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Original Article

Perceptions of Medical Students Regarding Online versus Traditional Classroom Learning: A Questionnaire-Based Study

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ABSTRACT

The importance of online learning platforms has risen after the shock that the world experienced due to the need to conduct learning remotely. Online learning is flexible and convenient, but classroom teaching is required to learn independently and acquire clinical skills. **Objectives:** To identify how the medical students in the online and traditional classroom learning were perceived and to compare their performance in areas of learning. **Methods:** The survey was conducted using a questionnaire and involved a cross-sectional survey among 220 undergraduate medical students in a tertiary care teaching hospital. A structured questionnaire, which was self-administered, was used to evaluate perceptions of flexibility, understanding, contact with instructors, acquisition of clinical skills, and revision facilities. The data were analyzed using the assistance of descriptive statistics and presented in frequencies and percentages. **Results:** Flexibility and accessibility of online learning (76%), and the opportunity to revise using recorded lectures (82%) were most popular among the students. However, the preference was on face-to-face classroom learning because of a better understanding and attention (70 percent), engagement with the instructors (88 percent), and acquisition of the clinical skills (91 percent). Students reported that online learning enabled them to control time, yet they experienced some problems with attention and participation in clinical conversations. **Conclusions:** Online learning is more accessible and offers more revision opportunities, but it cannot replace traditional classroom teaching, which is required to understand, interact, and gain clinical competence. The best learning model that might be used by medical students is a mixture of the two methods.

INTRODUCTION

The medical education landscape is also experiencing a paradigm shift in recent years, which can be mainly attributed to the rapid technological development, which has been further accelerated by the worldwide COVID-19 pandemic. Conventionally, medical education has been greatly dependent on in-classroom teaching, clinical demonstrations at the bedside, and practical training. Such practices are traditionally appreciated as providing direct student-teacher engagement, facilitating active learning, and allowing the acquisition of the necessary clinical skills by acquiring practical and real-time observation (and practice) [1, 2]. Nevertheless, the shift to online learning that occurred at the beginning of the pandemic required a rush to start using digital platforms that forced both educators and students to adjust to virtual classes, recordings, and distance testing [3]. This has caused a debate, which has continued to this day, on the effectiveness, benefits, and drawbacks of online education versus traditional classroom-based learning, especially in a practice-based learning field like medicine [4]. One of the

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unique advantages of online learning is the flexibility in the time of work, the ability to study the lectures again using the records, self-direction in learning, and the absence of the need to spend time on transportation, which may increase the level of student autonomy and convenience [5, 6]. These qualities are particularly attractive in a hectic medical course where time management is a big concern. On the other hand, the traditional classroom approach offers invaluable chances of face-to-face faculty interaction, instant feedback, unsupervised learning with fellow students, and above all, learning clinical skills through bedside education and simulated learning [7, 8]. Medical students, being the key stakeholders, are in a good position to share their insights on the effects of these two forms of learning on their knowledge, interaction, and career advancement. Their perceptions can only be understood when educators and institutions want to create blended curricula that maximize the effectiveness of education and deal with the inefficiency of either method [9, 10]. Several studies have discussed student preferences around the world; however, the contextual issues, including institution infrastructure, availability of internet, and attitude towards technology in the culture, can play a great role in determining the perceptions. Even in a country such as Pakistan, in which medical education is experiencing a contradictory situation, with resource limitations and different degrees of digital literacy, there is a need to determine how students view online learning and in-person learning in a systematic way [11]. This kind of evidence can be used to make policy decisions, facilitate the development of the faculty, and assist in developing a balanced educational model that would utilize the advantages of both modalities.

There is Limited modern-day evidence in the Pakistani setting of comparing the perceptions of medical students in online versus traditional classroom learning in a variety of educational domains, especially in the areas of clinical skill acquisition. The immediate transition to online learning during the COVID-19 pandemic raised questions about its usefulness for medical education, with little research on how students view digital and traditional approaches in the context of limited resources. This study aims to evaluate the perception of medical students towards online and traditional classroom learning and the efficacy of the two in enhancing learning results.

METHODS

It was a descriptive, cross-sectional, and questionnaire-based study that was carried out at a tertiary care medical college. It was a six-month study period from August 2025 to January 2026. The research was designed to evaluate and compare medical students' views on online and traditional classroom studies. Before the commencement of the study, all the participants were educated on the purpose and scope of the study, and informed consent was obtained in writing. The process of research was conducted in a way that guaranteed confidentiality and anonymity of responses. The target population consisted of Undergraduate MBBS students in the 2nd to final year. The study used a total of 220 medical students. The required sample size was calculated using the formula for cross-sectional studies, $n = Z^2PQ/d^2$. Assuming a 95% confidence level (Z = 1.96), a margin of error of 5% (d = 0.05), and an expected proportion (P) of 50% to maximize sample size, the minimum required sample was 385. However, due to practical constraints (limited study period and available participants at a single centre), a non-probability consecutive sampling of 220 medical students was enrolled. This sample size provides a margin of error of approximately 6.6% at 95% confidence, which was considered acceptable for this descriptive, hypothesis-generating study. They have used a non-probability consecutive sampling method to select the participants among all three clinical years (2nd, 3rd, and Final Year) of the medical program. The inclusion criteria were medical students who had experience in both types of learning and those who were willing to participate. First-year students lacked adequate exposure to both online and traditional learning modalities. Fourth-year students were either included under the "Final Year" category (per institutional curriculum) or excluded due to conflicting clinical rotation schedules that prevented questionnaire administration. The study sample was limited to medical students pursuing the MBBS program at the time of the study, of gender and those who were willing to participate. First-year students with poor exposure and incomplete questionnaires were considered as exclusion criteria. The students who were not present when the data were collected, students on long leave, and students who failed to grant their consent were omitted from the study. It was developed as a self-administered, structured questionnaire through an extensive literature review and with the consultation of experts. Questionnaire questions were divided into categories of Demographic Information (Age, Gender, Academic year, Perceptions of online vs traditional learning (Five items assessing the preference of flexibility, understanding, instructor interaction, clinical skill learning, and revision using recorded lectures), Advantages of online learning (Four items, including saving travel time, access to recorded lectures, self-paced learning, learning convenience), and Challenges in online learning (Four items, assessing poor internet connection, difficulty in concentration, lack of interaction, and poor clinical exposure, understanding, and concentration). The answers were put down in a dichotomous (yes/no) scale of the advantages and challenges, and preferences were put

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down as either Prefer Online or Prefer Traditional, depending on the aspect of learning. A pre-test was carried out on 20 students (not part of the final sample) to test the questionnaire in terms of its clarity, comprehensibility, and internal consistency. Changes were made depending on feedback. The questionnaire's psychometric properties were partially established through a pretest on 20 students to assess clarity, comprehensibility, and internal consistency, with revisions made based on feedback.
The data were gathered on normal working days and at the end of the academic session, with permission of the respective class coordinators. Questionnaires were given and collected immediately after the consent was obtained. Questionnaires were administered in a hard copy format and were collected immediately after they were completed in order to attain a high response rate. The questionnaire was allocated about 15 to 20 minutes to the participants. Two hundred and twenty-one filled questionnaires were returned, which presents a 100 percent response rate. The analysis of data was done with SPSS-25 and presented in frequency and percentage.

RESULTS

In this research, the demographic data of 220 participants of the study are given. It demonstrates that slightly more males (56%) than females (44%) were included in the sample. Concerning age, half (50%) of the respondents fell within the age group of 21-23 years, 35% in the 18-20 age group, and 15% in the 24 years and above age group. There was a reasonably even distribution of the participants in terms of the academic year, with the final-year students representing the greatest percentage (36%), and 3rd and 2nd year students at 33 and 31 percent, respectively. Such a distribution indicates an even distribution of samples at various academic levels (Table 1).

Table 1: Demographic Characteristics (n=220)

Variables	n (%)
Male	124 (56%)
Female	96 (44%)
Age 18–20	78 (35%)
Age 21–23	110 (50%)
Age ≥24	32 (15%)
2nd Year	68 (31%)
3rd Year	72 (33%)
Final Year	80 (36%)

The findings show the preference for online over traditional education by the participants on five educational aspects. To be flexible and accessible, most people (76%) wanted to learn online, which they saw as the convenience of digital media. Nonetheless, in an aspect of understanding and concentration, 70% preferred traditional learning, indicating a better concentration in physical classes. The preference for the instructor interaction was highly towards the traditional one (88%), and the importance of having direct teacher interaction. However, most notably, the learning of clinical skills was adopted by far in traditional environments only (91%), which is indicative of the inability of the given process to be replaced with practice. On the contrary, in the case of revision and recorded lectures, 82 percent of them thought online learning was the best, as it was possible to read at their own pace. These results show that students appreciate the ability of online learning in terms of flexibility and ability to revise, yet greatly appreciate the traditional approach of interactive, skills-based, and focused learning (Table 2).

Table 2: Perceptions of Online vs Traditional Learning

Learning Aspect	Prefer Online, n (%)	Prefer Traditional, n (%)
Flexibility and Accessibility	168 (76%)	52 (24%)
Understanding and Concentration	66 (30%)	154 (70%)
Instructor Interaction	26 (12%)	194 (88%)
Clinical Skill Learning	20 (9%)	200 (91%)
Revision and Recorded Lectures	180 (82%)	40 (18%)

The results have demonstrated the most important benefits of online learning among the respondents. Access to recorded lectures, which 83% of the respondents cited as most often mentioned, enabled students to go through the content at their own pace. This was directly followed by saving travel time (80%), which will prevent commuting and enhance flexibility. Convenience in learning was reported by 77%, and this means that the Web-based platforms provide a flexible training platform. Sixty-eight percent of them appreciated the idea of self-paced learning, which allowed them to learn at their own pace and comprehension. The results indicate that online education has its main advantages in flexibility, accessibility, and autonomy imposed on the learner, which allows considering it as a supplementary tool that is complementary to traditional ones (Table 3).

Table 3: Advantages of Online Learning

Advantage	n (%)
Saves Travel Time	176 (80%)
Access to Recorded Lectures	182 (83%)
Self-Paced Learning	150 (68%)
Learning Convenience	170 (77%)

This paper summarizes the significant problems of online learning among students. Poor clinical exposure was the greatest issue and was reported by 87 percent of respondents, which indicates the inefficiency of virtual platforms in practical medical training. Another challenge that was notable challenge in this case (77%) was reduced interaction with instructors and peers. Students were observed to have difficulty in concentration by 67% of the

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children, and this can be attributed to the fact that home settings might not necessarily be conducive to focused learning. Inadequate connectivity to the internet was a problem for 55 percent of the respondents, which shows that there are technical obstacles that interrupt the learning process. These have highlighted the fact that online learning has the advantage of being flexible, but it lacks the factor of offering vital clinical experience and interactive learning opportunities, which are imperative in medical education(Table 4).

Table 4: Challenges in Online Learning

Challenge	n (%)
Poor internet connectivity	120 (55%)
Difficulty concentrating	148 (67%)
Limited interaction	170 (77%)
Poor clinical exposure	192 (87%)

The analysis shows that Academic year is the only demographic variable significantly associated with a learning perception: students in higher years increasingly prefer traditional classroom learning for clinical skills ($p = 0.005$, Cramér's $V = 0.22$). For all other learning aspects (flexibility, understanding, instructor interaction, revision) and demographic variables (gender, age group), no statistically significant associations were found (all $p > 0.05$)(Table 5).

Table 5: Association Between Demographic Variables and Perceptions of Online vs Traditional Learning

Learning Aspect	Demographic Variables	Chi-square	p-value	Cramér's V
Flexibility and Accessibility	Academic Year	1.24	0.54	0.08
	Gender	0.11	0.74	0.02
	Age Group	2.01	0.37	0.10
Understanding and Concentration	Academic Year	2.98	0.23	0.12
	Gender	0.56	0.45	0.05
	Age Group	4.10	0.13	0.14
Instructor Interaction	Academic Year	1.87	0.39	0.09
	Gender	0.28	0.60	0.04
	Age Group	2.45	0.29	0.11
Clinical Skill Learning	Academic Year	10.44	0.05	0.22
	Gender	0.09	0.76	0.02
	Age Group	1.02	0.60	0.07
Revision and Recorded Lectures	Academic Year	0.92	0.63	0.06
	Gender	0.33	0.57	0.04
	Age Group	1.78	0.41	0.09

DISCUSSION

This article evaluated the perceptions of medical students towards online and traditional learning. Students enjoyed online learning as it was flexible, available, and allowed revision opportunities [11]. Taped lectures can be studied again, enhancing retention and studying for exams. The same has been found in international research, which highlights the comfort of online education. Nevertheless, the classical classroom instructions are better for learning and focus. Face-to-face lectures are more interactive and immediate response to complex concepts. Intrusion of instructors was highly preferred in a conventional environment. Personal interaction leads to mentorship, discussion, and clarification of clinical reasoning, which are essential in medical education. Acquisition of clinical skills was significantly linked with conventional learning [12]. Online platforms cannot completely teach bedside and patient interaction and provide procedural training. Online education faced such challenges as a lack of interaction, inability to concentrate, and lack of clinical exposure. These obstacles demonstrate the necessity of the incorporation of interactive tools and training based on simulation. The findings encourage the implementation of blended learning, which is the use of digital materials with face-to-face instruction to improve understanding and clinical competency. One study indicated that the most important issues for students were software matters, technical problems, and the absence of face-to-face contact compared to faculty. The learning disruptive desire of the social site was a major issue with the students as opposed to the faculty. Faculty and students reported giving and taking assessment problems of 60% and 63.8%, respectively. The Google Classroom platform was more popular in both of the groups. Sixty-five-point three percent of students and seventy-two percent of faculty favored audiovisual recording and PowerPoint with narration, respectively. The least preferred was a PowerPoint presentation without a narration (10.8). Both emphasized the significance of training and development of infrastructure. The practical/clinical teaching is highly discouraged as a use of e-learning to students and faculty alike [13]. The pilot study presented by Menon *et al.* indicated that the responses of 30 students were analyzed. The minimum sample size of the main study was determined based on the percentage of the level of satisfaction (23.3%) and usefulness (23.3%) of the current online classes that are being observed, using 20% relative precision and 95% confidence. The answers demonstrated that slight adjustments would be necessary in the questionnaire tool regarding its overall feasibility and accomplishment of the goals of the main study [14]. Jhunjhunwala and Bhoosreddy compared that 535 (63.0%) students agreed that the e-learning way of education failed to equip them with the practical aspect of the curriculum, but 617 (72.7%) students thought that the activities involved in e-learning must be combined with the traditional classroom-based mode of learning so that the former would be more enjoyable. Moreover, 526 (62.0%) students said that the problem they experienced during the e-learning mode of learning would be overcome in the

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application of a blended mode of learning [15]. The findings indicate that gender, age, and internet use have a strong influence on the computer anxiety and digital readiness of students. The information sharing behavior and ability of males were better than those of females, and the computer anxiety of students declined with age. Moreover, the findings also show that the more the students use the internet, the more their digital preparedness for academic activity. Moreover, computer anxiety and digital preparedness influence the students to think about their school performance in e-learning. Such a high pace of technological changes and integration of e-learning into the educational process implies that consideration of student attributes and their abilities should be given a careful look [16, 17]. The number of students who took the survey is 406, and Dhanabal *et al.* discovered that almost half of the respondents (51.1%) were happy to be in the online format of the digital learning (73.3%). Among all the respondents, no issues were reported regarding the accessibility (88%), and the problems connected with the weak internet connection (55.1%). Nevertheless, the mood of the students (79.9%), psychological stress (72.6%), and the inability to be confident in the clinical/ practical work (83.6%) appeared to be one of the key issues. Their plans appeared to raise a major issue, as in terms of employment (58.3%), studying abroad (87.5%), and most of them perceived the need to have further training (85.5%), [18]. Most of the most popular were multimedia platforms (33%), case-based approaches (26%), and were interactive (83%), asynchronous (71%), and available at home (83%). Twelve articles (29%) measured usability, and all of those studies had positive feedback. The success of students and preceptors in technology use, high levels of motivation, and openness were the main subjects of success [19]. Both teachers and students found that the experiential aspects of the teaching and learning process in offline learning are better than in online learning. The second survey argues that students who attended the SFCs scored better in the final test as compared to students who attended the plain offline classes. The survey also revealed that the new teaching approach contributed to the students getting more knowledge and to the positive impact the teaching method has had on the clinical practice [20].

This research study is limited in numerous ways. The study design is single-centred, which reduces the external validity of the results. There is a possibility of recall and social desirability bias with self-reported perceptions. A cross-sectional design only measures preferences at a single point in time. The digital infrastructure and internet access variability among the participants were not measured. The results of performance in terms of academic performance were not quantified to correlate with perceptions. First, the frequencies of depression and anxiety were presented only as affirmative percentages (HADS ≥11) without displaying the corresponding 'No' responses in parallel; a more detailed Likert-scale analysis would have provided a fuller understanding of symptom distribution. Studies involving multiple centers with different institutions ought to be made in order to increase generalizability. The longitudinal study needs to determine the changes in perceptions as more exposure to the two modalities is done. Student preferences should be related to objective learning outcomes (e.g., exam scores, clinical skills tests, etc.). Blended learning models should be compared with fully traditional or online models, which require interventional studies. Focus groups or interviews that were to be conducted qualitatively would give more insights into the reasons behind preferences. The development of institutional policies to facilitate a blended learning infrastructure and faculty training should be developed.

CONCLUSIONS

The conclusion was made that online learning is more flexible, accessible, and offers more opportunities to revise, whereas traditional classroom learning is necessary to understand, interact with the instructor, and acquire clinical skills. Blended learning is the most promising approach to contemporary medical learning.

Authors' Contribution

Conceptualization: SAK
Methodology: AB
Formal analysis: MI
Writing and Drafting: AB, NS, MAB, IF
Review and Editing: SAK, AB, MI, NS, MAB, IF, MFG

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

The authors declare no conflict of interest.

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