

Original Research Article

Medical Education Online: Remote Training Practice During the Covid-19 Pandemic
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Background: During the current COVID-19 pandemic, offline medical education was mandated to suspend at the teaching departments of medical colleges, so the teaching was done online, yet there is insufficient evidence regarding the preferred practice and methods for online training. **Objective:** The investigation aimed to examine whether the online training and blending learning mode can achieve a good effect and cater for students and whether the learning group size affects the teaching effect. **Design:** The subjects were 150 students. After completing the online course, the final scores and evaluation results were compared, and their preference to distinct contents of the course was analyzed. Statistical analysis was performed using the SPSS program (version 22.0). **Results:** Our online course received consistent positive recognition from the students. Ninety-nine percent of the students recommended incorporating the online course into the conventional offline training program after the pandemic. There was no significant difference concerning the final scores and course evaluation. A smaller learning group size (<25 students) could achieve a better teaching effect than a larger group size ($p < 0.05$). The students preferred interactive discussions, and course contents that they can get practice and feedback from, rather than video watching and didactic lectures. **Conclusion:** The online training course and blending learning mode is worthy of popularization in a large student base. The teaching effect of an online training program may be improved by limiting the group size to less than 25 students and encouraging more interactive discussion, more practice and feedback.

Keywords: COVID-19 pandemic, offline medical education Medical training, educational activities, virtual learning, web-based activities and new teaching technologies

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Introduction

Educational challenges faced by medical teachers and students has been widely noted during the pandemic, therefore remote education has been taken as a typical solution to address them. Many adaptations are being made in the way society works. Medical training had to be adapted in this context. In many schools, educational activities were adapted to virtual learning environments, with the introduction of web-based activities and new teaching technologies. These resources, despite being already present in many colleges, became the only way of teaching due to isolation protocols demanding many adaptations.

In view of the shortage of relevant experience and literature, this investigation aimed to examine whether the online training course can achieve a good application effect and cater for medical student during the pandemic period, as well as whether the learning group size has an impact on the teaching/learning effect, and to analyze how a remote clinical training course can be refined. Considering the unique advantages of online learning mode, a quality online training program schedule can possibly overcome, at least in part, the shortcomings of the conventional training program and achieve a good teaching effect

Methodology

The LNCT university has purchased an excellent system for online teaching worth 55 lakhs. It is called **MEDWHIZ LMS**. It helps in creating a class beforehand and students get the message of scheduled class. In order to review courses, educational outcomes, adapt educational strategies and bring classes to online platforms, a week's break was given to allow teachers to organize their courses to the new educational strategies and resources. There were 150 students in each batch. Out of 150 students on an average around 130 students used to attend class.

Activities were divided in two main ways: synchronous and asynchronous. The first were live transmissions that allow teacher-student interaction. The other ones are on-line texts, articles, or recorded classes. For questions, many teachers made an online forum to keep track of students' doubts. The online classes were interactive ones and students could ask questions in between the class, also the teachers were able to show some ready videos on the topic being discussed. Though the teachers taught with the help of power point presentations, there was a scribbling white board by the side so that they could write just like a blackboard. Otherwise by annotation feature also one can write or underline on the power point presentation itself. Students were given assignments that were checked by the teachers online and then the students were shown their marks. The University conducted 3 sessional exams online but as per government order the final exams were conducted offline. In sessional exams students were given a one hour paper and they were asked to complete it in the same time period and submit it.

The Medwhiz Learning Management System (LMS) is a cloud-based platform dedicated to e-learning activities in the field of Medical

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Education. This LMS is equipped with a lot of resources that help you with detail-oriented learning and ensures high standards in medical education technology. There are three types of LMS users:

- College, who is responsible for system functionality and administers access course creation, etc.

- Students, who have access to the study materials and activities made available on the site/platform for facilitating learning by the educator.

- Educator, also known as professors, instructors, or teachers, who are responsible for conducting classes, uploading study materials, giving assignments, and assessing the students.

To make the lecture much more interactive, the educator can use the annotation tools from the toolbar to annotate the model or the presentation and also add sticky notes to mention important points during the lecture. Modules were created using an iterative process over the course of the 4 weeks. The objectives were 3-fold:

1. Create a virtual platform to aid in the education of medical students regarding foundational physiologic knowledge

2. Set a “guideline” for programs to decrease the burden of creating such materials *de novo*, while allowing individual programs freedom to express their unique personalities.

3. Provide a standardized approach to student assessment, so that programs can have a consistent method of student evaluation.

We had shown them the instruments and other things required for any particular practical and then we asked the relevant questions as normally done in offline mode. It was a little tedious for teachers to do it as the working hands were also less, some senior professors were on leave due to covid 19 pandemic. Few practicals that need microscope couldn't be assessed that effectively. Conducting practical exams online was a challenge but was managed well. Overall experience had been good for the students as well as for the teachers who also gave a positive feedback response.

Observation Chart

Table 1: Demographic/Other Comparisons in Students

	Data	Division	Number	Percentage	Total
1	No. of Students	Male	78	52	150
		Female	72	48	
2	Background	Rural	60	40	150
		Urban	90	60	
3	Medium of Passing 12th	Hindi	55	36.67	150
		English	95	63.33	
4	Comfortable with Online Teaching	Yes	80	53.33	150
		No	70	46.67	

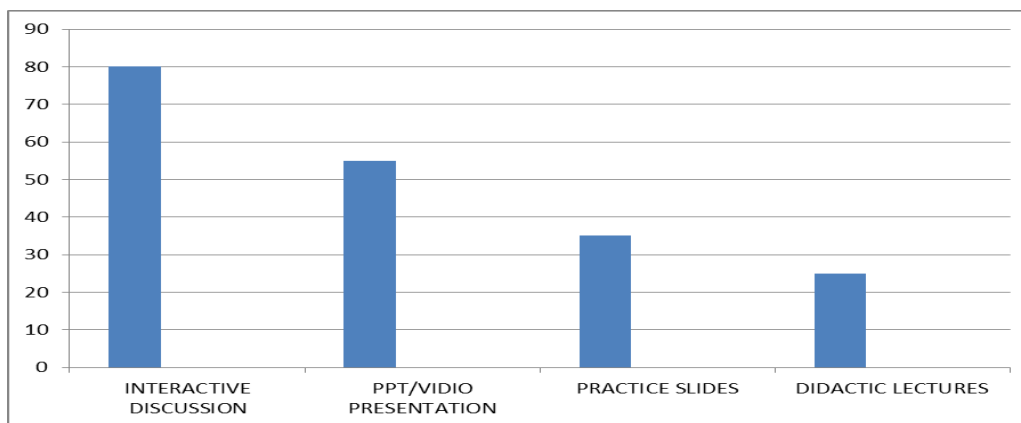


Fig 1: Student Preferences to Course Contents

Table 2: Response/Feedback of the Students

S. No.		Response of Students		
		Poor	Average	Good
1	Quality of Teaching Material	5	28	117
2	Efficiency of Teachers	10	34	106
3	Ease Of Understanding Course Material	15	40	95
4	Chances of Student Participation	20	20	110
5	Standard of Exams	10	15	125
6	Evaluation /Copy Correction/Grading	20	25	105

Results

These teaching programmes contain a thorough collection of resources, links, agendas, evaluations and objectives that can be used to tailor an institution-specific virtual topic with minimal effort, without having to invest the significant labor required from faculty and educators. This allowed students to get exposure to topics and

expertise they might not have through traditional methods. Further minor modifications were made based on feedback from the students and fellow teachers.

With the volume of resources available, course was designed to allow programs to offer a complete virtual course of the same duration and rigor as a traditional teaching. Each knowledge-based

module contains recommended reading, links to pre-recorded lectures, links to videos, simulated encounters, and a curreted selection of seminal articles in the field. The core competency modules contain instructions for interactive exercises, as well as links to pre-existing and original resources related to that competency.

It included a total of 25 links to recorded lectures, 29 links to videos, 9 original simulated scenarios, and 109 peer-reviewed articles. Modules were organized into sub-categories such that programs can easily scan this large volume of resources to find the ones that meet their specific needs. The lectures and articles were intended to fulfill the core competency of medical knowledge, The 2 remaining modules were Technical Skills Training and Student Assessments. Students are encouraged to create a free online account and to complete the practical modules with expert instruction and assessment using video conferencing.

Through social media and well-attended webinars, we were able to accumulate significant interest from the medical education community. The evaluation process consisted of questionnaires assessing curriculum variation, satisfaction, learning outcomes, barriers to implementation, and reusability from the perspectives of students and program directors.

Statistical Analysis

The counting data was described by percentage, while the descriptive data were expressed as median and interquartile range. Data processing and statistical analysis were performed using the SPSS program (version 22.0). Since the data did not conform to a normal distribution, the analysis of inter-group differences was performed by non-parametric test (Kruskal–Wallis Test or Mann–Whitney U Test). $P < 0.05$ was considered as statistically significant.

Discussion

Virtual educational tools offer a potential solution to the loss of offline teaching. Although there is no way to fully replicate the experience of in-person medical education, there is a variety of virtual tools available that can achieve the majority of the objectives. Indeed, the ability to teach foundational knowledge virtually has been established in a variety of health care settings, and it is conceivable that proper student performance assessment and evaluation of compatibility between students and programs can also be achieved virtually. Despite the challenges to medical education that the pandemic has presented, these objectives remain very important. Further, this initiative offers new opportunities for virtual learning that will hopefully have a role in the future of medical education and will last beyond the pandemic era. In this paper, we describe the approach for developing online physiology training and the plan for implementation and future evaluation. Each component of the curriculum will be evaluated from a learner, educator and institutional perspective.

Mikhail D et al emphasized that subinternships are integral to medical education as tools for teaching and assessing fourth-year medical students. Social distancing due to COVID-19 has precluded the ability to offer in-person subinternships – negatively impacting medical education and creating uncertainty surrounding the residency match. So with no precedent for the development and implementation of virtual subinternships, the authors Society of Academic Urologists (SAU) developed an innovative and standardized curriculum for the Virtual Subinternship in Urology (vSIU). Working groups were encouraged to develop innovative learning approaches. The final curriculum was assembled into the “vSIU Guidebook”. The concept of a virtual subinternship, particularly in a surgical specialty, is unprecedented. To our knowledge, the vSIU is the first of its kind in any field of medicine. It was concluded that virtual subinternships have tremendous potential to expand access to education for medical students, and could easily be adopted by all fields in medicine.

DeWitt DE et al on the other hand advocated enabling graduating students to start internship early at their own medical school in the fight for covid 19. They advised that we could quickly prepare our graduating students for meaningful work at their home medical schools in anticipation of a time in the next few months when many health care providers will become ill. Some countries, such as Italy, the United Kingdom, and Ireland, have already brought their students in as health care workers. Therefore there is a strong need to urgently prepare graduated students to help us address the looming workforce shortage as junior physicians.

Remote clinical training practice in the neurology internship during the COVID-19 pandemic was started by He M, Tang XQ et al. The investigation aimed to examine whether the online neurology training course based on Small Private Online Course (SPOC) and blending learning mode can achieve a good effect and cater for interns from different medical programs and whether the learning group size affects the teaching effect. After completing the online course, the final scores and evaluation results were compared among different groups of interns, and their preference to distinct contents of the course was analyzed. The online neurology intern training course based on SPOC and blending learning mode is worthy of popularization in a large student base. The teaching effect of an online intern training program may be improved by limiting the group size to less than 15 students and encouraging more interactive discussion, more practice and feedback.

Chinelatto LA et al worked on perception of medical students on their education. All students understand that this is an exceptional circumstance, and therefore there will be some educational losses. Despite the negative impacts of this medical education turmoil, exceptional times also represent an opportunity for changes. Online education can be helpful and introducing it as part of the curriculum may allow more free time for students, and may teach them time management skills. Despite that, the virtual environment also allows new opportunities for teaching and learning. At the same time, the volunteering experiences bring attention to the value of non-graded elective courses to make student's knowledge more diverse and increase their motivation in learning without worrying about grades. The 21st century will be divided into before, and after, the COVID-19 era. It relies on us, as a community, to make the best out of this pandemic and transform the post-COVID-19 era into a better one.

Foley A et al assessed the impact of a prolonged induction period on the technical abilities of interns embarking on their clinical careers. This study demonstrates the efficacy of an extended induction period in achieving a statistically significant improvement in technical proficiency. It appears that an 8-week induction period is neither feasible nor necessary in the absence of a global pandemic as the majority of interns recommended just a 2–4-week induction period. This approach to intern commencement would appear to represent a prudent use of healthcare resources which would benefit intern, patient and senior team members alike.

Maini R et al did a similar study on business school interns' satisfaction toward online summer internship program amid COVID-19. There is a dearth of empirical studies on internships in general and e-internship in particular, so this study fills the gap and contributes to the existing literature and provides ways to satisfy B-school interns toward e-internship. We created and distributed a 12-item electronic, anonymous and voluntary questionnaire to new interns commencing their positions at our institution during the COVID-19 pandemic.

Agazzi H et al studied COVID-19 Adaptations for Health Service Psychology Internship Training in a Medical School. Intervention implementation and evaluation, has changed drastically since the onset of the COVID-19 pandemic and shows little sign of returning to its previous state any time soon. COVID-19 has highlighted the importance of being prepared to adapt programs quickly and efficiently to ensure training. The adaptations we made allowed us to recognize the ability to increase access to care through telehealth for

underserved populations and mentally and physically ill patients who found it difficult to leave their homes for in-person appointments in the past. Programs should continue to explore ways to have a flexible training model that can adapt to global pandemics or other emergencies. Our program's COVID-19 adaptations supported interns in their development of greater autonomy, self-confidence, and telepsychology skills, which is particularly important as each one transitions into their postdoctoral training year with the continuation of the COVID-19 pandemic. This pandemic affected all people differently and some groups were especially marginalized and at risk for physical and mental health complications associated with COVID-19. Training directors should consider ways to integrate diversity-informed training across rotations, activities, and experiences to better equip trainees to meet all patients' needs. Finally, embrace reflective practice in health psychology training.

Conclusion

Virtual classes have potential to improve medical student education on a large scale. We would advise other fields employing similar standardization efforts to emphasize the importance of local program autonomy in order to develop a meaningful and rich educational experience. Virtual physiology classes allowed medical student access to high-quality education. With a standardized, accessible, and expertly-curated curriculum, it was found to be very useful.

Limitations

First of all, our findings are limited by the implementation of the study at a single medical center. Other limitations include small sample size of the cohort, limited number of questions in the theoretical examination, and lack of a control group that attended both online and offline training courses. We hope that our experience can serve as a reference for other medical schools and hospitals. However, since the pandemic is an emergency, further studies such as comparisons between the conventional training program, the online program, and the combination of both are still needed after the crisis.

Conflict of Interest: Nil

Source of support: Nil

What This Study Add to Existing Knowledge

We believe that this novel approach to teaching skills and medical knowledge, as well as providing standardized assessments, are essential during the pandemic and will likely become a standard component of medical education in post-pandemic world. Virtual classes will allow more students access to high-quality expert-curated content while decreasing administrative and financial challenges – both to the program as well as to the students. The virtual classes may allow programs and students to achieve many of the same goals of education, evaluation, and auditioning, while minimizing expense and bias.

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