


Assessing the Role of Internal Motivation and Extrinsic Factors on Online Undergraduate Medical Teaching in a Resource-Poor Setting During Covid-19 Pandemic in North India: An Observational Study

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Purpose: The unprecedented academic environment brought by the COVID-19 pandemic led to the evolution of online teaching as an ineluctable tool for education and training. To ensure that the undergraduate teaching curriculum does not become another victim of the virus, online teaching was started in most medical schools. The undergraduate students enrolled in our institution hail mostly from rural areas and small townships with limited internet connectivity and accessibility due to poor socioeconomic status. This study highlights the students' perception of and motivation towards online classes in respect to internet connectivity and accessibility during COVID-19 pandemic. Since online teaching is essentially a student-centered learning approach, the motivational level of students plays an important role in making teaching protocols effective.

Methods: A prospective qualitative and quantitative assessment of perceptions of 498 medical undergraduate students from 1st, 2nd and 3rd year of Dr. Ram Manohar Lohia Institute of Medical Sciences, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh, India was done using validated online questionnaires and anonymous voluntary feedback during the government-imposed lockdown from March 2020 to November 2020.

Results: On evaluation of 260 responses received, it was found that the majority of students were motivated to attend the online classes but external factors like internet connectivity and household environment were affecting their motivation on a daily basis and thus decreasing the motivation levels. Validity of feedback by Cronbach's alpha was 0.907 and Pearson coefficient between internet connectivity and motivation factors was 0.419 (p-value <0.001).

Conclusion: The extrinsic factors of internet connectivity and household environment hamper the motivation of students to attend online classes; this should be considered as an important factor to enable the desired student-led learning as mandated by competency-based medical education.

Keywords: curriculum, feedback, learning, medical education

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Introduction

The World Health Organization (WHO) declared the COVID outbreak to be a "public health emergency of international concern" on January 30, 2020 and as a pandemic on March 11, 2020.¹ A nationwide mandatory lockdown was imposed

by the government of India, imposed from March 24, 2020, which was extended further. Educational institutions including medical schools were not allowed to reopen.^{2,3} Until the evolution of the Novel Corona Virus and spread of COVID-19 disease which led to worldwide lockdowns and students being stuck at their homes, the traditional pedagogy of physical classrooms was the only method used in majority of higher education centers. This led to an instant evolution of online teaching methods. Various modalities of online platforms started to be used for delivering lectures and practical/clinical curriculum to reproduce the conventional classroom style. Teaching has been conducted via synchronous and asynchronous methods using the internet to continue with academic programs. Apart from delivering lectures and demonstrations, online classrooms have also been used for conducting formative and summative assessments. Since there was a sudden transition from the time-tested classroom to an extremely novel method of teaching and training, a thorough assessment of the online methods and the medical undergraduate students' perspective was much required to bring about quality control in the methodology of online teaching. Our institute is a government set up for which students gained admission as per their merit in a national-level medical entrance exam. Most of the students come from rural backgrounds and poor economic status; for such students, whose parents' livelihoods have been further compromised during lockdown, making available smart phones, laptops, internet connection and e-books to continue with their online teaching can be a very stressful situation. They also face internet and connectivity issues related to their place of stay as most of the regions of rural North India have poor or limited internet connectivity. Accessing internet in the rural parts of India is not the only necessity; providing internet could also promote business growth. Indian government along with IT firms should work more on these areas of interest towards development of rural India and should develop many applications and good infrastructure in rural India.⁴ However, the effectiveness of online teaching is still not clearly understood, particularly in developing countries like India, where there are technical constraints like availability of devices and internet bandwidth in rural areas, which poses a serious challenge for learning of the students.⁵ With this study we aim to assess what factors may motivate or impede online teaching for undergraduate medical students of our institute. The responses helped in assessing the quality of the teaching being given online with respect to the students'

views and how they perceive the concept of online classes and, further, whether these factors should be accounted for and integrated as a hybrid with the pedagogy.

Aim

Our aim is to assess the external factors influencing the motivation level of students for online teaching during the COVID-19 pandemic.

Materials and Methods

Study Design

This is an observational, prospective questionnaire based study conducted online. The cohort is the students enrolled in our institute at the time of study.

Study Population

All the medical undergraduate students studying in the institution. Recruitment of medical undergraduate students in our institute started in 2017 and thus at the time of study we had students only in 1st, 2nd and 3rd year of medical undergraduate training.

Place of Study

The study was conducted at Dr. Ram Manohar Lohia Institute of Medical Sciences, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh, India.

Time of Study

The study was conducted from March 2020 to November 2020.

Ethical Clearance

Obtained from the institutional ethical committee of Dr. Ram Manohar Lohia Institute of Medical Sciences, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh, India under Exemption from review, IEC No. 114/20. It involves comparison of instructional techniques and classroom management methods (as per ICMR Guidelines 2017, pg 36, under Types of Review; Exemption from review). After explaining the purpose of the study, an anonymous and validated feedback form was circulated among the students.

Inclusion and Exclusion Criteria

All the students who willingly participated in the study and submitted their responses with their informed consent were included in the study. Feedback collected maintained

total anonymity and promised that the students were free to voice their opinions and this would have no bearing on their academic results.

Preparation of Feedback Questionnaire

Feedback form was prepared via Google Forms application and was sent to 500 medical undergraduate students on their respective batch Whatsapp groups. The questionnaire consisted mainly of multiple-choice questions. The questionnaire was prepared consisting of 19 items. Motivation-based questions were 13 in number while 6 questions were based on internet connectivity. Opinions on motivation were scored 0–5 (1 for poor, 2 for bad, 3 for neither poor nor good, 4 for good, and 5 for excellent); internet connectivity and external factors-based questions were recorded on a five-point Likert scale, and the answers were subsequently treated as numeric with value 1 for “poor,” 2 for “bad,” 3 for “neither poor nor good,” 4 for “good,” and 5 for “excellent.” Students were asked to submit the feedback for online teaching within a period of a week. Students were told that submitting the feedback form was voluntary and anonymity would be maintained at all costs. Submitting or not submitting the feedback would not affect their grades or academic performance.

Testing and Validating the Feedback Form

Feedback form was validated by internal and external experts. Reliability of the feedback questionnaire was checked using Cronbach’s alpha and validated by the statistical method of Pearson correlation coefficient to calculate the correlation size between two variables. Significance was evaluated with help of p-values.

Results

Demographic Data

The institute has 498 M.B.B.S. undergraduate students enrolled, of which a total of 260 responded (response rate 52.2%).

Out of the total 498 students in the institute, 348 (69.9%) are males and 151 (30.1%) are females. Of the 260 respondents, 65% were male and 35% were female students. Fifty percent of the respondents were from 3rd year, 32% from 2nd and 15% from the 1st year of the medical course.

Geographic Data

Our results showed that 40.4% of the students belong to rural areas with relatively poor internet connectivity and

59.6% of the students to the urban areas, ie comparatively better internet facilities.

Qualitative Assessment

The responses recorded showed a remarkable difference depending upon their area of stay while attending the online classes. For some students it was comfortable to attend the online classes but for some it was difficult because of poor internet connectivity. Our findings suggest that offline learning is at least equivalent or possibly superior to online learning in terms of students’ knowledge, skills, satisfaction and attitudes.

Perception of Motivation of Students

On evaluating the motivation-based variables (Table 1), only 34.3% of students agreed that they were motivated to attend the online lectures and only 16.1% were highly motivated for the same.

Attitude Towards Online Classes Attended

As shown in Table 1, 48.6% of students were satisfied with the presentations for online lectures and 38.1% felt satisfied with the achievement of the learning objectives at the end of the session. According to student responses, 38.2% agreed that online classes increased knowledge and effectiveness for the topics taught and 40% agreed that they were able to understand the topics taught. While only 28.6% of students agreed that enough time was given to clear the doubts during/after the online classes, 44.8% of the students strongly believed that faculty’s interaction with students during the online classes was excellent. Responses showed that 32.4% of students were in agreement that study material of the online classes was made available and was easily accessible; 42.9% disagreed while 22.8% were neutral for online teaching methods being considered as a part of regular classroom teaching, and 36.2% were satisfied with the online teaching sessions being completed within the stipulated time.

Perception on Comparing the Methods of Teaching

As shown in Table 1, the student’s decision was neutral (31.4%) on being asked whether the online classes are equally effective and provide the same benefits as that of classroom teaching; 26.6% of students were again neutral

Table 1 Results of Motivation-Based Variables in Percentage Based on a Score from 1 to 5

Variables	Score				
	1	2	3	4	5
Level of motivation and excitement to attend the online lectures	6.7%	14.3%	28.6%	34.3%	16.1%
Lecture presentation for online lectures	1.9%	4.8%	21%	48.6%	23.7%
Objectives for a lecture were achieved at the end of the session	7.6%	7.6%	29.5%	38.1%	17.2%
Online classes increased knowledge and effectiveness for the topics taught	5.7%	11.4%	31.4%	38.2%	13.3%
Understanding of the topics during online lectures	5.7%	10.5%	38.1%	40%	5.7%
Experience of enough time being given to clear your doubts during/after the online classes	5.7%	14.3%	26.7%	28.6%	24.7%
Faculty's interaction with students during the online classes	4.8%	3.8%	14.3%	32.3%	44.8%
Study material of the online classes made available and easily accessible	10.5%	11.4%	20%	32.4%	25.7%
Online teaching method should be considered as a part of regular classroom teaching	21%	22.9%	22.8%	17.1%	16.2%
Satisfaction with the online teaching sessions completed within the stipulated time	3.8%	4.8%	22%	36.2%	33.2%
Agreeing that online classes are equally effective and provide same benefits as that of classroom teaching	18.1%	29.5%	31.4%	12.4%	8.6%
Comfort regarding your personal study space in attending your online classes from your home	14.3%	21.9%	26.6%	21%	16.2%
Lockdown and household responsibilities well managed with your time for studies	21%	16.2%	40%	19%	3.8%

Notes: 1 for Poor, 2 for Bad, 3 for Neither Poor nor Good, 4 for Good, and 5 for Excellent. Bold:Lowest Value; Bold and Italics: Highest Value.

on being asked about the comfort regarding their personal study space in attending online classes from their home; and 40% of students were indecisive about how they could manage increased household responsibilities during the lockdown along with the online classes.

Perception Based on Internet Connectivity

On evaluating the internet connectivity-based variables (Table 2), 38.1% of the students said that the internet connectivity in the region from where they attended the online classes was not good enough for them to attend synchronous online classes; 42.9% said that the experience of attending online lectures keeping in mind the internet disconnections faced was bad; 52.4% faced regular audio-visual lags whereby 33.3% totally missed 5 or more classes in a week due to this poor internet connectivity; 37.2% could maintain an average score on submitting assignments in the given amount of time, and 32.4% remained highly motivated for attending the online classes despite the poor internet connectivity issues faced.

Quantitative Assessment

Statistical analysis to check the reliability of the feedback questionnaire used Cronbach's alpha to estimate the internal consistency reliability, with a value of 1.0 as perfect consistency. To assess the validity between the two variables, we applied Pearson's correlation coefficient for which the p-value was calculated to check the significance of the results obtained. The calculated values for Cronbach's alpha for our study were between 80–90% (Table 3), which were highly consistent and the p-value calculated (Table 4) for the Pearson's correlation coefficient between internal motivation and extrinsic factors was highly significant.

Discussion

The purpose of our study was to evaluate the effect of external factors on the students' acceptance of online classes in order to help implement better techniques and methods to improve the quality of online teaching methods as it may potentially become an integral part of medical education. Unfortunately, a very few number of studies have evaluated the impact of learners' professional attitudes towards the concept of online teaching.

Table 2 Results of Internet-Based Variables in Percentage Based on a Score from 1 to 5

Variables	Score				
	1	2	3	4	5
Rate internet connectivity in your region from where you attend your online classes	37.1%	38.1%	17.1%	4.8%	2.9%
Experience of attending online lectures keeping in mind the internet disconnections faced	25.7%	42.9%	24.8%	5.6%	1%
Discouragement for attending online classes due to slow computer and poor internet connectivity	32.4%	25.7%	28.6%	8.6%	4.8%
Frequency of experiencing audio-visual lags during online lectures approximately in a week	9.5%	12.4%	12.4%	13.3%	52.4%
Classes missed approximately in a week due to poor internet connectivity	14.3%	18.1%	24.8%	9.5%	33.3%
Experience of submitting the assignments in the given amount of time in respect of internet issues faced	10.5%	19%	37.2%	23.8%	9.5%

Notes: 1 for Poor, 2 for Bad, 3 for Neither Poor nor Good, 4 for Good, and 5 for Excellent. Bold: Lowest Value; Bold and Italics: Highest Value.

Our findings suggest that the students feel online teaching can be used as a complement to traditional pedagogy but never as a replacement for it. They have expressed that they are more comfortable with the traditional classroom methodology than online teaching as it is physically and optically stressful for them to sit in front of the computer screens for long durations. The most important extrinsic factor affecting virtual classrooms is availability of internet facilities, especially for students with resource limitations of data expenditure and internet connection.

Factors affecting students' or learners' motivation in computer-based or distant learning have been mentioned by many of the previous studies which led to development of a theoretical framework for factors that influence the learner's motivation in self-directed e-learning. Song categorized these affecting factors into internal, external, and personal factors of motivational influences. Internal factors can be summarized as the teaching itself that can influence a learner's motivation. External factors comprise of the learning environment that can affect the learner's motivation. Personal factors refer to

motivational driving forces caused by the learner themselves.^{3,8}

Dhir and Saiyad stated the challenges related to technical issues as inadequate infrastructure or unstable internet connectivity for rolling out of online teaching and learning; they also mentioned that institutional strategies are not strong enough for exploring online teaching, along with insufficient funds, pedagogical instability and the faculty being not completely prepared for effective use of online teaching tools and learning management systems, time restraints, lack of appropriate tools for clinical teaching, and direct communication gap between facilitators and the learners. To overcome these challenges, it is required that facilitators and administrators together improve the teaching and learning process in medical schools.^{6,7}

Lao and Gonzales worked on attitudes, perceptions, and experiences of professors and the graduate students too for distant learning through an online portal which can be used as a training tool for administrators and faculty or facilitators.⁹ Kim and Frick found that motivation level during SDEL (self directed e-learning) was the best

Table 3 Results for Calculation of Cronbach's Alpha for Motivation-Based and Internet Connectivity-Based Variables

	Motivation-Based Number of Variables = 13	Internet Connectivity-Based Number of Variables = 6
	Cronbach's Alpha	Cronbach's Alpha
M.B.B.S 1st year	0.884	0.838
M.B.B.S 2nd year	0.926	0.886
M.B.B.S 3rd year	0.917	0.811
Total	0.907	0.851

Table 4 Results Showing Internal Consistency Reliability with Pearson's Correlation Coefficient and p-value

	Motivation vs Internet Connectivity	p-value
	Pearson Correlation Coefficient (r)	
M.B.B.S 1st year	0.366	<0.001
M.B.B.S 2nd year	0.426	<0.001
M.B.B.S 3rd year	0.536	<0.001
Total	0.419	<0.001

Note: Bold: Highly Significant p-value.

predictor of positive change in motivation to predict the level of learner satisfaction.¹⁰

Conventionally, the teaching in the pre- and para-clinical areas involves lectures, small group discussions, demonstrations and laboratory skills. Introduction of novel teaching concepts like flipped classroom lectures and simulation-based learning in the last decade by the medical schools has improved the teaching methods.^{11,12}

O'Doherty et al expressed that the most common factors affecting the medical facilitators from dissipating online teaching during the pandemic and otherwise include time constraints, poor technical skills, inadequate infrastructure and absence of proper institutional strategies. They proposed solutions in their study including improved facilitator skills, imbining positive attitudes and rewards for the time dedicated to develop and deliver the online material.¹³

Hart and Potaliya too elaborated that, in these unprecedented times when institutions have few options and learners' semester credits are in jeopardy, relying on online material provided by the facilitators is the only option. Such modules should be enthusiastic, motivational and should create a desire to learn in the learner.^{14,15} Rangel and Berliner explained that if

students are more motivated to learn, then they are more likely to be engaged; and if they are engaged and engaged successfully, they are more likely to achieve the learning objectives.¹⁶

While technology-based learning is the need of the hour, we need to work on the advantages and barriers it presents for students' learning. Online teaching material helps the students with an easy accessibility to educational material as per their time convenience, in their preferred surroundings and as many times as they want.¹⁷ Faculty roles which have now become more of a facilitator than a teacher and competencies for online learning now play a completely different role as

compared to traditional teaching and learning methods, as the teaching methodology has now been shifted to student-centered learning. Facilitators need to work upon the competencies in the three major areas of technicalities, teaching methods, and content.¹⁸ Other issues which need to be improved are the administrative issues, technical skills, time requirements for online teaching, designing, and handling the online learning modules. If these factors are not taken care of, they can hamper the online teaching, leading to low quality learning and wastage of time and resources in the teaching field.¹⁹ Internet connectivity being a major factor among these, states like Uttar Pradesh, which already have poor resources, are the most compromised. Uttar Pradesh is having the least number (21.64%) of internet users per 100 persons.²⁰ This is due to comparatively lower level of infrastructure available in rural areas than in urban areas, low population density, and the consequent lack of internet business in these areas.²⁰ As reflected in our observations, the resources available to the students like internet connectivity and purchasing power of data can affect their motivation to attend online classes and, if these factors are not taken care of, then there may be detrimental effects on learning and thus the whole purpose of the online teaching is defeated.

Limitations

Findings of our study are limited to our specific geographic region; however, they lay the foundation for future studies for which results may vary between colleges, states and countries with varying socio-economic backgrounds.

Conclusion

With the study conducted on 498 students of our Medical School of 1st, 2nd and 3rd year we concluded that an

amalgamation of both online teaching and traditional pedagogy with the recently introduced CBME method by Medical Council of India in the institutions and colleges should be used. This stands not only for betterment of students but also up gradation of students and the teachers also.

An appropriate categorization of methods used for effective online teaching and learning activities should be developed by formulating learning objectives, content, activities and assessment along with maintenance of optimal virtual contact with students.

In India, being a resource-poor setting in the developing world, there is limited access to the internet and many cannot afford facilities like desktops and laptops; some might not even have access to smart phones. These are major contributing factors affecting the students' learning in the home environment, especially during the pandemic and lockdown.

We need to bring forth a scholarly vision consisting of a holistic approach in order to come up with hands-on solutions for the benefit of medical graduates. Apart from external factors, internal factors equally play an important role for the online teaching programs to be successful, as in our study the internet connectivity and other external factors in the home environment significantly influence the students' motivation.

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Disclosure

The authors report no conflicts of interest in this work.

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