Allied Medical Research Journal
Vol:3 No.4: 105-111

Perspective

Time to Embrace the Future? Blended Learning in Medical Universities in Pakistan: A Student's Perspective

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ABSTRACT

Background: Medical education follows the traditional route of education delivery, where people are required to be present in person. Recent advances in technology have increased the efficiency of online education as well as the reliability. Not all students learn at the same pace, which is why blended learning can be such a vital tool in educational delivery.

Methodology: A narrative methodological approach was used, which was then elucidated with students' perspectives and current practices in Pakistan. The manuscripts were reviewed and discussed with relevant themes of online medical education in Pakistan.

Results: The literature survey revealed that blended education shows greater efficacy than traditional learning methods. Recent national policies have also worked on the inclusion of technologies in curricula. The existing medical curriculum must be restructured to accommodate a blended format. This involves dividing content between online and face-to-face components.

Conclusion: Blended learning maximizes learning strategies by combining both the strengths of traditional face-to-face learning and the advancement of online learning. Students can avail themselves of education according to their own pace and can revisit concepts as required. It is, however, yet to be implemented in medical universities.

Keywords: *Distance Learning, Distance Education, Medical Education, Online systems, Online social networking.*

Received: April 30, 2025**; Revised:** August 30, 2025**; Accepted:** October 26, 2025

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DOI: https://doi.org/10.59564/amrj/03.04/015

BACKGROUND

Learning is a complex process that occurs in many ways. Education delivery methods play a key role in the learning that students undergo. Medical education requires in-person training to ensure adequate delivery and proper knowledge transfer. The delivery of practical knowledge in medical education is an intricate process. Clinical education provides students with opportunities to experience classic learning situations; however, students also require epistemological access to develop their clinical reasoning capabilities[1].

Clinical education is a crucial element of a healthcare syllabus. Experience of patient dealing in clinical settings creates an atmosphere that cannot be simulated in a classroom[2]. Thus, medical education aims to deliver theoretical knowledge while ensuring clinical and critical reasoning skills are adequately developed. To this effect, blended learning has been touted as an accepted form of teaching that effectively stimulates students to reflect. A narrative methodological approach was used for this study as it employs the integration of blended learning in medical universities. It suggests different experiences and opinions from various studies regarding the approach for this innovative method of teaching in medical institutions.

Blended Learning is halfway between traditional face-to-face learning and online learning. Distance learning as a component of tele-education has gained traction in the past decade; however, it has not yet been fully incorporated and seems to have a greater role in basic medical sciences than clinical education. Distance learning does not necessarily preclude traditional learning methods but is rather used in

combination with face-to-face or professional training courses. Tele-education has been utilized in biomedical education as a blended system, which fuses tele-education technology with traditional teaching methods. One example of this is a lecture or demonstration that is accompanied by an online tutorial. Distance learning is also utilized for self-education, assessments, and examinations in medicine[2].

This method also benefits students in many ways, such as improving their theoretical knowledge and increasing practical skills. Moreover, it also offers flexibility to manage studies with other commitments. It can also stimulate enthusiasm, cultivate clinical thinking ability, and improve teaching quality[2]. Another benefit is the adaptation to modern technology. Dziuban and Picciano emphasized that participating in hybrid lectures and using digital resources helps medical students develop the technological skills required to manage and cope with today's data-driven society[4]. In addition, blended learning promotes self-regulatory culture in students who are accountable for their own development[6]. In low-resource health systems, a blended-learning program is beneficial in upgrading physicians' knowledge without significantly impacting their schedules. Accreditation of these programs and incentives for career progression are pivotal to the success of these initiatives[7].

Imitation learning techniques aim to simulate human behavior in each task. The idea of instruction by imitation is an old concept that has experienced a resurgence due to developments in computing, as well as an increased demand for intelligent applications[6]. In the past decade, e-learning has shown an upward trend in Pakistan. The system observes expert teachers—their teaching styles, feedback patterns, and how they respond to student queries. Using imitation learning, it mimics these teaching behaviors and adapts to different students' learning styles. While ICT provides the infrastructure—learning management systems, video conferencing, and interactive apps—and enables real-time interaction and data collection, which supports the imitation learning model in constantly improving its teaching strategy. The latest educational policy circulated by the Government of Pakistan has incorporated ICTs and e-learning in educational institutes. The national professional standards for educators have also suggested the integration of ICTs in classrooms and the development of e-learning platforms for education[9].

Blended models balances both face-to-face and online learning and offers many benefits. Blended learning offers more flexibility and accessibility compared to other traditional styles. It allows students to set schedules according to their pace and learning abilities. They can easily access their study materials and develop a better understanding through videos, recorded lectures, and other digital study tools[10]. It is an excellent source of tailored learning experiences, giving students an increased chance of getting engaged with the learning sessions, making it easier for them to understand things, and, on the other hand, trace and challenge their progress. This hybrid mode enables students to clear up their queries, which boosts effectiveness[11]. It is easier to control the dynamics of studies in both methods, face-to-face and online, giving students better control over their studies. This enables students to ensure their independence and collaboration in their studies[12].

Blended Learning in Pakistan

A study on MBBS students' psychiatry rotations at a private medical university in Pakistan found that the integrated blended curriculum outperformed other options in terms of student involvement, critical thinking, learner autonomy, and assessment alignment with learning objectives[2]. Studies conducted in medical universities in Karachi found significant improvements in test scores of those who underwent teaching in a blended environment[3,5]. The same results have been reported in studies conducted in India, Bangladesh, and Iran, with blended learning showing improved test scores in clinical examinations[6-9]. Additionally, it was recommended that technological infrastructure be developed, hybrid learning be promoted in institutes, faculty support be improved, and telemedicine be incorporated to aid in the implementation of blended learning[6]. It is also important that faculty are prepared to embrace the integration of technology in academia. Faculty development programs focus on improving the teaching, research, and administrative skills of faculty. In Pakistan, a study revealed that faculty

members appreciated these programs, particularly when they contained additional non-teaching components such as management and research. The study suggested that all faculty members undergo at least 6 months of training in medical education[12]. Teaching portfolios and reflective practices also serve a vital role in faculty development[13]. Continuing medical education ensures that faculty remain knowledgeable about the latest developments in medicine and teaching methodology. Participating in professional conferences, taking internet-based courses, and reading academic journals are a few examples that help maintain and enhance professional skills and knowledge[14]. Through these several programs, medical faculty can polish their skills continuously to offer better training for the upcoming medical practitioners.

Students utilizing blended resources displayed improved academic performance and were relatively unaffected by any kind of technological distraction[15]. A systematic review highlighted that these courses could improve healthcare learners' knowledge acquisition[16]. It also suggests that blended learning has a positive effect on knowledge acquisition compared to non-blended learning. These learners are less likely to feel isolated or less interested, as they are engaged in both face-to-face learning and online material. Another thing being added is exercises and tasks being flexible and accessible by both learner and teacher, which also yields positive results in knowledge acquisition of students, which is proven by a significantly large effect size for blended learning.

Blended Learning Implementation Strategy for Medical Universities in Pakistan

Step 1: Policy & Administrative Commitment

To successfully implement blended learning in medical education, it is essential to establish institutional policies at both the university and departmental levels. These policies should reflect a strong commitment to blended education. Involving regulatory bodies such as the Higher Education Commission (HEC) is an institution in Pakistan that is responsible for regulating, funding and controlling higher education in Pakistan. It appears after the development of educational institutions and formation of curriculum all across the country and Pakistan Medical and Dental Council (PMDC) is a regulatory body that supervises medical and dental profession. It is responsible to look after registered practitioners and ensuring maintenance of ethical and educational standards. The framework for both of these bodies is highlighted in figure 1. It is crucial to ensure alignment with standard guidelines and curricular frameworks. Additionally, forming a dedicated task force consisting of educators, IT professionals, and curriculum experts will help guide and oversee the implementation process. This is further elaborated in table 1.

Step 2: Faculty Training & Capacity Building

A well-prepared faculty is vital for the success of blended learning. Organizing digital pedagogy workshops focusing on platforms like Moodle, Zoom, and Google Classroom can equip medical faculty with the necessary tools and techniques. Encouraging key faculty members to enroll in programs such as the Master of Health Professions Education (MHPE) or instructional design courses will further strengthen teaching quality. Each department should also identify and develop blended learning champions to support peer training and promote adoption within their teams.

Step 3: Infrastructure & LMS Setup

Selecting and implementing a suitable Learning Management System (LMS), a digital program designed to plan, assess, monitor a student's progress reports, upload tasks, manage the course content, facilitate the communication and evaluate performance such as Moodle, Canvas, or Google Classroom, is the cornerstone of the infrastructure. This should be accompanied by the provision of essential digital facilities, including projectors, stable internet, power backups, and accessible IT support. For institutions in low-resource settings, mobile-optimized platforms and offline content delivery solutions should be prioritized to ensure inclusivity.

Step 4: Curriculum Redesign

The existing medical curriculum must be restructured to accommodate a blended format. This involves dividing content between online and face-to-face components. Online materials can

include recorded lectures, quizzes, and discussion forums, while in-person sessions should focus on practical labs, OSCEs, and bedside teaching. Incorporating microlearning techniques such as short video lessons, as well as case-based and problem-based learning modules, will enhance student engagement and comprehension.

Step 5: Pilot Testing

A phased approach is recommended, starting with pilot implementation in one or two courses per department, such as physiology or pharmacology. Feedback should be gathered from both students and faculty to evaluate ease of use, engagement levels, and learning outcomes. This data will inform adjustments needed to resolve challenges related **to** content accessibility and internet reliability.

Step 6: Student Digital Readiness

To ensure students are prepared for blended learning, an orientation should be conducted on how to navigate the LMS and access course materials. Institutions should establish technical help desks and peer support groups to provide ongoing assistance. Additionally, creating brief tutorial videos on tasks such as accessing lectures, submitting assignments, and joining live sessions will help students adapt more easily.

Step 7: Assessment Integration

Blended learning should be accompanied by a blended assessment strategy. Online assessments may include MCQs, assignments, case reflections, and quizzes, while offline components should cover OSCEs, viva voce exams, and clinical evaluations. Faculty training must also address online exam security, the use of rubric-based grading, and systems for providing constructive feedback.

Step 8: Monitoring & Evaluation

Institutions should define key performance indicators (KPIs) such as student participation rates, course completion statistics, OSCE performance, and satisfaction survey results. The data collected from pilot implementations should be analyzed to identify successful strategies and areas for improvement. This ongoing evaluation process will support the scale-up of effective modules and establish a feedback loop for continuous refinement.

Step 9: Scale & Sustain

Once the initial phases have proven successful, blended learning should be expanded gradually across all academic years and specialties. Budget allocations should be made annually to support faculty development, LMS enhancements, and IT infrastructure. Institutions should also promote faculty-led research and publication on blended learning to build local evidence and foster academic innovation.

Step 10: National Collaboration

To strengthen the national implementation of blended learning, universities should collaborate by sharing resources, including open content and best practices. Participation in HEC-led consortiums will help standardize blended learning approaches in medical education, ensuring consistency and quality across institutions.

Recommendations for Medical Universities and Policymakers

The employment of blended learning is quite low across Pakistan. Lack of technological resources and limited internet connectivity are significant barriers in the promotion of technology in education. So far only larger institutes have been able to integrate technology with limited success. When compared with our neighbors, the gulf in education standards is quite apparent. India has focused on constant upgrades to its educational infrastructure through strong government policies, better-trained faculty, and increased LMS integration[6]. Iran has made more progress than Pakistan despite ongoing political and internet restrictions, particularly in urban colleges, where organized processes and specially created platforms have raised student satisfaction[8]. When it comes to structured programs, clinical skill advancements, and the use of blended formats in communication training, Indonesia outperforms Pakistan[9].

Table 1: Blended Learning Implementation Strategy for Medical Universities in Pakistan

Step	Focus Area	Key Actions	Expected Outcomes
1. Policy & Administrative Commitment	Institutional policy & leadership	Establish blended learning policy; align with HEC & PMDC; form implementation task force.	Administrative and strategic support.
2. Faculty Training & Capacity Building	Faculty competence	Conduct digital pedagogy workshops; enroll faculty in MHPE/design courses; develop departmental champions.	Trained and motivated faculty.
3. Infrastructure & LMS Setup	Technological readiness	Implement LMS (Moodle/Canvas); ensure internet, IT support, and backup; provide mobile/offline access.	Functional and accessible e-learning system.
4. Curriculum Redesign	Pedagogical alignment	Blend online (lectures, quizzes) with face-to-face (labs, OSCEs) components; adopt micro- and case-based modules.	Modern, flexible curriculum.
5. Pilot Testing	Trial implementation	Pilot 1–2 courses; collect feedback; refine based on usability and outcomes.	Evidence-based refinement.
6. Student Digital Readiness	Learner preparedness	Orient students on LMS use; provide tech support and short tutorials.	Digitally competent learners.
7. Assessment Integration	Evaluation system	Combine online (MCQs, assignments) and offline (OSCEs, viva) assessments; train faculty in secure grading.	Comprehensive and valid assessments.
8. Monitoring & Evaluation	Quality assurance	Set KPIs; review pilot data; establish feedback loop.	Continuous improvement.
9. Scale & sustain	Institutionalization	Expand to all specialties; allocate budget; promote research on blended learning.	Sustainable adoption.
10. National Collaboration	Cross-institutional sharing	Share open resources; engage in HEC-led consortiums.	Standardized national framework.

To effectively use the blended learning model in medical education, medical institutes across Pakistan must establish department-specific objectives and well-structured institutional frameworks. In order to help faculty develop their skills, it is pivotal to pay for their training in digital pedagogy and offer incentives upon completion. Universities can improve their services by setting up centralized learning management systems, smart classrooms, and reliable internet connections.

To ensure quality, digital content libraries must be created, and student performance and engagement should be consistently evaluated through analytics and feedback. In the meantime, policymakers and regulatory bodies like the Higher Education Commission should set clear rules for blended learning, digital competency standards for teachers, and hybrid course accreditation in the medical curriculum. Such efforts would benefit a blended learning environment that is scalable, long-lasting, and of high quality.

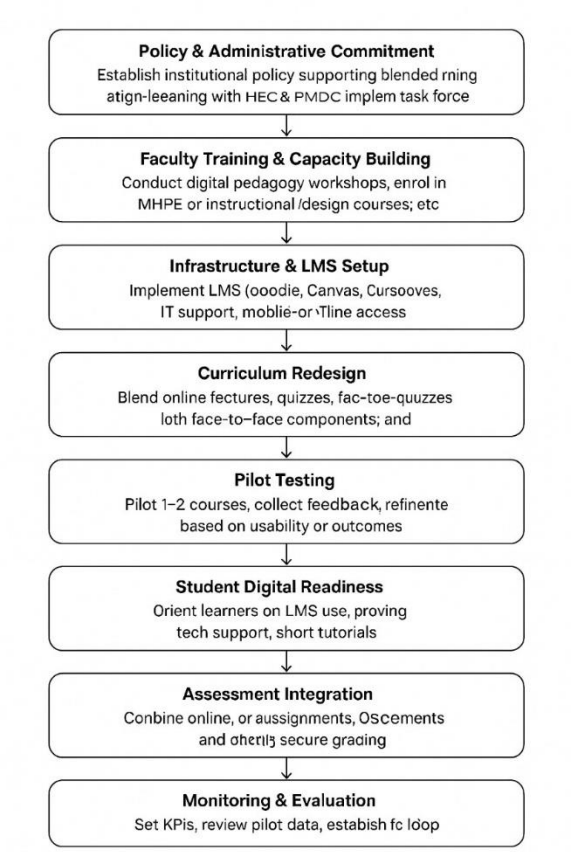

Fig.1 Framework for policies of HEC and OMDC

CONCLUSION

Blended learning plays a transformative role in medical education. It combines face-to-face learning with digital technological methods. It helps students learn at their own pace and builds strong engagement between teachers and students. It has optimized students' outcomes and advanced the quality of medical education. It can also maximize learning strategies by combining both strengths of traditional face-to-face learning and the advancement of online learning, which enables the learner to have diverse learning styles and choose a learning pattern according to their ease, learn at their own pace, and have a balanced approach with face-to-face interactions between instructor and learner and technology-based learning material with progress shown online, along with video-based learning, which makes it easier for learners. How soon, or how effectively, it is implemented in Pakistan yet remains to be seen.

Acknowledgments

None.

Author Contributions

Javeria Rao conceptualized and designed the study. **Muhammad Umair** and **Asfa Waheed** collected and analyzed the data. **Felicianus Anthony Pereira** contributed to data interpretation and literature review. **Faisal Yamin** assisted in manuscript drafting and critical revision. All authors read and approved the final version of the manuscript.

Ethical Approval

Not applicable.

Grant Support and Funding Disclosure

None.

Conflict of Interests

None.

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