e-Learning: An Uphill to Reshaping Learning in Dentistry in India in the COVID-19 Pandemic Era

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Abstract

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The sudden outbreak of the coronavirus disease 2019 pandemic has compelled universities worldwide to implement strategies for resuming academic courses by transferring some courses to a virtual modality. e-Learning has provided an excellent platform for education during this crisis. This review article discusses the various aspects of e-learning process that have to be considered before implementation, and the strengths and flaws of online education during this pandemic. It also sheds light on the necessary actions required to enhance the efficiency of e-learning in the future.

Introduction

Our world has suddenly been still with the outbreak of the coronavirus disease 2019 (COVID-19) pandemic.[1] Amid the lockdowns and social distancing measures, one of the critical problems that the educational institutions faced was keeping the learning process going on, by rearranging the academic calendar and creating a new system of learning curriculum.[2] During this confused turmoil, most education systems in the world turned toward the conveyance of education via the Internet or web-based learning.[1]

Compared to traditional brick and mortar classroom learning, e-learning in India is transforming at a quick pace. Until the last century, the education system in India did not allow students to participate in interactive sessions. With the evolution of digital learning in 2002, the students were able to cope with the concepts globally; the teaching has become easier for students and teachers.[3] However, there remains a question of whether India is ready for this switch in terms of its infrastructure and students' digital readiness.[1] Is online learning a boon or bane to the education system in this pandemic era?[4]

The Essentials of e-Learning in Health-Care Professionals

The education of health-care professionals in the age of the Internet requires a fundamental change to satisfy the demands of the learning patterns of the learners.[5] The application of information and communications technology in education includes a wide array of usage from displaying written text pages on a computer screen to sophisticated use of virtual environments in the simulation of clinical cases.[6,7] The literature on the impact of e-learning on dental education has been incorporated under the following sections: (1) role of administrators and information technology (IT) specialists, (2) students' response and perception, (3) teachers experience.

Institutional Level: Role of IT Specialists and Administrators

Computer-assisted learning or e-learning has progressively been used in dental curricula to support traditional classroom teaching and learning methods in various forms, such as web-based tutorials or discussion groups, theory lectures,

computerized patient simulations, and virtual reality-based simulations.[8]

The year 2020 saw most Indian dental institutions continuing the learning process using e-learning. The universities that had already implemented web-based learning through online teaching methods could smoothly keep the e-learning. However, the execution of advanced IT in dental education remains a slow and tedious process. The administrators had to hire IT specialists to enforce e-learning to create web pages. Multiinstitutional trials, expertise in software development, ongoing technical support to provide necessary updates, and long-term financial support was another concern. Moreover, the hallmark of dental education still boils down to human contact with faculty members mentoring dental students and passing on the clinical skills needed to deliver excellent dental care.[9]

Students Response and Perception

Students' appraisal of the tools and value of online learning and evaluation of their attitudes are important factors that are essential to judge the success of any online learning system.[10] A study conducted by Moshabab A. Asiry in 2017 regarding dental students' perception of online learning concluded that overall student attitudes were positive regarding online learning. The students viewed online learning helpful as a supplement to their education rather than a replacement for traditional teaching methods. With possession of necessary computer skills and access to the Internet, 59.2 and 64.8% of the students replied that online lectures and procedural videos were helpful to their learning.[11]

A descriptive quantitative study conducted in Delhi used a modified questionnaire to examine the students' perception and readiness about the online-learning system adopted at the university level during the ongoing pandemic. The study showed students' positive perception toward e-learning, which proves acceptance of this new learning system.[12] However, contrary to this study, another qualitative research by Samra et al for undergraduate dental students showed a little diffident perspective toward the implementation of online learning. Nevertheless, the students were optimistic of engaging in online learning after ad-libbing in the future syllabus.[13]

Teachers Experience

The role of educators is also critical in the successful adoption of learning technologies. The faculty time, efforts, and requisites of IT skills are some of the teachers' concerns regarding online teaching. Colleges and universities must address the need to assist faculty members in their efforts to integrate technology into instruction by holding training programs regarding the use of online tools.[14]

Essentials of Dental Education

The essentials of dental education (►**Fig. 1**) comprise (a) theory lectures, (b) laboratory/simulation training, and (c) clinical skill training. Theory learning can be easily attained through online platforms. There are different systems available on the Internet such as Zoom Meetings, Google Hang-

Fig. 1 Essentials of dental education.

outs, and Google Meet for online learning. Some universities have also created new online platforms for continuing the curriculum. An Indian questionnaire study by Samra et al involving undergraduate dental students concluded that 81% of the students used Zoom for their online lectures, whereas 2% of the students also reported the use of portals such as Microsoft Teams, Google Hangouts, and WebEx. The second essential is the laboratory training that includes practicing on the simulation models such as phantom heads. This can be carried out using digital or virtual reality techniques. But currently, there seems to be a lack of such facilities. The most crucial component of dental education, that is, clinical skill training, is the most difficult to consider in a pandemic environment. For clinical learning, students need to be in contact with patients.[13]

Strengths of Online Learning in India during the COVID-19 Pandemic

Someone has aptly said that the learning process should not be interrupted at a time of crisis. The information and communications technology department that has enabled and facilitated online learning has ensured that the learning process has been at a steady pace even now. The curriculum has been rearranged in most universities so that students have not fallen back into the learning schedule. Several e-learning websites are created and upgraded that can be accessed by the students and teachers.[4]

Another additional strength is that the retention of information procured through online learning is more compared to traditional classroom teaching.[4] This is because the learning process is faster. The time required to obtain information reduces. The freedom of learning at your own pace, rereading the study matter online, and skipping the concepts that are not essential are the benefits that the students can gain

through this virtual platform.[15–17] The added advantage was the lockdown curfew imposed throughout the country, which ultimately forced the students to remain at home and attend the online lectures and tests.

The ease and comfort of studying from home create a motivating and stimulative studying environment.[18–20] Health professionals, who were busy with the clinical/hospital duties, could make use of this platform with minimum stress.[21] The need to dress up and commute was also avoided.

A quantitative study by Khan et al revealed the highest response rate to the modified online questionnaire from the university students was 73.4% concerning "Ease and Quick Share of Educational Material." It showed that through the medium of e-learning, the instructor and learner could easily and quickly share the educational material.[12] A virtual platform creates an active learning environment with a better focus on teacher–student and student–student interaction. The discussion forums are an additional advantage for the students who are hesitant to clarify their doubts about the topic in a classroom. It provides an opportunity for a less pressured environment. Also, classroom-based "introverts" behave more like extroverts and are quite active when involved in online discussion forums.[22]

Adding to ease and comfort, the lessons provided on the learning websites can be viewed anytime. The lectures that are taken online could be heard and seen again and again if the student did not fully understand the topic.[19] Some of the universities have their teaching platform online, which the students could make better use of.

The need for a structural edifice of roof and walls, distribution of study materials, and use of electric and water resources are minimized when online learning is considered for a large group of students. The cost of providing education seemed to be quite affordable. The money spent on travel was also saved.[23]

Flaws of Online Learning during the COVID-19 Pandemic

In a developing country like India, many are unaware of the complexity of networking systems. Especially in rural areas, the provision for a computer/laptop with Internet connectivity is inadequate. This might lead to a competitive disadvantage compared to those who contact advanced technology in several different settings. Most of the low-income or middle-income population cannot afford the requisites needed for online learning. Also, the varying understanding of web-based learning in different age groups is a matter of concern.[24] Connectivity/network issue was reported by most students (59.6%) as a major drawback in a cross-sectional study conducted by Acharya et al in 2021 on 130 undergraduate dental students in Bhubaneswar, India.[25]

The willingness of students to benefit from the online learning program is also essential. Without a computer or proper connectivity in their residential area, the students will gradually become disinterested in this type of learning.[26]

Though e-learning is quite interactive, the feel of human interaction is entirely missing. Students may take the learning for granted as there is no close monitoring of their activities. Also, the teachers are unable to control the attention of the students during the learning process.[27] The supervision of the active participation of students in online learning is a downside. Opportunities for distraction may come in the form of work, family, or social responsibility. Moreover, the Internet itself can be a huge obstruction to learning. The option of switching between other open programs, such as gaming, listening to music, and browsing through other websites, can hinder the learning process.[23]

Team effort is essential when developing a useful online learning tool. It starts from the e-learning technical aspects to creating course pages for the institution's various programs and coordinates the plan of action with the faculty and the students.[28] The instructor/teachers may have different levels of creativity and technical knowledge, and this may create differences in the teaching pattern for the students.[29]

Student evaluation is also of utmost importance. Most of the assessments carried out during this pandemic have been in the form of tests and quizzes. Multiple choice questions and true/false options cannot judge a students' depth of knowledge about a subject. Online tests in the form of typing the text answers cannot be implemented because the typing skills also differ among the students.[23]

Professional education has been quite affected by the lockdown. Though the students have benefitted from the teaching of the use of clinical skills via e-learning, implementation and practice of these skills have been lacking. There remains an inadequacy for developing practical skills through online education.[11,30] Though some medical educators have been enthusiastically embracing the use of virtual patients, its effectiveness in dentistry is not known. Dental skills have to be practiced on phantom heads and live patients for practical skill improvement.

Necessary Actions to Enhance the Efficiency of e-Learning

- Implementation of e-learning at every university level with well-equipped latest technologies. The perception of inferior IT services could reduce a particular school's applicant pool. Educational technology must be utilized in a way that is learner and user-centered.
- Promoting scientific and practical level of students and staff in the use of e-learning methods.
- Encouraging educational staff for valuing new educational methods and devoting at least a part of the educational program for it.[31]
- Creating standardized patients for measuring competency by use of virtual patients.[32] Virtual patients, as defined by the American Association of Medical Colleges, are "a specific type of computer program that simulates real-life clinical scenarios; learners emulate the roles of health-care providers to obtain history and conduct a physical exam, and make diagnostic and therapeutic decisions." Its advantages include flexibility in terms of space and pace for the learner, as well as a high potency of teaching reproducibility. Patient cases are

standardized and cost-effective and a lecturer or an auditorium is no longer necessary.[33]

Conclusion

Online learning is altering the face of dental education in this pandemic situation. India faces a lot of challenges in terms of delivering education during these times. There certainly needs a lot of improvisation in technology, training of faculty in using online resources, availability of Internet connectivity for both the students and the teachers, and many more.[34] Although online technology is known to many, certain constraints to its use and application still exist. It will not be responsible for irremediably changing the face of education.[4]

Conflict of Interest
None declared.

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