

## COVID-19 Pandemic and Subsequent Demand for E-learning: Insights of Dental Educators' Perspective

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### Abstract

**Background:** COVID-19 pandemic highlighted the importance of online learning and assessment in higher education system. The aim of the current research was to evaluate staff member's educational perception towards implementing E-learning teaching and assessment during the COVID-19 era.

**Material and Methods:** A cross-sectional questionnaire was distributed to a sample of dental staff members in different universities. The questions included participant's demographic data, perceptions of online course preparation regarding time, complexity and quality, virtual classroom environment, and online assessment, technical support and finally the intellectual property.

**Results:** 222 dental staff members participated in this study, the responders were predominantly females (73.8%), the age range were from 20 to above 60. Majority of participants work in public (73.8%) and 26% in private universities. 79% agreed that using information and communication technologies (ICTs) saves educators and student's time, 57.7% of responders agreed that developing an online course is not complicated, 46.3% finds adequate time to develop it. Almost half of the participants agreed that online teaching does not take more time than classroom teaching. However, only 27.73 thinks assessment methods are appropriate for the virtual classroom environment. Most of responders have concerns about intellectual property and teaching online. There was a high degree of satisfaction with the quality of the content of courses. However, less satisfaction with the interaction with students in virtual classes.

**Conclusions:** This multicenter study concluded that E-learning is essential in dental education during the COVID-19 pandemic Era and has saved the current academic year from suspension.

**Keywords:** COVID-19; Pandemic; E-learning; Online Assessment

### Introduction

The COVID-19 pandemic is a distressing event that challenged and changed the way of consideration regarding health professions education. The standard education methods had been changed not only beyond converting the mode of face to face instructions into online but rather to create a culture that support adoption of in-

novative practices which demand various skills, proficiency from educational staff, students and administration that maintain the educational standards that fits the product quality [1].

During the COVID-19 pandemic, the importance of social distancing measures were taken into consideration to minimize

coronavirus SARS-CoV-2 spread. Numerous events were changed or cancelled as conferences, institutions are canceling classroom-based classes and converting them to online sessions, colleges are being forced to consider large-scale preventive measures to keep students and professors healthy [2]. E-Learning become the only option in this situation, suspension of in-campus activities was declared in all educational institutions in most countries worldwide. Distance learning using different learning management systems and platforms totally replaced face-to-face learning, and significant efforts are being offered by all faculty staff to continue teaching and assessment of their courses [3].

Learning using the Internet is rapidly growing and increasing over the traditional learning and teaching methods. This fundamental shift is directly linked to the digital computer technology revolution and computer technology innovation that amplified of E-Learning and teaching scope, as a result, the process of information exchange became simple, transparent, and effective [4]. Online teaching is a useful tool to advance teaching and learning quality in modern education. Higher Education Institutions worldwide are increasingly adopting and implementing e-learning approaches and scopes, which provide information, knowledge and skills via electronic devices and tools. The effective teaching and learning objectives and impact are improved by considering the importance of various contributory factors, as the learner, the learning outcomes, the learning content, the instructional strategy, the technology and the context [5].

A proper assessment works had multiple purposes as to develop students' learning; students' strengths and weaknesses recognition, review, assess, and improve the effectiveness of different teaching methods and curricular courses, enhancement of teaching effectiveness, beneficial administrative data that accelerate decision-making [6]. Online assessment (OLA) is an electronic system that is defined as a broadly based approach that covers a wide scope of activities in which digital technologies are used in designing and demonstration of assessment activity, recording responses, marking, reporting, storing and transferring of data associated with public and internal assessments. In addition, the focus on using information and communication technologies (ICTs). OLA has the facility to generate electronic reports immediately after test completion, which saves time, costs for test handlers, and allows quicker feedback [7].

OLA had outlined many benefits as timesaving, flexibility in design and data reporting, increased quantity and quality of learner's responses, and reduced instructional and support costs. In addition, OLA had many capabilities as it can stimulate cognitive effort (Testing Effect) which influence active form of learning, allow students participation to recent acquired skills, produce an additional enriched and adjustable encoding of the target information [8]. The main purpose of this research is to evaluate staff member's educational perception towards implementing online learning and assessment during the COVID-19 era.

## Material and Methods

### Implementing online teaching and assessment

Prior 2019, dental courses in many universities were mainly in form of theoretical lectures, practical tutorials and sessions. However, after COVID 19 outbreak all the dental universities were forced to complete the second semester by online form, which was completely new in some dental universities. The staff perception about both online teaching and assessment is highly valued in order to monitor this valuable experiment regarding its limitations, strength and weak points.

### Study sample and design

The study was designed as a cross-sectional questionnaire-based analysis of the staff' perceptions about online teaching and assessment methods in a sample Faculty of Dentistry in different public and private Egyptian universities.

### Questionnaire development and design

A self-developed questionnaire consisted of twenty-two questions distributed into six sections:

Section 1 included demographic data recording (age, gender, position and degree in university level, department). Section 2 included questions regarding information and communication technologies (ICTs), effective participation of students in online courses. Section 3 included the online course preparation regarding time, complexity and quality. Section 4 included the virtual classroom environment, assessment methods and the future of online teaching. Section 5 included the technology and technical support of online teaching. Section 6 included intellectual property of online teaching and its considerations for promotion and/or salary increase in universities.

13 questions were answered using a 3-point Likert scale (1 = agree, 2 = neutral, and 3 = disagree), 5 multiple-choice questions and 4 linear scale questions scored from 1 to 5 (1 = very bad, 5 = excellent). The questionnaire was written in English, with brief explanation about the purpose of the study. The confidentiality and sole use of the information for the mentioned purpose were ensured and that completing the questionnaire is considered informed consent of the participants. Approval to conduct this study was given by the Faculty of Dentistry, Ain Shams University, research ethics committee approval number (FDAsuRecR062004).

A pilot study was performed on 10 staff members before the commencement of the study to determine the acceptability and clarity of the questionnaire and to confirm its validity. Depending on the comments, minor changes were made before questionnaire distribution. The questionnaire was then transformed into a google online form and the link was sent to the staff members (Appendix 1).

**Data analysis:**

Data were analyzed using Statistical Package for Social Sciences (SPSS) (version 16, SPSS Inc., Chicago, IL, USA). Descriptive and crosstab analysis were used to analyze the demographic data. Responses were quantified as a percentage of the total number of responses received for each question.

**Results**

The sample size consisted of 222 dental staff members employed in different universities in Egypt participated in this study and answered the questionnaire. The responders were predominantly females 164 (73.8%). The age range were from 20 to above 60 years, the higher age participation were from 31-40y (44%). The position of responders were teaching assistants, lecturers, associate professors, and professors (33.3%, 27.4% and 39% respectively). The majority of participants (73.8%) work in public universities and 26% in private universities. The participants were from different departments, the higher participation were from oral medicine and periodontology department (26%) followed by endodontics department (16%), the least participation were from orthodontic department 2.7% (Table 1).

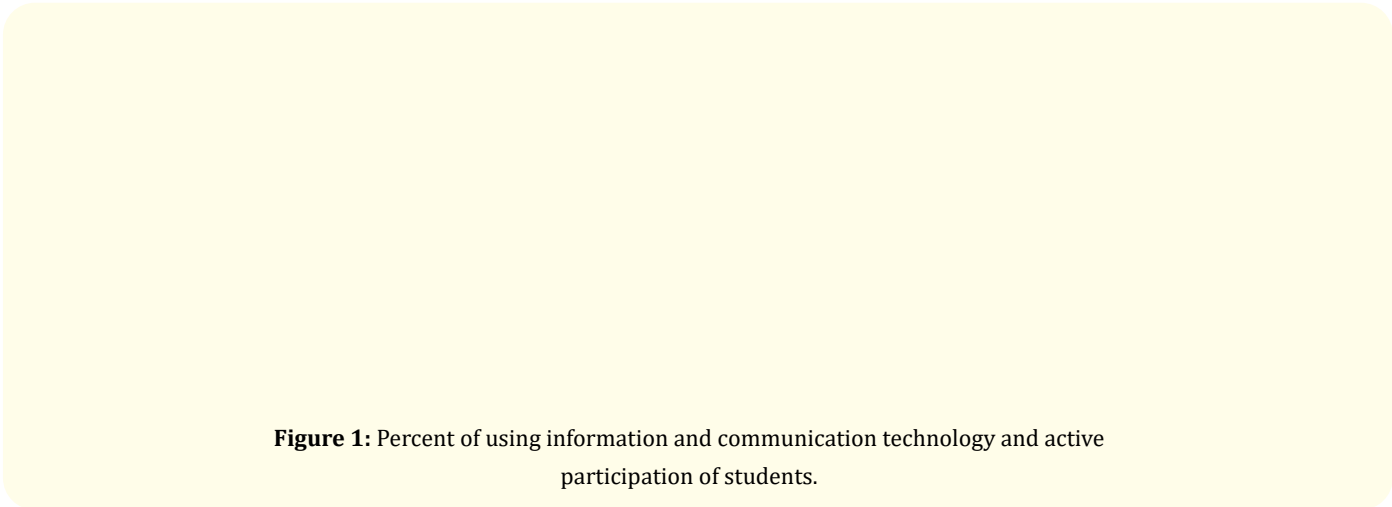
Most of the staff members (79%) agreed that using information and communication technologies (ICTs) saves educators and student's time and only 43.6% thinks students can participate ef-

Variable	Staff number	(%)
Gender		
Male	58	(26.13)
Female	164	(73.87)
Age		
20-30	36	(16.22)
31-40	98	(44.14)
41-50	52	(23.42)
51-60	27	(12.16)
>60	9	(4.05)
Current position		
Teaching assistant	74	(33.3)
Lecturer	61	(27.47)
Associate Professor/professor	87	(39.18)
University		
Public	164	(73.87)
Private	58	(26.1)
Department		
Dental biomaterial	29	(13.06)
Endodontics and restorative	36	(16.22)
Oral Medicine and periodontology	58	(26.13)
Oral Pathology and histology	22	(9.91)
Oral Radiology	10	(4.5)
Oral Surgery and maxillofacial	11	(4.95)
Orthodontics	6	(2.7)
Pediatric and Public health	27	(12.16)
Prosthodontics	23	(10.36)

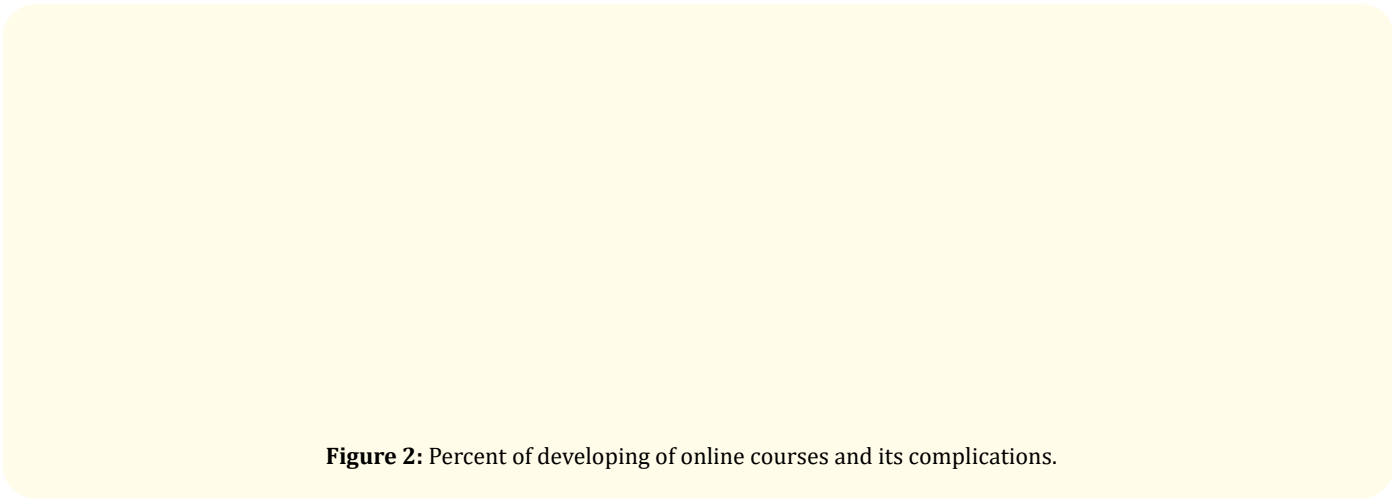
**Table 1:** Demographic data of the participants.

fectively in online courses (Figure 1). The high percentage of the responders agreed that developing an online course is not complicated (57.7%) and 46.3% finds adequate time to develop an online course with only 15.9% disagreed (Figure 2).

Almost half of the participants agreed that online teaching does not take more time than classroom teaching and teaching method adapted to the virtual classroom environment are appropriate (54%) and (50%) respectively. However, only 27.73 thinks Assess-

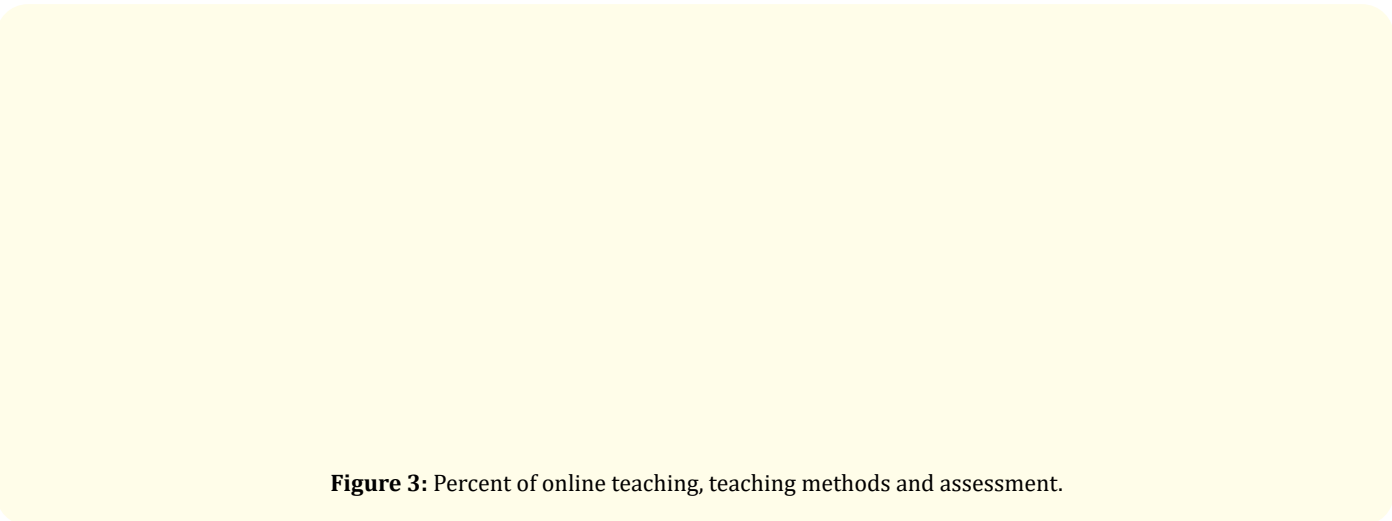


**Figure 1:** Percent of using information and communication technology and active participation of students.



**Figure 2:** Percent of developing of online courses and its complications.

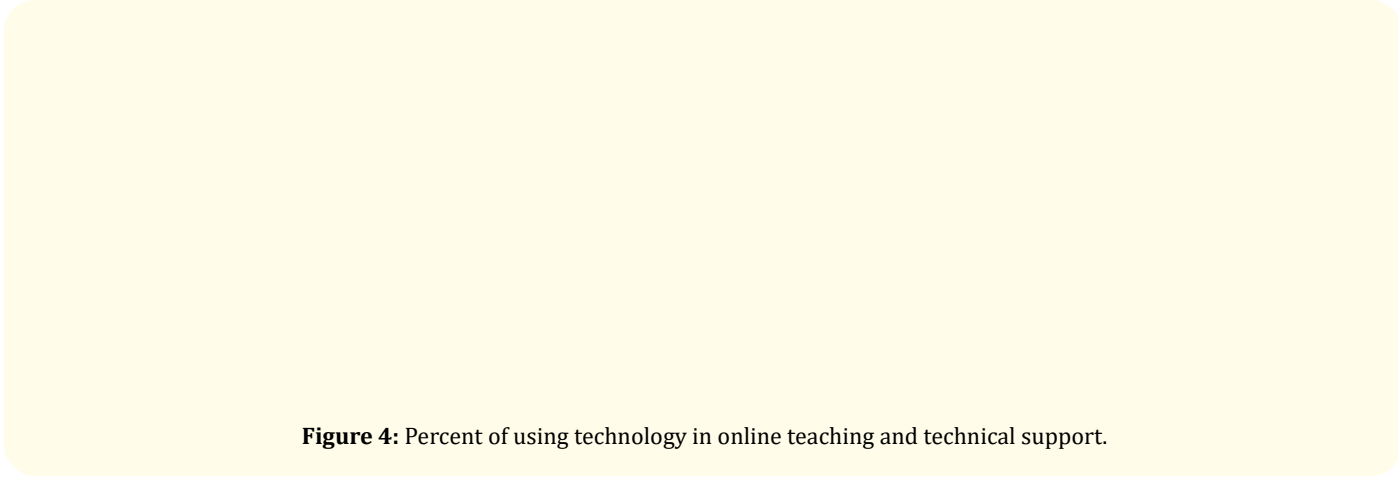
ment methods are appropriate for the virtual classroom environment (Figure 3).



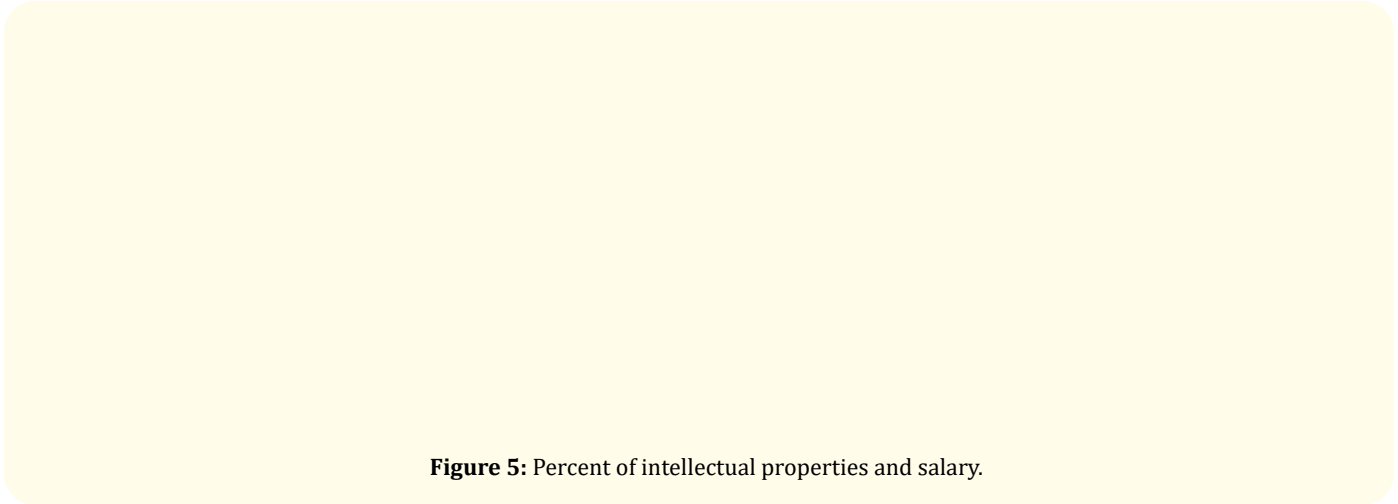
**Figure 3:** Percent of online teaching, teaching methods and assessment.

Less negative responses were regarding the technology in online teaching (8.6%) and 20.9% for the adequacy of technical support for online course development (Figure 4). Most of responders have concerns about intellectual property and teaching online. In addition, only 27.7% thinks that there is a recognition of online


teaching regards to considerations for promotion and/or salary increase (Figure 5). Most staff members believe the university administration appreciate the efforts as well as the online courses enhances the quality and ranking of the university (54.5%, 77.7% respectively) (Figure 6).



**Figure 4:** Percent of using technology in online teaching and technical support.



**Figure 5:** Percent of intellectual properties and salary.



**Figure 6:** Percent of university administration recognition and reputation.

The degree of satisfaction is much higher with the quality of the content of courses (20% + 44%). However, less satisfaction with the interaction with students in virtual classes were (14.5 + 6.3%). The majority agreed on future involvement of online learning (11.36+35+48.64) as well as were satisfied with online learning services (29.5+38.6+17.7%).

## Discussion

The novel COVID-19 pandemic has become a challenge for healthcare providers around the world and has significantly affected the dental professionals in practices, universities and research institutions [9]. E-Learning systems are exempted from time and location limitations, offer opportunities for teaching and learning and play a vital role in promoting new teaching methods [10]. The urge of applying the E-learning systems is no longer optional for now and certainly the future. Thus, we design this research to assess the perception of dental faculties' staff members regarding online learning, teaching and assessment during the COVID-19. The research tries to identify critical factors influencing E-learning.

As most of the Egyptian Universities have nearly the same educational model, so the participants of this survey were random samples of staff members in dental faculties in different Egyptian universities both governmental and private who were active in academic information systems on academic year 2019-2020.

The majority of the staff agreed that using (ICTs) saves teachers and student's time (79%), while 43.6% of responders found that students could participate effectively in online courses, which may be explained as staff members have the flexibility to choose their own online schedule and can work without any limitations regarding place and time. This was in accordance with a study that showed that the use of technological tools had an advantage of learning anytime and anywhere, and motivates students to interact with each other. In addition, exchange of different points of view and the facilities of communication and improvement of relationships that support learning [11].

Around half of the participants (57%) agreed that developing an online course is not complicated; in addition, 46.3% finds that there is adequate time to develop an online course. This could be due to the availability of many online programs with the assistance of technologies in developing and creating online courses easily. In addition, different programs can be shared online easily as Micro-

soft office files, Mac and various online programs explain why most of responders agreed that online teaching does not take more time than classroom and teaching method adapted to the virtual classroom environment are appropriate.

Online teaching presented new challenges; however, working through these challenges was rewarding because it improved both their online and face-to-face teaching practices that explained why 77.73% believes online courses enhance the quality and ranking of the university.

The high percentages of satisfaction were detected with the quality of the content of online courses as there are increase accessibility to information, better content delivery, personalized instruction, content standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and increased convenience [12].

In virtual classrooms, synchronous communication is used as a channel by having regularly scheduled chat room with video conferencing, which learners use to interconnect with fellow class members and their lecturer. In the classroom, lecturers and students send and receive nonverbal intimations several times a day [13]. So even with the lack of face-to-face communication (36+43%) of the responders were satisfied with the interaction with students in virtual classes.

Assessment is one of the most important elements of teaching and learning in higher education and had profound effect on students' future careers. Professional assessment takes into account the valuable information for institutions about the effectiveness of teaching and learners' support. Most of the responders agreed about the effectiveness of online assessment methods, probably because OLA has many advantages, as it is much quicker to mark online with quick results delivery as auto-scorable questions, flexibility regarding place and time, more cost effective [14]. On the contrary, 32.2% were not satisfied with OLA, which may be due to some technical issues or frequent poor internet connections and information can be lost if a system breaks down. In addition, some educators need more technical experience to create well-formulated online exams while others believe that cheating is still an issue to be solved.

Around half of the responders (53.6%) had concerns regarding intellectual property and online teaching. This may be due to law

that deals with original work rights protects intellectual property. The purpose of intellectual property laws is to encourage new technologies, artistic expressions and inventions while promoting economic growth. When individuals' guarantees that, their creative work will be protected, authors and inventors will continue to produce, develop new technology and make processes more efficient E-learning facilities [15].

The value and appreciation of university faculty members plays a critical role in maintaining a high level of work satisfaction and low level of turnover rate. Only 27.7% of the responders acknowledge their university encourage and appreciate the staff members to improve the online teaching raising an alarm of the importance of consideration in promotion and salary compensation with regards to the efforts spend by faculties in online learning process as well as conventional teaching.

COVID-19 pandemic has totally interrupted the education system worldwide. However, E-learning and virtual classrooms was proved an efficient and respectable learning tool in the current times.

## Conclusions

This multicenter study concluded that E-learning is essential in dental education during the COVID-19 pandemic Era and has saved the current academic year 2019-2020 from suspension. Despite the differences between face-to-face and online learning, in the hands of a well-trained educator, both delivery methods can be used to achieve the same goals, our results can be generalized to a wide population of Egyptian dental educators. However, we as educators are still reluctant to online assessment process.

## Recommendations

Capacity building program is essential in parallel with the online learning to train staff members on teaching and assessment methods suitable for E-learning. Universities have to improve the facilities, logistics and equipment's for the technology involved in E-learning for both educators and learners. Promotion consideration and financial compensation have to be addressed by the authorities involved to increase staff member's satisfaction.

## Disclosure

All the persons involved in this manuscript were named as an author. The authors declare no conflicts of interest. The authors

claim to have no financial interest, either directly or indirectly, in the products or information listed in the article.

## Authors' Contributions

Conceptualization: SSI, MRBK. Data analysis: DAK, MRBK. Methodology: DAK. Writing- original draft: DAK, RRH, YF. Writing-review and editing: SSI.

## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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