

Original Research Article

Practices and perceptions of online teaching among faculty of medical colleges

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ABSTRACT

Background: COVID-19 pandemic has enormously impacted the medical education system owing to a nationwide lockdown. The faculty of medical colleges had to face an abrupt switch from traditional classroom teaching to online teaching methods, which proved challenging. We aimed to evaluate the practices and perceptions of online teaching among faculty of medical colleges.

Methods: An online survey tool consisting of socio-demographic variables, teaching experience details, online teaching practices, perceived self-efficacy and training and support received was used.

Results: Only 89 of 108 faculty members participated were eligible for the survey. Majority (69.7%) belonged to the age 25-40 years, were Assistant Professors (44.9%) and from Private medical colleges (79.8%) and used Zoom application (71.6%) as their teaching tool. About 16.9% had previous experience of online teaching. Among the teaching practices, content related practices were frequently utilised by the faculty followed by effective communication practices. The overall responses for perceived self- efficacy were above neutral. The faculty received highest and least training/support in content specific knowledge and online classroom management respectively. Linear regression analysis revealed statistically significant positive association of perceived professional and technological self-efficacy with effective communication [$(\beta=0.238, p=0.05)$, $(\beta=0.510, p<0.001)$] and content related practices [$(\beta=0.309, p=0.007)$, $(\beta=0.477, p<0.001)$].

Conclusions: Addressing faculty concerns and appropriate training in the use of digital platforms can help improve online teaching practices thus facilitating effective e-learning. Post-pandemic, a blended classroom and online teaching curriculum would probably provide a better learning environment.

Keywords: Online teaching, Medical college faculty, Perceptions, practices

INTRODUCTION

Coronavirus disease (COVID-19) pandemic has impacted all sectors of life including the education system across the country. The most effective preventive strategy to mitigate COVID-19 transmission was to follow the norms of social distancing. It was a compelling necessity and a nationwide lockdown was imposed by the Government of India. Medical colleges across the country were shut down and

the traditional classroom teaching was suspended to avoid congregation of students, keeping in view their safety and as a measure to contain the disease.^{1,2} Almost all the undergraduate students of medical colleges have relocated to their hometowns leaving behind the didactic lectures, seminars, clinical postings and internal assessment examinations. Our present medical students are imminent doctors. Therefore continuing the learning process even in these exceptional and unprecedented situations is of

paramount importance. The Ministry of Home Affairs, Government of India and many universities have instructed the medical colleges to conduct online classes as per the academic year curriculum.³ Online pedagogy became the new norm. Several countries across the globe were on the same path. Increasing use of technology in the field of learning has improved the standard of education. Online learning and teaching process is convenient, flexible, less costly, and easily accessible and ensures remote learning. Other benefits observed were automatic attendance and structured interaction with the students. The students also become self-directed learners which is an important competency for encouraging lifelong learning processes among health professionals.

Online learning has its own pitfalls. Technical issues are the prime concern. The shift from conventional classroom teaching to the digitally driven virtual teaching/learning was all of a sudden and unplanned. It was a challenging task for students as well as the faculty, but ultimately most of them have adapted very quickly. Although there is a lot of information available to students on the internet, the live online lectures by the faculty provide guidance and a conducive academic environment for learning in the proper context of their curriculum. The medical faculty play a key role in guiding and motivating the students in this phase of transition towards online classes. Success of the learning systems is highly influenced by its acceptance by the students and the faculty. Therefore understanding their views towards online classes is necessary so that their concerns can be addressed properly.⁴ Hence we tried to evaluate the practices and perceptions of online teaching among faculty of medical colleges.

METHODS

A cross sectional observational study was conducted in the month of February 2021 (03rd February 2021 to 24th February 2021) to understand the practices and perceptions of online teaching among faculty of medical colleges. Institutional Ethics Committee approval was obtained prior to the initiation of the study. Snowball sampling technique was adopted to recruit participants into the study. The initial eligible respondents could potentially recruit more respondents from their acquaintances. A convenient sample size was considered. Inclusion criteria included i) Being a faculty member involved in online teaching in medical colleges in India ii) Having experience in both traditional classroom and online modes of teaching. An online semi-structured questionnaire with annexed informed consent form was developed as a Google form in English language. The survey link generated was sent through online platforms like emails, WhatsApp, Facebook to the faculty acquaintances of the investigators. Only completed surveys were considered. After consenting for participation, faculty were directed to a screening question. Faculty who did not have experience of both classroom and online teaching methods were excluded from the study using the screening question. Those eligible for the survey were then directed to the

questionnaire. All the questions were mandatory for the participants. The anonymity of participants was ensured.

The questionnaire consisted of 5 sections with a set of questions appearing in sequential order as: socio-demographic variables, teaching experience details, ten items concerning online teaching practices, six items regarding perceived self-efficacy, seven items on training and support received. Section 2 also included questions on tools used for online teaching and regarding any online teaching experience prior to the pandemic.

For items in section 2 and 3, the participants had to respond on a 5-point Likert's scale ranging from 1- "Strongly disagree" to 5- "strongly agree" (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). Section 5 with items about the training and support received by the faculty had responses on a scale of 1-5, where 5 = "Excellent", 4="Above average", 3= "Average", 2= "Below average" and 1= "None". The final question in the survey was about preferred mode of teaching, where the faculty had to choose one response among online classes, classroom teaching, and blended teaching (combination of online and classroom teaching). The survey instrument used by Lin and Zheng (Cronbach's alpha- 0.63-0.88) was modified by the authors and adopted for the present study.⁵ The internal consistency of the modified version of the questionnaire was good for items on online teaching practices (Cronbach's alpha =0.88) and perceived self-efficacy (Cronbach's alpha =0.91). The survey tool took approximately 5-10 minutes to complete.

Data analysis

The data obtained was organized into Microsoft excel sheet and Statistical Package for Social Sciences (SPSS) software version –26 was used to perform statistical analysis. Data are presented as mean±standard deviation (SD) for continuous variables and frequencies and percentages for categorical variables. The frequencies of various tools used by faculty for online teaching were graphically depicted in a pie chart. Analysis of variance (ANOVA) test was used to determine any significant difference between means of various teaching practices and perceived self-efficacy across demographic and teaching-related variables of the faculty. The relationship between various faculty variables and online teaching practices was examined using linear regression analysis. $P < 0.05$ was considered statistically significant for all analyses.

RESULTS

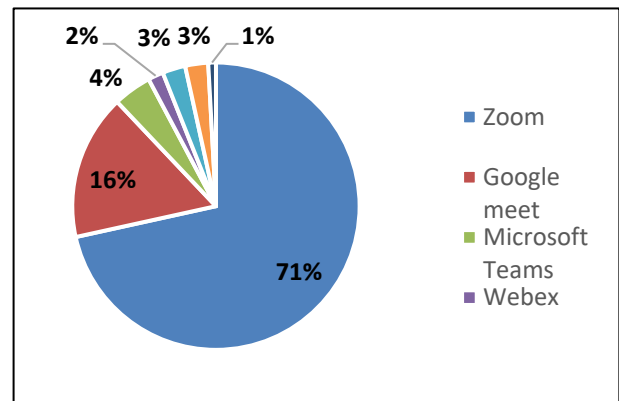
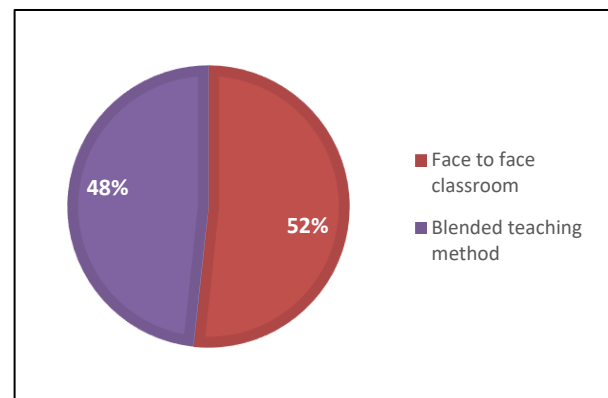
A total of 108 medical faculty participated in the online survey. Of the 108 respondents, only 89 could complete the survey, as two participants didn't provide consent for the survey and 17 respondents were excluded with the screening question. Out of 89 respondents, there was almost equal participation from both the genders (52.8% (n=47) males versus females (47.2%, n=42).

Table 1: Demographic and teaching experience details of participants of the study.

Variable		Frequency (n=89)	%
Gender	Male	47	52.8
	Female	42	47.2
Age group (in years)	25-40	62	69.7
	41-60	17	19.1
	>60	10	11.2
Designation	Resident	13	14.6
	Assistant Professor	40	44.9
	Associate Professor	17	19.1
	Professor	12	13.5
	Tutor/other	7	7.9
Faculty in	Government Medical College	18	20.2
	Private Medical College	71	79.8
Teaching experience (in years)	0-2	19	21.3
	3-5	33	37.1
	6-10	20	22.5
	>10	17	19.1
Any online teaching experience prior to COVID-19	Yes	15	16.9
	No	74	83.1
No. of online classes conducted during the period of pandemic	Once a week	41	46.1
	Once a month	20	22.5
	Twice a month	20	22.5
	Twice a week	5	5.6
	Thrice a week	2	2.2
	more than twice per month	1	1.1
(Mean±SD)			
Age (in years)		39.25±11.75	
Teaching experience (in years)		7.91±8.74	

Majority (69.7%, n=62), of the respondents belonged to the age group of 25-40 years, while 19.1% (n=17) were of the age 41-60 years, and 11.2% (n=10) were older than 60

years. Mean (\pm SD) age of the participants was 39.25(\pm 11.75) years. (Table 1)

**Figure 1: Tools used for online teaching in the present study.****Figure 2: Preferred mode of teaching of the participants in the present study.**

Among the participants in the survey, a greater proportion (79.8%, n=71) of the faculty were from Private medical colleges, rest 20.2% (n=18) belonged to Government medical colleges. Assistant Professors constituted about 44.9% (n=40) of the participant group. Only a minor portion (16.9%, n=15) of the participants had experience of teaching online prior to the pandemic. Mean (\pm SD) teaching experience of the faculty was calculated to be 7.91(\pm 8.74) years. Nearly half of the faculty (46.1%, n=41) were engaged in at least one online class per week during the pandemic. (Table 1)

Digital tools utilized by the faculty for online teaching are represented in Figure 1. Majority of the faculty utilized the digital application 'Zoom' as their tool for online teaching and interaction with students. Zoom constituted the most frequent (71.6%) digital platform used by the faculty followed by Google Meet (16.4%).

Other online platforms such as Microsoft Teams, WhatsApp, Skype and WebEx meet were used to a lesser extent.

Table 2: Comparison of online teaching practices based on demographic and teaching related variables.

Variable	Teaching Practices									Perceived self-efficacy						
	Frequency	Effective communication			Content related practices			Classroom management practices			Professional efficacy			Technological efficacy		
		N	Mean±SD	f	P	Mean±SD	f	P	Mean±SD	f	P	Mean±SD	f	P	Mean±SD	f
Gender																
Male	47	3.59±1.06	2.116	0.149	3.94±0.92	1.053	0.308	2.98±1.41	0.043	0.835	3.35±1.27	2.243	0.138	3.48±1.24	0.836	0.363
Female	42	3.88±0.79			4.12±0.63			3.04±1.19			3.72±1.06			3.7±0.90		
Age group (in years)																
25-40	62	3.79±0.95	0.450	0.639	3.97±0.80	0.726	0.487	2.90±1.36	0.791	0.457	3.47±1.21	0.878	0.419	3.58±1.11	0.267	0.766
41-60	17	3.62±0.911			4.25±0.77			3.23±1.23			3.85±1.22			3.72±1.20		
>60	10	3.53±1.06			4.06±0.86			3.35±1.08			3.30±0.88			3.40±0.78		
Designation																
Resident	13	3.30±0.93	1.486	0.214	3.84±0.91	1.679	0.162	2.92±1.46	1.567	0.191	3.15±1.35	1.469	0.219	3.30±1.123	1.761	0.144
Assistant Professor	40	3.70±0.93			3.87±0.81			2.68±1.30			3.36±1.25			3.46±1.155		
Associate Professor	17	3.94±0.83			4.15±0.76			1.18±3.37			3.85±0.98			3.92±0.98		
Professor	12	3.66±1.082			4.416±0.593			3.37±1.00			3.62±0.93			3.39±0.97		
Tutor/other	7	4.28±1.02			4.34±0.73			3.28±1.52			4.21±1.14			4.35±0.85		
Teaching experience (in years)																
0-2	19	3.54±1.16	0.413	0.744	3.95±0.85	1.928	0.131	2.71±1.40	2.008	0.119	3.21±1.41	1.229	0.304	3.43±1.33	1.325	0.272
3-5	33	3.75±0.92			3.86±0.86			2.81±01.24			3.40±1.18			3.40±1.045		
6-10	20	3.88±0.75			4.04±0.73			3.10±1.14			3.75±1.14			3.97±0.97		
>10	17	3.72±1.01			4.42±0.57			3.64±1.02			3.85±0.91			3.67±0.99		
Total		3.73±0.95			4.03±.80			3.01±1.30			3.52±1.18			3.58±1.09		

Table 3: Descriptive statistics of training and support received by faculty members.

Training/support	Mean±SD
Content specific knowledge	4.07±0.876
Technology based skills	3.94±0.958
Organizing and structural instructional content for online teaching	3.93±1.031
Strategies for accommodating different online learning styles	3.73±1.116
Effective communication with online students	3.72±1.158
Finding and evaluating quality resources for online classes.	3.63±1.132
Online classroom management	3.58±1.195

Table 4: Multiple linear regression analysis of factors associated with various online teaching practice.

Variable	Online Teaching practices														
	Communicating effectively					Content related practices					Classroom management practices				
	Unstandardized Coefficient B	SE	Standardized Coefficient t	t	P	Unstandardized Coefficients B	SE	Standardized Coefficient t	t	P	Unstandardized Coefficients B	SE	Standardized Coefficient t	t	P
Age	-0.017	0.013	-0.212	1.377	0.172	-0.002	0.010	-0.025	0.172	0.864	0.024	0.018	0.214	1.356	0.179
Female	0.027	0.064	0.014	0.164	0.870	0.059	0.129	0.037	0.461	0.646	0.096	0.231	0.037	0.415	0.679
Designation	0.115	0.097	0.131	1.186	0.239	0.073	0.076	0.099	0.958	0.341	-0.003	0.137	-0.002	0.020	0.984
Teaching experience	0.005	0.016	0.049	0.341	0.734	0.009	0.012	0.093	0.691	0.491	0.003	0.022	0.019	0.128	0.898
Professional self-efficacy	0.191	0.096	0.238	1.984	0.050*	0.209	0.076	0.309	2.766	0.007*	-0.002	0.136	-0.002	0.015	0.988
Technoloic al self efficacy	0.445	0.103	0.510	4.306	<0.000**	0.349	0.081	0.477	4.319	<0.000**	0.802	0.145	0.672	5.520	<0.000**

* - p<0.05, **-p<0.01 (Statistically significant).

The ten-item questionnaire on online teaching practices were categorized into three broad categories: 1. Effective communication (3 questions) 2. Content related practices (5 questions) and 3. Online classroom management practices (2 questions). Items in the survey with regard to perceived self-efficacy were categorized into perceived professional self-efficacy (2 questions) and perceived technological self-efficacy (4 questions). Composite scores were obtained for the three broad categories of online teaching practices and two perceived self-efficacy categories by adding the participants' responses for various items in each category. Descriptive statistics were applied to illustrate the usage of these online teaching practices and perceived self-efficacy by medical faculty and were compared across different demographic and teaching-related variables.

Among all the online teaching practices, content related practices were frequently utilised by the faculty (Mean±SD=4.03±0.80) followed by effective communication practices (Mean±SD=3.73±0.95). Classroom management practices were utilised less frequently (responses below neutral) by majority of the faculty members (Mean±SD = 3.01±1.30). The mean (±SD) of the responses for perceived self-efficacy, both professional (3.52±1.18) and technological (3.58±1.09) were rated above neutral across different demographic and teaching related variables. Our study revealed that female faculty used all the three categories of online teaching practices more frequently than male faculty. Effective communication practices were more frequently used by faculty belonging to the age group between 25-40 years and with a teaching experience of greater than 6 years. Content related practices were more frequently utilised by professors, with a teaching experience of more than 10 years belonging to the age group between 41-60 years. The perceived self-efficacy with regard to online teaching was greater in female faculty, in the age group between 41-60 years, with a teaching experience of greater than 6 years and among tutors. However, Analysis of variance (ANOVA) test revealed that the difference between the mean values of various online teaching practices and perceived self-efficacy was not statistically significant across different demographic and teaching-related variables. (Table 2)

The top three types of training and support received by the faculty were in content specific knowledge (4.07±0.87), technology-based skills (3.94±0.95), and organising structural content for online teaching (3.93±1.03). They received least amount of training in online classroom management (3.58±1.19) followed by evaluating quality resources for online teaching (3.63±1.13) (Table 3)

Multiple linear regression analysis of factors associated with online teaching practices revealed a statistically significant association between perceived self-efficacy both professional as well as technological with online teaching practices. Perceived professional self-efficacy had statistically significant positive association with

effective communication ($\beta=0.238$, $p=0.05$), and content related practices ($\beta=0.309$, $p=0.007$). Perceived technological self-efficacy had statistically significant positive association with effective communication ($\beta=0.510$, $p<0.001$), content related practice ($\beta=0.477$, $p<0.001$) and classroom management practices ($\beta=0.672$, $p<0.001$). (Table 4)

The preferred mode of teaching of the participants in the present study revealed almost equal (52% versus 48%) percentage of responses for face to face classroom teaching and blended mode of teaching methods (mixture of online and traditional teaching methods). (Figure 2)

DISCUSSION

We are living in a technology-driven world. The recent innovations in technology have revolutionized the education system. In this smart learning environment, the role of a teacher is modified from being an instructor to being a facilitator of knowledge. The pandemic of COVID-19, with its consequence of lockdown, has hastened the transformation of the education system from conventional classroom environment to the novel methods of online pedagogy and e-learning. Widespread accessibility and uninterrupted connectivity of the internet has made e-learning possible even in unprecedented times. Change in any system is always a challenge, more so, if it's abrupt and rapid. Medical schools in some parts of the world, with previous experience of severe acute respiratory syndrome (SARS) in 2003 have developed pedagogical innovations involving technology and simulation-based teaching, including online lectures, video clinical vignettes, and virtual simulators to provide uninterrupted education.⁶ On the other hand, majority of the faculty in the medical colleges of developing countries, like India, are used to traditional classroom teaching methods. Several institutes were unprepared for online teaching exercise.⁷ In our survey, about 82% of the faculty had no previous experience of online teaching. It is extremely challenging for these faculty, lacking prior online teaching experience and training in the same, to involve in effective online medical teaching. Also, owing to scarce healthcare personnel in the country, a greater portion of the faculty in Medical colleges have been redirected to participate in the fight against the pandemic. Faculty had to oblige their duty towards the patients, taking extreme precautions about their individual health, at the same time, address the new challenge of online teaching methodology. Adoption of a new teaching and learning process requires support and acceptance of the teaching faculty and the students using it. Our study thus can identify the lacunae among the online teaching practices of the faculty and thus, help to address the same which is quintessential for effective online medical teaching.

A plethora of online tools (for video/audio conferencing) and social media platforms are available for the teachers to communicate and interact with their students. Also a

number of online methods of assessments exist. In our study, most of the faculty chose Zoom application for the conduction of their online classes.

The online teaching practices were classified into 3 major parts in our study, viz., Effective communication practices, content related practices and classroom management practices. Effective communication and interaction with the students play a pivotal role in remote learning. It is required to strengthen the student-teacher relationship to create an enriching and conducive environment that sustains the motivation of the student towards acquiring knowledge and their regular attendance to the classes. Communication can be asynchronous which allows the transmission of messages that can be viewed and responded to at any moment of time, as per the student's convenience. (Chats, blogs, documents, pre-recorded audio message/video, emails). Synchronous and real time communication occurs in the live online lectures (video lectures). Both can be used in online teaching.⁸ To further improve the quality of online teaching and enhancing student engagement, several strategies like providing clear directions at the beginning of the sessions, giving breaks, introducing gamification, breakout rooms, polls, and whiteboards during the lectures are recommended.⁹ In remote learning, a time gap in interaction is identified to be a potential barrier. Hence, a timely response and feedback are essential for engaging students.¹⁰ We evaluated the online communication of the faculty (questions such as regular communication with students, interaction similar to face to face classroom and timely response to student queries) and found out that the responses were above neutral ($\text{Mean}\pm\text{SD}=3.73\pm0.95$) and were more frequently used by faculty belonging to the age group between 25-40 years and with a teaching experience of greater than 6 years. It reflects the greater ability of younger generation faculty to use technological tools as means of communication with the students as they are better acquainted with it.

Content related practices were the frequently ($\text{Mean}\pm\text{SD}=4.03\pm0.80$) used teaching practices in our study. These were assessed by questions on utilization of multiple teaching strategies by the faculty and their ability to provide different resources for the students, and respond to queries real time. Faculty aged 41-60 years, with a teaching experience of more than 10 years, who were professors by designation had frequent content related practices. It mirrors the expertise of faculty in their respective subjects and their ability to demonstrate it on the digital platform. Moreover, faculty participating in our survey received highest training in content specific knowledge, thus able to practice them frequently. In e-learning, the physical absence of teachers and learners can be compensated by multiple instructional methods. They add to the strength of the online educational process.¹¹ Classroom management practices were the least used practices. In this category, the survey tool included items such as monitoring cheating in the online class and use of technology to address inappropriate behaviour of the

students. It indicates the inadequacy of training of the faculty in those aspects of online teaching.

Our study also evaluated medical faculty's perceived professional and technological self-efficacy and areas of training and support provided. Professional self-efficacy comprising of questions on being confident to deliver online lecture as effectively as face to face lecture and being able to motivate the students to do their home assignments, had above neutral response from the participating faculty ($\text{Mean}\pm\text{SD}=3.52\pm1.18$) Technological self-efficacy ascertained through questions, such as, being confident to use appropriate technology for teaching and designing assignments for students and helping students when they had difficulty with computers and provision of various e-learning resources to the students, were rated above neutral by the participants in our survey. ($\text{Mean}\pm\text{SD}=3.58\pm1.09$). However unlike our survey, Aziz et al, in their study on medical education during COVID-19 pandemic, found out that teacher's self-efficacy was compromised because of uncertainty in the achievement of required learning objectives during online teaching.⁷ In our study, faculty who perceived to be professional efficient were more likely to have better online teaching practices. This emphasises on the need for good professional training of the faculty, especially in organising structural instructional content for online teaching and adoption of different online learning styles, for enhanced online medical education. Similarly faculty who had greater perceived technological self-efficacy were associated with better online teaching practices. Therefore, adding Information technology-based skills to the faculty training programs, would definitely improve their efficiency in online teaching.

The mean responses for the training and support received by the faculty were greater (above average) for content specific knowledge and technology based skills. Training in classroom management skills was the least among all. This is reflected in the less frequent usage of classroom management practices, among all teaching practices. Dearth of appropriate training of the faculty has been identified as a significant obstacle in implementing online teaching programs Training is required for the faculty, not only in the aspects of engaging the learners actively in online classes but also in carrying out assessments using technological tools.⁹ The medical faculty need training to ensure that they are familiar with online environment to provide effective guidance to the students. A multidisciplinary team support and institutional and infrastructural support is necessary for the training of the faculty to achieve the goals of this evolving mode of education.¹²

The concluding question of the survey was about their preferred mode of teaching for which majority voted for traditional online teaching (52%). However the remaining 48% of the faculty favoured blended teaching. In study conducted by Shetty et al, medical students preferred a combined online and classroom learning approach for their

better academic development.¹³ Rajab et al, in their study on challenges in online medical education found out that about 62.5% preferred blended conventional and online method of teaching, while only 25.5% preferred face to face instruction.¹⁴ In another study on pharmacy students and faculty, done by Syofyan et al, majority favoured blended learning over fully online or face to face lectures.¹⁵

The online teaching and e-learning has been welcomed by the medical student community.^{16,17} It allowed them to continue their education without interruption in the most comfortable zone, in their homes, during the pandemic crisis. Lack of social support in the form of peer groups, probably may have left some students in isolation at their homes. However, Clinical and practical skills are utmost important in medical education. The genesis of the next generation doctors shouldn't be hampered by any pandemic. It is of considerable challenge as to how online methods of teaching can be adapted to impart these skills remotely. Also, it's an opportunity for innovation of newer teaching methods.

CONCLUSION

COVID-19 pandemic has changed the way we teach our undergraduates. E-learning is on a trajectory pace in the field of education. Our study supports that online classes can be a supplement to traditional classroom teaching but never a complete replacement. A well-trained competent faculty will effectively facilitate student learning and positively impact student outcomes. Addressing the faculty concerns and providing training in necessary aspects will further positively motivate the faculty which in turn helps in the success of online learning.

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