Online Learning is Going Viral during COVID-19 Lockdown! What Lessons do We Take to Guide the Future of Physiotherapy Education? A Cross-Sectional Survey from Teachers' Perspectives

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Abstract

Background: Online learning, also referred to as e-learning, is education that takes place over the internet and is the newest and most popular form of distance education today. The long lockdown for the COVID-19 has closed educational institutions and ushered in online learning as a crisis-management tool to continue learning. The global sector of online learning and educational technology is facing the biggest opportunity-and biggest test-of its existence. Electronic medical education has already been widely integrated in developed countries since it has educational value and is broadening the scope of educational programs through multiple educational goals. To date physiotherapy education in India seems to have hitherto remained untouched by the digital revolution. The adoption of technology is still a new experience for many of us; and teachers all over are struggling to make online learning work. This study aimed to analyze the experience of physiotherapy teachers towards online learning during COVID-19 lockdown. Overall purpose of the present study was to better equip the education sector; and bridge the gap between potential effectiveness and successful implementation of technology in physiotherapy education.

Method: It was a cross-sectional descriptive study conducted during COVID-19 lockdown period (April to May 2020). All physiotherapy teachers affiliated to academic institutions from various universities across India were invited to participate in an online survey. Teachers who undertook online teaching as a part of curriculum for undergraduate or postgraduate students during COVID-19 pandemic lockdown were recruited. It was an online survey administered using self-reported questionnaire. The questionnaire sought to obtain information which includes teacher's profile details relevant to online learning; methods employed by the teachers in online learning; as well as teacher's perspectives of this process.

Results and conclusion: A total number of 111 responses were received from 11 universities across the country. This representative sample consisted of both undergraduate and post graduate teachers and with varied number of teaching experience. Remote learning is still a new experience and teachers all over are findings ways to make online learning work. The rapid adjustment has been challenging to quickly migrate all of its in-person courses virtually. The use of educational software programs has increased; however, teachers need to be trained in their effective use. It seems that educational technology mastery is an important neglected competency in faculties. There have been changes and new introductions of e-learning tools. However, it is not paralleled by the education of medical educators regarding digital literacy and e-learning tools. As e-learning continues to be widely integrated in the training of future practitioners, well-designed scientific studies are required to know which technological tools work the best and thus to support evidence based education.

Keywords: COVID-19; Online learning; Technology; Physiotherapy teachers

Introduction

Online learning, also referred to as e-learning, is education that takes place over the internet and is the newest and most popular form of distance education today [1]. Online learning has its roots in the tradition of distance education, which goes back at least 100 years to the early correspondence courses. Due to its core benefit of improving access to education; factors such as convenience, geography and the need to work while studying were driving most of the growth in online learning, especially in the higher education sector. Since the early 2000's in parallel with rapid, nationwide developments in information and communication technologies, some institutions of higher education and corporate training have actively adopted e-learning. However, by majority of the universities and colleges, the growth of online teaching and learning have been held back by concerns about cost; lack of reliable access to digital devices and high-speed internet connections, especially among poorer families or countries; and widespread attitudes that online learning was inferior to traditional learning methods [2].

Some of the academic leaders believe that online learning quality is equal to or even superior to face-to-face instruction, labelled as 'the no significant difference phenomenon'. However, the pedagogic approach of blended learning where in e-learning complements the traditional learning is well established and accepted over pure e-learning. Although medical education systems lagged behind at first, over the last number of decades there has been a shift in medical education practice from traditional forms of teaching to other media which employ online, distance or electronic learning. Technology has always been at the forefront of human education and continues to push educational capabilities to new levels. In recent years, the emergence of virtual universities promises a revolutionary approach to training medical doctors using cutting edge e-learning technologies and this sector's adoption of e-learning is now proceeding rapidly.

The Association for Educational Communications and Technology (AECT) defined educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources"[3]. Educational technology is an inclusive term which combines the use of both physical hardware, software, and educational theoretic and practice to facilitate learning and improve user academic performance [4]. Integrating technology into healthcare education has been shown to improve professional education and student support, mainly through better communication and increased access to information [5]. There is increasing evidence of its effectiveness in accelerating the learning curve and facilitating learning environments that encourage the development of non-technical skills as well such as collaboration, reflection and knowledge sharing [6-9]. However, there are many challenges involved in the process of integrating technology into teaching and learning. Thus, overall, the use of information and communication technology for educational purposes in health education contexts is still an emerging field of practice and research.

While we are aware of the importance of technology and how it has changed education positively, certain caution needs to be exerted. In the past, those developments happened carefully, closely aligned to academic strategy and with the entire rigor you would expect of the institutions involved. The move to online education was a strategic choice for a group of students who wanted to learn that way.

But COVID-19 means online education delivery at a scale and across the board, by necessity rather than choice! The long lockdown for the COVID-19 has closed educational institutions and ushered in online learning as a crisis-management tool to continue learning. Though this experimental embrace of online learning could have been challenging for us; congratulations are in the order that our students have continued to learn, to be supported and assessed; and the education system did not collapse amidst the unprecedented pandemic situation. However, explosion of technology and this unprecedented situation has many apprehensions about the pandemic's negative impact on the education system.

In the rush to develop online capacity, the focus has understandably been on implementing technology-based solutions fast. Internationally infiltration of technology in education has responded magnificently and at speed to a previously unimaginable scenario. Nobody anticipated that innovation would be fast-forwarded in this way but necessity has been the mother of invention. There has never been a greater need for educators and institutions to adopt technology and new pedagogical strategies; and to create a new learning environment. Technology, being the vehicle for driving this changes; remote teaching and learning, virtual classrooms, online support and assessment are creating a new normal. As new technology is developed and deployed in learning settings at a rapid pace, the question that should be answered is: What specific contributions can technology make towards improving the quality of medical education? The empirical evidence already suggests that more technology does not always equal better learning outcomes. Our experience has always been that success in online learning means putting teaching first and technology second. Technology is critical, of course, but its role should be to enable rather than determine outcomes. Yes, Information Technology (IT) infrastructure and support systems need to be reliable and robust, but we need to pay as much, if not more, attention to helping teachers and students adopt these technologies to the best effect. As we witness this revolution in physiotherapy education; teacher support, pedagogy and care for students deserve just as much attention.

Physiotherapy education in India might not have readily adopted education technology but it's heartening to see how it geared up to meet the learning needs in this crisis situation. Although it's mainly through tardy adoption of distance learning during the period of social distancing, many physiotherapy teachers got an opportunity to experience technology-based learning.

Electronic medical education has already been widely integrated in developed countries since it has educational value and is

broadening the scope of educational programs through multiple educational goals [10]. To date physiotherapy education in India seems to have hitherto remained untouched by the digital revolution. The adoption of technology is still a new experience for many of us; and teachers all over are struggling to make online learning work. The rapid adjustment has been challenging to quickly migrate all of its in-person courses virtually. The additional skills and forging of a new teaching approach might not come easily to all the teachers. The evolving nature of technology may unsettle teachers, who may experience themselves as perpetual novices. It will be interesting to explore if this experience gained due to COVID-19 pandemic is valuable to shape the future of our educational system. It can be speculated that this situation may in fact produce a positive experience overall and even break down preconceived notions. Fostering a change of norms and attitudes could push us a little further into making online more mainstream. Thus, this study seeks an opportunity to gain insights into this evolving process of medical education.

The global sector of online learning and educational technology is facing the biggest opportunity-and biggest test-of its existence. While studies highlight the potential value of information and communication technologies in crisis settings, they also show the lack of scientific evidence. Within disruption, lies opportunity, however challenging to see at the time. Mainly experimental embrace of distance learning during the corona virus pandemic provides an opportunity for us to think critically about what works and doesn't work as COVID-19 accelerates the rise of virtual education. Given the recency of the pandemic, academic studies on this educational moment do not yet exist. The innovation, infrastructure and knowledge gained from this crisis will change the way we teach and how we imagine new models of health professional education. This pandemic has given us an opportunity to build a knowledge base that can guide both practitioners and researchers in developing effective technology-based learning using evidence-based findings.

Even after the pandemic is over, technology will continue to influence the way we train future health professionals. Second, there exists an untapped potential for use of technology and online learning. Even with today's extensive and pervasive use of technology in medical education, some of the basic questions related to the role of online learning remain unanswered. But the COVID-19 pandemic serves as an educational experiment, pressing accelerate on the screeni-fication of the medical education system at a very large scale.

Information obtained from this study will serve to guide the educators to develop more effective teaching strategies and skills required for online learning so as to enhance the learning outcomes. It shall also help the technological sector to develop digital strategies and design features to overcome the technological barriers and facilitate the teaching process. Results can be used to inform policy makers at the institute, university and national level in their initiatives that seek to bring learners, teachers, and technical means together in an effective way. Overall purpose of the present study was to better equip the education sector; and bridge the gap between potential effectiveness and successful implementation of technology in physiotherapy education.

It was hypothesized that perspectives of teachers, as direct service providers to its stakeholders would contribute to provide directions as we navigate through this period of social distancing; and also to prepare for the new education model of the future. Thus, this study aimed to analyze the experience of physiotherapy teachers towards online learning during COVID-19 lockdown with specific objectives outlined as

• To identify the various methods used by the teachers for online learning

• To identify the outcomes used by teachers to assess effectiveness of online learning

• To assess the attitudes of teachers towards use of technology in learning

• To identify the key barriers in its successful implementation

• To compare the experience of teachers with online learning in relation to years of teaching experience, digital literacy; and professional training received.

In this article, online learning is discussed in the context of learning conducted completely online as a substitute or alternative to face-to-face learning; and also based on a linear curriculum that integrates the activities into a chronological course and syllabus. The literature search conducted for the present study focused on 'online learning in medical education' and included articles published online only. Given the inadequacy of scientific literature on online learning in recent pandemic situation, information published on social media such as news, reports, blogs, letters, etc. (In the past two months-March and April 2020) is also included to support the views of the author.

Methods

It was a cross-sectional descriptive study conducted during COVID-19 lockdown period (April to May 2020). Ethical approval was obtained from the institutional review board of KJ Somaiya College of physiotherapy, India. All physiotherapy teachers affiliated to academic institutions from various universities across India were invited to participate in an online survey. Teachers who undertook online teaching as a part of curriculum for undergraduate or postgraduate students 'during COVID-19 pandemic lockdown' were recruited. Participation in the study was voluntary and electronic consent was obtained from the participants. Teachers' unwillingness to participate, or teaching activities conducted 'not as a part of curriculum' were set as an exclusion criteria. The target population is representative of teachers available on social media platform; and with or without prior experience of online learning as an instructor. Sample size was not estimated prior to the study. However, maximum number of participants was desirable as well as anticipated considering the importance of online learning in the given current situation; and the beneficial use of social media as a method of data collection.

A questionnaire was developed de-novo as a part of this study.

The questionnaire sought to obtain information which includes teacher's profile details relevant to online learning; methods employed by the teachers in online learning; as well as teacher's perspectives of this process. The questionnaire is self-reported and in English language. It is semi-structured and has a combination of open and close ended-questions (Includes multiple choice and ranking Likert-scale style questions). Content validity of the questionnaire was established from three experienced teachers. The questionnaire was distributed to the participants as Google forms via social media on Whatsapp; and was emailed, if requested by them. Link to the forms was available to them for seven consecutive days. Reminders were sent to ensure maximum participation. (Questionnaire is available upon request to the author). Data thus collected was subjected to analysis.

Data analysis

All the responses obtained via Goggle-forms were validated. Inaccurate or incomplete responses were discarded from the analysis. The close-ended data was analyzed automatically using Google spread-sheet; and descriptive statistics using percentage and frequency distribution was performed. The open-ended questions were analyzed using categorization and thematic analysis.

Results and Discussion

Approximately one third of invited participants completed the survey and a total number of 111 responses were received. Out of the 11 universities approached across the country, the major responses obtained were from universities located in the state of Maharashtra. Other universities and teachers had not taken any online class during the lock down period as they had already completed their syllabus for the academic term and thus were not eligible to participate. Some of these teachers while conveying their inability to participate also expressed concern and interest about this topic. Although not fitting into the pre-determined criteria of this study, these teachers were encouraged to provide their overall opinions about online learning and these responses were analyzed separately.

Teachers' profile

This representative sample consisted of both undergraduate and post graduate teachers and with varied number of teaching experience. Instructor competencies were inferred from the number of teaching experience, experience in teaching post graduate students and faculty training programs in medical education and/or research methodology. The adoption of technology in physiotherapy education was still a new experience for many (81.1%) of the teachers; with only 18.9% teachers having prior experience of online learning as an instructor. In this sample only 20.7% of the teachers' institutes were offering online e-learning in the blended form as a regular part of their educational system prior to the pandemic lock down. **Table 1** shows the profile details of the participants **(Table 1)**.

Characteristics Teachers' category	Percentage of teachers					
UG teachers	99.1					
PG teachers	75.2					
Teaching experience (in years)	None	<1	1-3	3-5	5-10	>10
UG (% of teachers)	0.9	5.5	18.3	9.2	13.8	52.3
PG (% of teachers)	24.8	11	17.4	8.3	16.5	22
Faculty professional development programs	Percentage of teachers					
Basic health sciences education technology	70.6					
Advanced health sciences education technology	27.5					
FAIMER fellowship	4.6					
Basic research methodology	78					
Advanced research methodology	22.9					
Other-outcome based education	0.9					
None	6.4					

Table 1: Teachers' profile characteristics.

Digital literacy and technological proficiency of teachers

E-learning refers to learning mediated by technology, such as the World Wide Web (WWW), internet, and multi-media based computer applications [11]. Knowledge and skills required to use technology in this particular method of teaching is thus, obviously understandable because of its very nature. With these advances come new responsibilities to the instructor and therefore increase the value of learning design and technology in education. To seek support to this assumption, digital literacy of teachers **(Table 2)** in terms of knowledge and basic technical skills related to computer and internet was asked directly in this survey whereas teacher's technological proficiency was inferred from some other questions related to the technological features used by the teacher; ease of administration and specific barriers faced related to technology use, etc.

ICT courses	Percentage of teachers
Basic computer skills	56
Supplementary courses related to online learning (Google classroom, Microsoft teams training, Moodle MOOC, Blackboard learn, etc.)	0.9 or 1.8% each
Additional ICT courses during lockdown	16.5
None	23.9

Table 2: Digital literacy of the teachers.

Clearly, as technology is an inherent part of online teaching, it requires some level of technological savvy. The online instructor assumes a role of technology specialist and must choose tools that are appropriate for learning goals and that are within the technical capabilities of students. When technical aspects of the

course are running without issue, students can focus on learning. Otherwise, technology can become a source of frustration or distraction for students, and be a hindrance to learning.

As the world of technology evolves, the learning environment, both on-campus and online, will equally progress, and the need for teachers who are educated in technology and design will continue to grow. Teachers need to be in the driving seat and it will be they who are best placed to understand how students will move from A to B and to design learning experiences that will enable them to thrive. Over time, a teacher who becomes adept at adopting a range of technologies-including the emerging learning experience platforms will be able to move beyond webinars and lecture recordings to create dynamic, multi-faceted online learning experiences comprising sequences of experiential activities, labs, rehearsal exercises, presentations and 'real world' assignments. Due to the ever changing nature of e-learning and skills needed for e-learning, it is imperative that staff develop these skills or be left behind in the digital era.

The challenges associated with the preparedness of teachers to work with these technological tools are varied. When asked about their preparedness with the technical aspects before conducting the online class 25.7% reported that they were well prepared, 58.7% reported that they were moderately prepared whereas 15.6% teachers reported that they were minimally or not prepared at all. Technological incompatibility with lack of skills to integrate new technologies into teaching practice (31.2%) and unfamiliarity with online educational portals and platforms (36.7%) was reported as barriers by the teachers. Some (16.5%) of the proactive teachers felt the need to take training (during the lock down period) to simplify the T-L process; and engaged themselves in free online tutorials designed to efficiently use a virtual learning environment and learning management system.

Such feeling of inadequacy, stemming from limited knowledge of, or proper training with, a particular tool may be influencing the attitude of some educators when asked to commit to online learning. Teachers noted feeling overwhelmed with the entire process of engaging with new tools and having little patience for navigating minor technical issues. **(Table 3)** Reported in other words as challenging, demanding, and difficult to cope with maintaining a positive attitude in the face of seemingly difficult to use and time-consuming e-learning tools and technologies can be quiet problematic. In a previous study, educators noted that adopting these new tools may in fact produce a positive experience overall and even break down preconceived notions [12]. While some positive experiences are also identified as 72.5% teachers commented that this experience was an 'opportunity to learn' and 11.9% reported it as 'rewarding'. It is important to just embrace this new reality and work within its limitations and opportunities. Fostering a change of norms and attitudes therefore is an important solution in the development and implementation of online learning. These findings support the need to provide additional staff training and to offer staff mentoring.

Overall experience	Percentage of teachers	
Opportunity to learn	73.9	
Rewarding	12.6	
Overwhelming	11.7	
Challenging	42.3	
Demanding	25.2	
Difficult to cope with	9	
Willing to continue online teaching after pandemic	20.7 (Yes)	50.5 (May be)
Best method to teach (as per participant's subject matter)		
In-person	54.1	
Completely online	None	
Blended	45.9	

Table 3: Experience and attitude of teachers towards online learning.

Some teachers may be better using certain external technologies and tools than others, which can make them feel insecure. Establishing a self-help or peer support approach over and above including digital literacy skills within faculty training will ensure that teachers develop the skills that they need. Institutions while recommending any external technology should test the usability, reliability and user experience of institutional technologies early on implementation. This can be done by assessing ongoing feedback and analyzing patterns of use. It is important to provide this evaluation data from initiatives within the institute, or from other institutions to the central or departmental IT support teams in making decisions. This will allow teachers to achieve their teaching goals quickly with minimum effort or errors and provide an acceptable user experience.

Mastery with new instructional technologies requires significant time and attention. Especially in the given scenario, time constraints can be referenced as a barrier and could have affected self-confidence of the teachers. 25.7% teachers reported lack of protected time to get oriented to new digital tools, learn pedagogical and organizational aspects of online learning, 16.5% reported additional investment of time in preparation of the tutorial.

Preliminary analysis revealed a mixed and unequal pattern with respect to the experience of teachers with online learning with respect to years of teaching experience, digital literacy; and professional training received. Thus, for further analysis all the teachers were treated as a single group. However, author acknowledges that these could be the confounding variables and suggest further studies to determine their influence and address this disparity.

Nature of teaching-learning activities

The educational goals of using technology in medical education include facilitating basic knowledge acquisition, improving decision making, enhancement of perceptual variation, improving skill coordination, practicing for rare or critical events, learning team training, and improving psychomotor skills [13]. Technology needs to be flexible enough to support the rich tapestry of different teaching activities required across different subject areas and student groups. It is up to the educator to identify which technologies will support the pedagogic aims.

In the present study, the topic taught in online class was theory oriented (56.8% of the teachers) and combination of theory and practical oriented (43.2%) whereas none of the teachers taught any procedural skills in online class. The teaching activities involved varied from a didactic lesson delivered by the teacher (89.2%), followed by group discussions (48.6%) and presentation by students (45.9%). Very few (0.9-1.8% each) case-based and problem-based learning activities through simulations or sharing real patient videos; and research oriented presentations were reported.

Effective technology use deploys multiple evidence-based strategies concurrently (E.g. adaptive content, frequent testing, immediate feedback, etc.), as do effective teachers. Emerging technologies have potentials for meeting new requirements for competency-based training. However, the current trend of teachers has been with a focus on didactic sessions. Many teachers expressed that teaching practical and clinical skills is a major challenge; and clinical learning for patient evaluation and treatment, bed side learning, etc. is not possible in online learning. Hands on demonstration of techniques; and teaching tools like models, mannequin, skeleton etc. are missing in online learning activities.

P64: "Physiotherapy curriculum which is focused mainly on 'hands on' cannot be taught online. Theory part can be done but again it is questionable how much students will gain it but practical point of view it has to be in person."

Use of e-content and multimedia features

Regarding the type of multimedia content used for online class, majority of the teachers (60%-80%) listed text, diagrams, pictures, video clips followed by web links to articles, simulations; book PDFs. **(Table 4)** It is observed that online TL process increased use of e-content resources than classroom teaching. However, only 33.9% as reported in this study and some previous studies [14] have identified low use of e-learning resources by faculty. The main reasons could be lack of awareness of these resources and of pedagogical understanding of their utilities. Also, access to the e-resources on personal devices without institutional authentication could have been a hindering factor. An effective strategy could be use of open educational resources. Open educational resources are teaching, learning, and research resources that reside in the public domain and are freely available to anyone over the web [15]. They are an important element of an infrastructure for learning and range from podcasts to digital libraries to textbooks and games.

Sr. No.	Multimedia content	Percentage of teachers
1	Text	87.4
2	Diagrams	64.9
3	Pictures	71.2
4	Video clips	61.3
5	Power point presentation	2.7
6	Web links to research articles	33.3
7	Simulation	12.6
8	Book PDF	0.9

Table 4: Multimedia content used in online class.

A wide range of e-learning modalities and learning resources are available and intended to be used in various teaching and learning contexts. Their effective use can contribute to enhanced educational efficiency by supporting teachers in developing and applying an array of skills as effectively as in the classroom. A recent study by Kim et al. analyzed usage pattern of e-learning resources over a period of 10 years in Korean medical schools demonstrated increasing use of e-learning in medical education [16]. They found that 90% hits were on online videos and among those, on procedural skills followed by patient encounters and video lectures.

Training of physicians in the 21st century requires a new focus on emerging competencies. There is an increasing call at the national level to restructure the undergraduate education and growing emphasis in medical school curricula to promote student-centered learning [17,18]. The role of e-learning in facilitating newly emerging competency-based training has important implications for improvements in the design and development of learning resources to better meet medical students' curricular needs and their e-learning styles. This indicates we need to make clinical cases more interactive and engaging for the students and to better promote students' clinical reasoning skills. This also emphasizes the need to make teachers actively and effectively use the procedural and clinical skills resources to meet training needs in emerging competencies. There are various formats for presenting clinical cases, from a simple text-based format to promoting interaction with the virtual patient in a computer-based simulation environment [19]. It is also plausible to present patient encounters using virtual and augmented reality, which are increasingly garnering the attention of medical educators and are likely to become a prevalent technology in the near future [20-22]. Teachers need to be made aware to make better use of the real potential of digital technology and enhance learning experiences through innovative approaches.

Technology use for active learning

Student-centered learning and active learning are of increasing importance in medical education. There is a shift away from top-down lecturing and passive students to a more interactive, collaborative approach in which students and instructor co-create the learning process. The Instructor's role is changing from the "sage on the stage" to "the guide on the side. In this study, it was observed that engagement with e-learning was predominantly at an instructive level, an approach that is teacher-centered [23], where the learner takes a passive role, accessing knowledge provided by the teacher, rather than seeking to generate knowledge and understanding. Furthermore, didactic lectures do not appeal to a variety of learning styles, lack learner participation strategies, require lengthy educator preparation, etc [24]. To create the best synergy, an online class should include presence, interaction, respect, encouragement, and timely feedback [25]. Integration of all these elements reflects the fluid nature of what constitutes good teaching practices.

Garrison's Community of Inquiry (CoI) model appropriately lends itself into the analysis of the instructor-student interaction because the framework addresses the social, cognitive and teaching presence as concentric circles that overlap and create

synchronous movement within the interaction [26]. Students view the interaction that takes place in the online learning environment as the essence of teaching and quality indicators that enhance positive outcomes. In the CoI model, Social Presence (SP) explores the feeling of connectedness to one another. Supporting its importance Carter et al. mentioned SP as the center of a meaningful learning experience [27]. Cognitive Presence (CP) focuses on the process in which students build and confirm meaning. Teaching Presence (TP) centers on the instructional methods utilized to enhance the quality and potential outcomes; and has been identified as a community pillar building SP and CP.

According to Kolbe's Experiential Learning Theory (ELT), active learning process takes place during real or simulated experiences that include the interaction with a problem and others discussing the same problem [28,29]. This cyclical process begins with a problem (The discussion question) followed by learner's critical thinking or reflecting on personal knowledge and experience. Learning continues as the instructor, or another student, through scholarly dialogue, stimulates deeper thinking with a well formed question or comment and spurs the student to asset their position on the issue.

With modern gadgets and interfaces now, one can initiate learning methodologies and experiences to accommodate the custom learning experience in our present day educational infrastructure. In simple words, technology has provided teachers and learners with a new and enhanced way of interacting during the learning process. Technological features that enable interaction include discussion board; audience response system e.g. survey, polling, etc.; online quizzes; audio calls; digital games, audience reaction, e.g. use of emoji, raise hands, etc. Instructional methods such as sharing experiences; communicating through announcements, phone calls, and emails; answering questions, providing detailed feedback; and asking probing/prompting questions in the discussion forums could be some of the strategies to foster interaction between instructor, student, and content. The technical features used in the present study are as reported in **Table 5**.

Sr. No.	Technical features used in online class	Percentage of teachers
1	Active speaker view (video)	70.3
2	Text chat	44.1
3	Share screen	79.3
4	White board	17.1
5	Annotation	9
6	Audience response system e.g. survey, polling, etc.	8.1
7	Online quiz	18.9
8	Discussion board	8.1
9	Digital games	0.9
10	Audio call	23.4
11	Audience reaction, e.g. use of emojis, raise hand, etc.	22.5
12	Record meeting	32.4
13	Host controls	25.2

Table 5: Technical features used in online class.

Considering 'learner behaviour' as a critical element, we asked teachers to rate students' involvement in online learning, in terms of concentration, motivation, active participation, peer support (Providing feedback and knowledge sharing), etc **(Table 6)**. Teachers were unsure as to how to monitor learner behaviour in terms of concentration, attention and physical presence as they cannot directly observe the students. Majority of the teachers felt that direct interaction was a missing factor and students' interaction and active participation was less as compared to in-person teaching. It was observed that interactive functions in terms of technological tools and interactive strategies in pedagogical design were not used to any great extent **(Figure 1)**.

In online class	As compared to face-to-face learning			
Student involvement	More	Equal	Less	Can't say
Concentration	13	39	39	21
Motivation	21	53	23	14
Interaction	14	31	64	4
Active participation	21	35	52	3
Peer support (e.g. feedback, knowledge sharing)	20	45	41	6
Attendance	46	49	15	4

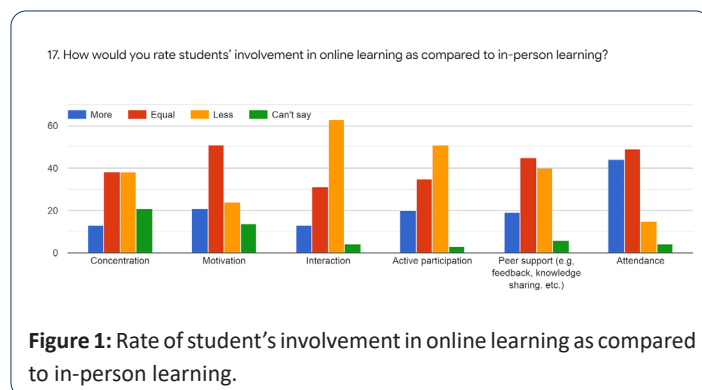**Table 6:** Students' involvement in online class.

Figure 1: Rate of student's involvement in online learning as compared to in-person learning.

P35: "Active interaction is not such as live class.... Students take time to respond after question has been asked may be technical issue or casual attitude being online."

In terms of concentration, P57: "In online class we have virtual environment, students' minds may not be focused as they are more comfortable at home."

Traditionally, classrooms have been relatively isolated, and collaboration has been limited to students in the same classroom or building. The walls of the classrooms are no longer a barrier as technology enables new ways of learning, communicating, and working collaboratively. This was particularly asked if teachers merged different level students into the same virtual classrooms as applicable to synchronous method of delivery. This attempt was made by very few teachers who merged students tracking the same expedition. Multiple undergraduate batches were taught together by 8.1% whereas undergraduate and postgraduate batches were taken together by 14.7%.

A descriptive survey was conducted in undergraduate

physiotherapy students of Delhi, India to identify the knowledge and attitudes regarding the use of ICT [30]. Students felt that integrating technology such as web-based tasks would enhance their learning; and expressed a preference for visual and collaborative learning strategies such as activities that make use of graphical and textual representations of information, as well as formats that involve discussion. This study clearly indicated a paradigm shift in learning and students expectations from their educators in lieu of preparing themselves for the progressive future. The authors of this study emphasized that institution should aim to work towards students' wellbeing and their social interaction with a view that these two factors support academic achievement.

Next on the list of must-have e-learning website features is assessment and feedback. Including periodic quizzes and tests during the course can provide checkpoint to the learners and can help students evaluate progress. 67.6% teachers used online tool to give assignments and 42.3% used it for formative assessments. Writing assignments was one of the most frequently mentioned forms of online assessments. Though these assignments may indicate measurable component of student learning, they were limited to knowledge domain of learning; assessment of affective and psychomotor domains was not reported by any of the teachers. In the medical arena, students need to get higher level thinking and skills development to be applicable to real-life providing the best comprehensive care for the patient. The question becomes what technology is available to create an interactive assessment of students that will allow them to face real life situations and to relate online physiotherapy education to the human values of a real physiotherapy situation. Creating authentic assessments is a significant challenge unique to online environment with limited choice of tools available for assessments and also cheating by students as another issue [31,32].

Academic integrity is always a concern in online teaching. Many teachers (47.7%) felt lack of control over discipline and attendance; doubted honesty and reported casual attitude being online. As these were curriculum-based classes, teachers required to use additional administrative tools to monitor attendance records of students. It can be expected that 'mature students are with high integrity', however, there is a definite concern for those students who do not fall into that category. With the internet and social media, using educational apps makes the students highly susceptible to distraction and sidetracking. Even though proper use has shown to increase student performances, being distracted would be detrimental. Technical solution to ensure student's actual presence in the virtual class could be engaging features such as, polling, frequent interactions, etc. while sub serving the goals of retaining the motivation of learners.

While working from home, teachers and students were accessing the online learning with their personal devices such as mobile phones. The content stored in their devices may be accessed by a range of different technologies creating a threat to data privacy and security. 56% teachers reported this as a concern and lacked knowledge of the data security policies with online media use.

With the advent of internet and World Wide Web (WWW), today's online learning offers rich educational resources in multiple media and the capability to support both, real-time and asynchronous communication between instructors and learners as well as among different learners. Many e-learning software companies provide easy-to-use systems for educational instruction, communication, and assessment; and have touted them as a vehicle for expanding access to higher education with specific applications in distance learning, hybrid courses, and as didactic supplements to other electronic environment enhancement systems. Easily downloadable and other user friendly features offered by this have resulted into massive use of these portals for online teaching. In this survey, the educational platforms used to deliver the class showed use of both synchronous and asynchronous methods. Synchronous method showed preference for virtual learning environments such as Web conferencing (89.2%), followed by live streaming on YouTube (3.6%) and telecasting by 4.5%. Amongst the asynchronous mode of e-learning teachers used Google classroom (20.2%) uploading prerecorded lessons on YouTube (3.7%). Some teachers showed reluctance to use e-learning, not wanting to engage with new technologies to support their teaching and sent learning material to their students by email (29.7%). Asynchronous and synchronous modes differ in terms of instructor and learner control of educational experience. Live feedback from the instructors and one-to-one interaction inspires confidence and helps students better understand and thus, is critical for the success of a course. Teachers expressed satisfaction with asynchronous platforms such as with Google classrooms for documentation of assignment work and providing teaching material.

Social media use was also reported by 14.4% with Whatsapp as the preferred mode and utilizing its features of sending voice notes (11.9%) and sharing visual content through graphics and video clips. Instant connectivity has branched out from merely a tool of personal communication, to a platform for educational instruction and outreach. Social media is now being recognized as an accepted form of instruction in some instances, and groups such as Scholastic Teachers provide excellent support and tips for instructors. Many instructors use social media to communicate directly with their students, or to form forum-style groups for students to communicate with each other, and the method seems to be proving valuable in providing one-on-one attention to student's questions and concerns [33].

Models relying on national online education platforms are recently established in many countries. In India, as per the government initiate an equivalent platform Swayam ("Study webs of active-learning for young aspiring minds") has been developed [34]. 'Digital Infrastructure Knowledge Sharing' (DIKSHA) is another platform offered by National Council for Teacher Education (NCTE) under the Ministry of Health and Resource Development's an initiative for curriculum-based education and training was launched in 2017. It is proposed to be well equipped to cater to unlimited demands of learning, anytime, anywhere getting just in time knowledge and skill sets for online teacher training, conducting quizzes, and doing learning activities to

promote creative and critical thinking. It has been leveraged by Government of India for ensuring continuity in curriculum linked education for students in these times and to help tide over the present crisis; and multiple states in the country are using it in other educational disciplines [35]. However, only 4.6% of physiotherapy teachers were aware of this existing system and platform and only 1.8% teachers reported that they accessed it during the lock down. 68.8% teachers were unaware of any curriculum-based online courses available for physiotherapists in India.

Previous studies have shown that in many instances, technological limitations hinder the adoption and implementation of e-learning by medical schools [12]. The key themes identified in review articles were technical skills, resources, institutional strategies and support; and attitude. In the present study, lack of physical infrastructure teaching material, device e.g. computer, internet facility (19.3%), and poor quality of services such as poor internet connectivity (59.8%), orientation and training on the use of digital tools, access to educational portal were reported as significant barriers. Initiatives are being taken by technology sector for developing virtual platforms for institutions around the world with collaborations across content-providers to those companies offering technical support and consulting for online learning for educators. Due to the ever changing nature of e-learning and skills needed for e-learning, it is imperative that staff develop these skills or be left behind in the digital era.

Equity and access to the learners

The increased access that students have to digital mobile technologies is a source of support for education delivery, administration and support services in emergency contexts. Some institutions were concerned about the issues of equity and access to technology and tools; and carried a pre-course survey to identify if students don't have appropriate access to this remote form of learning especially when they were scattered across different geographical areas. Poorer students may not be able to afford up-to-date devices, and students living in areas where mobile signals are weak or non-existent are potentially at a disadvantage. Providing an equitable experience was a challenge and alternatives into either content or learning activities are being considered by them. Alternative solutions could be an asynchronous mode of delivery such as to record the lessons and give them to non-attendees; and also, institutions to have financial student support. Ensuring that resources are mobile friendly could be one way of potentially increasing accessibility. However, resource constrained institutions are required to actively seek policy alternatives to ensure access and continued learning in the pandemic crisis with cost-effective solutions without substantial declines in student learning outcomes.

With the massive and rapid shift of education system online, the corona virus pandemic is testing countries abilities to provide quality learning for all. The results have been mixed across the world; and if anything, this pandemic shows how online education is still in its infancy. Institutions are actively seeking policy alternatives to continue learning. Initiatives

are also being taken with collaborations across information and communication technology sectors for developing virtual platforms to support institutions around the world. However, one-size-fits-all solutions implemented globally may lead to poor experiences for the majority of students as per their geographical contexts. In developing and resource constraint countries like India e-learning poses a specific challenge to both teachers and students over technology and access; and further raises the level of inequality between the learners with devices and the internet and those without. The key concern of academic bodies is to have equivalent learning outcomes at a lower cost ensuring access, equity and quality.

An international survey aimed to determine the level of technology use and access among students from physiotherapy departments at universities in seven countries (Bangladesh, Belgium, Brazil, Luxembourg, South Africa, Sudan, and Switzerland) engaged in the blended course in professional ethics [36]. The results indicated that students' digital technology experiences were generally low. Most students preferred learning in environments that included digital tools and some online components but wanted less social media in their learning environments. The differences in technology use and access highlight the challenges inherent to offering international online courses.

Institute support and strategies

Moving to an online medium requires attention not only to the best educational practices and technologies but also to how institutions support and prepare faculty to accomplish such tasks [12]. Apart from teacher-related factors, this study sought to obtain information about institutional approach to deal with this crisis situation. Institutional support received by the teachers was in the form of resources (Teaching material-11%, computer device-16.5%, and internet facility-22%), institutional tools such as user credentials for educational portals (37.6%); orientation and training on using digital tools (27.5%); colleague discussion (1.8%); and incentives in the form of appreciation and acknowledgment (9.1%). These provisions of support often serve as helpful starting points and as a guide to help steer faculty. However, it was observed that in the early stages many learning activities were begun but the structure was missing within the faculty to see them through. There was a lack of institutional guidance and direction as to how tools or programs would be implemented (reported by 20.2%). E-learning was often reported as a process which was adopted in polarization while it was taking place across a number of departments in an institution. Subsequently lack of interdepartmental collaboration and whole institute approach was perceived as a barrier (Reported by 20.2%). The asynchronous environment generated is perceived as one which does not support the active exchange of ideas and shared knowledge amongst staff and lack cohesive education for its learners. Also, students could have been overloaded with too many applications and platforms as used differently by individual teacher under the same institute profile. While not imposing or limiting design freedom or flexibility, institute should streamline and blend appropriate approach limiting the number of applications and platform, develop distance learning rules

and tools to monitor learning process; and facilitate connection by sharing experiences and supporting teachers on the use of digital tools. An institutional strategy is therefore required which includes all relevant stakeholders and departments and put important operational mechanisms in place so that faculty might continue to participate in the development of online programs and for its future success. Further institutional incentives in the form of appreciation, acknowledgment, etc, as well as recognition and increased opportunities to assist other faculty (Training or mentoring, for example) may be considered to increase the desirability and entice faculty to teach online. There is perhaps an even greater need to now look at strategies that influence the desired behavioural changes within the faculty and result in consistent use of the institutional support mechanisms provided.

Online learning and student outcomes

When interpreting the results of online learning, effectiveness should be evaluated in broad categories of learning and non-learning outcome measures. In understanding the impact of e-learning on learning, Kirkpatrick's work has been cited as a useful model [37]. The model consists of four dimensions, including learner satisfaction, learning outcomes, performance improvement, and patient/health outcomes. Learner satisfaction mainly encompasses participants' perceptions and satisfaction with learning objectives, content, format, and instructor's effectiveness. Learning outcomes include assessment of learners' knowledge, attitudes, and skills. Performance improvement targets changes in practice behaviours as a direct result of the newly acquired knowledge, attitudes, and skills. Lastly, patient and health outcomes include changes in patients' behaviours and health indicators as a result of trainees' improved practice patterns **(Table 7)**.

Sr. No.	Nature of the outcome assessed	Method of assessment	Percentage of teachers
1	Learner satisfaction	Informal feedback	45.9
2	Learning outcomes	Informal observation	56
		Online assignments	67.6
		Online formative assessment	42.3
3	Technical ease of administration		16.2
4	None		25.2
Long term impact of online learning on learning outcomes			
a	It will positively affect		38.7
b	It will negatively affect		2.7
c	It will remain the same		6.3
d	I don't know		7.2
e	It's too early to say		45

Table 7: Learning outcomes.

Online enhancements need to be justified by superior learning outcomes. Acceptable learning outcome measures for student learners may include assessments of content knowledge, analysis of lesson plans or other materials related to the intervention,

observation (Logs) of class activities, etc. whereas; non-learning outcome measures may include (E.g., Attitude, retention, attendance, level of learner/instructor satisfaction). A meta-analysis of research in medical education indicates e-learning is associated with positive outcomes across a wide variety of learners, learning contexts, clinical topics, and learning outcomes [38]. A recent study showed that technology-enhanced learning in physiotherapy education had high student satisfaction with virtual learning environment resources and positive effect on knowledge acquisition of entry-level students in the United Kingdom [39].

In the present survey, 45.9% of teachers used learners' satisfaction assessed using informal feedback; 56% teachers used learning outcomes assessed informally or using quizzes, giving assignments, etc. Technical ease of administration was assessed by 16.2%. This trend is similar to a study by Curran and fleet [40] which examined continuing medical education-related e-learning studies, 81% of the reviewed studies included evaluation of learner's satisfaction, followed by 52% targeting learning outcomes and 7% evaluating student performance change in clinical practice. No studies included patient or health outcomes as part of the evaluation.

Teachers were unsure as to how to monitor learner behaviour in terms of concentration, attention and physical presence as they cannot directly observe the students. Along with learner related outcomes, majority of the teachers felt the need to assess their own teaching effectiveness with this new platform as one of the instructional quality indicators. Also teachers' own satisfaction with teaching online could be considered as one of the outcomes. The following excerpts from the transcripts support this uncertainty. P23: "We can't see students' expressions so I don't understand whether they really understand the topic or no." P102: "I did not get the satisfaction of teaching as I can't have a look on each student during lecture to judge their level of understanding". P119: "Online learning lacks in giving good teaching experience in professional courses like physiotherapy."

An important consideration is that the present study analysis was completed within the lockdown period itself. Thus, the long-term outcomes as well as those outcomes which cannot be assessed online could not be a part of these study findings. When asked about impact of online learning conducted during the lock down period on learning outcomes of the institute, majority said it's too early to say (45.9%), while others opined that it will positively affect (38.5%), remain the same (6.4%), they can't say (6.4%) or few also feared that it will negatively affect (2.8%). P 76: "Only time and prospective studies on this will tell us the actual results."

Redefining teachers: The roles of an online teacher

Facilitator and guide: Technology has also begun to change the roles of teachers and learners. In the traditional classroom, such as what we see depicted in de Voltolina's illustration, the teacher is the primary source of information, and the learners passively receive it. This model of the teacher as the "sage on the stage" has been in education for a long time. Because of the access

to information and educational opportunity that technology has enabled, we can now see the teacher's role shifting to the "guide on the side" as students take more responsibility for their own learning using technology to gather relevant information. However, the teacher-centered traditional model is still in existence today. Thus, in the current dramatic educational shift and penetration of technology in education, teachers need to understand that their own pedagogical approaches to teaching will in fact need to shift to accommodate the online environment; adjust to this new model and how to use technology as an enabler **(Table 8) (Figure 2)**.

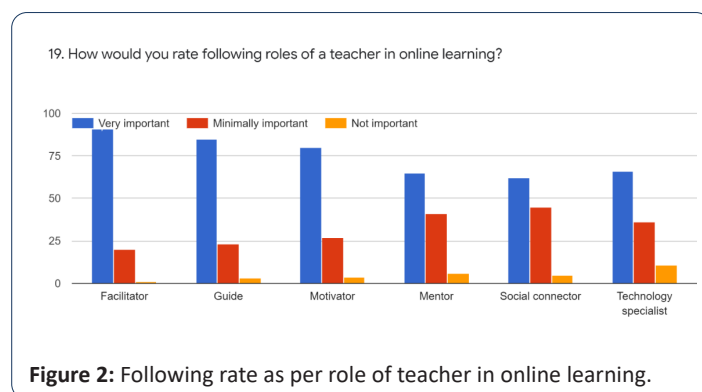| Teacher's role	Very important	Moderately important	Not important
Facilitator	91	20	1
Guide	85	23	3
Motivator	80	27	4
Mentor	65	41	6
Social connector	62	45	5
Technology specialist	66	36	11

Table 8: Role of online teachers.

Figure 2: Following rate as per role of teacher in online learning.

Social connector: We must remember that education is a profoundly human experience. Social relationships are important but high-tech environments may compromise the balance of trust, care and respect between teacher and student. As opposed to traditional classroom when the class meets and social interactions naturally ensue, for an online class these things require a bit more effort and creativity to establish a sense of community and a class culture. The online teacher becomes a social director and must purposefully establish a sense of community and modes of interaction among all participants. Through use of discussion forums, chat rooms, videos or other means, the virtual classroom is brought to life. Apart from ensuring connectedness during online class, it's important to create communities such as on social media to address sense of loneliness or helplessness, facilitate sharing of experience and discussion on coping strategies when facing learning difficulties.

Motivator and mentor: As with all learning environments, learners often need some encouragement. Learning is hard work and studying online can sometimes feel isolating, confusing, or discouraging without this important role of the teacher. As a result, the effective online teacher makes intentional efforts

to communicate specific encouraging messages to individual learners and the group as a whole to maintain an overall positive morale in the class, even when providing constructive feedback. The goal is to help students engage in the course and increase the feeling of social connectedness while reducing feelings of isolation. Also, social isolation and COVID-19 outbreak has given rise to many psychological issues including stress and anxiety. For the diligent educator, this additional responsibility of mentorship can prove very rewarding. But for many, this unprecedented responsibility of identifying and dealing with psychosocial needs could be an overwhelming experience. Thus, it was valuable to seek information on contribution of teachers to ensure mental health of their students.

Need to alter teaching style: It is important that an online course meet the same objectives and curriculum requirements as its on-campus counterpart. Teaching face-to-face and teaching online are both teaching, but they are qualitatively different. There are some things that the two have in common, but there are plenty of differences which warrant additional training and preparation when switching from one to the other. The same is true when faculty move from the traditional classroom to the online classroom. The mediums of delivery are different; consequently they require different approaches. Merely replicating the course in an online setting by uploading lectures and slides may not be effective and the online instructor must re-conceptualize the course and design it for the online environment. 24.8% teachers were aware that they need to alter their own teaching-style for online class; however they mentioned difficulty in doing so. This emphasizes the need for faculty preparation in the form of not only technical but also pedagogical training for best educational practices as well.

It is evident that, a satisfactory experience in online education requires hard work and dedication, but, for the diligent educator, can prove very rewarding. From the study it is seen that majority of the teachers have this perspective; actively assuming these roles will lead to a higher quality experience for both the instructor and students.

Missing factors in online class

There is something unique and special about being in residence. Teachers appreciated the convenience of e-learning, but reported greater engagement in face-to-face learning environments and reported that some aspects of a classroom setting are missed. Teachers unanimously mentioned that facial expressions eye contact, reading body language and gestures is not possible in online class which helps the teachers to monitor the level of understanding of the students. Many teachers felt that they could not monitor learner behaviour in terms of concentration and attention, no idea even if they are physically present or no; in-person attention towards students is not possible; and also were unsure if effective learning is taking place. Literature indicates that virtual classroom can leave many students feeling disconnect [41,42]. Similar feeling was shared by the teachers that personal connection with the class is less due to lack of physical presence **(Table 9)**.

Sr. No.	Factors missing	Percentage of teachers
1	Immediate feedback to the students	1.8
2	Physical presence, face-to-face communication, eye contact, gestures, body language	12.61
3	Auditory and visual feedback from the students	3.6
4	Inability to demonstrate and evaluate hands on, practical and procedural skills, explanation through physical activities, etc.	25.22
5	Inability to have clinical learning, case-based learning, bed side learning	5.4
6	Tools for teaching-learning e.g. models, mannequin, skeleton	3.6
7	Inability to provide individual attention	6.3
8	Direct, quick and proper communication	7.2
9	Self-discipline by students, class control	2.7
10	Lack of transformational power	2.7
11	Lack of flexibility in terms of time, teaching style, etc.	3.6
12	Lack of student participation and active interaction	14.41
13	Lack of concentration, more distraction in online environment and at home	4.5
14	Personal connect with the class	1.8
15	Own satisfaction of teaching	2.7
16	Uncertainty in terms of students' actual presence and learning	9.9
17	Network issues, technical interruption	4.5
18	None	1.8

Table 9: Factors missing in online learning.

P53: "I don't feel connected with the students, as I can't read their faces and body language." P97: "I did not get the satisfaction of teaching as there was less face to face communication and only passive interaction."

While it may not be possible to provide human experience of classroom environment, combating this issue by utilizing web 2.0 technologies as well as incorporating more mentorship between students and faculty members even outside the class can be possible solutions.

Overall, teachers felt that classroom decorum cannot be maintained and everything is dependent on good internet connectivity. P23: "Teaching online is more time consuming as quick conversation is not possible sometimes due to internet issues." P55: "Because of the technical issues sometimes the flow of lecture delivery gets disturbed." P86: "Students are not confident about their virtual presence and hesitate to take part in discussion."

Would you continue online learning after the pandemic lock down is over? Which method do you think is the best for teaching as per your subject matter?

And after this is over, teachers unanimously don't think it will ever all go online; maybe the situation will push us a little further into making online more mainstream. P13: "It's an aid to complete theory topics but completely online teaching should not be the trend of future education". P23: "Slow evolution good e-learning is difficult to do". P27: "Online classes should be made a part of regular courses also. Its time based demand and revolution in teaching technology....need to be prepared for the future." 54.1% teachers would prefer 'in-person teaching' while remaining 45.9% would prefer to use 'blended learning' method for their subject matter. None of the teachers are willing to teach with 'completely online' mode of delivery. P81: "Medical field needs to be in person teaching as it is more reliable method". P107: "Online teaching alone cannot be a proper method for teaching physiotherapy subjects." P77: "Technology use is important but during professional education it should be both technology plus direct oriented education."

Face-to-face learning has remained the long established pedagogical approach within the teaching culture of medical education. "Cultural resistances" amongst staff leading to reluctance to adopt new and emerging practices and technologies have been identified as a barrier in implementation of e-learning within a medical school or program [43]. Staff focused initiates may be the key to the introduction of successful e-leaning programs. Robust research based evidence may strengthen one's position when encouraging faculty to transition to online learning. It is crucial to identify the barriers and solutions that restrict and aid in e-learning from the educator's perspective.

Are the teachers aware of any research on online learning in medical education?

Only 42.2% teachers reported as being aware. Teachers should seek evidence from experimental studies that compared the effectiveness of different technological tools used in online learning practices.

To date, only one systematic review addressed the outcomes of online technology use in physiotherapy teaching; and included studies conducted on pre-registration physiotherapy students and physiotherapy professionals. The most commonly investigated technologies were discussion boards, websites followed by use of video podcasts, collaborative wikis, and blogging [44]. Overall results showed benefits for facilitating learning and varied effectiveness according to the technology used. Users' perceptions of the use of technology use were mostly positive while there was paucity of studies focusing on its barriers. Owing to the mixed results, this review suggested incorporation of technology into learning and teaching practices needs to be carefully planned; and indicated the need to identify optimum approaches and practices for the use of technology in physiotherapy education [45].

Limitations

However, we acknowledge certain limitations and exert caution in interpreting the results, especially with respect to attitude of the teachers. Due to nationwide strict lockdown everyone was suddenly forced to stay at home due to the coronavirus pandemic. First of all, it all happened so fast, and so many

institutions were not prepared that much. The adjustment has been challenging to quickly migrate all of its in-person courses virtually. After a last-minute training class, faculty were trying their best to manage class discussions on virtual platforms to continue learning. However, teachers could have had a different attitude had they been well prepared in advance and would have experienced online learning in the context of routine teaching learning scenario.

Apart from this, the attitude of the teachers in this pandemic situation could have been influenced by many other psychological and social factors. This online learning was delivered by the teachers while working from home with limited availability of resources such as devices, internet connectivity, books and library facility, etc. Also, it was difficult for most of them to manage work-life balance, personal life commitments with limited help available at home during the lock down which may also restrict or modify their ability to perform their online teaching duties adequately. The psychological issues surfacing from this unprecedented pandemic situation could have led to anxiety and stress. Also, the teaching approach and technological tools adopted by them in these circumstances may have compromised the method which they might have otherwise used in an ideal situation.

Another consideration is that the study analysis was completed within the lockdown period itself. Thus, the long term outcomes as well as those outcomes which cannot be assessed online could not be a part of this study's findings.

Summary

The nationwide long lockdown for the COVID-19 pandemic has closed educational institutions and ushered in online learning as a crisis-management tool to continue learning. Though this experimental embrace of online learning could have been challenging for us; congratulations are in the order that our students have continued to learn, to be supported and assessed; and the education system did not collapse amidst the unprecedented pandemic situation.

Electronic medical education has been widely integrated in developed countries since it has educational value and is broadening the scope of educational programs through multiple educational goals. Physiotherapy education in India might not have readily adopted education technology but it's heartening to see how it geared up to meet the learning needs in this crisis situation. Although it's mainly through tardy adoption of distance learning during the period of social distancing, many physiotherapy teachers got an opportunity to experience technology-based learning. The additional skills and forging of a new teaching approach might not come easily to all the teachers. Thus, this study sought to obtain teachers' perspectives of their novice experience.

Conclusion

Remote learning is still a new experience and teachers all over are findings ways to make online learning work. The use of educational software programs has increased, however

teachers need to be trained in their effective use. There is a need for medical educators to gain a comprehensive overview of online platforms and technologies and to understand that their own pedagogical approaches to teach will in fact need to shift to accommodate online environment. Many of the themes identified through this study complement previous studies in health profession education. This survey and review highlights the ubiquity of barriers to online learning across diverse medical education systems and speaks to a shared history of overcoming them. Future horizon reports and discussions will be interesting to follow.

Implications for educational practice

It seems that educational technology mastery is an important neglected competency in faculties. There have been changes and new introductions of e-learning tools. However, it is not paralleled by the education of medical educators regarding digital literacy and e-learning tools. Prevalent use of the internet in almost every aspect of our life and that of the social media in the current digital era does not guarantee its transfer when it comes to their use in online teaching programs. As the world of technology evolves, it is imperative for medical educators to gain a comprehensive overview of online platforms and stay well-informed of current and changing technologies to further their educational proficiencies.

Accrediting bodies have remained conservative in integrating digital skills in the faculty development programs. Some of the universities mandate teachers to have completed basic computer technical skills courses but this may not be sufficient to serve the needs of online teaching. Considering the growing movement of education towards the new technologies, the need for upgrading the educational technology programs and the experts in education technology is clear. In the mission of establishing online training, focus needs to be on scientific promotion and academic training improvement in educators and mandates an especial training program upgrading the existing faculty. One of the key solutions is building digital capability in the learning context and ensuring that this enhances learning outcome. Programs can be initiated by the institute with collaboration with universities to develop courses for educators to make them competent in effective use of newest communication and teaching methods and equipped with educational and professional skills required for online teaching.

Digital competence is a multifaceted moving target, which is constantly evolving as new technologies appear. High tech approaches have changed the entire traditional approach to education. In looking at where educational methods and tools have come from to where they are going in the future, technology's importance in the medical education is evident now more than ever. It will be up to instructional designers and educational technologies to make the most of the opportunities provided by technology to push educational capabilities to new levels. Teaching online can be a rewarding and invigorating experience, and we hope this guide eases the transition into the world of online learning.

More efforts are required to support the work of teachers

through initiatives and resources that lift the profession and help educators and students succeed. It is also clear from the findings that institutional support when promoting this method of learning is of utmost importance and that this support should be encouraging future developments to ensure that online learning as a mode of teaching is maintained and updated to reflect the dynamic nature of information technology. Initiatives can be taken by the government to equip the education sector with the necessary implementation at various levels.

It can be said that technology-enabled learning provides an authentic context to learning and allows for documentation of learner behaviour and outcomes. Education data at the individual, institute and university levels are sometimes poorly documented, and make it difficult to obtain nationwide overviews of statistics. Missing, incomplete or low-quality information impedes the capacity of ministries of education and development organizations to rebuild, plan and manage education programs. At the system level, lack of information poses challenges in planning, operating and monitoring educational programs and entire education systems. To address this undocumented and uncertified educational progression, developing and implementing simple and flexible information systems to ensure the availability and use of quality data through education management information systems is needed to strengthen systems in emergency settings.

Findings from some previous studies show our resource development has focused on the core curriculum pertinent to learning outcomes for basic medical education and fit more closely with the core curriculum. There is a growing emphasis on "student-selected components" in medical school curricular to promote student-centred learning by offering subjects of more choice and depth of study than the cor e curriculum. Therefore, there is a need to expand our resources to support such curricular components. A wide range of e-learning modalities are integrated in medical education but relatively few of the contents of these courses were developed in medical schools. There is a need for consistent efforts made by medical educators to develop e-learning resources that meet the curricular needs in basic medical education. Due to the broad range of subjects that must be covered in medical education, it is a considerable challenge to develop resources on all subjects. The inter-institutional collaboration model of the e-learning consortium offers valuable experience in such collaborative efforts to provide learning resources. At the national and international levels, a number of initiatives have emerged with the purpose of creating a digital repository of peer-reviewed electronic resources for public dissemination. These initiatives recognize the need to create a mechanism for sharing quality e-learning resources across institutions and to reward the works of faculty and staff through peer reviewed processes.

The present crisis should lead to reconsideration by the universities of the balance in investment between physical and virtual campus given the proportion of learning hours that will be delivered in the virtual campus. This adoption can alleviate the pressure on physical space and may improve access to more aspiring students.

Implications for future research

As e-learning continues to be widely integrated in the training of future practitioners, well-designed scientific studies are required to know which technological tools work the best and thus to support evidence based education. Without an evolving knowledge base on how best to design e-learning applications, the gap between what we know about technology use and how we deploy e-learning in training settings will continue to widen. It is critical that our efforts in conducting evaluative studies should target specific e-learning features that can best mediate intended learning goals and objectives. Also, studies need to explore physiotherapy students' online learning patterns. Future study of learner analytics regarding differences between high-achieving and low-achieving students is recommended to advance our understanding of effective use of online learning.

Acknowledgment

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