



ENHANCING PROBLEM-SOLVING SKILLS IN GENERAL CHEMISTRY THROUGH SIMULATION-BASED INSTRUCTION

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ABSTRACT

This study evaluated the effectiveness of simulation-based instruction (SBI) in enhancing the problem-solving skills of Grade 12 STEM students in General Chemistry. Specifically, it compared the pre-test and post-test performances of students exposed to traditional instruction (TI) and SBI, examined significant differences within and between groups, and proposed strategies to strengthen SBI implementation.

A quasi-experimental design was employed using two intact groups from Bauan National Vocational and Industrial High School during the 2025–2026 school year. The control group received traditional instruction, while the experimental group utilized SBI. Data from pre-tests and post-tests were analyzed using frequency, weighted mean, paired sample t-tests, and independent sample t-tests.

Findings revealed that both groups had similar initial performance, showing mastery in basic concepts but struggling with higher-order problem-solving. Post-intervention, both groups demonstrated significant improvement. Statistical analysis indicated a significant difference between pre-test and post-test scores within each group. However, no significant

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ISSN: 2704-3010

Volume VII, Issue IV

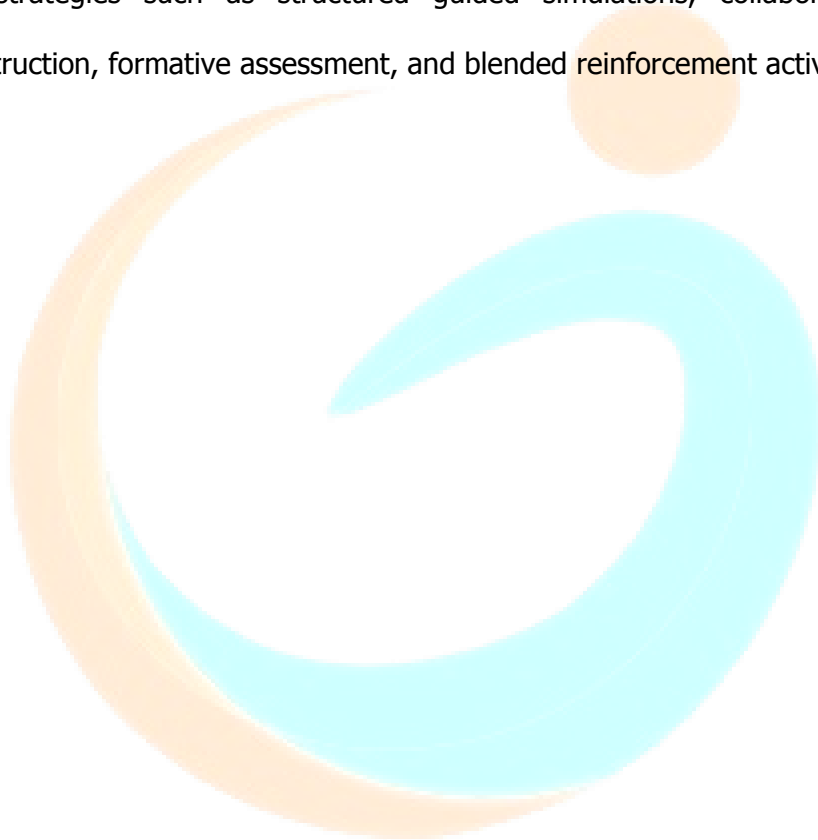
April 2026

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difference was found in the post-test performance between the control and experimental groups, suggesting that SBI and TI were equally effective.

The study concludes that SBI is a viable alternative to traditional methods, yielding comparable academic results. To further enhance problem-solving skills, the study suggests instructional strategies such as structured guided simulations, collaborative learning, scaffolded instruction, formative assessment, and blended reinforcement activities.



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