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GAMIFICATION FOR MASTERY: ENHANCING GRADE 7 STUDENTS' MULTIPLICATION AND DIVISION SKILLS IN INTEGERS

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ABSTRACT
The purpose of this study was to evaluate the effectiveness and impact of gamification intervention on students' multiplication and division skills in integers. The study aimed to determine the significant difference between students' pretest and post-test scores. A pre-experimental research design was utilized to assess the intervention's effectiveness. Data was collected from 89 students in grade 7 at Baltazar Nicor Valenzuela National High School, selected through purposive sampling. Pretest and post-test assessments were employed for data gathering. The findings revealed a substantial improvement in scores, with the mean percentage score increasing from 25.35% (Low) before the intervention to 59.85% (High) after the intervention. This significant difference indicates a highly positive impact of the gamification for mastery intervention on students' skills in multiplying and dividing integers. The results suggest that the intervention effectively enhances students' multiplication and division skills in integers.
KEYWORDS: *Action Research, Intervention, Multiplication and Division of Integers, Gamification*

INTRODUCTION

Many students struggle with basic operations involving integers. COVID-19 worsened students' performance in mathematics. Integers are foundational for algebra and higher-level math. Students in year 7 are introduced to integers. Low proficiency in basic mathematics is common among high school students. Effective assessment is needed to address learning losses in mathematics.

OBJECTIVES

- Enhance student engagement in multiplying and dividing integers.
- Improve proficiency in multiplying and dividing integers.
- Determine pretest skill levels in multiplying and dividing integers.
- Determine post-test skill levels in multiplying and dividing integers.
- Assess significant differences between pretest and post-test scores.

REVIEW OF RELATED LITERATURE

A study in Bengkulu City showed cultural approaches, like the dakon game, enhance understanding of integers. Visual representations through games help students grasp multiplication and division concepts better. Culturally relevant contexts in math education promote engagement and understanding.

A qualitative study in Madiun emphasized structured scaffolding and visual media for students with difficulties. Tailored instructional approaches are essential for promoting reasoning abilities in mathematics. Research on efficient algorithms for integer operations contributes to computational techniques in math.

Targeted interventions have proven effective in improving math performance for struggling students. Incorporating cultural elements into lessons enhances students' understanding and problem-solving skills. Overall, addressing specific needs and providing tailored support is vital for students with math difficulties.

Proposed Intervention and Strategy

Gamification can enhance established learning environments without replacing them. Successful gamification relies on integration into effective learning systems. The study will measure gamification's impact on knowledge, motivation, and engagement. Lessons will be gamified for Grade 7 Math learners using three games: Integers Product Game, Multiplication Bingo, and Math Do-Well.

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Integers Product Game
Played in pairs, the player with the most rounds won is the overall winner. Game results will be recorded to assess students' understanding and speed in multiplying integers.

Multiplication Bingo
The teacher calls out multiplication problems, and students mark answers on Bingo cards. The first to align five pebbles wins, and results will measure accuracy and speed in solving problems.

Math Do-Well
Results will assess proficiency in multiplication of integers under time pressure. Data will be collected through observations, game results, and pre-and post-tests. Analysis will determine gamification's effectiveness and gather student feedback on motivation and engagement.

Sampling Design
The respondents were grade 7 students from Baltazar Nicor Valenzuela National High School. Students were selected due to challenges in multiplication and division skills. The study focused on students' performance in basic operations with integers.

Research Design
The study employs a pre-experimental design to measure gamification's effectiveness on students' skills. Pretests assess prior knowledge, while post-tests evaluate learning improvements post-intervention. Statistical analysis will include mean scores and paired t-tests for pretest and post-test comparisons.

Geographical Locale
Respondents are Grade 7 students facing challenges with integer operations.
Poor performance is linked to insufficient arithmetic fluency, worsened by the pandemic. The study includes 89 students from two sections: 44 from section Carnation and 45 from section Rose.

Statistical Design
Researchers used researcher-made questionnaires for data collection. The instrument consisted of 20-item problems on integers.
Mean percentage scores were measured using specific criteria.

Statistical Tools
Questionnaire responses will be recorded and analyzed using appropriate statistical treatments. A paired t-test will identify significant differences in performance between pretest and post-test scores.

RESULT
The study measures students' skills in multiplying and dividing integers through pretest and post-test scores.

Pretest
Low proficiency in basic mathematics, especially integers, is common among high school students.

Post-test
Students show significant improvement in skills for solving integer multiplication and division problems. The integration of gamified elements enhances motivation and understanding of mathematical concepts.

CONCLUSION
The study demonstrates the effectiveness of gamification in improving students' problem-solving skills in mathematics. Engaging with gamified lessons helps students refine their abilities in fundamental operations involving integers.

AREA FOR FURTHER RESEARCH
Further research is needed to assess gamification's impact in other mathematical domains. Professional development for teachers on integrating game-based learning strategies is essential. Long-term effects of gamification on student performance and engagement should be investigated. Collaborative learning environments utilizing gamification can enhance teamwork and problem-solving skills. Expanding gamification's application can lead to more effective and enjoyable learning experiences across subjects.

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