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*Guest Editorial*

# Navigating complexities: Improving evidence quality in Indian medical education research

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## INTRODUCTION

Educational research is a scientific and systematic process of data collection on educational problems. It involves analysis and interpretation of these data, which are then applied to problem-solving, contributing to improving the curriculum and its impact.[1,2] This field of inquiry encompasses various aspects of education, including the development of curriculum components such as objectives, content, teaching-learning methods, assessment, feedback, educational environment, and student support. It also covers the implementation and impacts evaluation of the curriculum.[3]

In addition to curricular matters, educational research, being a social science, deals with the development of theories to explain educational phenomena (e.g., identity formation, imposter syndrome) or educational constructs (e.g., competence, professionalism). It also involves building consensus among stakeholders for various issues in the learning ecosystem (students, teachers, parents, administrators, community members, and regulators), as well as policy development and its implications.[4] The study results are expected to guide desired and agreed changes in the context of learning ecology.[2] Despite its importance, the field faces significant challenges. Hence, this editorial review seeks to delve into the concept of evidence in educational research, examining trends, identifying gaps, and proposing strategies to enhance the quality of research evidence in India.

## CONSEQUENCES OF NOT DOING EDUCATIONAL RESEARCH?

As discussed above, educational research refines curricula, shapes policies to meet stakeholder needs, and evaluates interventions for professional growth.[5] Neglecting timely research and evaluation can halt curriculum improvement, leaving students with outdated content and inequitable policies.[6] Misaligned teaching and assessment practices can lead to low student and faculty motivation, diminish the relevance of educational institutions, and reduce the credibility of universities at a global level.[7] Students may miss critical opportunities to develop essential skills such as critical thinking, innovation, and collaboration, resulting in less resilient, less competent professionals, which adversely impacts patient outcomes and healthcare efficiency. Previous reviews from India have highlighted challenges in medical education, such as inadequate training environments, unqualified faculty, resource misallocation, outdated curricula, and neglected research.[8,9]

In the long term, insufficient educational research deepens regional disparities, hinders policymaking, halts innovation, and limits the adoption of modern teaching methods. This leaves graduates unprepared for healthcare challenges, reducing their contribution to public health, social progress, and economic growth. Cultivating a culture of program evaluation fosters systematic, incremental curriculum improvements, positioning the education system as a cost-effective solution to real-world challenges.[10]

## NATURE OF EVIDENCE IN EDUCATIONAL RESEARCH

The term "evidence" refers to the information, data, or facts that are systematically collected and analyzed to support or refute a scientific theory or hypothesis. In the context of scientific research, evidence is expected to be empirical, meaning that it is based on controlled experimentation and is interpretable in accordance with the scientific method. In medicine, the idea of using research evidence is well established[11] where systematic reviews on the effects of health interventions are being used right from patient level to policy level decision-making.[12]

Applying the idea of evidence-based education is a bit challenging for various reasons. Knowledge in the field of education is often developed through direct experience, discussion with peers, and analysis of data. This knowledge helps us make situational decisions on what works and what does not. Furthermore, educational matters deal with complex systems where numerous known and unknown variables influence the phenomena, making it difficult to measure and infer causality. Contextual differences and ethical concerns in conducting experimental research in real educational settings make it harder to get reliable measures that clearly show cause and effect. While the case for evidence-based teaching has long been advocated – drawing parallels to a treating physician assessing the efficacy of new chemotherapy – there remain significant challenges in implementing this approach.[13] Hence, the prevailing dominance of "evidence-based" thinking in educational policymaking has been criticized for undermining the integrity of evidence itself. In addition, it risks fragmenting education as a field that aspires to be both coherent and research informed.[14]

Unlike in the USA, where Flexner's report,[15] rooted in robust data and systematic analysis, played a transformative role in shaping and improving medical education, the Indian context presents a different narrative. In India, decision-making in routine educational matters is frequently influenced by dominant political, public, regulatory, and institutional factors, rather than grounded in empirical evidence. This may stem from challenges such as diverse socio-cultural contexts, resource limitations, and the pressing need to address immediate practical demands. Nevertheless, the application of evidence to educational matters is of paramount importance, particularly as we progress toward a more accountable, transparent, and impactful education system. To facilitate application of evidence in decision-making, Harden *et al*. (2000) proposed the QUESTS framework for evaluating evidence in medical education. Evidence is assessed based on its Quality (reliability), Utility (transferability without modification), Extent, Strength, Target (validity of outcomes), and Setting (contextual relevance). Best Evidence Medical Education fosters a decision-making ethos grounded in these principles and the context of decision-making.[13]

## INSIGHTS INTO MEDICAL EDUCATION RESEARCH AND ITS CONTRIBUTIONS IN INDIA

In educational research, both quantitative and qualitative evidence play crucial roles. Quantitative evidence (e.g., test scores) provides measurable, objective data for researchers to identify trends and draw clear conclusions. This type of evidence is often preferred by policymakers and stakeholders for its reliability and comparability. On the other hand, qualitative evidence offers rich, in-depth insights into the experiences, perceptions, and attitudes of students, teachers, and other stakeholders. Qualitative research explores the "why" and "how" behind quantitative trends, leading to a deeper understanding of educational processes and outcomes.[4] Together, this complementary mixed-methods approach is expected to provide a comprehensive view of educational realities, enabling the development of more nuanced and context-specific interventions and policies.

According to a scoping review of educational research in India from 2006 to 2015, there was a steady increase in studies, rising from 3 to 44% during the reference period. Approximately 80% of these studies targeted undergraduate populations, with a focus on single-site quantitative surveys, stakeholder perceptions (Kirkpatrick Level 1),[16] comparisons of teaching-learning methods, and evaluations of faculty development programs.[17]

Community Medicine accounted for one-fourth of the studies, followed by Physiology and Medical Education Units. Notably, among selected studies, 63% of the studies were conducted in private medical colleges alone. Fellowships and advanced courses in medical education appeared to be significant drivers for this growth. Of the 71 studies included in the review, only six (8.5%) received funding, primarily from intramural grants. In the past decade, there has also been a rise in the number of studies, particularly following the introduction of competency-based curricula and the increased use of technology in education. Most of these

studies aimed to assess stakeholders' perceptions of the new interventions.[17] Recent scoping review on articles published during COVID-19 pandemic confirms similar tends in India.[18]

Faculty in medical colleges shoulder multiple responsibilities, including educating students, providing services to patients and communities, and conducting research on health challenges. Teaching is often overtaken by patient service and research to improve the healthcare delivery system. Clinicians in medical colleges are often so heavily engaged in service delivery that they struggle to find time for research, particularly educational research.[19] To bridge this gap, it is essential to establish a dedicated team or department that focuses on directing educational research, managing educational matters, and shaping policy at the institutional level. This team could also actively direct and even conduct educational research, ensuring a continuous flow of evidence-based insights to enhance teaching and learning practices. Furthermore, fostering a culture that recognizes and rewards teachers who have a passion for teaching, conducting educational research, and embracing innovative teaching methods is crucial for driving meaningful progress.[19]

## WHAT ARE WE PUBLISHING AND WHAT SHOULD BE THE FOCUS?

Noteworthy, given the nature of evidence in educational research, the designs of medical education research in India often appear overly simplistic, falling short of capturing the multifaceted realities inherent in this complex domain. Many studies have relied on single-site quantitative methods or basic assessments that fail to delve deeper into the complexities of education systems. There is a pressing need for studies that move beyond surface-level inquiries to explain educational processes in depth.[17] Examples include investigating mechanisms of change management post-accreditation, implementing new curricula or technologies, and developing strategies for consensus-building among diverse stakeholders, especially in the context of the recent rollout of competency-based curricula across various courses. Moreover, advancing research on "explanatory theories" and "educational constructs" through qualitative and mixed methods, though currently limited, is essential for driving progress in the field.

Such studies should uphold scientific rigor by addressing real-world challenges within their specific contexts. Beyond uncovering underlying processes, they must incorporate thorough outcome evaluations at higher Kirkpatrick levels, including assessments of behavioral changes and their subsequent impact on practice and outcomes. In addition, studies and publications should intertwine activities with scholarship in a seamless "activity-scholarship double helix," fostering a robust integration of research and practice,[20] and bridge gap between theory and routine practice.[21]

Recently, it has been argued that today's health professionals lack the resilience to deal with the complex challenges of the healthcare system. This is attributed to the lack of education system's focus on the development of inner goals such as self-awareness, critical thinking, complexity awareness, connectedness, communication, and the ability to convert intentions into actions.[22] This area necessitates educational research to improve the curriculum and learning of student in given ecology of education system.

## FELLOWSHIPS, COURSES, AND FUNDING OPPORTUNITIES

Over the last one and a half decades, the fellowship program by the Foundation for Advancement of International Medical Education and Research and the Advanced Course in Medical Education by the National Medical Commission have significantly improved educational research in India. These programs provide technical guidance to fellows, equipping them with the skills to undertake meaningful educational research, even though they do not offer direct financial support for conducting research.

Funding for medical education research in India is scarce, with most resources allocated to health problems and systems research. Organizations such as the Indian Council of Medical Research, the Department of Biotechnology/Wellcome Trust India Alliance, and the Department of Health Research prioritize public health and biomedical advancements, as their outcomes are often more immediate and measurable compared to educational research. As a result, most teaching faculty aim to secure these grants to enhance expertise in their professional disciplines.

Outcomes of educational interventions are often intangible, with measurable short-term results, but their long-term impact on health improvement is challenging to evaluate due to confounding factors. Although interventions at the health professions education system level hold the potential for significant, cost-effective changes, they face difficulties in securing funding due to their typically indirect and distant outcomes, which limit donor interest in supporting educational research. As a result, funding remains unavailable for faculty-initiated projects, master's and PhD theses in Health Professions Education, and multicentric or longitudinal studies. Based on existing literature and our experience, Figure 1 illustrates the research flow across different stages of education.[8,9] Educational research in India primarily relies on self-motivation, self-funding, and occasional institutional support. However, several barriers hinder its growth, including a lack of motivation, skills, and

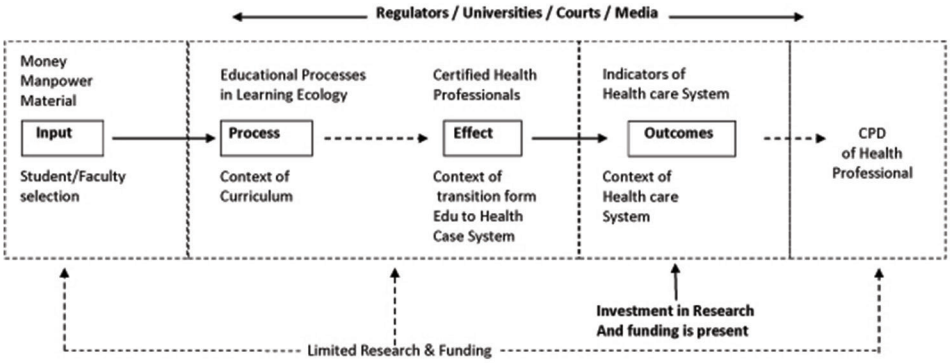


**Figure 1:** Flow of research at various stages of education and funding opportunities. CPD: Continuing professional development.

resources, as well as resistance to innovation.[19] In addition, the absence of a dedicated national-level journal for advancing medical or health professions education research presents a significant challenge to the development of this field.

## CONCLUSION

Educational research has immense potential to drive evidence-based decision-making and improve the quality of education. Utilizing both quantitative and qualitative methods enable a thorough understanding of educational challenges. Establishing dedicated teams or departments to manage research, oversee educational matters, and shape institutional policies can ensure a consistent stream of evidence-based insights for enhancing teaching and assessment practices. However, inadequate funding and the absence of national-level journals for educational research remain significant obstacles. Tackling these barriers will strengthen the evidence base, fostering professional development and elevating the overall quality of education and health services in India.

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