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Original Research

Evaluating the Immediate Impact of an Online Dental Faculty Development Course for Emergency Remote Teaching Preparedness

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Abstract.

Background and Objective: During the COVID-19 Pandemic, this study evaluated the immediate effects of an online course on MOODLE offered to the dental faculty of a medical university to deal with the emergency remote teaching and assessment.
Materials and Methods: This single-group pre-post-design intervention study was conducted from November 2020 to April 2021. Data was collected through the feedback form, pre-post-tests assessing content knowledge and faculty readiness in online teaching and assessment. Descriptive variables were analyzed using SPSS version 20.0. A paired sample t-test was applied to determine the differences between mean scores.
Results: A total of 172 responses (96.65%) were received by the faculty teaching remotely. There was a statistically significant difference in the pre and post-test scores (9.11±2.20 and 12.92±2.53 respectively) and course readiness scores (75.45±18.82 and 86.19±18.67 respectively) with a $p < 0.001$. Participants were satisfied and identified main strengths of the course which were use of online teaching tools and the relevance of the course content and weaknesses as technical glitches using MOODLE®.
Conclusion: The basics of online assessment and teaching course improved faculty knowledge and readiness to use online tools. However, feedback highlighted areas of improvement in the course and recommended addition of synchronous sessions and developing more comprehensive blended courses.

Keywords: Asynchronous online course, faculty readiness, teaching assessment, emergency remote teaching

1. Introduction

The COVID-19 pandemic created a challenging situation that affected various aspects of human life, including health and education, and became a menace to the entire globe, with more than 26 million instances of infection confirmed globally in 2021.[1,2] Curtailing social interaction to reduce spread led to the closure of educational institutes. According to estimates of August 2020, this epidemic affected about 1.6 billion pupils in over 190 countries, with most of them living in low- and lower-middle income nations.[3]

To reduce the effect of this brutal disease on the students and educational system, governments and educational institutions modified their teaching and learning modalities switching completely to emergency remote teaching (ERT), where South Africa provided access through radio-based learning and zero-rated access to educational websites.[4] One study across 31 European countries found nearly 90% teaching institutions had shifted to online platforms by April 2020.[5] Moreover, The United States and Canada, rapidly converted face-to-face teaching into ERT where they used hybrid and asynchronous learning approaches.[6] Brazil and Argentina used MOODLE® extensively along with other social media tools.[7] However, across the Middle East, universities in countries like the UAE and Saudi Arabia converted teaching to full online modalities in no time.[8] In Asia, "China implemented what was termed the largest online teaching experiment in human history, with over 270 million students affected".[9] All of this was done by introducing a variety of e-learning tools and platforms to complete academic plans as much as possible.

Pakistan, too, responded in a similar fashion; overnight, institutions followed directives to switch to teach online with minimal preparation.[10] This presented a mammoth challenge to a traditionally tuned faculty.[11] Many issues were reported by the institutions in dealing with technical issues. Internet connectivity, faculty readiness to deal with online tools and students' complaints regarding the quality of online teaching undergone. In contrast to which faculty development courses to deal with this situation were just a few.[12]

In response to these challenges, Higher Education Commission (HEC) instructed all institutions to develop and train their faculty and staff in conducting online teaching and assessment through different online web-based courses to improve quality of delivery and assessment.[13] At the same time, HEC provided access to universities of online courses databank available at national and international levels. Simultaneously, the university faculty was asked to prepare virtual courses for dissemination to students.[14] All the educationists, teachers, administrative staff and students had to get cognizant to deal with the challenges that ensued. The biggest hurdle to remote teaching was that educators started spending relatively more time trouble- shooting technical issues rather than in content delivery. This was mainly because they were not adept at using the virtual tools.[15]

As a result, institutions developed and launched indigenous online courses on the most commonly available Learning Management Systems (LMS) e.g. MOODLE.[16] Jinnah Sindh Medical University (JSMU), being the largest public sector university in Sindh, responded immediately by not only starting online teaching but also initiating a course to train the faculty in this new modality. The two-months' asynchronous course, titled 'Basics of Online Assessment & Teaching' (BOAT), aimed to cater to the challenges faced by the faculty in web-based teaching and issues dealing with commonly used e-learning tools. [17]

There were a lot of published literature from Pakistan reporting the challenges and perceptions about online teaching during the lockdown. However, none of the studies was about the effects of a tailor-made course on faculty readiness and its perceptions about the course. In contrast to which countries like USA and Canada did reported studies evaluating impact of online faculty development courses and suggested to improve faculty readiness of teaching and assessing online.[18,19] It is hoped that this study will provide an impetus to institutions in Pakistan to report the impact of such courses so that faculty development in this emergent area may be improved and more faculty benefit from the courses.

The aims of this study were to assess the immediate impact of the course on faculty readiness towards online teaching and assessment along with identifying the strengths and areas of improvement in the course launched.

1.1 Research Questions

- What is the immediate impact of the course on faculty readiness toward online teaching and assessment?
- What are the strengths and areas of improvement in the course on faculty readiness toward online teaching and assessment?

2. Materials and Methods

2.1 Study Design and Method

This was a single group pre- post design intervention study, conducted from November 2020 to April, 2021 after approval from the Institutional Review Board. Universal sampling was used. To retrospectively assess the adequacy of our sample size, we applied Cochran's formula for sample size estimation in large populations. Assuming a 95% confidence level, 5% margin of error, and a conservative proportion estimate ($p = 0.5$), the required sample size was calculated to be $n = 119$. The course Basics of Online Assessment and Teaching "BOAT" was announced for various Universities and colleges. During the above-mentioned period three times (with overlapping dates), 178 faculty members were admitted to this course. The eligibility criteria to take the course was full-time dental faculty members working at the university and its affiliated institutions currently teaching undergraduate dental students online. Part time dental faculty members with no teaching load, and those with less than one-year experience, or on leave were not admitted to the course. Participants who did not consent or complete the course and were unable to attempt tests were excluded from the course and study.

The self-paced course consisted of three separate modules (Online Teaching, Online Assessment and online Troubleshooting). Each module consisted of Video Tutorials, reading material, and Quizzes containing Multiple-Choice Questions. Upon submitting the course feedback form, participants who completed all three modules were awarded a course completion certificate.

2.2 Data Collection

On day one of the course, the online knowledge test and readiness questionnaire were distributed to the participants using Google Forms with the link embedded in the course on "MOODLE". Approximately 2 months after completing all three modules, the knowledge test and readiness questionnaire was re-administered (post-test) to all the participants using the link on MOODLE. The participants were also asked to complete a course feedback form provided as a Google form.

These questionnaires had a section seeking permission from the participants to use the data for research purposes along with the research objectives. Anonymity and confidentiality were ensured. The online tests were to be filled by the course participants after watching videos and going through the reading material. The feedback form was to be filled out after successfully attempting the quizzes.

2.3 Study Tools

Data comprised of scores on a test of knowledge, a Readiness Test for online teaching & assessment (both administered as pre- and post-tests) and a course feedback form. The study tools were developed by four Medical Educationists with prior experience in developing online courses and teaching. The study tools were developed based on learning objectives and the content of each module. All the tools were piloted to determine their reliability explained under the heading of piloting.

Participants were asked to provide their demographic data in the feedback form. The requirements of name and other areas of identification were optional. Details of each study tool are as follows:

2.3.1 Pre & Post Test of Knowledge

This test consisted of 20 items assessing the content knowledge related to PowerPoint presentation skills, online collaborative learning tools (Zoom Platform, Google Classroom, Google Meet), technical glitches in the devices used and online assessment tools (Kahoot and Socrative) present in supplementary 1.

Participants scoring equal to and less than 10 were considered failed and participants scored more than 10 were considered as passed. The cut off score was decided based on the University policy of 50% minimum pass marks for undergraduate programs.

2.3.2 Readiness for online teaching and assessment (Pre-Post)

In this test, there were seven items for demographic details of faculty. These included age, gender, basic qualifications, teaching experience (in years), academic designation and department. Regarding readiness, there were 32 Items in total from which 20 items were on using online tools (0 = never tried, 1 = always faced a problem, 2 = often, 3 = few times, 4 = never faced a problem), 7 items were on technology access to be rated on a 5-point Likert scale (0=No access at all, 1 = Very difficult to access, 2 = Difficult, 3 = Easy, 4 = Very easy to get access) and 5 items related to computer skills, (0 = never used it, 1 = very hesitant, 2 = hesitant, 3 = confident, 4 = very confident).

2.3.3 Course feedback form

This form consisted of 33 items from which 14 items were on teaching and learning, 7 items focused on administrative issues during the course, 3 items required feedback on overall content, 3 items sought feedback regarding the facilitators, 2 items were on the asynchronous environment. All the items had to be rated on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). There was one item for overall rating ranging from 1 to 10 and 2 open-ended items where respondents were asked to describe the strengths and weaknesses of the course.

2.4 Piloting

The test of knowledge, readiness questionnaire, and course feedback forms were piloted on 10 faculty members. A pilot group of participants (n = 10) was asked to assess item clarity and difficulty, leading to minor wording modifications. Reliability is essential evidence for the Validity testing and minimally acceptable value of Cronbach's Alpha is 0.7 for high-stake assessments however, 0.6-0.69 is said to be marginally acceptable.[15-21] This was taken as the benchmark. Reliability level for the test of knowledge was low (0.523) indicating the need for review and improvement before it was used. Therefore, the three authors who are medical education experts reviewed and revised questions II, IX, XI, XIII and XIV. The test of knowledge was then piloted again on the same faculty and the reliability increased to 0.603. The Readiness tests and the Course Feedback Form demonstrated a high internal consistency with a Cronbach alpha 0.88 and 0.93 respectively. The data of pilot study was not included in the study results.

2.5 Ethical consideration and participants consent

The study protocol was reviewed and approved by the Institutional Review Board (IRB) with the. Reference #: JSMU/IRB/2020/-862. Participation in the study was voluntary, and participants were informed of their right to withdraw from the study at any time without any consequences. All collected data were stored in secure, password-protected databases accessible only to the principal author. Participants were assured that data would be anonymized to protect their identities.

Prior to participation, all participants were provided with comprehensive information about the study's purpose, procedures, potential risks, and benefits. Written consent was obtained after ensuring that participants fully understood their involvement and voluntarily agreed to participate.

2.6 Data Analysis

The descriptive variables were analyzed using SPSS version 22.0. Frequency, percentages as well as mean and standard deviation were used to determine demographic data variability and feedback form summarization. A paired sample t-test was applied to determine if there were any differences between content knowledge and readiness (pre- and post-tests). Thematic analysis was done by 3 coders, for two open-ended questions on strengths and points that need improvement identified by the participants in course feedback.

Confounders like Prior online teaching experience was non-existent /minimal among all the faculty included. Years of online teaching experience, Previous exposure to instructional design training was also nil.

4. Results

A total of 172 responses were received from the 178 faculty members enrolled in the course giving a response rate of 96.65% i.e. 6 participants dropped out from the course. Our achieved sample of 172 exceeded the threshold (N=119), suggesting sufficient representation for descriptive analysis. Table 1 shows that the mean age was 34.62±9.28 years, 77% were females, 78% were with MBBS background, 58.7% had teaching experience of less than 5 years.

Table 1. Demographic profile for age, gender, basic qualification and teaching experience.

Demographic Variable	Category	Participants (%) N=172	Dropouts (%) N=6
Age	Mean	34.62 ± 9.28	31± 2.18
Gender	Males	23	33
	Females	77	66
Basic qualification	MBBS	78	83
	BDS	22	17
Teaching experience	0-5 years	58.7	16
	6-10 years	24.5	66
	>10 years	16.8	16

There was a statistically significant ($p < 0.001$) difference in the scores of content knowledge on pre-and post-test. Out of the 172 respondents, 66 participants scored 10 or above and passed (38.3%) in the pre-test. In the post-test 153 respondents scored 10 or above and passed (88.9%). A statistically significant difference was also found in the Self-Perceived Readiness of the faculty ($p =0.001$) (Table 2).

Table 2. Pre and post-test of content knowledge and readiness of the faculty who participated in the online course boat.

	Test for Online Teaching & Assessment	Max Score	Pre Mean Score + SD	Post Mean Score + SD	*p*-value
1	Content knowledge	20	9.11±2.20	12.92±2.53	0.001
2	Readiness	128	75.45±18.82	86.19±18.67	0.001

Table 3 summarizes the course participant feedback. The complete feedback data is present in supplementary 2. The participants found the content to be useful for their workplace. Although they were highly satisfied with the facilitators' teaching skills in an asynchronous environment, they were more comfortable using Zoom as an online platform and preferred fewer asynchronous sessions to synchronous ones. and. They reported a high level of satisfaction in their ability to use online tools for quizzes. A 10-point, global rating scale was included at the end of the form to capture their overall impression of the course, summarizing the learner's experience in a single score; this showed a highly positive trend (8.14±1.39).

Table 3. Summary of participant feedback on different aspects of the online course.

	Aspects	No. of Items	Mean (±SD)	Highest Rated Item
A	Content	3	4.49 ± 0.54	Content useful in the workplace (4.59)
B	Teaching & Learning	14	4.25 ± 0.68	Online Tools used for Quizzes were engaging (4.49) **Comparing face-to-face sessions, the asynchronous session was better (3.4) Mixed preference; neutral to slightly positive response*
C	Learning Environment	2	4.33 ± 0.61	Moodle was interesting (4.42)
D	Facilitators	3	4.44 ± 0.48	Facilitators were helpful (4.59)
E	Administrative Support	7	4.30 ± 0.50	Course ended on time (4.57)
Global Course Rating		8.14 ± 1.39		

**least item rated overall*

The written comments received for the open-ended questions were coded and categorized under the themes. Thematic analysis was conducted to identify key patterns within the open-ended responses. The authors give a thorough reading and re-reading of the responses gathered, which helped in taking initial notes. These notes helped in initial coding using an inductive approach, where labeling was done on pieces of text. These were then grouped into broader themes. These themes were then refined to ensure clarity, distinction, and comprehensive representation of the data, with adjustments made to merge overlapping themes. Four themes emerged for course strength (1, 2 and 4 have been divided into 2 categories each) while 3 themes were finalized for course improvement. Themes, codes, participants IDs and Verbatim are represented in Table 4. The main strengths of the course identified were the teaching tools/methods used, the relevance of the course content, the use of the discussion forum, the facilitation abilities of the instructors and the administration of the course. Suggestions for improvement included adding more synchronous sessions, reducing the time of interactive videos and overcoming the technical glitches faced in MOODLE®.

Table 4. Strengths and points need improvement identified by the participants in course feedback form

S.no	Strengths of the online course BOAT		
	Themes	**Codes**	**Participants ID: Verbatim**
1.	**Helpful and worth participating**	***C-1: Improvement in learning***	***P8:****"Exercises of PowerPoint presentation was worth practicing"*
			P57*: "Provided Video tutorial on teaching and assessment tools were helpful"*
		C-2: Self-Assessment	***P66:*** *"The instant feedback and facility to retake quiz was extremely helpful"*
			P103*:"Video tutorials are really interesting and informative specially Learning how to overcome some online problems"*
			P14:*"Quizzes in the end of every session helped in self-assessment"*
2.	**Learned new tools and skills**	***C-1 Introduction to new Tools***	***P23:****"Get chance of Learning new online collaborative platforms and online assessment tools/ apps"*
			P46*:"Simple tips of making PowerPoint presentations better! Using breakout rooms on Zoom, making quizzes on Kahoot and Socrative best to watch"*
		C-2 Improved computer literacy	***P37:*** *"Discovering new applications for online teaching assessment and knowledge about different useful applications"*
			P48: *"it enhanced my computer skills as well as I learned so many things about online teaching through one platform"*
3.	**Improved learning via Discussion Forum**		***P19****: "participating on discussion forum helped to clear confusions"*
			P86:*"Active participation and discussion supported active learning"*
4.	**Support and Facilitation**	***C1-Knowledge Expertise***	***P34:****"The explanation of the content by the facilitators in the interactive videos shows their expertise and they were well aware of the course guidelines"*
		C2- Good coordination	***P101****:"Extraordinary supportive behavior of our facilitator on WhatsApp group and during sessions."*
			P67:*"Explaining things and keeping us updated regarding what's coming next and verbal*

			communication and explanation made online courses easier for us"
	Things need to be improved in the online course		
1	**Blending with synchronous sessions**		***P33**:"Practice session should be included in the presence of facilitator"* ***P49:"**Synchronous sessions for follow-up and feedback can be added so that candidates can work on different tools and then discuss problems in real time"* ***P64:**"Adding synchronous workshops on the use of online tools"*
2	**MOODLE-related issues**		***P1:**"Communication problems related to MOODLE needs to be re-evaluate"* ***P16:** "The little glitch issue with MOODLE should be resolved"* ***P55:**"The settings of MOODLE account, and the completion of all task tracking was confusing the participants"*
3	**Shortening of Interactive Videos**		***P77:** "shortening of time duration of some videos will help more to stay engaged"* ***P100**:"Reducing duration of interactive Videos and pattern of all videos need to be same as in PowerPoint presentation videos"*

4. Discussion

The online faculty development course named Basics of Online Assessment and Teaching (BOAT) was developed and launched using "MOODLE" to support the faculty conducting emergency remote teaching. The course was developed after reviewing literature on the experiences of teachers globally facing issues in dealing with the sudden change.[17,22-24] Addressing some of the challenges, teaching of educational content was done through interactive videos and online discussion forum, and the assessment of participants learning was done through asynchronous online quizzes.

The results showed that the course resulted in a small but highly significant change (p=0.001) in knowledge of content (mean pre-test score 9.11±2.20 and mean post- test score 12.92±2.53), providing evidence that faculty improved their knowledge regarding online teaching, assessment, and handling of critical issues during online teaching after finishing the course. Similar results have been reported by others, however most of the training in these studies was conducted on campus.[23] The success in preparing faculty to embrace the transition to distance education has been attributed to their readiness to learn and implement their learning. [25-26] Alanazy et al[27] and Jena PK [28] have reported a positive change in attitude toward online learning, improved computer self-efficacy, improved attitude toward technology, and decrease in computer anxiety leading to improve readiness towards online teaching upon successful completion of online courses. Moreover, one of the studies by Cutri, R. M et al 2020 [29] identified constructs required to assess faculty online readiness explored that the 'forced readiness' do bring an optimistic sentiment from the participants regarding their rapid transition to online teaching. This suggests that an urgency, constraints and pressure can lead teaching faculty to rethink and innovate on their pedagogical approaches.

On the other hand, a larger and statistically significant difference was found in the mean pre and post scores of self-perceived readiness of the faculty (pre-75.45±18.82 and post-86.19±18.67 (p=0.001)). This may be due to two reasons, one because it was mandatory for the faculty to get trained in teaching and assessing students online during the COVID-19 pandemic, with emergency remote teaching the only source for students learning. Another reason could be because of a higher number of young faculty members (mean age 34.68±9.28) who are motivated to accept the change and learn new skills. These reasons were mirrored in studies done by Cutri, R. M et al[29] and Alanazy et al.[27] Both showed that younger faculty having less teaching experience was more willing to accept online strategies than the faculty who were having greater than 5 years teaching experience.

The course feedback of our study presented participants satisfaction with the facilitators' teaching skills in an asynchronous environment where the facilitators adapted online teaching skills in a way that ensured effective student engagement and learning. They structured content logically, provided clear instructions, and used discussion forums and interactive videos to maintain interaction. Moreover, they had provided instant feedback to support participants in the absence of real-time communication, that helped in bridging the interaction gap. Facilitators were also technically proficient in using MOODLE and online tools, which had a positive impact on content delivery. However, it is interesting to note that most participants rated the item "Comparing face-to-face sessions, with the asynchronous session was better or not," as neutral". This represents that participants may not have found the online asynchronous sessions superior to in-person sessions but also did not perceive them as inferior. This suggests that fully online courses can be a workable option for certain areas, especially when the course has been designed meticulously and uses a user-friendly learning management system. With the correct strategies, asynchronous sessions can supplement traditional methods rather than compete with them. The participants also suggested reducing duration of interactive videos with the addition of synchronous sessions in the future amendments to cater for issues emerging during the course.

Other studies conducted in countries like Canada and United States have also reported that participants prefer asynchronous session however, some have personal preferences for synchronous session or face-to-face classes blended with a self-paced content. It is important to note that these findings may be influenced by various factors, such as the nature of the course content, the quality of the online platform used, and the individual preferences and experiences of the participants. [6,29,30]

The mean global rating of 8.14±1.39 indicates that the participants were overall satisfied with the course and its related aspects including the content covered, teaching & learning strategies used, the mode of instruction, facilitators and course administrative support. This indicates that the course was successful in meeting its objectives and the needs of the participants, providing a positive learning experience for the participants and suggests that the course was well-designed and appropriately implemented in a very short period of time.

These findings of the quantitative data were further reinforced by the analysis of responses to open-ended questions. The main areas of strengths included participants' satisfaction with teaching and facilitation, introduction of new tools enhanced their motivation to improve teaching skills.

The feedback also highlighted areas that need improvement, that is reducing video time adding synchronous online learning sessions (SOL) and the difficulties faced by the participants when dealing with LMS. These challenges were similar to the study by Nabolsi et al [25] with the nursing faculty, experiencing a course Online Distance Education (ODE) for e-learning experience where participants demanded for a blend of synchronous and asynchronous sessions. In our study, the participants were more inclined to have a blend of real-time sessions in the course. Contrasting with a study conducted in 2019 on undergraduate students, where they compared offline and online learning, reporting no significant difference in students' knowledge and skill development.[26] However, studies from countries like the United States. Taiwan and India found that a blended learning approach where there is both asynchronous and in-person sessions increases student engagement and motivation for deeper learning as compared to only one mode used.[6,31,32] Moreover, a systematic review of 157 articles from 1995 to 2014 explored the evolution in the SOL because of improved technology offering enhanced functionalities that facilitate better interaction and engagement among learners. The systematic review suggests that while there is a wealth of information, there is still much to learn about the effectiveness of SOL and their impact on learning outcomes. Addressing these gaps can lead to more robust educational practices in the future. [33]

Overall, the high ratings and positive feedback from participants motivated the course developer to launch the course again with suggested changes and provide a positive learning experience. However, continued evaluation and improvement efforts may be necessary to ensure the ongoing success of the course. It is highly recommended to develop an improved version of the course, providing easy and free access to the faculty to learn more about online tools and their updated versions by interactive videos, quizzes and online activities which should be uploaded in chunks which have been given full consideration by course developers. Pre-training workshops designed before the faculty take the course should be offered to develop skills in operating MOODLE. Synchronous online sessions should be conducted to deal with any confusion participants are facing reading the content on the MOODLE.

Based on the institutional goals and positive feedback of the participants, the course was planned to be added to the six-month certificate course in health professions education (CHPE) already offered by the University. Also, as it was planned that its improved version would be included in the master's program, so this course is now also offered as a three-credit course in the Master of Health Professions Education (MHPE) program offered by the University with the addition of emerging technologies.

It is also suggested to discuss real-time scenarios to apply knowledge in the teaching practices gained through this course. Reliability and validity of all tests used for assessment of knowledge should be improved before future use by adding scenario-based questions and post hoc analysis.

For future research it is recommended to conduct longitudinal or mixed-method studies to track changes in job satisfaction and retention over time among faculty who have participated in upskilling programs versus those who have not. Moreover, it is suggested to keep faculty participation or contribution in these courses as one of the key performance indicators when evaluating the faculty performance to sustain faculty dedicated to continuous improvement.

This study was conducted during the time when online education was taken as emergency remote teaching and was abruptly made mandatory. The course was made with minimal resources and skills needed to be conducted again as a planned activity and then re-evaluated. One of the limitations is the internal consistency related to the test of knowledge was modest (α= 0.603), falling below commonly accepted thresholds.[20,21] This happened due to urgent data collection limiting our ability to refine the questions again after piloting them once. While our questions were content-validated by experts, the modest alpha suggests the potential for attenuated associations with outcomes. Although post-hoc item analysis showed marginal reliability improvement with item deletion, outcome patterns remained consistent. Future work should employ more rigorously tested instruments and consider using generalizability theory to better account for error variance. Moreover, as it was a single institution focus and there is self-selection bias that may have been intensified by individuals with greater health concerns, access to resources at that time of emergency, or motivation to seek information may have been unduly represented, also highlighted by the prior research. [34,35] These factors have limited the generalizability of the findings and may not fully represent diverse educational settings. Furthermore, it is important to consider the limitations of using a single approach (single-group pre-post design) to assess the effectiveness of a course, as there may be other factors that contribute to the success or failure of a course that are not captured by quantitative methods. Additionally, it limits causal inference, as changes may result from external factors rather than the intervention itself. Faculty members from other institutions should be encouraged to join this course so that the representative sample can be increased for a more valid interpretation of the results.

5. Conclusion

The basics of online assessment and teaching for faculty development to deal with emergency remote teaching was found to be effective as it increased the knowledge and readiness of faculty for online education using commonly available online tools and trained faculty to deal with glitches during online teaching. The course feedback found the participants to be satisfied with the facilitators' way of teaching, however they identified a need for the shortening of interactive

videos, instant solutions for dealing with MOODLE® related technical issues and adding real-time sessions to be more engaging and helpful to learn.

Abbreviation	Full Form
BOAT	Basics of Online Assessment and Teaching
HEC	Higher Education Commission
LMS	Learning Management System
MOODLE	Modular Object-Oriented Dynamic Learning Environment

Declarations:

Supplementary Materials: All two study tools are available as supplementary files. Content knowledge test, readiness test & course form (supplementary 1). The feedback gathered quantitatively presented in (supplementary file 2).

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