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ORIGINAL ARTICLE

Student's Perception of Computer-Based Assessment Environment in an Undergraduate Medical College

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ABSTRACT

Background: It is emphasized in medical education that assessment drives learning. In 2020, during the first COVID-19 lockdown, University College of Medicine and Dentistry made a shift towards Computer Based Assessments (CBAs) in order to facilitate learning.
Objective: To determine undergraduate medical student's perception for computer based assessment environment in medical school
Methods: The cross-sectional descriptive study was conducted at the University of Lahore, Pakistan, from May 2022 to September 2022, and included undergraduate medical students who were requested to complete the Assessment Environment Questionnaire. Students' individual perception scores were calculated and the means of individual domains and global scores were compared in different academic years. SPSS version 23 was used for statistical analysis.
Results: Of 574 participants, 20% of the participants were from 1st year, 20.7% were from second year, 20% from 3rd year, 19.9% from 4thyear and 19.3% from final year. Generally, the students perceived their assessment environment positive resulting in a global mean score of 67.6±13.7 out of the maximum 80. First year students scored significantly higher (P <0.01) compared to other years.
Conclusion: The students' perception for computer based assessment environment was positive

KEY WORDS: Computers based assessment, Perception, Medical Students

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INTRODUCTION

Assessment of students is an essential component of educational programs and has a significant impact on student's performance.[1] In health education, assessment serves multiple purposes. It drives learning, provides information on the strengths and limitations of curricula and the efficacy of teaching and ultimately ensures students are competent enough to practice safe medicine. [2, 3]

In 2020, COVID-19 lead to a widespread closure of educational institutes globally thereby disrupting education and related assessments. To

overcome this challenge, the University College of Medicine and Dentistry (UCMD) made a rapid shift towards online, computer-based assessments. Computer Based Assessments (CBAs) have been in use since 1960 but their true potential as an alternative to traditional pencil and paper-based assessments was only explored during the Covid lockdown.[4] CBAs promise to be time efficient as assessments can be conducted concurrently at several locations and are marked automatically. Monitoring student progress in CBAs is easier and this enables teachers to provide students with immediate feedback. In addition to this, compared to paper-based assessments, a wider range of media (such as video, graphics, etc.) and test kinds can be used in CBAs.[5, 6]

Literature has established that the educational environment has a profound impact on the learning processes of the students.[7] What students learn and how they learn is also dependent upon how they think and are assessed.[8] While there is a sufficient body of literature available on assessment, the area of assessment environment with respect to computer-based assessments in Pakistan is relatively under-explored. Hence the present study was planned to explore the perception of undergraduate medical students towards computer-based assessments.

METHODS

After approval from the Institutional Review Board (ref #: ERC/38/21/04), descriptive cross sectional study was conducted at the University of Lahore, Pakistan from May 2022 to September 2022. A web-based, pre validated Assessment Environment Questionnaire (AEQ)[9], was administered to students of first, second, third, fourth and final year MBBS using census sampling. AEQ questionnaire is a 20 item questionnaire with Cronbach's alpha coefficient (0.89), was applied to study various features of the assessment environment in medical undergraduates. The following four domains were assessed on a four point likert's scale: feedback mechanism, learning, and performance, information on assessment and assessment system/procedure. The Demographic data encompassed gender and student's year of education.

Statistical Analysis

Data was analyzed using SPSS version 23. Frequencies and percentages were utilized for expressing categorical variables and mean and standard deviations were used for continuous variables. T-test was used to compare the mean AEQ scores of first, second, third, fourth and final-year students. $P<0.05$ was considered statistically significant.

RESULTS

A total of 574 students participated in this study out of which 247 (43.0%) were male and 327 (57.0%) were female. The students participated in the study were from 1st year 115 (20.0%), 2nd year 119 (20.7%), 3rd year 115 (20.0%), 4th year, 114 (19.9%), 4th year and final year there were 111 (19.3%) students.

The total mean score of the entire sample was 67.6±13.7, with 1st-year students scoring the highest at 72±9.05 followed by second-year 70±12.29, fourth year 69.8±13.6, final year 63.3±16.51 and third year 62.6±13.7 as shown in Table 1. The lowest rated score was from the perception of assessment system/procedure 11.6±2.23 while the highest score was 23.02±6.6, for the perception of feedback, followed by the perception of learning and performance 18.0 ±4.33 and perception of information on assessment 18.6±3.9 as shown in Table 2.1, 2.2, 2.3 & 2.4).

Different academic year's students had variable perceptions of the assessment environment, as there were significantly different AEQ scores among groups. The mean AEQ score of 1st-year students was significantly higher compared to the students in the other years. The results of the study highlighted that 1st-year students consider

their assessment environment more favorable followed by 2nd year, 4th year final year and 3rd year respectively. The mean score of 3rd year was low as compared to other years.

Table 1: Mean AEQ scores of students according to the year of study

Academic Year	Mean	Median	Mode	SD
1st Year	72	74	76	9.05
2nd Year	70	73	74	12.29
3rd Year	62.6	65	76	13.7
4th Year	69.8	72	76	13.6
Final Year	63.3	66	76	16.51
Combined Classes Score	67.6	71	76	13.7

Table 2.1: Assessment Environment Questionnaire (AEQ) mean scores

	Perception of Feedback Mechanism	23.02±6.6 (mean score)
1.1	I received feedback on my performance for continuous assessment.	3.33±1.24
1.2	I received feedback on my performance for final exams.	3.02±1.32
1.3	Feedback from assessors about my performance is adequate.	3.34±1.16
1.4	Feedback is given promptly after an assessment.	3.21±1.31
1.5	The form of feedback I received matches the purposes of the assessments.	3.49±1.14
1.6	Feedback from assessors about my performance is appropriate.	2.48±1.10
1.7	I receive ongoing feedback on my progress.	3.16±1.25

Table 2.2: Assessment Environment Questionnaire (AEQ) mean scores

	Perception of Learning and Performance	18.0±4.33 (mean score)
2.1	The assessment system encourages me to reflect on my own performance.	3.76 ±1.03
2.2	I receive feedback on my work from a range of sources (teachers, peers)	3.27 ±1.20
2.3	The feedback I received helped me to improve my learning.	3.63 ±1.09
2.4	The assessment system supports my learning.	3.77 ±1.00
2.5	The feedback I received helped me to improve my grades.	3.64 ±1.09

Table 2.3: Assessment Environment Questionnaire (AEQ) mean scores.		
	Perception of Information on Assessment	**18.6±3.9 (mean score)**
3.1	A description of how individual assessments and exams contribute to the total score is made known to students.	3.71±1.11
3.2	I received information about what is expected of me in any exam/ assessment.	3.60 ±1.07
3.3	Students receive clear information about the assessment.	3.75 ±0.99
3.4	I understood the assessment criteria for all the tests / exams that I took.	3.80 ±0.97
3.5	Assessment criteria are clearly defined.	3.80 ±1.00

Table 2.4: Assessment Environment Questionnaire (AEQ) mean scores.		
	Perception of Assessment System/Procedure	**11.6±2.23 (mean score)**
4.1	Assessment in the program is conducted fairly.	3.89±0.89
4.2	Students are adequately assessed.	3.90±0.87
4.3	Learning outcomes are appropriately assessed.	3.86±0.93

DISCUSSION

The study, explored the perceptions of students regarding the assessment environment, showed that majority of students had a favorable opinion of the assessment environment in terms of the feedback process, learning and performance and overall the assessment system. The overall mean AEQ score of 67.6 reflect that they were similar with the study by the developer of the questionnaire.[9] The mean scores of the subscale can be used to identify problem areas as they provide a good idea of the strengths and weaknesses within the assessment environment/ system.

The assessment and quality feedback go hand in hand for enhancing students' performance.[10,11] Feedback is the key for enhancing learning and is essential for knowledge acquisition, training and shaping the medical students to be effective clinicians.[12] First year students scored highest in perception of feedback mechanism, followed by second-year students, thus leading the investigators to deduce that satisfaction with feedback is highest as the students start their academic career, followed by a marked dip in satisfaction during the third year, while satisfaction with feedback related to assessment improves in the subsequent years but it plateaus below the level achieved during the initial year of an academic career. A study reported that student perception of assessment-related feedback worsens as the years of study progresses concurs with our findings, but our findings further show that these perceptions do improve after the initial drop as the students mature with each passing year, though it never attains the level it had at the start of the academic life.[13] The exact reason for the dip in perception in 3rd year is unclear. However, a possible explanation may be that in 3rd year, students are in a transition phase from basic sciences towards clinical sciences and since already established teacher-student relationship

is challenged, which may create barriers in the provision of effective feedback.

Results of various studies have shown that one of the main advantages of CBAs is timely and customized feedback.[14,15] However, item 1.6 “Feedback from assessors about my performance is appropriate” had the lowest mean score (2.48) followed by item 1.2 “ I received feedback on my performance for final exams” and item (3.02). Since both these items are from the feedback mechanism domain, their mean scores are in clear contradiction with the expectations established regarding provision of feedback in CBAs. In the second domain, perception of learning and performance, item 2.2 “I receive feedback on my work from a range of sources (e.g., teachers, peers)” had the lowest mean score (3.27) which again points towards a gap in the feedback process of the assessment program.

This is alarming and it signifies that efforts must be made to integrate feedback into CBAs in a way that it can be utilized by students to improve their performance in the next assessments. While medical students generally are not satisfied with the reception of feedback, the process of giving and receiving feedback must be improved to enhance the overall assessment environ-ment.[16]

Item 3.2, "I received information on what is expected of me in any exam/assessment," obtained the lowest mean score of 3.6 from the third domain i.e. perception of information on assessment. These perceived weak points suggest that students need to be informed of all assessment-related material clearly and promptly. The WFME global standards for quality enhancement in medical education reiterate that the institutes make its assessment policy clear to all stakeholders including the students and opinion of the stakeholders must be taken into account to reshape the assessment system as needed.[17]

All items in the sub-domain of assessment procedure had nearly comparable mean score of 3.86-3.90. This is important as literature also shows learner achievement is dependent on their perception of the learning and assessment environment.[18] If students perceive the environment to be fair and positive, they are more likely to do better on assessments. Students from various academic years perceived the assessment environment in considerably different ways, and this was reflected in the significantly different AEQ scores they received. The mean AEQ score for first year was significantly higher than the rest of the years indicating that the perception of assessment environment is best at the beginning of the academic journey.

There are numerous perceived benefits of CBAs.[19] The low-scoring items in the present study indicate problems within the present assessment system/environment. However, if faculty development is given the proper priority, these problems are not difficult to resolve. Additionally, as CBAs in medical education are a developing area in Pakistan, training and workload allowances for faculty can motivate them in streamlining policies and procedures.[20]

CONCLUSION

The perceived benefits of CBAs are many fold and the results of the study indicate that majority of the students’ consider general assessment environment of their medical college positively. However, some areas that require attention and improvement such as feedback mechanism is highlighted. Despite the lacunae identified CBAs in medical education are an exciting prospect and medical colleges may gradually work toward implementing the same within their setup in order to enhance learning processes.

Limitations

Being a cross sectional study conducted at one institute, limits the generalizability of the results but this research nonetheless provided a window into the assessment environment of an institution following computer based assessments with

active student engagement in both curriculum and assessment committees.

Conflict of Interest:

All authors declared no conflict of interest.

Contributors:

KA: Design and write up
SHRZ: Concept and data acquisition
TA: Analysis and interpretation of data
FZZ: Critical review
MN: Final approval and proofreading

All authors approved the final version and signed the agreement to be accountable for all aspects of the work.

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The data that support the findings of this study are available from the corresponding author upon reasonable request.

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