Pedagogical Research Journal
Vol. 4 No 1. Juni 2026, pp. 38-40
P-ISSN 3124-1255 E-ISSN Process, DOI:

THE EFFECT OF CONTECTUAL PROBLEM-BASED TASKS ON STUDENTS' MATHEMATICAL PROBLEM-SOLVING ABILITY IN SPLTV

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ARTICLE INFO

Keywords:
Keywords 1 ;Contextual Problems
Keywords 2 ; Problem-Based Learning
Keywords 3; Mathematical Problem-Solving Ability
Keywords 4; System Of Learning Equations In Three Variables

Article history:

Received 2025-05-24
Revised 2025-06-12
Accepted 2026-06-26

ABSTRACT

This study investigates the effect of using contextual problem-based tasks on the mathematical problem-solving ability of Grade X students in learning Systems of Linear Equations in Three Variables (SPLTV). A quantitative approach with a quasi-experimental nonequivalent control group design was employed. The sample consisted of one experimental class and one control class selected through purposive sampling at SMAN 2 Rimba Melintang. The experimental class was taught using contextual problem-based tasks, while the control class received conventional instruction. Data were collected using a mathematical problem-solving ability test and analyzed through an independent samples t-test. The findings indicate a significant effect of contextual problem-based tasks on students' mathematical problem-solving ability. Students exposed to contextual problem-based tasks demonstrated higher problem-solving performance than those taught using conventional methods. These results suggest that contextual problem- based tasks are effective in enhancing students' mathematical problem-solving skills, particularly in SPLTV learning.

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1. INTRODUCTION

Mathematical problem-solving ability is a core competency that students must develop to understand and apply mathematical concepts effectively. In secondary education, problemsolving plays a crucial role in enabling students to analyze situations, construct mathematical models, and interpret solutions meaningfully. One topic that requires strong problem-solving skills is Systems of Linear Equations in Three Variables (SPLTV), which involves abstract reasoning, algebraic manipulation, and logical thinking.

However, many students experience difficulties in solving SPLTV problems, particularly when problems are presented in contextual or real-life situations. Traditional instruction often emphasizes procedural fluency and routine exercises, limiting students' opportunities to develop deeper conceptual understanding and strategic problem-solving skills. As a result, students tend to rely on memorization rather than meaningful reasoning.

Contextual problem-based tasks offer an alternative instructional approach by presenting mathematical problems rooted in real-life contexts that require students to explore, analyze, and solve problems actively. This approach aligns with constructivist learning theory, which emphasizes active student engagement and knowledge construction through meaningful experiences. Previous studies have reported that contextual and problem-based learning can enhance students' understanding and problem-solving abilities, yet empirical evidence specifically focusing on SPLTV at the senior high school level remains limited.

Therefore, this study aims to examine the effect of using contextual problem-based tasks on the mathematical problem-solving ability of Grade X students at SMAN 2 Rimba Melintang in learning SPLTV.

2. METHOD

2.1 Research Design

This study employed a quantitative approach using a quasi-experimental nonequivalent control group design. Two intact classes were assigned as the experimental and control groups without random assignment.

2.2 Participants

The population consisted of all Grade X students at SMAN 2 Rimba Melintang. Two classes were selected through purposive sampling based on similar academic characteristics. One class served as the experimental group, while the other served as the control group.

2.3 Instructional Treatment

The experimental group received instruction using contextual problem-based tasks, where students were engaged in solving SPLTV problems embedded in real-life situations. Learning activities emphasized understanding the problem, planning solution strategies, implementing solutions, and evaluating results. The control group received conventional instruction focusing on teacher explanations and routine exercises.

2.4 Instrument

Data were collected using a mathematical problem-solving ability test in the form of essay questions. The test was developed based on problem-solving indicators, including understanding the problem, devising a plan, carrying out the plan, and reviewing the solution. The instrument was validated and tested for reliability before use.

2.5 Data Analysis

Data analysis involved descriptive statistics and inferential analysis. An independent samples *t*-test was used to determine whether there was a significant difference in mathematical problem-solving ability between the experimental and control groups.

3. RESULTS

The results of the independent samples *t*-test showed a significant difference in mathematical problem-solving ability between students taught using contextual problem-based tasks and those taught using conventional instruction ($p < 0.05$). The experimental group achieved a higher mean score on the posttest compared to the control group. This finding indicates that the use of contextual problem-based tasks significantly improved students' mathematical problem-solving ability in SPLTV.

4. DISCUSSION

The findings of this study demonstrate that contextual problem-based tasks have a positive and significant effect on students' mathematical problem-solving ability. Students in the experimental group were better able to understand problems, formulate solution strategies, and evaluate their answers. This improvement can be attributed to the learning environment that encouraged active engagement, critical thinking, and meaningful learning.

Contextual problem-based tasks help students connect mathematical concepts with real-life situations, making learning more relevant and comprehensible. These findings are consistent with previous research indicating that problem-based and contextual learning approaches enhance students' higher-order thinking skills and problem-solving performance.

5. CONCLUSION

This study concludes that the use of contextual problem-based tasks significantly improves the mathematical problem-solving ability of Grade X students in learning SPLTV. Students taught using this approach demonstrate better problem-solving performance than those taught using conventional methods. Therefore, contextual problem-based tasks are recommended as an effective instructional strategy for teaching SPLTV and other mathematical topics that require strong problem-solving skills.

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