

Assessing the Impact of Diverse Components on Medical Education Outcomes

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Abstract

Identifying the factors that contribute to educational effectiveness, evaluating teacher performance, and highlighting both strengths and weaknesses are essential for providing valuable feedback to planners, policymakers, and stakeholders in the education system. This study aims to evaluate the effectiveness of medical education from the perspectives of students and professors. A comprehensive review was conducted on articles published between 2010 and 2023. An electronic search was conducted using the terms “medical sciences” and “education effectiveness” across several databases, including PubMed, Scopus, Ovid, Elsevier, ScienceDirect, and ProQuest. Six key factors influencing the success of medical education were identified in the studies reviewed. These factors included the teacher’s communication skills, personal attributes, teaching methods, student characteristics, scholarly research involvement, and the learning environment. Based on these findings, it is recommended that the effectiveness indicators be introduced to all faculty members and that evaluations of teachers incorporate these areas, prioritizing them as necessary. Furthermore, objective and reliable evaluation tools need to be developed and applied to ensure that the ultimate aim—improving the quality of education—is effectively supported.

Keywords: Medical education, Education effectiveness, Students, Teacher performance

Introduction

Medical science education has achieved significant milestones, with the training of thousands of professionals across various levels playing a crucial role in reducing human mortality rates [1-3]. The primary objective of medical education should be to foster students’ learning, personal growth, self-confidence, and social development within the broader context of social sciences and humanities, ultimately enabling them to help others effectively [4, 5]. Medical education is the

cornerstone of providing a skilled workforce capable of meeting societal health needs [6, 7].

Scholars in this field have emphasized that effective and efficient education is essential for student learning and academic progress [8]. Educational effectiveness is characterized by independence, student-centered approaches, active cooperation between students and instructors, and a long-term orientation aimed at the holistic development of individuals [9-11]. Numerous studies have explored faculty perspectives on education, highlighting the importance of their views on teaching and learning [12, 13]. For instance, one study found that over 50% of medical faculty members expressed dissatisfaction with their institution’s educational performance [14]. They identified several critical issues, including inadequate planning, insufficient focus on legal and managerial matters, and a lack of attention to material concerns [15-17].

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Transforming and advancing education requires a deep understanding of the educational process, awareness of innovative implementation methods, and clear indicators of educational effectiveness [18, 19]. This is particularly vital in medical education, where the central mission is to train highly skilled and competent professionals with the necessary knowledge, attitudes, and abilities to safeguard and enhance public health [4]. Banidavoodi's study of 75 medical and 75 paramedical students highlighted key factors contributing to educational effectiveness from the students' perspective, including personal attributes of professors (28%), communication skills (34%), teaching methods (47%), and academic research (54%) [18].

Universities are pivotal in the development of nations, as they serve as key institutions for training and preparing skilled professionals to meet societal needs across various sectors. Thus, examining and addressing the factors that contribute to educational effectiveness is crucial for advancing national development [20-22]. This issue is particularly pressing in developing countries like Iran, where challenges such as inadequate investment in education, a shortage of specialized human resources, and insufficient focus on the efficiency of the educational process remain widespread [23, 24].

Over recent decades, universities have faced a variety of obstacles, including the expansion and globalization of higher education, political influences, rising unemployment among graduates, rapid technological advancements, an emphasis on quantity over quality, reduced funding from governments, and competition with other sectors [25]. These factors have contributed to changes in the efficiency and effectiveness of higher education systems [26].

The push for greater quantity in higher education—without consideration of the social, cultural, and economic resources available—has forced universities to reevaluate their structures, goals, and operations [27]. Understanding the key factors of educational effectiveness, assessing faculty performance, and identifying areas of strength and weakness can provide valuable insights for policymakers, planners, and education stakeholders [28]. This process also allows instructors to adjust their teaching methods, improving the quality and impact of education [29]. Since the core aim of education is to ensure accurate knowledge transfer and enhance student learning, these factors must be thoroughly considered from every angle [30]. This research aims to explore the effectiveness of medical

education as perceived by both professors and students in the field of medical sciences.

Materials and Methods

This review included articles published from 2010 to 2023. A comprehensive electronic search was carried out using the keywords “Education Effectiveness” and “Medical Sciences” across databases such as PubMed, Ovid, Elsevier, ScienceDirect, Scopus, and ProQuest. After reviewing and compiling all the relevant articles, duplicates and articles deemed unrelated were excluded. The inclusion criteria for the study were: original research articles of medium to high quality based on the L-MASTARI evaluation tool and the availability of the full article. Articles that were excluded consisted of editorials, case studies, and those for which the full text was not accessible.

Results and Discussion

The findings from the reviewed studies identified several key components that contribute to the effectiveness of training for medical students.

The Power of Teacher Communication

According to various studies, the strength of a teacher's communication is considered one of the most influential factors in education, as observed by the majority of students. This was highlighted in the research of Askari and Mahbob Moadab [31], Mohaddesi *et al.* [32], Mirmohammadi Meybodi [33], and Valiee *et al.* [34], and similarly in Gholipour Moghaddam's study [35], which emphasized communication as a critical indicator of educational effectiveness. Key aspects contributing to effective communication include the teacher's readiness to address student concerns, fostering class participation, availability beyond office hours, establishing a friendly rapport with students, encouraging independent learning, recognizing and adapting to individual differences, promoting a positive self-image, using discipline and tact in communication, ensuring mutual respect, and demonstrating fairness in evaluations and clarifications. In the educational context, “communication” refers to the exchange of ideas, knowledge, and cultural values between the teacher and the students. Effective communication is fundamental to the learning process, as it enables not only the transfer of knowledge but also the creation of a shared understanding between the teacher

and students. Learning cannot occur without strong communication between both parties. Given the importance of communication in the educational environment, particularly in universities, there is a pressing need to focus on enhancing communication skills among professors. Organizing workshops and seeking student feedback on faculty communication could help improve these skills and, by extension, the quality of education.

Personal Characteristics of the Teacher

In the reviewed studies, the personal attributes of the teacher were identified as the second most important factor influencing educational effectiveness. Studies by Sadigh *et al.* [36], Ghorbanian *et al.* [37], Tofoghiyan [20], and Sayyadi *et al.* [38] revealed that, from the student's perspective, the teacher's personal qualities were among the most significant components of effective education. Key factors influencing the teacher's characteristics, as highlighted in the studies, include the clarity of the teacher's communication, enthusiasm for the subject matter, punctuality in starting and ending classes, the ability to provide constructive feedback, fairness, professional appearance, flexibility, decisiveness, sense of humor, self-confidence, adherence to social and ethical standards, positive attitude towards the field, teaching experience, academic rank, and leadership roles held by the professor.

Given the undeniable role of the teacher in the teaching and learning process, understanding the traits of an effective educator is crucial for improving teaching quality. Students, who have the most direct interaction with professors, form judgments about their teaching based on these personal attributes. Their views on the qualities of an ideal teacher can significantly influence the learning experience. Furthermore, because students often look up to their instructors as role models, a teacher with the right personality can foster greater student satisfaction during the educational process. Therefore, organizing targeted training sessions that follow sound educational principles and strategies is vital. These sessions not only enhance professors' academic knowledge but also improve their ability to communicate content clearly and effectively.

Teaching Method

The method of instruction was recognized as the third vital factor for teaching effectiveness in this research.

According to Abazari and Namnabati [39], this was highlighted as the most important element from the professors' perspective, while Mohaddesi *et al.* [32] and Elahi *et al.* [40] identified it as crucial from the students' viewpoint. Key areas that influence the effectiveness of teaching methods, as found in the reviewed studies, include: how the professor introduces new content, the ability to stimulate intellectual curiosity in students, the strategic use of educational tools, clear communication of course materials, maintaining a logical structure throughout the lesson, referencing real-world cases relevant to students' future professions, the variety of resources used by the instructor, investing time to address student queries, assigning students tasks to present course material, ensuring course content aligns with educational objectives, demonstrating in-depth knowledge of the subject, focusing on skill development, creating a conducive learning environment that fosters a positive student attitude, incorporating diverse teaching methods, establishing clear, measurable learning objectives at the start of the lesson, and evaluating students' progress.

The teaching method is an essential factor in fulfilling educational goals across various institutions. It encapsulates the teacher's overall approach, including teaching techniques, lesson content, teaching materials, goals, and the roles of both instructors and students. A successful method of teaching is rooted in the alignment between the learning objectives and the teaching strategies, ensuring students are effectively engaged and the educational goals are met.

Effective Teaching

Effective teaching encompasses a combination of a professor's behaviors and qualities that help achieve educational goals and foster student learning. However, learning is influenced by several factors beyond the teacher's actions, including student behavior, motivation, curriculum content, and the learning environment. According to Sadigh *et al.* [36], from the students' perspective, teaching effectiveness is a multifaceted concept, with the professor's actions playing a significant, though not exclusive, role. Research on the implementation of effective teaching criteria in universities serves a dual purpose: identifying gaps in the education system and helping address them. By offering a comprehensive assessment of educational quality, this approach enables improvements in teaching by reinforcing strengths and addressing weaknesses [41].

University officials must recognize all the components that contribute to effective teaching to enhance educational outcomes. The creation of a robust and high-quality education system requires focusing on scholarly aspects, and when professors' teaching methods promote a discrimination-free environment combined with sincere and respectful interaction, both the effectiveness and overall quality of education can be significantly improved.

Student's Characteristics

Student characteristics are another key factor influencing the effectiveness of education. In studies by Firoozehchian *et al.* [42], Elhami *et al.* [43], and Tofoghiyan *et al.* [20], student characteristics were identified as a crucial component in the learning process. From both students' and professors' perspectives, the student's behavioral interaction with the teacher, respect for the professor, and interest in the subject matter were the most critical factors. The student's interest in the subject was particularly highlighted as the most significant sub-component affecting educational effectiveness. Interest plays a pivotal role in teaching and learning, leading to positive emotional outcomes. When students find the subject matter engaging, they are more likely to continue their efforts to understand and master it. Interest also determines how deeply students process the material. Engaging topics naturally leads to more profound learning, whereas uninteresting topics may result in shallow engagement. To enhance educational quality, it is suggested that student interests be considered when designing curricula, and that students' characteristics be taken into account during the admission process, aligning their traits with the field of study. This approach could improve both student satisfaction and the overall quality of education.

Scholarship

Scholarship is identified as the fifth essential component of educational effectiveness in the review of various studies. According to research by Askari and Mahbob Moadab [31], scholarship emerged as one of the most critical factors in the education process, from both the students' and professors' perspectives. The key areas influencing scholarship in teaching include the professor's general knowledge of the course, the integration of research findings into the teaching

materials, the professor's engagement in research related to the subject matter, and the professor's research history. Among these factors, the most significant sub-component of scholarly research, from the perspective of professors, is the professor's deep knowledge of the subject being taught. A university professor is expected to possess comprehensive knowledge about the course content, ensuring that the material is not only accurate but also up-to-date and relevant to the curriculum. This principle emphasizes the importance of maintaining high-quality course content, ensuring that it aligns with the course objectives and adequately prepares students for future coursework that depends on this foundational material. An effective professor communicates the course's goals and continuously updates their knowledge. This can be achieved through ongoing professional development, such as engaging with current educational literature, attending workshops, and participating in academic conferences, which help maintain the relevance and quality of the content they teach.

Educational Environment

The educational environment is identified as the final component influencing the effectiveness of education, as highlighted in the studies by Firoozehchian *et al.* [42], Ghorbanian *et al.* [37], and Elhami *et al.* [43]. In addition, Abazari and Namnabati [39] emphasized that an unsuitable educational environment is one of the primary factors limiting the effectiveness of education, especially from the perspective of administrators. Several sub-components that contribute to the educational environment, based on the reviewed studies, include: ensuring both professors and students have access to a diverse range of patients with varying medical conditions, the appropriate student-to-patient ratio, and fostering cooperation and coordination between professors and department staff.

Clinical education is particularly significant for students in the medical sciences field, as it forms a major component of their educational programs. While theoretical education provides foundational knowledge, it is the clinical environment that plays a pivotal role in the development of practical skills. The clinical setting serves as the bridge between theoretical knowledge and real-world medical practice. It is within this environment that students can apply what they have learned, develop

hands-on skills, and gain insights into the realities of working in healthcare.

The clinical training environment is thus integral to effective medical education, as it allows students to engage directly with patients, practice clinical procedures, and participate in the treatment process. This collaborative learning process between instructors and students helps foster measurable changes in the student's abilities. Given the critical role clinical education plays in developing the essential skills and professional competencies of medical students, educational planners need to create conducive conditions within clinical departments. This will maximize the educational value of clinical training and ensure students gain the practical experience necessary for their future careers.

Conclusion

This review identified six key factors that influence the effectiveness of medical education: teacher communication skills, teacher personal qualities, teaching methods, student characteristics, scholarly research, and the educational environment. These components are essential for enhancing the educational process and ensuring the development of skilled professionals in the medical field.

It is recommended that universities incorporate these effectiveness indicators into the design of professional development workshops for faculty, encourage research engagement among both students and faculty and consider these factors when selecting lecturers. Additionally, it is crucial to incorporate these factors into faculty evaluations, ensuring that performance assessments align with these priorities. By doing so, universities can improve the quality of education, ultimately fostering a more effective and productive learning environment.

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