



E-learning and online assessment in COVID-19 era: Students' perspective

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ABSTRACT

Introduction: COVID-19 pandemic has a major impact on the health and education system globally and elearning platform has up-surged to impart medical education. Various strengths and challenges encountered while using e-learning platform by learners and facilitators, could be identified and improvised to implement future hybrid model in medical education.

Aim and Objectives: The aim of our study was to explore the advantages, disadvantages, challenges and strengths of online teaching-learning-assessment in COVID-19 era through feedback by the learners.

Methods: The cross-sectional study was conducted after IEC approval and consent, over 121 phase 1 MBBS students using e-platform for teaching-learning, and assessment sessions. An online feedback via Google form was taken using validated questionnaires. The data was graphically represented and expressed in proportion; unpaired student's t-test was applied to evaluate the statistical difference between the rating score for online & direct contact classes.

Results: Majority of learners disagreed on advantages of e-learning over direct contact classes for better learning (72.7%), opportunity for interaction with teacher (62.8%), comprehensiveness (72.7%), and difference in learning (64.5%). However, learning objectives & presentation were clearer and understandable (43.8%), with better opportunity for SDL (41.4%). Direct contact classes were better than online classes as agreed by 82.7%. Network problem, eye strain, long duration of classes, and other issues were faced by 87.4% learners during online classes. The mean rating for the online classes and direct contact classes was 4.88 ± 2.31 and 7.83 ± 2.61 respectively (*p*=0.00). Direct contact classes followed by assessment (40.7%) remained the first preference of the students. The outcome of e-assessment was encouraging as 83.5% students scored >70%, and 58.3% learners faced network related issues, and fear/panic of not being able to submit within time.

Conclusions: Identifying the limitations, challenges and strength of innovative online teaching and learning practices will help in developing a future hybrid teaching-learning module which could be adopted to enhance learning.

Keywords: E-learning, Zoom & WhatsApp, Google form, COVID-19, Online teaching-learning, Feedback **INTRODUCTION**

The outbreak of the current COVID-19 pandemic not only affected the working culture of society but it has also revolutionized the trend of education system. As there have been fast technological innovations over the past few decades, hence, e-learning was accepted and adopted as the major platform of education



system globally under the threat of COVID-19. As described by Howlett *et al* [1], "Electronic (e) or online learning can be defined as the use of electronic technology and media to deliver, support and enhance both learning and teaching and involves communication between learners and teachers utilising online content".

The emergency e-learning protocols have emerged among schools and professional institutes in response to this pandemic to fill the gap created by suspended classroom learning. But every coin has its two faces; one aspect is the continuous delivery of teaching and learning during this era of physical distancing, while other aspect is the sudden and rapid shift to online learning, with no formal training, insufficient internet facilities or bandwidth, and little preparation of lesson plan. But it has created a great possibility for evolution of a new hybrid model of education in future with significant benefits.

The emergency e-learning in response to current COVID-19 pandemic crisis is not which is practiced for the first time. The similar type of emergency elearning programs in response to medical crisis had been observed in Fall 2009 during H1N1 pandemic, the education imparting schools and institutions considered contingency plans that involved substitution of traditional face-to-face classes for online classes [2]. The analogue of COVID-19 response was also observed during Hurricane Katrina's landfall in August 2005 that led to physical damage and demolition of many colleges in the Gulf region and in Texas making it impossible for oncampus teachings. In response to the natural disaster crisis, many institutes and universities incorporated online and distance learning in their plans known as "Sloan Semester" which was named for the sponsoring Alfred Sloan Foundation [3].

Since 2012, the online learning has immensely increased as evidenced by flourishing of massive open online courses (MOOCs) [4]. Moreover, the current progress in technology and affordable internet connectivity has enabled accessibility to online learning even in low resource settings than a few years ago [5]. The faculty development program implemented by Medical Council of India (MCI) in order to achieve goal of Indian Medical Graduate (IMG) through Competency Based Medical Education (CBME) has also accelerated the training of medical faculties on medical education technologies which has sensitized them for e-learning and self -directed learning.

The effectiveness of online learning is determined by many factors, such as technical skills, academic skills. learner motivation, internet connectivity, the multimedia knowledge of materials usage. administrative issues and other technical issues [6]. The effective analysis of online teaching in medical education during the COVID-19 era, therefore, should depend on a comprehensive consideration of various factors influencing the learner, facilitator and the multimedia. Various strengths as well as challenges are encountered during online learning platform by students and facilitators which may be helpful in modifying various aspects of the modern education delivery system and thereby could help to establish good online practices by the cumulative experiences. Hence, this study has been planned to explore the challenges and strengths of online teaching-learning through feedback by the learners in order to improvise the e-learning programme for effective learning.

AIM AND OBJECTIVES: The aim of our study was to explore the advantages, disadvantages, challenges and strengths of online teaching-learningassessment in COVID-19 era through feedback by the learners in order to identify the factors for the improvisation and thereby implementation and adaptation of e-learning interventions to sustain elearning equitably and effectively.

MATERIAL AND METHODS: The crosssectional study was conducted over 121 Phase 1 MBBS students of Rohilkhand Medical College and Hospital, Bareilly, U. P., India after taking Institutional Ethics Committee (IEC) approval and online informed consent from the participants. Initially, we have incorporated the use of Zoom and WhatsApp as a Learning Management System (LMS) teaching-learning, and assessment for in Biochemistry. A WhatsApp group of Phase I MBBS students and faculties of Biochemistry department already created was used to communicate and provide updates of the information, share resource materials and two-way discussions on the topics. Teaching-learning sessions were conducted through Zoom classes which included Power Point

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presentations, video demonstrations, and discussions including question answer sessions. Learning resource materials including PDF files of lectures, links of the articles and YouTube videos explaining the concepts, were shared for students in the WhatsApp group. Early Clinical Exposure (ECE) activities, which included clinical case discussions, were conducted in co-ordination with faculties of respective departments on online portal to fulfil integration concepts framed by Graduate Medical Education Regulation 2019 [7]. Faculties were open to take questions from the students and resolved their queries up to their satisfaction through WhatsApp and sometimes by individual phone calls also. Formative assessment of the students was conducted comprising multiple-choice questions (MCQs), short answer questions, and multiple true and false questions through Google forms followed by feasible constructive feedback. We considered outcome of the above teaching-learning methods to be successful if >60% students scored >70% marks in assessment.

Later, an online feedback administered via Google form was taken from the students comprising 28 preset and validated questionnaires comprising mostly of Likert's scale, rating scale, and open-ended questions. Out of these, 21 questions were for feedback on online e-learning through Zoom & WhatsApp, and 7 questions for feedback on online assessment through Google form. The feedback responses in the Google form received online from the students were graphically represented and were expressed in proportion with the help of Microsoft Excel 2010. Appropriate statistical methods were used to interpret the results. The unpaired student-ttest was applied to find out statistical difference between the rating scores for online & direct contact classes (*p*<0.05).

RESULTS: In view of uncertainties on the pandemic and lockdown, our institute started online classes for all professional MBBS students to cope up with the academic lag and maintain continuity of semester and the session. We engaged ourselves for preparedness of COVID-19 and teaching-learning sessions with a combination of apprehension for COVID-19 and enthusiasm for exploring new opportunities on elearning in alignment with CBME to face the duo challenges. Gradually we moved ahead accelerating on both the fronts regaining more and more confidence and conducted online teaching-learning, assessment, and feedback sessions successfully.

As depicted in figure-1, the feedback responses of learners on advantages of e-learning as compared to direct contact classes was recorded on majority as disagreement on Likert's scale (strongly disagree & disagree) for better learning (72.7%), better opportunity for interaction with teacher (62.8%), more comprehensive (72.7%), make difference in learning (64.5%), better e-learning design & methods (64.5%), and useful for future purpose (51.2%). The percentage of neutral responses for these points was more (range 18.2% - 28.1%) than those of their total agreements (range 6.7% - 20.7%). However, their response was almost similar on disagreement (41.3%) and agreement (39.6%) scale on better relaxed environment during class. For learning objectives & presentation being clearer and more understandable, majority agreed (43.8%) while 33% disagreed and 23.1% remained neutral. Majority (41.4%) agreed, 28.3% disagreed and 30.6% stayed neutral on better opportunity for SDL.

Feedback of learners on disadvantages/limitations of e-learning was also sought as shown in figure-2 and majority of the learners agreed and strongly agreed on questions based upon limitation for queries (59.5%), network issues & limited opportunity for student-teacher interaction (86.8%), more useful combined e-learning & direct contact classes (45.4%), WhatsApp was better tool for question & answer session (49.6%), and direct contact classes being better than online classes (82.7%).

The outcome of assessment was encouraging as 83.5% students scored >70% and only 3.3% students scored <50% by the assessment tools through Google form. Feedback responses of learners on online assessment through Google forms reflected that majority agreed and strongly agreed on questions related to relevant topic (78.5%), adequate time given (47.1%), and helpful for better learning and self-assessment (77.7%). On the question of online assessment must follow each e-learning session for better understanding & learning, their response was recorded equally (38%) as neutral and combined agreement scale. However, majority disagreed (46.3%) for hassle free assessment without any technical issues (Fig. 3).

Direct contact classes followed by assessment (40.7%) remained the first preference of the students followed by a combination of direct contact & online class, and group discussion followed by assessment (31.4%). Direct contact and online class followed by assessment (11.9%) was opined by the learners as less appropriate method for better learning (Fig. 4). Majority of the learners couldn't clearly opine (58.4%) about Zoom if combined with WhatsApp could be utilised for better learning. Only 25.8% frankly said that Zoom if combined with WhatsApp could be utilised for better learning (Fig. 5).

We noted varieties of responses from learners on challenges and advantages of online teachinglearning and assessment through open ended questionnaire. Most of the learners (87.4%) faced various issues like network problem, audio-video lag, eye strain, less attention span, headache, background disturbances, long duration of classes, and lack of knowledge of new technology during online teaching learning sessions (Fig. 6, Table 1). Some students also expressed their views on advantages of online teaching-learning session, like relaxed environment continuity education at home. of during pandemic/lockdown and enhancement of selfdirected learning (SDL) but according to many of the students (47.1%), there was no advantage at all. (Table 2)

During online assessment, 58.3% learners faced various issues like network problems, fear/panic of not being able to submit within time, technical problems during submission of response, and limited time as per their open-ended responses. However, 41.7% students did not face any issue during online assessment and submission (Fig. 7, Table 3).

We also obtained the feedback rating from the students for online and direct contact classes on a scale of 1 - 10. The mean (\pm S.D.) score given for the online classes and direct contact classes was 4.88 \pm 2.31 and 7.83 \pm 2.61 respectively. The unpaired student-t-test was applied to see the statistical difference between the scoring for online & direct contact classes, which was found to be significant (*p*=0.00). Similarly, the rating on online assessment through Google form was given as 6.82 \pm 2.26 on the scale of 1 – 10, by the learners.

DISCUSSION: We are facing the freakish academic crisis in schools, colleges as well as in the

professional institutes in the current pandemic. The circumstances led to the expeditious transition from traditional method of teaching-learning to the online education system which resulted in perplexity and confusion among educators and learners. In the present study, the feedback responses received from learners revealed the major disagreement over various aspects of expediency for e-learning viz. better learning, better opportunity for interaction with teacher. better method of learning, more comprehensive and useful for future purpose. The points on which learners show their agreement in majority were the relaxed environment, clear & understandable lecture and better opportunity for self-directed learning (SDL). Similarly, learners were in consensus over the various elements of disadvantages during e-learning viz. limitation for queries, issues of network & limited opportunity for student-teacher interaction. Though majority of learners did not find any significant issues during online assessment and they also considered the assessment tool relevant, however, the network issues and fear of timely submission puzzled them. The inconsistent response on the agreement for pros and cons of online classes and assessment showed their attitude as more vigilant and careful during the online assessment sessions. Similar types of responses from the learners were also observed by few other researchers which are in accordance with our study [8,9,10]. On the contrary, a meta-analysis conducted in China to find out the superior method of teaching between online and offline teaching-learning, showed little difference on the basis of pre and post-test scores [11]. A study used a delayed retention test and showed that online learning was better than traditional learning [12]. A crossover study was also done in London to compare eLearning with traditional lectures in ophthalmology teaching and the outcome showed better satisfaction and examination performance by undergraduate students through e-learning [13]. In our study, better learning happened as reflected by the scores of the learners because the sessions were well planned and delivered with clear objectives with timely assessment. Online teaching-learning necessitates the use of assessment by proper plan and design as foremost it acts as a substitute for traditional formative and summative assessment and secondly it also helps learner and teacher to introspect.

Direct contact classes followed by assessment, and combination of direct & online classes with group discussion followed by assessment were the most preferred options by the students. Based on the response over question related to WhatsApp and Zoom as a combined teaching-learning tool, majority stayed neutral or agreed upon. Another study from India used the similar platform for assessing efficacy of Google classroom as LMS for teaching Biochemistry in a medical college, they reported the response of learners as the better access to learning material and other teaching resources, benefits of immediate feedback, and relaxed learning environment. Students also preferred mobile phones rather than laptops for online learning [14]. Almost all of the students have been using smart phones and WhatsApp on routine basis and they are familiar with technology. Addition of Zoom with WhatsApp for learning as well as discussions led to better interaction and filled the gap in teaching-learning process to some extent. So, there was nothing significant negative issue related to the combined leaning platforms. In view of future hybrid system of learning, these platforms can be used in addition to direct contact classes to add value to traditional education system.

The present study has also explored the strengths, limitations, and challenges faced by the Phase I MBBS students during online teaching-learning It revealed that the sessions and assessment. accessibility issues were the major limitations for the e-learning sessions including online assessment. The main challenges were the network issues, technical glitches, poor internet speed and audio-video quality. Other challenges faced by learners were the eye strain, headache and exhaustion during long duration of e-classes. Learners also had poor concentration and less attention span during online classes as compared to direct contact classes. During online assessment, the major issue was the network connectivity along with the technical issues and also had fear for the new technology and of submission failure within time. Almost similar issues were also noted by other researchers in their studies during this pandemic [8,9,10]. In our institute, admitted students are from different parts of the country belonging to urban, semi-urban and rural areas where there is variation in network coverage and internet speed of various service providers with limitations of data pack to some extent. As this unexpected lockdown did not give time to get well versed with technology both at learners and facilitators ends, although faculties were already sensitized on e-learning through previously conducted faculty development programmes which helped to take off online teaching-learning without much difficulty. Another major challenge faced by students was related to increased screen time which beyond doubt would have been contributed to health issues. The online classes have a longer monotonous stretch time, and lack of break-time interaction with batch mates and relaxation which they routinely used to have during offline classes. Online session's time could have been reduced to minimize their stress. The most important fundamentals to follow during online teachinglearning sessions are to choose right tool, right learner, and right learning dose with right route in right time [15]. Students' willingness to adopt any contemporary approach of teaching is rather more important for the success or failure in implementing the new education process.

Direct contact classes are still preferred over online classes by the students as evident in our study. Human beings, being a social animal, prefer to stay and enjoy in their community and peer group. The students have been in the habit of traditional contact classes since beginning of their lives but this pandemic not only broke this continuity but also deprived them from their sociality. They missed their peer, campus, classrooms, labs, OPDs, wards and teachers, hence may have craving to resume their contact classes.

We, as faculties are basically facilitators who nurture and guide our students, hence it is our prime responsibility to be fairer and expertise in the teaching content, technology, and pedagogy in this era of education [16]. The need for better monitoring interactivity. learning by various assessment tools, feedback, and perpetual support to the learners, is almost mandatory in online learning compared to traditional classroom teaching. The next important issues that need to be considered are regarding network issues under administrative support, modify technical skills and better designing implementing teaching-learningand online assessment modules.

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CONCLUSION: Online classes were the only remedial option adopted as emergency measure and continued to impart education during COVID-19 pandemic. In spite of few network and technical issues, it helped to achieve the goal to a greater extent. Contact class is considered superior for teaching-learning, and assessment sessions in many ways as noted through feedback in this study. Gradually we are returning back to the routine life which was baffled and confounded during last few months. Cumulative experiences through identifying the limitations, challenges and strength of innovative online teaching-learning practices will help in developing a future hybrid teaching-learning module which could be practiced for better learning.

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CONFLICT OF INTEREST: None

REFERENCES

- 1. Howlett D, Vincent T, Gainsborough N, Fairclough J, Taylor N, Vincent R. Integration of a case-based online module into an undergraduate curriculum: what is involved and what is effective? E-Learning and Digital Media. 2009;6(4):372–84. doi:10.2304/elea.2009.6.4.372.
- Allen IE & Seaman J. What Contingency Plans do Institutions Have for H1N1? Learning on demand: Online education in the United States. Babson Survey Research Group. Jan 2010:9-10.
- 3. Meyer, K. A., Wilson, J. L. The role of online learning in the emergency plans of flagship institutions. Online Journal of Distance Learning Administration, 2011;14(1):1-20.
- 4. Daniel J. Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility. Journal of Interactive Media in Education, 2012;(3):8. DOI: http://doi.org/10.5334/2012-18.
- 5. Mack H, Golnik KC, Murray N and Filipe HP. Models for implementing continuing professional development programs in lowresource countries.

MedEdPublish.2017;6(1):18. https://doi.org/10.15694/mep.2017.000018

- 6. Muilenburg LY, Berge ZL. Student barriers to online learning: a factor analytic study. Distance Educ. 2005;26(1):29–48.
- 7. Medical Council of India. Curriculum Implementation Support Program of the Competency Based Undergraduate Medical Education Curriculum. New Delhi:Medical Council of India; 2019.

https://www.mciindia.org/CMS/informationdesk/for-colleges/ug-curriculum.

- Rajab MH, Gazal AM, Alkattan K. Challenges to Online Medical Education During the COVID-19 Pandemic. Cureus. July 02, 2020;12(7): e8966. DOI: 10.7759/cureus.8966.
- Aboagye E, Yawson JA, Appiah KN. COVID-19 and E-Learning: the Challenges of Students in Tertiary Institutions. Social Education Research. 2021;2(1):1-8. DOI: https://doi.org/10.37256/ser.212021422.
- Singh K, Srivastav S, Bhardwaj A, Dixit A and Misra S. Medical Education During the COVID-19 Pandemic: A Single Institution Experience. INDIAN PEDIATRICS. JULY 15, 2020; 57:678-679.
- 11. Leisi Peia and Hongbin Wub. Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis. Medical Education Online. 2019;24: 1666538. DOI: https://doi.org/10.1080/10872981.2019.16665 38
- 12. Subramanian A, Timberlake M, Mittakanti H, Lara M, Brandt ML. Novel educational approach for medical students: improved retention rates using interactive medical software compared with traditional lecturebased format. J Surg Educ. 2012;69(2):253-256.
- 13. Petrarca CA, Warner J, Simpson A, Petrarca R, Douiri A, Byrne D and *et al.* Evaluation of eLearning for the teaching of undergraduate ophthalmology at medical school: a randomised controlled crossover study. Eye.

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2018;32:1498-1503. https://doi.org/10.1038/s41433-018-0096-1

- 14. Dash S. Google classroom as a learning management system to teach biochemistry in a medical school. Biochem Mol Biol Educ, 2019;47:404-407. DOI: https://doi.org/10.1002/bmb.21246
- 15. Cook DA. The value of online learning and MRI: Finding a niche for expensive technologies. MedTeach. 2014;36:965-72. [PubMed: 25072533]
- Bawane J, Spector J. Prioritization of online instructor roles: Implications for competencybased teacher education programs. Distance Educ. 2009;30:383-97.





- *Q1. Better learning
- Q2. Better opportunity for interaction with teacher
- Q3. More comprehensive
- Q4. Better relaxed during class
- Q5. Learning objectives & presentation more clear and understandable
- Q6. Make difference in learning
- Q7. Better E-learning design & methods
- Q8. Useful for future purpose
- Q9. Better opportunity for SDL



Figure 2: Feedback of learners on disadvantages/limitations of e-learning

- *Q1. Limitation for Q&A
- Q2. Issues of network & limited opportunity for student-teacher interaction
- Q3. Combined e-learning & direct contact classes are more useful
- Q4. WhatsApp is better tool for Q&A session
- Q5. Direct contact classes are better than online classes





*Q1. Relevant to the topic

Q2. Hassle free without any technical issues

- Q3. Adequate time given
- Q4. Helpful for better learning and self-assessment
- Q5. Online assessment must follow each e-learning session for better understanding & learning



Which of the following combination you feel is the best for better learning?

Figure-4: Feedback of learners on the various combinations of teaching-learning-assessment methods



Do you think Zoom if combined with WhatsApp can be utilized for better learning? Figure-5: Feedback response of learners on combination of Zoom & WhatsApp e-learning as a better learning tool



Did you face any issue during online sessions? Figure-6: Feedback response of learners on facing issues during e-learning



Did you face any issue during online assessment?

Figure.7. Feedback response of learners on facing issues during online assessment through Google forms

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Factors	No. of students (%)
Accessibility Issues	
Network issues/Poor internet speed	70 (57.9%)
Poor audio-video quality	17 (14.1%)
Technical glitches	8 (6.6%)
Lack of knowledge of newer technology	1 (0.8%)
Teaching-learning Issues	
Long duration of classes	12 (9.9%)
Poor interaction between teachers & students	7 (5.8%)
Lack of practicality	3 (2.5%)
Monotony in class	2 (1.7%)
Explanation not at par	1 (0.8%)
Learner issues	
Eye strain	21 (17.4%)
Headache/Exhaustion	16 (13.2%)
Poor Concentration/Less attention span	11 (9.1%)
Background disturbances	7 (5.8%)
Cost/Need of large data pack/No laptop	4 (3.3%)
Poor learning	3 (2.5%)
Environment of e-class/home is not suitable	1 (0.8%)

 Table-1: Challenges faced by learners during online teaching-learning

Advantages	No. of students (%)
No advantage	57 (47.1%)
Relaxed environment/Ease of home or workspace	18 (14.9%)
On-going education during pandemic/Lockdown	15 (12.4%)
Readily available study material	7 (5.8%)
Enhances SDL	7 (5.9%)
Clear & understandable lectures	4 (3.3%)
Good interaction with teachers	3 (2.5%)
Syllabus covered in time	3 (2.5%)
Short/To the point study	2 (1.7%)
Overall beneficial	2 (1.7%)
WhatsApp learning is better	2 (1.7%)
Innovative way of studying	1 (0.8%)

Table-2: Advantages of online learning/e-learning according to learners

Factors	No. of students (%)
Network issues	25 (2.1%)
Technical issues on submission	10 (8.3%)
Panic/fear of failure during submission	3 (2.5%)
Limited time	3 (2.5%)
Questions not up to the mark	1 (0.8%)
No laptop available	1 (0.8%)
No learning	1 (0.8%)

Table-3: Problems faced by learners during online assessment

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