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Importance of online self-assisted assessments for medical students in knowledge acquisition

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Abstract:

BACKGROUND: Assessment is an important aspect of teaching and learning in medical education. Regular early assessments create scope for improvement in students, and this digital era technology should be utilized for ease of administration. E-assessment involves the usage of technology to create, deliver, collect, and provide feedback to the students. The present study aims to understand the importance of online assessment and the preference of students with difficulties faced and the methods of improvement.

METHODS AND MATERIALS: This study was a cross-sectional descriptive study conducted among fifty-six undergraduate medical students, where forty-five objective structured practical questions (OSPEs) were administered to the students in anatomy. After the assessment, feedback was collected in the form of a fifteen-item questionnaire. The responses were graded using a five-point Likert scale and represented in the graphs using Microsoft Excel software.

RESULTS: The feedback collected has the following responses. The prosected specimen pictures used in the exam, with pointers and markers, were clear and oriented for which 77% agreed, the pointers and markers were clear and easy to identify for which 79% agreed, and 66% preferred the traditional method of assessment over the online mode of assessment and 48% were neutral on the question of whether E-assessment improves knowledge and skills. Most of the students preferred the traditional method of assessment over the online method of assessment.

CONCLUSIONS: Traditional methods of teaching or assessment cannot be replaced by online methods, but technology can be utilized as an addition to regular mode to improve the outcome. Regular early formative assessments help teachers to understand areas of deficiency and help students in improvement. E-assessment can be adapted for formative assessment and regular practice because of their ease of administering and providing feedback simultaneously.

Keywords:

Anatomy, E-assessment, feedback, formative, medical education

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Introduction

The main role of a facilitator in medical education is to help the learner to understand and retain the information which has to be utilized in the future. The performance of the learner should in turn be observed by a facilitator to improve the performance. The gap between teaching and learning should be filled by performance assessment and regular feedback. Formative assessments are classroom regular assessments that have a less threatening environment and help in self-directed learning, with regular feedback[1] and added value of improvement in the early part of the semester. The limitation is the inability to provide feedback for each individual, which can be overcome by online self-assisted assessments. Summative assessments are end-of-term exams that are graded and certified, as they have high stakes and are normally conducted in an invigilated environment to ensure test security.[2]

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The recent COVID situation has opened the gates of technology and highlighted the importance of distance learning. Online formative assessment with the use of spotters, multiple-choice questions (MCQs), and quizzes has become an essential need for the smooth running of institutes. In routine, offline practical assessment steeple chase/bell ringer method of examination is followed which requires constant movement in the examination hall from one spotter to another spotter.

In present study, practical assessment was conducted through online freeware as objective structured practical examination (OSPE) with images of prosected specimen, osteology images, X-rays, images of histology slides, and embryology images with pointers and markers. There is a need to understand and evaluate the online formative assessment to understand the limitations and include them in routine curriculum.

Materials and Methods

Study design and settings

The present study was a cross-sectional descriptive study where first-year medical undergraduates were the study participants.

Study participants and study sampling

During lockdown period (May, June 2020), when remote teaching was enforced, formative assessment for the first-year medical students was conducted online using online platforms. Before the lockdown, regular didactic lectures and small group teachings were conducted offline, following which online self-assessment was administered to the students using the Google Forms. A total of forty-five questions (OSPE) were posted on Google Forms and shared with 62 first-year undergraduate medical students. Throughout the exam, students were asked to be online on Webex platform. In the 45 questions, 14 were related to gross anatomy, 10 related to embryology images, 10 related to histology images, five osteology, and four related to radiology images. Exam was conducted for 90 minutes, and each question was given 2 minutes to answer.

Data collection tool and technique

After the completion of exam, feedback for the online self-assessment was collected from the students. A fifteen-item questionnaire was administered to the students, which was filled by 56 out of total 62 students through Google Forms. In the 15-item questionnaire, 12 were close end questions (questions 1-10,12,14), and three were yes/no type (questions 11,13,15). All the questions were reviewed and validated by the peer review. The questionnaire is detailed in Figure 1.

The students were briefed about the questionnaire, and participation was made voluntary. The close-end questions were graded with five-point Likert scale with range from strongly agree to strongly disagree with neutral in-between, whereas the yes/no questions were analyzed and represented in a graph. The responses collected were stored in Microsoft Excel sheets and handled with complete anonymity.

Feedback Questionnaire administered to the students

1. The prosected specimen pictures used for online exam were clear and oriented.
2. The pointers and markers were clear and easy to identify.
3. The time provided for each spotter was sufficient.
4. Microscopic photographs of histology slides in different magnifications are clear and oriented.
5. The images of embryology models were clear and understandable.
6. The dissected specimens in traditional method of assessment are better than photographs of prosected specimen.
7. The spotters and markers on photographs of X-rays were clear and easy to understand.
8. Traditional method of assessment is better than online mode of assessment.
9. Group discussions before exams is helpful which cannot be done with online assessment.
10. Group discussions after exams also helps in better understanding.
11. Online practical assessment is dominated by closed answer type questions. (Yes, No)
12. Online practical assessment improves Knowledge, skill and helps in practice.
13. Online practical assessment is timesaving. (Yes, No)
14. Monitoring during online examination is difficult.
15. Internet connectivity issues were present during the assessment. (Yes/No)

Likert scale: strongly agree, agree, neutral, disagree, strongly disagree

Figure 1: Feedback questionnaire administered to the students

Ethical consideration

Ethical clearance was taken from Institutional Ethical Committee (IEC Ref No: AIIMS/BBN/IEC/SEP/2021/65-A), and informed online written consent was taken from each participant.

Results

The feedback was collected from 56 students (n = 56), from the total of 62 students, where 28 (n = 28) were males and 28 (n = 28) were females in the age-group of 17 years to 21 years.

Sixty-four agreed and 13% strongly agreed that the images of the prosected specimen provided were clear and oriented, whereas 21% were neutral. The markers and pointer used in the image were clear and understandable for which 79% agreed, 16% were neutral, and 5% disagreed. The time provided for each spotter was sufficient to answer for which 41% agreed, 36% were neutral, and 24% disagreed. Micrographic photographs of histology and images of embryology model were clear and oriented for which 66% and 79% agreed, respectively. The dissected specimen in traditional method of assessment is better than photograph for which 85% agreed and 66% agreed that traditional method of practical assessment is better than online mode of assessment. The results were calculated as percentage and represented in a graph in Figure 2.

Online practical assessment improves knowledge and skill and helps in practice for which 19% agreed, 48% were

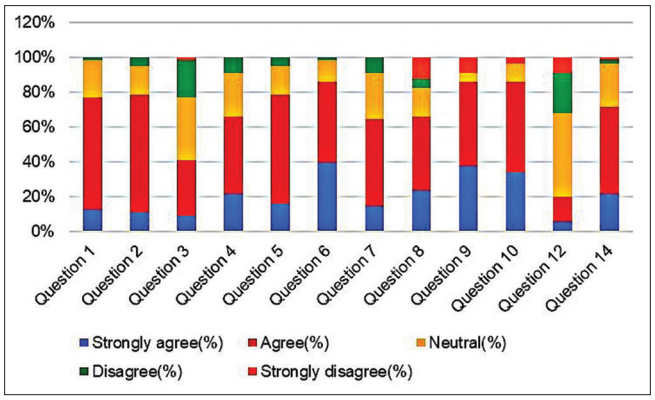

Figure 2: Student responses for nominal data represented in graphs

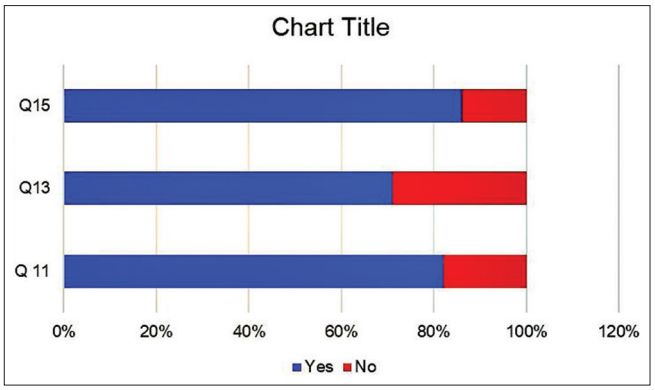

Figure 3: Responses for Yes/No questions represented in graphs

neutral, and 23% disagreed. For yes/no questions whether online assessment is dominated by closed answer-type question 82% said yes and for the question whether they faced Internet connectivity issues during assessment 86% said yes [Figure 3]. Most of them were inclined to traditional mode of conducting practical assessment and felt that traditional dissected specimen will be easy to identify rather than images of prosected specimen.

Discussions

Formative assessment should be well designed and should be able to answer the question "how am I doing?", whereas a summative assessment should be able to answer "how did I do?".[3] Multiple studies have indicated that formative assessment should precede summative assessment to improve the performance of learners.[4,5] Formative assessment helps in improving the performance of students and reduces the anxiety during summative assessment. If confidence is lacking, failures may be the grounds for abandonment of goal.[6] Repeated exposure to formative assessment may improve the confidence level, and the results act as guide for further improvement. The medical education should be in-depth learning with involvement of student aptitude and passion.[7] With the advent of technology, use of online free platforms for formative assessment helps in frequent feedback with scope for improvement. E-assessment might have some advantages over traditional methods of learning with efficiency, effectiveness, authenticity, and engagement.[8]

In the feedback collected from students, 85% of students voted for dissected specimens rather than prosected specimen pictures. This might be because the whole year students were taught on three-dimensional dissection specimen, sudden transition to images of prosected specimen, where they cannot feel or touch the structures might have caused a difficulty in understanding the relations, blood supply, and structure.[9] The photograph of histology slides in different magnification, images of embryology modes, and photographs of X-rays were clear and can be easily understood by the students, which explains that because embryology and histology are usually taught and read from textbooks with images and students are more oriented to images. Similarly, X-rays are usually taught with the photographs, so they do not feel difficulty in identifying the structures.

Online practical assessment is dominated by closed answer-type questions for which 82% agreed, which emphasizes the time constraint and inability of student to conclusively answer the question. For the question whether online practical assessment improves knowledge and skill 48% were neutral which shows that the students are not prepared for online sessions. If the students are given a scheduled timetable with dates, timings, and study material in advance, it might help them better in managing[10] and they might understand the importance of frequent E-assessment. The main advantage of online assessment is that they are time saving, easy to administer, and frequent feedback can be collected from the students.

For a question whether students preferred traditional method of assessment or online, 66% opted for traditional method of assessment. Summative assessment cannot be replaced from traditional to online mode due to difficulty in monitoring, security issues, and as they are term end exams with higher priority, but formative assessment can be modified as they are for improvement of student performance. Also, there should be incentives and continuous feedbacks to inculcate interest in student.

In one such similar study, inclination of students during initial years was more toward traditional methods, but subsequent senior students preferred more online formats. Due to shortage in cadaveric specimen and wear and tear of old specimens, usage of image atlases was more rather than dissected specimens.[11] The strength for the above study was usage of high-quality images instead of old specimens and easier time management where students can sit and attend the assessment with proper time management. The limitations being slow

Internet connectivity and fear of computer software/hardware failure. In another study by Petrisor *et al*., the preference of students was more to online format with increase of acceptance each year.[12] The limitation which might cause difficulties is network connectivity issues and monitoring of students during examination.

In a study by Jagadeesan *et al*., they highlighted the importance of online assessment which create opportunities for both the sender and receiver. The advantages for teachers were non-rank-based assessment and for students' assessment were self-paced, repeatable with immediate feedback from teachers.[13] Basic sciences that is anatomy, physiology, and biochemistry form the background foundation and help to better understand the clinical sciences.[14] Repeated early assessments help to better understand the topics and online self-assisted assessment help improve teacher student relationship with frequent feedbacks.

There were limitations to the present study, where it was confined to single institute and single specialty. Further research should be done where E-assessments should be utilized as self-assessment tool in all specialties extending to clinical subjects.

Conclusions

Traditional methods of assessment cannot be replaced, but incorporation of frequent E-assessment helps in providing feedback and has a scope of improvement for students. In particular, formative assessment should be more inclined to online platforms because of ease of administration. Library with images of prosected specimen, histology slides and embryology images should be maintained for reference and updated regularly. E-learning should be made mandatory for both students and teachers with the recent advancement in technology.

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Conflicts of interest

There are no conflicts of interest.

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