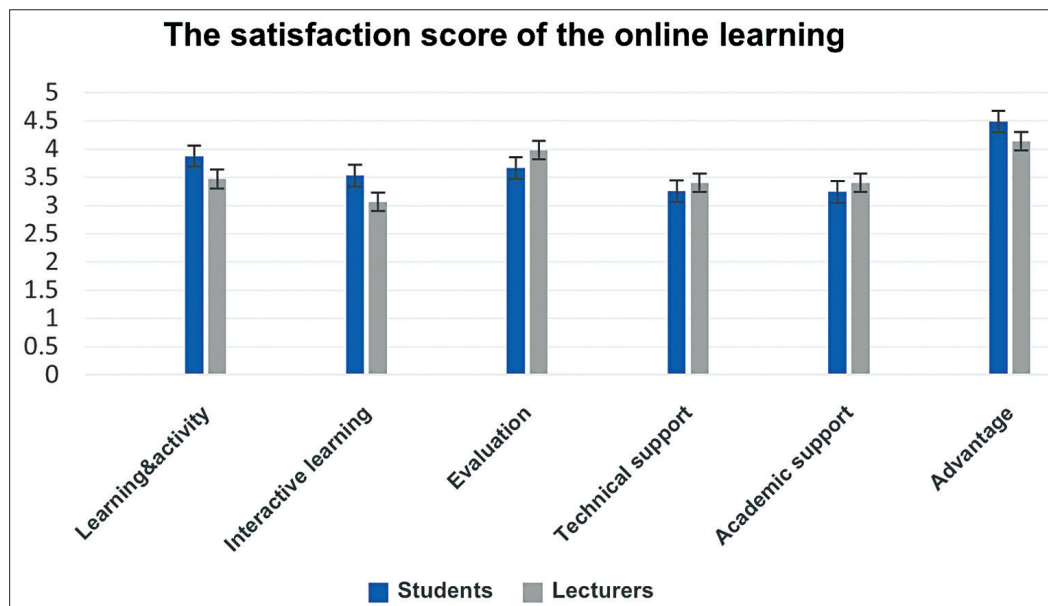**Figure 2:** Platform used for online learning

Figure 3: The mean satisfaction score of online learning among students and lecturers

Table 3: Satisfaction score of online learning between participants (t-test)

Question	Group	Mean	SD	*p*-value
Learning and Activities	Students	3.9	0.83	<0.001*
	Lecturers	3.5	0.61	
Interactive learning	Students	3.5	0.98	0.539
	Lecturers	3.1	1.03	
Evaluation	Students	3.7	0.94	0.022*
	Lecturers	4.0	0.93	
Technical support	Students	3.2	0.91	0.262
	Lecturers	3.4	0.86	
Academic support	Students	3.5	1.0	0.252
	Lecturers	3.4	0.86	
Advantages of online learning	Students	4.5	0.77	0.285
	Lecturers	4.1	0.77	

Statistical analysis for the satisfaction score of online learning comparison between students and lecturers (t-test)
(**$p<0.01$, *$p<0.05$)

Table 4: Reliability statistics for questions

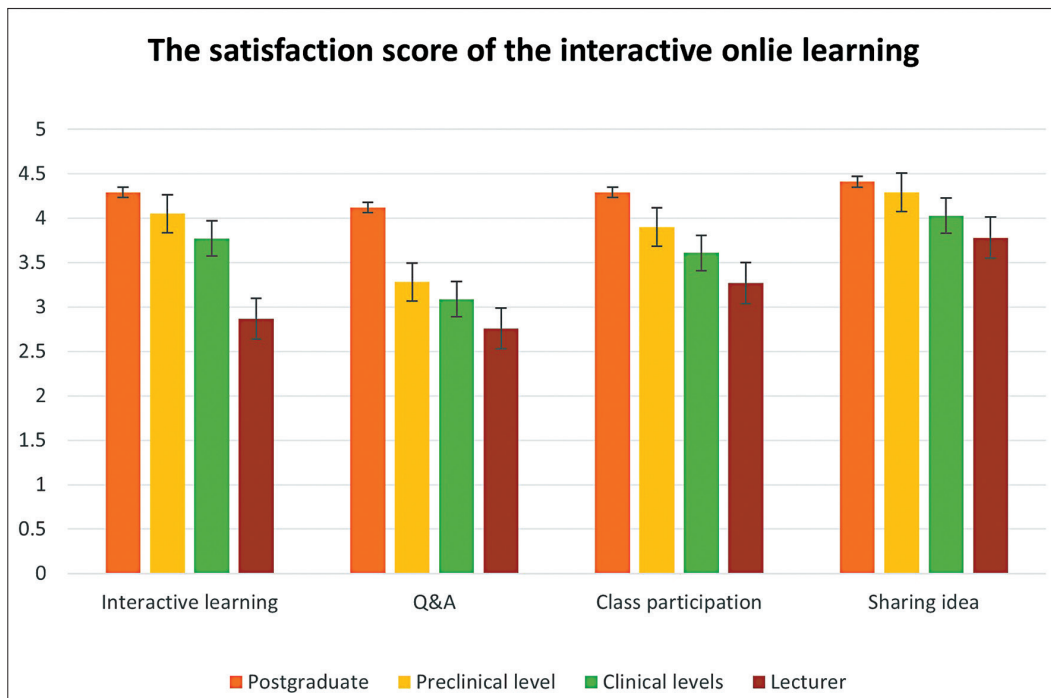| Question	Cronbach's alpha	Number of items
Q.2 Learning activity	0.795	7
Q.4 Interactive learning	0.799	7
Q.5 Evaluation	0.873	7
Q.6 Technical support	0.906	7
Q.7 Academic support	0.822	7
Q.9 Advantage	0.819	7

Figure 4: The differences in the satisfaction scores of the interactive online learning between all participants

Table 5: Differences in satisfaction scores of interactive online learning among participants

Topic	Group	Mean	SD	F-test	*p*-value	Post hoc test	*p*-value
Interactive learning	PG	4.29	0.84	24.47	<0.01	PG ≠LS	<0.001**
	PC	4.05	0.82			PC≠LS	<0.001**
	CL	3.77	0.79			CL≠LS	<0.001**
	LS	2.87	1.09				
Q&A	PG	4.12	0.69	6.40	<0.01	PG ≠LS	0.04
	PC	3.28	1.19			PC≠LS	<0.001**
	CL	3.09	1.21			CL≠LS	<0.001**
	LS	2.76	1.15				
Class participation	PG	4.20	0.77	9.27	<0.01	PG ≠LS	0.02*
	PC	3.90	0.88			PC≠LS	0.00*
	CL	3.60	0.80			CL≠LS	0.00*
	LS	3.20	0.85				
Sharing ideas	PG	4.40	0.69	0.00	<0.01	PG ≠LS	0.02*
	PC	4.30	1.19			PC≠LS	0.00*
	CL	4.00	1.21				
	LS	3.78	0.83				

PG = Postgraduate, PC = Pre-clinical, CL = Clinical, LS = Lecturers

Discussion and Conclusions

Online learning replaced many traditional learning styles during the COVID-19 pandemic and in particular lecture-based learning. This study surveyed satisfaction with online learning in the Faculty of Dentistry at SWU during the COVID-19 pandemic. The response rate of students and lecturers was 53.42%. There was a statistically significant difference in satisfaction with online learning between students and lecturers ($p<0.01$). There were also statistically significant differences in satisfaction with interactive online learning ($p<0.01$).

The results of the satisfaction scores between students and lecturers show that satisfaction with interactive learning was lower than other topics. Overall, the scores of the lecturers tended to be lower than the students. The advantage of online learning scored highest in all groups. The advantages included remote learning, comfort, and accessibility. The interactive aspect of online classes was identified as the most significant limitation and this indicates staff should receive training on using technology to facilitate interaction or developing lesson plans to increase interactive learning online.[13] The theories of active learning indicate that active online learning was applicable to dental students.[14] The interactive teaching methods in both offline and online platforms in Periodontics showed equivalent performances by undergraduate dental students. According to Kumar *et al*.[15], to facilitate interactive learning, instructors should shift their role from traditional lecturer to that of facilitator.

Among preclinical students, online learning may benefit the style of learning in lecture-based studies. Teaching material and an online learning platform can be developed for this group. Postgraduate students can learn individually and in small groups, and have clinical experience, as such, their reported satisfaction levels suggest this allowed them to adapt easily to the learning style for the situation.

The clinical study level was most impacted by the COVID-19 pandemic as the School was closed and the clinical practice ceased. Most dental schools in the United States and many countries, including Thailand, ceased clinical activity and simulation labs, except in the case of emergencies.[16] Lockdown reduced patient flow and patient incomes, which limited clinical practice. The characteristics of learning in clinical and preclinical students were different. Online learning was a significant limitation

for the practice of clinical skills, both 'hands-on' and laboratory study. However, it is yet to be determined if online learning improves or reduces professional skills.[17] Most students did not feel confident clinically managing patients as an outcome of e-learning.[18] Online learning was satisfactory in acquiring knowledge but could have been more effective in acquiring clinical and technical skills.[19]

In the lecturer group, the primary teaching style was lecture-based teaching. Lecturer age, computer skill level, technical support and ability to adapt to new online teaching techniques may represent barriers to effective online teaching. The teaching experience of lecturers was based on the in-class participation of students. However, during online sessions, many students did not turn on their personal cameras and did not participate in discussions leading to one-way communication. Online learning promoted isolation and a lack of face-to-face interaction has been shown to contribute to professional isolation and a reduced learning experience.[20] From the perspective of the lecturers, they desired student participation and aimed to hold 'Q&A' sessions or develop a sense of participation among students.

Academic support for the internet and the online library was the main topic addressed by respondents. This indicates that universities should sufficiently support the internet system and access to technical assistance, e-journals and e-books for all staff. Computer devices, the internet and online learning platforms can represent major barriers to online learning. When teaching synchronous methods, staff require timely technical support when they have internet connectivity or other technical problems. If the system is unstable and the internet signal is not strong, it interrupts online learning.

With continuous improvements, online teaching and learning methods can become integral to the academic system. Progress and development in online learning remains necessary. Lack of resources, infrastructure, and training may be associated with low efficacy.[21,22] Online learning had a beneficial impact on learning continuity during lockdown allowing distance learning and revision of learning material. The results indicate that online learning might be suitable for lectures, seminars, or presentations. However, a key finding is that although students were satisfied with online learning, lecturers were not. Further study should investigate this discrepancy.

Acknowledgments

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