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A K20 Center Research Brief

Building Thinking Classrooms: Conditions for Problem-Solving

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Introduction

Peter Liljedahl's research on "Building Thinking Classrooms" explores the conditions necessary for fostering problem-solving skills in mathematics classrooms. The literature review highlights the challenges faced by traditional teaching methods in engaging students in deep thinking and problem-solving. Liljedahl's work is grounded in over a decade of research, focusing on the "AHA!" experience and its impact on students' beliefs and self-efficacy in mathematics. The significance of this research lies in its potential to transform classroom norms and practices to create environments where students actively engage in thinking and problem-solving.

Methodology

Research Design:

Liljedahl employed a qualitative research design, using narrative inquiry to explore the development and maintenance of thinking classrooms. This approach allowed for a detailed examination of classroom interactions and the implementation of specific teaching practices.

Sample:

The study involved multiple classrooms across different schools, with a focus on middle school mathematics classes. Teachers and students participated in the research, providing insights into the effectiveness of the proposed interventions.

Data Analysis:

Data were analyzed using thematic analysis, identifying key patterns and themes related to classroom norms, student engagement, and problem-solving behaviors. This method facilitated a comprehensive understanding of the conditions necessary for building thinking classrooms.

Results

The results of Liljedahl's research indicate that several relatively easy-to-implement teaching practices can significantly enhance students' problem-solving abilities. Key findings include:

- **Random Grouping:** Students were randomly grouped to encourage collaboration and reduce fixed mindsets.

- **Vertical Non-Permanent Surfaces:** Using whiteboards and other non-permanent surfaces allowed students to freely express their ideas and engage in iterative problem-solving.
- **Questioning Techniques:** Teachers used open-ended questions to promote deeper thinking and exploration.

These practices led to increased student engagement, improved problem-solving skills, and a shift in classroom norms toward a more thinking-oriented environment.

Application into Practice

To replicate Liljedahl's intervention in your school, consider the following steps:

1. **Professional Development:** Provide training for teachers on the principles and practices of building thinking classrooms. This includes workshops on random grouping, use of vertical non-permanent surfaces, and effective questioning techniques.
2. **Classroom Setup:** Equip classrooms with whiteboards and other non-permanent surfaces to facilitate collaborative problem-solving.
3. **Implementation:** Encourage teachers to adopt random grouping and integrate open-ended questioning into their daily teaching practices.
4. **Monitoring and Feedback:** Regularly assess the impact of these interventions on student engagement and problem-solving skills. Use feedback to refine and improve the implementation process.

By following these steps, schools can create environments that foster deep thinking and problem-solving, ultimately enhancing students' mathematical abilities and self-efficacy.

Work Cited

Liljedahl, P. (2016). Building thinking classrooms: Conditions for problem-solving. In P. Felmer, E. Pehkonen, and J. Kilpatrick, eds., *Posing and solving mathematical problems: Advances and new perspectives* (361–386). Springer Cham. https://doi.org/10.1007/978-3-319-28023-3_21