Original Article
ISSN (Online): 2350-0530
ISSN (Print): 2394-3629

International Journal of Research - GRANTHAALAYAH
February 2025 13(2), 198–204

DESIGN THINKING AS A PEDAGOGICAL FRAMEWORK: IMPACT ON STUDENT CREATIVITY AND PROBLEM-SOLVING

Dr. Aditi Jha [1]

[1] Associate Professor, Rachana Sansad College of Applied Art & Craft, Mumbai, Maharashtra, India

Received 02 January 2025
Accepted 29 January 2025
Published 28 February 2025

Corresponding Author
Dr. Aditi Jha,
aditij@rachanasansad.edu.in

DOI
10.29121/granthaalayah.v13.i2.2025.6333

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

This paper examines the impact of design thinking (DT) as a pedagogical framework in higher education, with a specific focus on student creativity and problem-solving abilities. It investigates whether the integration of design thinking processes into teaching methodologies enhances students' capacity to generate novel ideas, adapt to ambiguity, and address real-world challenges effectively. Drawing on a mixed-methods research design, the study analyzes quantitative measures of creativity and problem-solving, alongside qualitative reflections from students and faculty. Findings suggest that design thinking positively contributes to student learning outcomes, though challenges such as resource availability and faculty readiness remain. This paper contributes to the growing body of empirical evidence on design thinking's effectiveness in educational contexts.

Keywords: Design Thinking, Pedagogical Framework, Student Creativity, Problem-Solving

1. INTRODUCTION

The evolving demands of the 21st-century workforce have shifted educational priorities from knowledge memorization toward the cultivation of higher-order thinking skills. Global frameworks such as the OECD's Learning Compass 2030and UNESCO's Education for Sustainable Development stress creativity, adaptability, collaboration, and problem-solving as essential future skills.

Traditional pedagogical models, rooted in lecture-based instruction, often fail to equip learners with these competencies. Design thinking, originating from the

field of design practice and later expanded to business and education, offers a human-centered, iterative, and experiential framework for teaching and learning. Its emphasis on empathy, collaboration, prototyping, and reflection aligns with contemporary calls for student-centered education.

This paper addresses a critical question: Does design thinking as a pedagogical framework measurably enhance creativity and problem-solving among students?

2. LITERATURE REVIEW

2.1. UNDERSTANDING DESIGN THINKING

Design thinking is commonly defined as a human-centered, iterative approach to innovation that integrates empathy, ideation, and experimentation Brown (2009). It consists of five phases:

1) **Empathize:** Understanding users and their needs
2) **Define:** Framing the problem
3) **Ideate:** Generating possible solutions
4) **Prototype:** Creating tangible representations
5) **Test:** Refining ideas through feedback

This cyclical process shifts students away from linear "problem–solution" thinking toward adaptive exploration.

Diagram 1

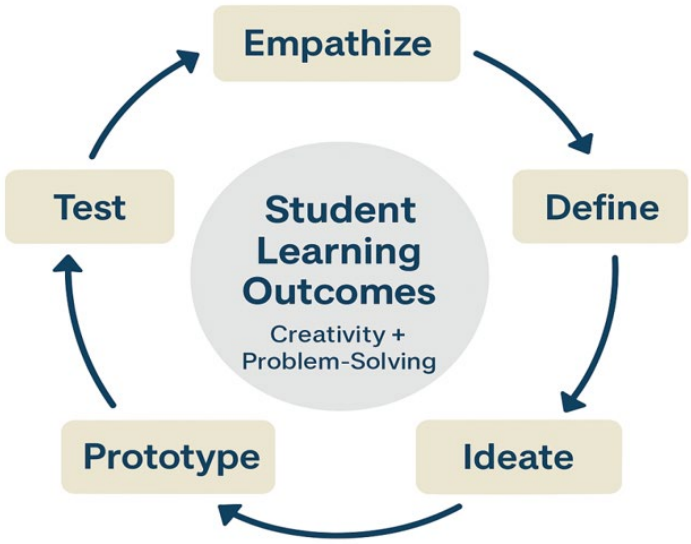


Diagram 1 The Design Thinking Cycle in Education

2.2. PEDAGOGICAL APPLICATIONS OF DESIGN THINKING

Scholars have argued that design thinking transcends disciplinary boundaries. In higher education, it has been applied in engineering Leifer and Meinel (2010), business Liedtka (2015), and liberal arts Razzouk and Shute (2012). DT fosters active learning, peer collaboration, and problem ownership.

Moreover, project-based learning and inquiry-driven models naturally align with DT, making it a flexible pedagogical tool across contexts.

2.3. DESIGN THINKING IN EDUCATION

DT is a human-centered, iterative process—Empathize, Define, Ideate, Prototype, Test—adapted from design practice Brown (2009), Razzouk and Shute (2012). In classrooms, it scaffolds inquiry, experimentation, and reflection Plattner et al. (2011). Unlike linear models, it embraces ambiguity and iteration.

2.4. THEORETICAL FOUNDATIONS

DT reflects constructivism and social constructivism Vygotsky (1978), experiential learning Kolb (1984), Amabile's componential theory of creativity, and research on design cognition Cross (2011). These frameworks highlight DT's focus on active making, reflection, and collaborative knowledge building.

2.5. CREATIVITY OUTCOMES

Creativity involves fluency, flexibility, and originality Torrance (1990). DT supports this through divergent ideation, rapid prototyping, and safe-to-fail experimentation. Studies report improved idea fluency and creative confidence Wrigley and Straker (2017).

2.6. PROBLEM-SOLVING OUTCOMES

DT strengthens ill-structured problem-solving Jonassen (2011) via empathy-driven problem framing, strategic iteration, and team-based reasoning. Evidence shows transferable gains in engineering, healthcare, and social innovation projects.

2.7. CREATIVITY AND ITS DEVELOPMENT

Creativity in education is often measured by fluency (number of ideas), flexibility (diversity of ideas), originality, and elaboration. Torrance (1990) emphasized the need for structured opportunities to stimulate creativity. DT provides such opportunities by legitimizing experimentation and failure as learning pathways.

2.8. PROBLEM-SOLVING IN EDUCATIONAL CONTEXTS

Problem-solving requires cognitive, social, and emotional skills. Jonassen (2011) differentiates between well-structured and ill-structured problems—the latter requiring empathy, adaptability, and innovative thinking. Design thinking is particularly suited to ill-structured problems, as it encourages divergent thinking before converging on solutions.

2.9. GAPS IN CURRENT RESEARCH

While case studies report positive student experiences, fewer studies provide empirical data comparing outcomes of design thinking-based pedagogy with traditional teaching. This study aims to bridge that gap by integrating quantitative and qualitative methods.

3. METHODOLOGY

3.1. RESEARCH DESIGN

A mixed-methods approach was chosen to capture both measurable outcomes and rich, experiential insights.

- **Quantitative:** Standardized assessments of creativity and problem-solving, pre- and post-intervention.
- **Qualitative:** Student journals, classroom observations, and faculty/student interviews to contextualize the data.

3.2. PARTICIPANTS

The study involved 120 undergraduate students (aged 18–22) across design, business, and humanities disciplines. Students were divided into:

- **Experimental Group (n=60):** Engaged in a semester-long design thinking module.
- **Control Group (n=60):** Followed conventional lecture-based pedagogy.

3.3. INTERVENTION DESIGN

The design thinking module lasted 12 weeks and included:

- Problem-based projects (real-world community challenges)
- Group workshops in empathy, ideation, and prototyping
- Reflective journaling at each stage
- Continuous faculty feedback

3.4. DATA COLLECTION TOOLS

- **Creativity Assessment:** Torrance Tests of Creative Thinking (TTCT)
- **Problem-Solving Scale:** Heppner's Problem-Solving Inventory (PSI)
- **Observation:** Rubric-based documentation of collaboration and engagement
- **Interviews:** Conducted with 15 students and 5 faculty members

3.5. DATA ANALYSIS

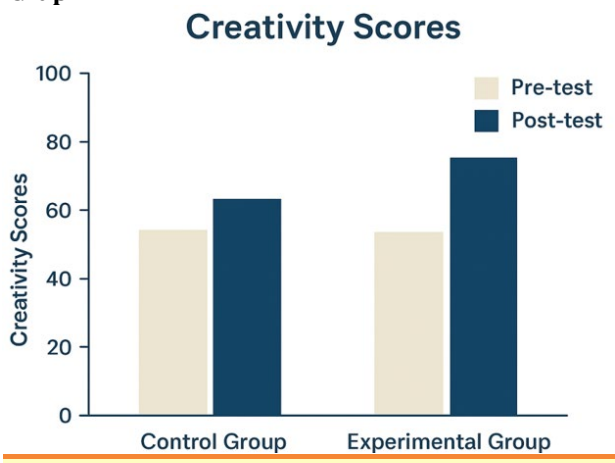
- **Quantitative:** Paired t-tests and ANOVA to measure differences between groups.
- **Qualitative:** Thematic coding of journals and interviews to identify recurring themes.

4. FINDINGS

4.1. QUANTITATIVE OUTCOMES

- **Creativity Scores:** Experimental group showed an average 22% improvement, compared to a 7% improvement in the control group.

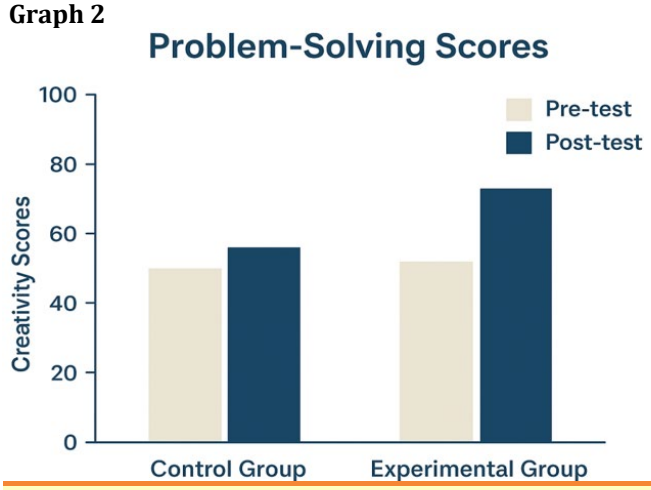
Graph 1



Graph 1 Creative Score

- **Problem-Solving Scores:** Experimental group improved by 18%, while the control group improved by 5%.

Graph 2



Graph 2 Problem Solving Scores

4.2. QUALITATIVE OUTCOMES

- **Engagement:** Students expressed higher enthusiasm for collaborative projects.
- **Confidence:** Many reported increased willingness to take risks and explore unconventional ideas.
- **Empathy:** Reflection journals highlighted the importance of user perspectives in shaping solutions.

4.3. CHALLENGES IDENTIFIED

Initial discomfort with ambiguity and lack of fixed answers.

Faculty required training to facilitate DT effectively.

Time-intensive nature of iterative cycles posed curriculum challenges.

5. DISCUSSION

The results support the argument that design thinking enhances student creativity by providing structured freedom for divergent thinking. It also improves problem-solving skills by exposing students to ill-structured problems requiring adaptive strategies.

From a pedagogical standpoint, DT fosters:

- **Cognitive growth:** Encouraging critical and divergent thinking.
- **Affective growth:** Building resilience and comfort with uncertainty.
- **Social growth:** Promoting collaboration and empathy-driven approaches.

However, systemic integration requires addressing barriers: faculty preparedness, curriculum alignment, and institutional support.

Diagram 2

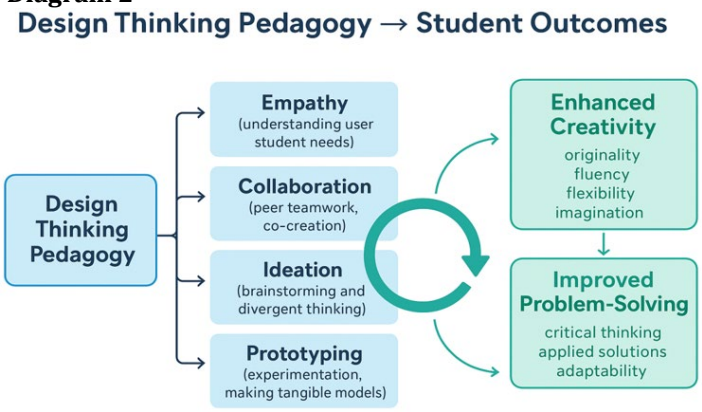


Diagram 2 Design Thinking Padagogy – Student Outcomes

6. CONCLUSION

This study demonstrates the potential of design thinking as a powerful pedagogical framework for enhancing student creativity and problem-solving. Unlike traditional teaching methods, it encourages empathy, collaboration, experimentation, and reflection, enabling students to generate innovative ideas and refine them through iterative cycles.

Findings suggest that students exposed to design thinking show higher levels of originality, flexibility, and critical thinking, while also developing resilience and adaptability through iterative learning. This positions them as active creators of knowledge, better equipped to tackle complex challenges.

Overall, design thinking provides educators with a future-ready approach to learning. By integrating its principles into curricula, institutions can cultivate creative confidence and problem-solving skills essential in an innovation-driven world.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

Cross, N. (2011). Design Thinking: Understanding How Designers Think and Work. Berg Publishers. https://doi.org/10.5040/9781474293884

Hennessey, B. A., & Amabile, T. M. (2010). Creativity. Annual Review of Psychology, 61, 569–598. https://doi.org/10.1146/annurev.psych.093008.100416

Jonassen, D. H. (2011). Learning to Solve Problems: A Handbook for Designing Problem-Solving Learning Environments. Routledge.

Leifer, L., & Meinel, C. (2010). Design Thinking Research: Building Innovation Eco-Systems. Springer.

Liedtka, J. (2015). Perspective: Linking Design Thinking with Innovation Outcomes Through Cognitive Bias Reduction. Journal of Product Innovation Management, 32(6), 925–938. https://doi.org/10.1111/jpim.12163

OECD. (2019). OECD Learning Compass 2030. OECD Future of Education and Skills Project. https://www.oecd.org/education/2030-project/

Plattner, H., Meinel, C., & Leifer, L. (2011). Design thinking: Understand–improve–apply. Springer. https://doi.org/10.1007/978-3-642-31991-4

Razzouk, R., & Shute, V. (2012). What is Design Thinking and Why is it Important? Review of Educational Research, 82(3), 330–348. https://doi.org/10.3102/0034654312457429

Sawyer, R. K. (2012). Explaining Creativity: The Science of Human Innovation (2nd ed.). Oxford University Press.

Schön, D. A. (1983). The Reflective Practitioner: How Professionals Think in Action. Basic Books.

Torrance, E. P. (1990). Torrance Tests of Creative Thinking: Norms-Technical Manual. Scholastic Testing Service.

UNESCO. (2020). Education for Sustainable Development: A Roadmap. UNESCO Publishing. https://doi.org/10.54675/YFRE1448

Wrigley, C., & Straker, K. (2017). Design Thinking Pedagogy: The Educational Design Ladder. Innovations in Education and Teaching International, 54(4), 374–385. https://doi.org/10.1080/14703297.2015.1108214