

EDUCATIONAL AND HEALTH IMPACT OF TEACHER'S DEVELOPING CENTRIC ACTIVITIES FOR MIDDLE SCHOOL STUDENTS IN UTTAR PRADESH

Sameena Yaqoob , Dr. Sanjeev Kumar

PhD Scholar, Department of Education, Maharishi University of Information Technology,
Lucknow, Uttar Pradesh, India

Professor, Department of Education, Maharishi University of Information Technology, Lucknow,
Uttar Pradesh, India

ABSTRACT : This study evaluates the educational and health impacts of teacher-centric developmental activities on middle school students in Uttar Pradesh, India. Focusing on interactive and engaging teaching methods, the research assesses improvements in academic performance and student well-being through a sample of 300 middle school students. Methods include participatory activities that emphasize critical thinking and problem-solving, coupled with interventions aimed at enhancing physical health and nutritional awareness. Preliminary results indicate significant enhancements in students' cognitive skills and a notable improvement in their physical health indicators, suggesting that active, teacher-driven engagement not only boosts academic achievement but also contributes positively to students' overall health. These findings underscore the importance of innovative teaching strategies and holistic education approaches in fostering better educational and health outcomes, supporting the need for their broader implementation across schools in the region.

INTRODUCTION

India's educational landscape has changed dramatically in the last several years, especially with the advent of cutting-edge techniques like design-based learning (DBL). This method places a strong emphasis on active learning by having students create, refine, and enhance design prototypes, which develops their capacity for critical analysis and problem-solving. Design-based learning has a great deal of promise to help students in Uttar Pradesh's middle schools acquire 21st-century skills. For design activities to be implemented successfully in the classroom, instructors' roles are crucial. In addition to comprehending the fundamentals of DBL, educators also need to modify them to fit the unique requirements and environments of their pupils. This study assesses the effects of middle school design activities on student learning outcomes by looking at how UP teachers create and carry out these activities in the classroom. The study also discusses the difficulties instructors have and provides suggestions for successfully incorporating DBL into the curriculum. Numerous investigations have examined the efficacy of design-based learning in several educational settings. Hmelo-Silver (2004) conducted a noteworthy research that emphasised the advantages of problem-based learning (PBL) and DBL in fostering students' critical thinking and collaborative abilities. Similar to this, Kafai (2006) highlighted how digital media might help middle schools implement DBL by demonstrating how students can participate in challenging, multidisciplinary projects through design projects.

DBL has not received much attention in India, however recent initiatives at educational reform have begun to highlight its potential. Bhattacharya and Sharma's (2019) study, which examined the application of DBL in STEM teaching in urban schools, showed how it may encourage creativity and collaboration. Research in rural and semi-urban settings, like UP, where access to resources and teacher preparation may be restricted, is lacking, nonetheless. By concentrating on

the unique possibilities and difficulties that UP teachers have while adopting DBL in middle school settings, this research seeks to close this gap.

RESEARCH APPROACHES

Using a mixed-approaches approach, this study collects data using both qualitative and quantitative methods to provide a thorough knowledge of the role that teachers play in creating design activities. Students' social and cognitive development is greatly influenced by their education, especially in the early years of middle school. Teaching strategies and classroom activities are crucial in this setting for developing critical thinking, creativity, problem-solving, and teamwork abilities. Over time, rote learning and exam-based evaluations have dominated India's traditional educational architecture. However, the necessity to implement more student-centered and innovative techniques in the classroom—among them, design-based learning (DBL)—has been highlighted by recent educational reforms and pedagogical shifts.

A pedagogical strategy called Design-Based Learning (DBL) incorporates practical design projects into academic programs. Because it gives students the freedom to recognise real-world issues, generate ideas for solutions, create prototypes, then improve those ideas via iteration and feedback, it is especially successful at keeping their attention. In addition to encouraging creativity, these exercises improve students' problem-solving, teamwork, and critical thinking skills. DBL's main goal is to provide students the chance to "learn by doing," which is in line with the ideas of experiential learning.

Table 1. Role of Teacher and Students

Step	Teacher's Role	Student's Activity
Introduction	Present the design challenge	Understand and clarify the problem
Research and Planning	Guide research and encourage creativity	Brainstorm ideas and create plans
Prototype Creation	Provide resources and troubleshoot issues	Build prototypes using available materials
Evaluation and Feedback	Offer constructive feedback	Test and improve prototypes based on feedback

The middle school curriculum in Uttar Pradesh (UP), India, has historically been more rigorous and regimented. Even while this system has assisted students in achieving academic success, the need for more creative and participatory teaching methods is becoming increasingly apparent. This understanding is particularly crucial for acquiring the practical knowledge and soft skills needed to meet the ever-evolving needs of the twenty-first century. Teachers are essential in implementing such pedagogical changes since they are knowledge facilitators.

The creation and application of design activities in the classroom by middle school teachers in Uttar Pradesh, India, is investigated in this study. The main goal is to comprehend the tactics they use, the difficulties they encounter, and the effects these activities have on student participation and performance. The importance of DBL in STEM and non-STEM fields, as well as how this strategy improves learning outcomes across disciplines, are also examined in this study.

RESULTS AND DISCUSSION

This section presents the findings of the study, analyzing the data collected through surveys, interviews, and classroom observations. The results are presented in the context of key themes: student engagement, problem-solving, creativity, collaboration, and challenges faced by teachers. The section also includes hypothesis testing, supported by six tables illustrating the quantitative data.

Hypothesis Testing

To understand the effectiveness of design-based learning, the following hypotheses were tested:

- **Hypothesis 1 (H1):** Design-based learning activities significantly improve student engagement.
- **Hypothesis 2 (H2):** Design-based learning activities significantly enhance students' problem-solving skills.

Statistical Method: A paired t-test was used to compare the pre-activity and post-activity scores for engagement, problem-solving, and creativity. The significance level was set at 0.05 for all tests.

As hypothesized, there was a significant improvement in student engagement after participating in design-based learning activities. Prior to the intervention, the average engagement score (on a scale of 1-10) was 5.1. After the DBL activities, the average engagement score increased to 8.4. A paired t-test revealed a statistically significant difference between pre- and post-activity scores ($p < 0.001$), confirming **H1**.

Table 2. Test of Hypothesis-1

School Type	Pre-Activity Engagement Score	Post-Activity Engagement Score	Mean Difference	p-value
Urban	6.2	8.9	2.7	< 0.001
Semi-Urban	5.7	8.2	2.5	< 0.001
Rural	4.5	7.9	3.4	< 0.001

Students demonstrated significant improvement in their ability to approach and solve complex problems after engaging in DBL activities. The average problem-solving skills score improved from 5.3 to 8.1. The paired t-test yielded a p-value of < 0.001 , supporting **H2** that DBL enhances problem-solving skills.

Table 3. Test of Hypothesis-2

School Type	Activity Problem- Solving Score	Activity Problem- Solving Score	Mean Difference	p-value
Urban	5.9	8.5	2.6	< 0.001

Semi-Urban	5.6	8.0	2.4	< 0.001
Rural	4.7	7.9	3.2	< 0.001

The study's findings show that middle school pupils in Uttar Pradesh, India, who participate in design-based learning (DBL) activities greatly increase their level of engagement, creativity, and problem-solving abilities. Instructors are essential to the creation and execution of these activities, but they confront several obstacles because of limited resources, curricular demands, and inadequate training. By addressing these obstacles, teacher development initiatives and resource distribution can facilitate DBL's broader acceptance in Indian classrooms.

This study adds to the increasing body of data demonstrating that DBL is a successful teaching strategy for helping students acquire 21st-century abilities. But in order for DBL to fully materialise in Indian education, a systematised approach to teacher preparation and resource availability is required.

Conclusion

This study shows that in middle schools in Uttar Pradesh, India, design activities have the potential to greatly increase student involvement, teamwork, and problem-solving abilities. The study emphasises how crucial curriculum alignment, resource accessibility, and teacher preparation are to the effectiveness of design-based learning. The benefits of DBL are evident despite its obstacles, especially in remote schools, which implies that additional funding for teacher preparation and resources is necessary before broad adoption can occur.

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