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Original Research Article

Evaluation of students learning during COVID -19 lockdown period by e – assessment: A perceptual study

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ABSTRACT

Introduction: Assessment is a rating method to evaluate students learning. E-assessments are novel assessment methods with some advantages such as decreasing the work burden of teacher, provision of immediate feedback and monitoring students remote learning. Aim of the present study is to look in to perception of students and faculty regarding the E - assessment based evaluation of remote learning during COVID 19 lock down period and compare its effectiveness with traditional assessment methodology.

Materials and Methods: It was a perceptual study in which hundred IM.B.B.S students of ESIC medical college, Hyderabad participated voluntarily. E- Assessment was in the form of Online viva sessions and Google meet was the mode of interaction. Students and faculty perception was obtained by separate feedback questionnaire links and responses were analyzed. E- assessment marks and 1st Internal assessment marks comparison was done to evaluate the effectiveness of this methodology.

Results: Student's perceived that online evaluation simulated a direct face to face interaction (61%) and strengthened their learning process (66%). Faculty opined that provision of immediate feedback (71.5%) and monitoring student's remote learning were the advantages. Problems in connectivity, lack of student's initiative were the disadvantages felt. Comparison of marks showed a positive correlation.

Conclusion: E-assessment has many advantages both from students and teacher's perspective and was of major utility in monitoring student's remote learning especially during COVID -19 lockdown period. Properly planned E-assessment with prior sensitization is equally as good as traditional assessment methods in proper evaluation of students learning.

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1. Introduction

Assessment is an integral, vital component of education and is a tool to evaluate students learning. Novel assessments strategies include Formative and Summative assessments.¹ The former is aimed mainly at monitoring students learning and has an advantage of providing immediate feedback and helps in strengthening the areas of his weakness. On the other hand, Summative assessments decide whether a student can be promoted to their next stage of learning or not.²

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For the present-day medical teacher conduction of assessments in a traditional format at an increased frequency with increased student to teacher ratio is a challenging task. It may be a quite laborious, time-consuming process and at times may not provide the desired outcome. E-assessments are electronic assessment process where the help of information and communication technology is used to assess student's performance. Previous studies state that E - assessments are the modern assessment methods with some promising benefits to teachers such as work load reduction and proper utilisation of their time in conduction of the assessments.^{3,4} Monitoring of remote learning (when the students are away from medical school) being an

additional advantage of them. The studies done on usage of E - assessment for evaluation of students remote learning are relatively few in number. In the present study E - assessment methodology (Online viva sessions) was used to monitor the learning of Phase I M.B.B.S students during the COVID 19 lock-down period where the students can't attend the medical school. The aim of the study was to look in to the perception of students and faculty regarding these online viva sessions and also to evaluate its efficacy in proper assessment of students learning.

2. Materials and Methods

The present study was a Perceptual study conducted at Department of Biochemistry ESIC medical college Sanathnagar, Hyderabad from June to July 2020. A total number of hundred students belonging to Phase I M.B.B.S were included in the study and their participation was purely on voluntary basis. Instructions regarding the syllabus (included chapters of Molecular biology and Nutrition), pattern, marks and time duration was informed one week prior to the start of assessment. Prior sensitization of students and faculty regarding the methodology was done.

The methodology comprised of an Online mode of interaction through Google meet based video calling and the evaluation was done in two formats. The first format being the viva voice questions (theory) which were of various grades of difficulty and were ranging from simple recall type to application and analytical type - as per Miller's pyramid.⁵ Each candidate was evaluated for 10 marks and for a maximum duration of 10 minutes. The second format was Clinical Case studies (to test at the application aspect) based viva sessions which comprised of two case studies 5 marks each and a duration of 5 minutes per case was provided. Clinical case studies were prepared in a power point presentation and screen sharing of the examiner was done. Each format was scheduled for five days with a two days gap between the formats. Subjective bias was avoided by a dedicated examiner for each format.

Before the start of each viva session an invitation mail was sent and telephonic information regarding the invitation was provided. After joining the meet instructions were repeated before the start of Viva sessions. It was made sure that only one student was interacting with the examiner at a time. For students with connectivity problem viva was conducted through alternative mode of interaction such as WhatsApp video calling or direct calling. At the end feedback was provided by the examiner. At the end of the schedule separate google form links containing the feedback questionnaire were shared to Student and Faculty through WhatsApp. The responses were based on the Likert's scale. Proper validation of feedback questionnaire was done by subjecting it to external and internal review and making necessary corrections as per their suggestions (Student questionnaire - Table 1, Faculty questionnaire - Table 2

. The submitted responses were analyzed. More over to determine the efficacy of this E - assessment (does it can really differentiate a good learner from poor learner) in proper evaluation of students learning a comparison was made between the 1st internal assessment (conducted before COVID 19 lockdown period) and Online viva session marks.

2.1. Statistical analysis

Data obtained from individual responses for each question the was summarized in the form of percentage of the components of Likert's scale. Pearson correlation analysis (SPSS software version 16.0) was used to compare the 1st Internal assessment and Online viva session marks. p - value < 0.05 was considered as statistically significant.

3. Results

3.1. Total of 100 students including 36 males and 64 females participated in the study

Majority (97%) of students agreed that they were informed regarding the syllabus, pattern, schedule and mode of conduct prior to the assessment. 67% of students agreed that they had necessary facilities and many (87%) had a basic awareness in Online mode of interaction. (Table 1)

On the day of evaluation 64% of them agreed that they could connect online easily where as 14% disagreed and 18% were neutral in this regard. 43% agreed that their audio-visual connectivity was satisfactory where as 34% were neutral and 20% disagreed in this regard. Most of them (84%) agreed that in case of connectivity problems alternate method (WhatsApp calling) was an effective mode of communication. (Table 1)

Majority of them agreed that the questions pertained to the syllabus informed (89%) and were clear without any ambiguity (88%). 77% and 72% of students respectively agreed that enough time was given to read and answer the questionnaire during the assessment and a only a few 11% and 22% respectively were neutral in this regard. (Table 1)

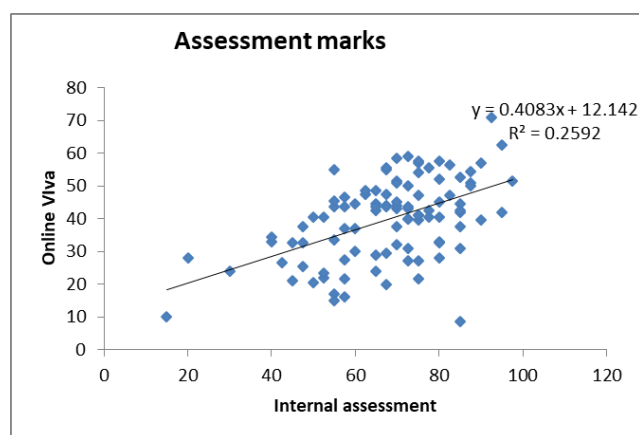
Many of them agreed that Online viva sessions simulated a direct face to face interaction (80%), strengthened their learning process and gave an insight on how to face an interaction (85%). 69% of people agreed that immediate feedback was provided by the faculty which was helpful for their improvement, a few of them (15%) disagreed and a few of them were neutral (13%) in this regard. More over 69% of them opined that the present Online assessment was encouraging and increased their willingness to attend similar sessions in future. (Table 1)

Majority of faculty strongly agreed that for a successful outcome in Online evaluation, basic awareness, availability of necessary facilities, proper planning, prior sensitization of students and proper audio / visual connectivity are essential pre - requisites. 42.9% agreed that E - assessments

Table 1: Student feedback - summarization of the individual responses of each question in the form of percentage

Q no.	Question	SA* (%)	A (%)	N (%)	D (%)	SD (%)
1	I was made aware of the syllabus, pattern, schedule and mode of conduct of Online assessment well in advance to the assessment	55	42	1	2	-
2	I had necessary facilities at my place for performing an Online mode of interaction	15	52	22	9	2
3	I had basic awareness in Online mode of interaction	21	67	9	-	3
4	The Online assessment was done as per schedule	21	55	17	5	2
5	I was informed by phone prior to the start of assessment as a reminder	41	54	2	2	1
6	I was able to connect easily online to my evaluator on the day of evaluation	19	45	18	14	4
7	Do you agree that the audio-visual connectivity was satisfactory during the interaction?	9	34	34	20	3
8	Do you agree that in case of problem with Online connectivity usage of alternative method such as WhatsApp calling/ Direct calling is an effective mode of communication?	25	59	12	4	-
9	Do you agree that the questionnaire asked / included in the evaluation were clear and unambiguous?	21	67	11	1	-
10	Do you agree that the during online evaluation enough time was given to read the questions in power point presentation?	25	52	11	10	2
11	Do you agree that there was enough time given for answering during assessment?	13	59	22	5	1
12	Do you agree that the questions asked/ included in the evaluation pertained to the syllabus informed?	31	58	8	2	1
13	I was provided a feed back of my performance by the faculty which was useful for me to improve further.	17	52	13	15	3
14	The online evaluation simulated a direct face to face interaction.	19	61	17	1	2
15	The Online assessment strengthened my learning process and gave me an insight of how to face an evaluation.	19	66	11	3	1
16	Do you agree that the present Online assessment was encouraging and increased my willingness to attend similar sessions in future?	13	56	27	2	2

(* SA – Strongly agree, A – Agree, N – Neutral, D –Disagree, SD - Strongly disagree)

**Fig. 1:** Correlation of marks obtained in E - assessment and 1st Internal assessment (before lock down)

helps in quick assessment of a student and has a provision of immediate and personalized feedback where as 28.6% disagreed in this regard. (Table 2)

42.9% strongly agreed and 57.1% agreed that E - assessment sessions are beneficial for students when they are away from the medical college (Lock down period). 42.9% strongly agreed 14.3% agreed that E-assessment if made a part of formative assessment helps in proper evaluation of student (especially their remote learning) whereas 14.3% disagreed and 28.6% were neutral in this regard. (Table 2)

57.1% strongly agreed and 42.9% agreed that problems in connectivity, loss of time in situations of delayed connectivity, lack of proper motivation from student side at times as some of the disadvantages of Online assessment. (Table 2)

Pearson correlation analysis showed a Positive correlation ($r = 0.5091$) between the 1st Internal assessment

Table 2: Faculty feedback - Summarization of the individual responses of each question in the form of percentage

Q no.	Question	SA* (%)	A (%)	N (%)	D (%)	SD (%)
1	Do you agree that basic awareness in Online mode of interaction is necessary for the present-day medical teacher?	57.1	42.9	-	-	-
2	Do you agree that necessary facilities for Online mode of communication with students is a pre requisite for a medical institution?	42.9	57.1	-	-	-
3	Do you agree that proper planning of Online evaluation, preparation of questionnaire without ambiguity, prior sensitization of students are essential pre requisites for an effective outcome in an e - assessment?	71.4	28.6	-	-	-
4	Do you agree that proper audio / visual connectivity is one of the key features for proper evaluation of student?	71.4	28.6	-	-	-
5	Do you agree that in case of problem with Online connectivity usage of alternative method such as WhatsApp calling / direct calling is an effective mode of communication?	28.6	42.9	28.6	-	-
6	Do you agree that even in an Online evaluation inclusion of variety of questionnaire which tests both simple ordered learning (such as recall questions) and higher ordered learning (analytical type) helps in in depth evaluation of students?	42.9	28.6	14.3	14.3	-
7	Do you agree that the Online method of evaluation helps in quick assessment and has a provision of immediate and personalized feedback?	28.6	42.9	-	28.6	-
8	Do you agree that online evaluation when planned properly can be done with appropriate Objectivity?	28.6	57.1	14.3	-	-
9	Do you agree that Online evaluation (Theory viva) if made as a part of formative assessment helps in proper evaluation of student especially when away from medical college?	42.9	14.3	28.6	14.3	-
10	Do you agree that e -assessment sessions are beneficial for students when they are away from the medical college (Lock down period)?	42.9	57.1	-	-	-
11	Do you agree that direct video interaction for assessment is a better method compared with Online assignment submission to avoid malpractice done by the student?	57.1	28.6	14.3	-	-
12	Do you agree that Online mode of evaluation equally holds good as direct face to face interaction in proper assessment of students performance?	14.3	42.9	14.3	28.6	-
13	Do you agree that provision of necessary facilities, requirement of number of Evaluators, sensitization with the methodology are some of the disadvantages of Online assessment?	42.9	42.9	14.3	-	-
14	Do you agree that loss of time in situations of delayed connectivity/problems in connectivity, lack of proper motivation from student side at times as some of the disadvantages of Online assessment?	57.1	42.9	-	-	-

(* SA – Strongly agree, A – Agree, N – Neutral, D –Disagree, SD - Strongly disagree).

(conducted before COVID -19 lock down period) and E-assessment marks. A p - value < 0.00001 was obtained and was statistically significant. (Figure 1)

4. Discussion

Assessment is an integral component of education and according to Crisp et al⁶ can be classified as Formative and Summative. The former acts as self-assessment tool for the student, provides information about his/her strengths, weakness and helps both student & teacher in planning personalised teaching learning strategies.^{6,7} Summative assessments on the other hand help to evaluate the acquisition of knowledge, skills sufficient enough to be promoted to their next level of learning and a low performance in them emphasizes an improper planning of formative assessments.⁸ Traditional method of conduction of these assessments with increased Student to teacher ratio causes an increased workload on the teacher and consumes more time.

According to P. Marriott et al. in their study at University of Winchester found that E - assessments increases student motivation to enhance their performance⁹ and even in the present study the students felt that the conduction of E - assessment gave them motivation to read especially during the times of COVID -19 lock down period and it helped them in completion of the syllabus. They also opined that it aided in self-assessment which was a similar finding observed by Crisp et al.⁶ Cook and Jennings opined that provision of immediate feedback¹⁰ was a major advantage of E - assessments and even in the present study majority of the students felt that provision of immediate feedback was really helpful in improvement of their learning. Llamas - Nistal et al and J. Donovan et al^{11,12} in their study of comparison between traditional and E- assessments found that students prefer E - assessment over traditional assessment and even in the present study the students felt that E - assessments were good alternative to routine assignments and increased their willingness in attending similar sessions in future. In the present study students felt that E - assessment helped in concept-oriented learning. - a similar finding was observed in a study done by Sorenson et al. which emphasized that online assessments help to add value to students learning.^{13,14} The other important perceptions were that E - assessment gave an insight to real time viva experience, removed fear and increased confidence to face the examination.

Ridgway et al¹⁵ R. Ellay way et al¹⁶ D. Peterson et al,¹⁷ T.W. Crews et al¹⁸ D. Nichol et al.³ in their study on E - assessment opined that timely provision of student feedback, tracking of student's performance, provision to test higher order learning, reduction in malpractice were some of the advantages apart from decreased work burden on teacher and saving of their time. In the present study also Majority of the faculty opined that it was as good as a face-

to-face interaction, had a provision for assessing student's remote learning and decreased their work burden.

According to A. Way et al and T.W. Crews et al the major disadvantages for conduction of an E - assessment were accessibility to computer and internet connection facilities.^{18,19} Ridgway et al, S. Jordan et al opined that proper training and familiarization of E - assessment process is a prior requisite for a proper outcome.^{15,20} In the present study both Students and Faculty perceived that network issues while connecting to the examiner and audio visual problems were main obstacles for a smooth conduct of E - assessment - similar to above studies and observations of Latha Rajendra kumar et al, K. Walsh.^{21,22} Proper planning, sensitisation and arrangements were made to mitigate these difficulties in the present study and necessary alternative arrangements (WhatsApp calling) were made as and when required. Grutmann, Bohm, Kunchen²³ opined that one another disadvantage of E - assessment is that it cannot be used to test the practical skills of the student. Loss of time in delayed connectivity situations and at times lack of proper motivation from student side were the other disadvantages expressed by the faculty. The comparison of the E - assessment marks and 1st Internal assessment marks gave an r- value of 0.5091 representing a moderate correlation suggesting that it might hold a sufficiently enough importance in assessment of student's learning especially in the situations like COVID 19 lockdown period. (Figure 1)

5. Conclusion

We conclude that Proper planned E-assessment has advantages such as motivation to learn especially during lock down period, monitoring of student's remote learning, provision of immediate feedback and aids in self-assessment. Moreover, it saves teacher's time and decreases their work burden. On the other hand, Improper Online connectivity and audio-visual problems are some of the disadvantages of it. We also infer that E -assessment process might not be a total replacement to present methods of evaluation but may be of enough importance especially in situations like COVID 19 lockdown period.

6. Limitations of the Study

Few of the students were from poor socio-economic background and attended the assessment through a cell phone (mobile). The syllabus, time for preparation, number of questions, time duration of assessment were different for 1st internal assessment and this might be a limitation for comparison of the two types of assessments. Increased teacher to student ratio was also one of the limitations.

7. Source of Funding

None.

8. Conflict of Interest

The authors declare no conflict of interest.

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