

Adoption of a Design-Based Research Approach to Improve Understanding about Complex Educational Problems

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Abstract

Over the past couple of decades, remarkable progress occurred in medical education research. However, most of the ongoing research did not seem to have added much to the existing literature. Thus, our understanding has not shown considerable improvement. An extensive search of all materials related to the topic was carried out in the PubMed search engine, and a total of six articles were selected based on the suitability with the current review objectives and analyzed. Design-based research targets complex educational problems in the real world, with an ultimate intention to enhance learning among the students and not justify the superiority of one teaching–learning method. In conclusion, the framework of design-based research plays a significant role in the better understanding and resolving of complex educational problems. Further, considering the encouraging results obtained in different educational problems, it is the need of the hour that all the educational researchers should adopt a design-based research approach for gaining an in-depth understanding of the local educational problems.

Keywords: Design-based research, evaluation, medical education

INTRODUCTION

Over the last couple of decades, remarkable progress has been reported in the field of medical education research, as reflected by the rise in the number of dedicated medical education journals, articles targeting different aspects of medical education, formation of a different association of medical educationists, and organization of multiple conferences-cum-workshops focusing on research in medical education.^[1] Nonetheless, most of the ongoing research did not seem to have added much to the existing literature. Thus, our

understanding (viz. why a specific intervention has delivered results or not, identifying the predisposing factors or the wide range of factors influencing the occurrence of an outcome) has not shown considerable improvement.^[1,2]

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METHODS

A search of all materials related to the topic was carried out in the PubMed search engine. Relevant research articles focusing on design-based research in medical education published from 2012 to 2019 were included in the review. A total of eight studies of similar objectives to the current study were identified initially, of which two studies were excluded due to the unavailability of the complete version of the articles. Overall, six articles were selected based on the suitability with the current review objectives and analyzed. Keywords used in the search include design-based research and medical education. The collected information is presented under the following subheadings: design-based research, applications of design-based research, potential limitations and suggested solutions, and implications for practice.

Design-based research

Design-based research targets complex educational problems in the real world (where learning routinely happens), with an ultimate intention to enhance learning among the students and not justify the superiority of one teaching–learning method.^[3] These research activities follow a continuous cyclic process comprising design, evaluation, and redesigning. In the first stage of design, an in-depth analysis of the problem is done with the help of the involved stakeholders, and solutions are implemented to resolve the problem. The design is made based on the existing educational theories to produce a robust study design.^[2-4]

In the next stage of evaluation, the impact of the interventions is evaluated, which gives a better understanding of the overall problem, and then redesigning is done to identify the best possible solution to the given educational problem.^[3] This type of research employs a combination of methods. Both quantitative and qualitative methods are employed to gain deep insights into the wide range of interactions between different variables (such as faculty members, students, learning environment, learning resources, and teaching–learning methods). The specific method is ascertained based on the nature of the educational problem.^[1-3]

Applications of design-based research

It is worth noting that design-based research has found application in different domains of medical education, such as the successful implementation of problem-based learning, facilitating learning through educating simulation facilitators, planning competency-based assessment of supervisors, and web-based initiatives.^[4-6] These research activities are carried out by a range of experts, who communicate with each other regularly and work together to identify and disseminate the solution.^[2,3]

Potential limitations and suggested solutions

Although design-based research plays a defining role in advancing academic knowledge, we must acknowledge that the findings of such research have relevance in the local settings, and it is not easy to generalize the findings. This limitation can be relatively eliminated by conducting such studies across different learning environments.^[3] There is a definite possibility that owing to the researcher's involvement in the stages of design and evaluation. The factual findings will be ignored. In other words, the researcher might have a prejudice that the proposed intervention will surely deliver results and thus will not criticize them. This issue can be a better deal by ensuring triangulation of the data sources and motivating researchers to practice reflexivity.^[2-4]

Implications for practice

There is an immense need to promote design-based research in medical education to provide valuable insights to sort out the existing lacunae. It is encouraged to use a combination of methods, and based on the complementary findings, an evidence-based decision can be taken. The staff members can be oriented about the scope of the design-based research and how it can be employed in the teaching–learning setup. This will essentially require the involvement of the Medical Education Unit and the organization of training programs as a part of capacity building.

CONCLUSIONS

The framework of design-based research plays a significant role in better understanding and resolving complex educational problems. Further,

considering the encouraging results obtained in different educational problems, it is the need of the hour that all the educational researchers should adopt a design-based research approach for gaining an in-depth understanding of the local educational problems.

Authors contribution

SRS contributed in the conception or design of the work, drafting of the work, approval of the final version of the manuscript, and agreed for all aspects of the work.

PSS contributed in the literature review, revision of the manuscript for important intellectual content, approval of the final version of the manuscript, and agreed for all aspects of the work.

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Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

We have strictly adhered to ethical principles

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