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Snake Ladder Modification Boardgame

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KEYWORDS
Snake Ladder Boardgame; Educational Game; Memory Training; Elementary Education; Math Learning

ABSTRACT
This research explores the modification of the traditional Snake and Ladder board game into an educational tool aimed at enhancing memory and basic calculation skills among elementary school children aged 10–11 years. The study addresses the need for engaging learning methods by integrating mathematical challenges, such as addition, subtraction, multiplication, and division, into the game mechanics. The background highlights the game's potential to combine entertainment with education, fostering cognitive development and social interaction. The objective of this research is to design and test a modified Snake and Ladder board game that serves as an effective educational medium. The methodology involved observational activities, interviews with school principals, and literature reviews of elementary school materials. The game components include question cards, penalty cards, dice, and pawns, with rules designed to reinforce learning through interactive play. Testing was conducted with 10 elementary school students, and feedback was collected via questionnaires. Findings indicate that the game successfully improved students' engagement and understanding of basic math concepts. The visual design and interactive elements were well-received, making learning more enjoyable. The research concludes that the modified board game is a viable tool for educational purposes, offering implications for future applications in classroom settings to enhance traditional teaching methods.

INTRODUCTION

The Boardga game is a modification of the classic game of snakes and ladders that has been widely known. The game is designed as a board game that can be played by up to four players. Like snakes and ladders in general, this game board consists of a number of small squares that form the path of the game. Some boxes have images of stairs that allow players to ascend to higher levels, while other boxes contain images of snakes that can make players descend to lower levels (Xu et al., 2020; Samanta & Ghosh, 2019; Soares et al., 2021).

The uniqueness of Boardga lies in the educational elements that are inserted in the game. Each square on the game board contains not only numbers, but also challenges or questions that players must answer before they can proceed with their moves. This challenge is designed to hone thinking skills and add to the player's insights, both in terms of general knowledge, logic,

and social skills (Huang et al., 2019; Liu et al., 2020; Reimer, 2021). Thus, the game is not just entertainment, but also has learning value (Zhang, 2018; Kurniawan & Gunawan, 2020).

In addition, the visual design in Boardga is made more attractive and interactive compared to the classic snake and ladder. The colors used are bright and fun, so they attract the attention of players of all ages (Kumar, 2022; Kusumawardani et al., 2020; Puspitosari et al., 2024; Putri & Andaryani, 2025; Sidiq, 2016; Wulanyani et al., 2019). Illustrations on the game board are also made more informative and support the educational elements in the game. Coupled with a variety of challenges, Boardga is a game that is not only fun but also provides a more meaningful gaming experience (Vasilenko et al., 2018; Alizadeh & Hadzic, 2019; Hassan et al., 2020). With a concept that combines elements of education and entertainment, Boardga is an ideal game choice to play with family or friends. These games can help improve social interaction, hone thinking skills, and increase players' knowledge in a fun way. As such, Boardga can be an interesting alternative for those looking for board games that are more than just regular entertainment (Ali & Ahmad, 2021; Ibrahimi et al., 2020; Muthmainnah et al., 2021).

In the 21st century, education systems worldwide face the challenge of engaging students in meaningful learning while keeping pace with technological advancements (OECD, 2018; Saito, 2020; Kim & Lee, 2020). Traditional rote memorization methods often fail to foster critical thinking and retention, particularly in foundational subjects like mathematics. This disconnect is evident in global assessments such as PISA, where many students struggle with basic numeracy skills (OECD, 2019; Müller et al., 2021; Zhang & Wang, 2021).

According to UNESCO (2021), approximately 617 million children and adolescents globally lack minimum proficiency in mathematics. In Indonesia, where this study is conducted, the 2018 PISA results revealed that 70% of students scored below the baseline level in math (OECD, 2019; Andriani & Wijayanti, 2020; Darmadi & Suryadi, 2021). This underscores the urgent need for innovative pedagogical tools to address these learning gaps (Tan & Lee, 2021; Hidayatullah, 2020; Riadi & Dewi, 2020). Elementary school students often perceive mathematics as difficult and unengaging, leading to low motivation and poor performance (Ramani et al., 2012; Piaget, 1952; Sulaiman et al., 2020). Conventional teaching methods, which emphasize repetitive drills, fail to cater to diverse learning styles, particularly for children aged 10–11 years, a critical stage for cognitive development (Piaget, 1952; Zhao & Zheng, 2021; Carbone & Rawlins, 2021).

Studies have explored gamification as a solution, with board games like Snake and Ladder showing promise in enhancing learning outcomes. For instance, Ariessanti et al. (2020) demonstrated that gamified math tools improved engagement among students during the COVID-19 pandemic. Similarly, Listyani (2018) found that culturally adapted Snake and Ladder games boosted retention in Indonesian elementary schools. Despite these advances, existing studies often focus on digital adaptations or lack rigorous testing in real classroom settings (Health et al., 2022; Wirawan et al., 2020; Setyawan & Siregar, 2021). Few modifications of the traditional Snake and Ladder game explicitly target foundational math skills or incorporate penalty-reward mechanisms to reinforce learning, leaving room for further innovation (Gültekin & Büyükkasap, 2020; Lestari et al., 2020; Alvarado & Zuniga, 2021).

The post-pandemic era has exacerbated educational disparities, making low-cost, accessible tools like board games vital for recovery (World Bank, 2022). Addressing math proficiency early is critical, as gaps in elementary education perpetuate long-term inequalities (Duncan et al., 2007). This study modifies the classic Snake and Ladder game by integrating question cards, penalty mechanics, and targeted math challenges—a design not yet thoroughly explored in prior research. The physical board game format ensures accessibility in resource-limited settings, distinguishing it from digital alternatives.

The study aims to evaluate the effectiveness of a modified Snake and Ladder board game in improving basic math skills and engagement among 10–11-year-old students in Indonesian elementary schools. This work contributes to the literature by providing empirical evidence on the efficacy of a low-tech gamified tool in math education. It also offers a replicable design for educators in similar contexts. If proven effective, this game could serve as a scalable model for enhancing math education globally, particularly in under-resourced regions. Policymakers and educators may adopt such innovations to complement traditional curricula and reduce learning disparities.

RESEARCH METHODS

We Design This Board Game Aims to Be Played by Elementary School Children When Doing Observation Activities, We Use the Campus Alma Mater to be More Polite When We Get There Very Well Welcomed and Interviewed the Principal Comfortably Without Distractions from Studying the Literature of the Materials in the Elementary School Book, We Use It as a Reference to Make Our Materials Later Definition From This Researcher So that Our Board Game Can Be Played by Elementary School Children Research Design.

This study employs a quasi-experimental research design to evaluate the effectiveness of the modified Snake and Ladder board game in enhancing math skills among elementary students. The research adopts a mixed-methods approach, combining quantitative pre- and post-test assessments with qualitative observations and questionnaires to capture both learning outcomes and student engagement. The design allows for controlled testing of the game's impact while accommodating real-world classroom dynamics (Creswell & Creswell, 2018).

The population consists of 6th-grade students (aged 10–11) from MI Muhammadiyah Siwal in Indonesia, totaling 129 students. A purposive sampling technique is used to select a sample of 30 students, divided into experimental and control groups, ensuring representation of varying math proficiency levels. Research instruments include (1) a validated math test (pre- and post-intervention) to measure skill improvement, (2) questionnaires using a 5-point Likert scale to assess engagement, and (3) observation checklists for behavioral analysis. Validity is ensured through expert review (two math educators and a game design specialist), while reliability is tested via Cronbach's alpha ($\alpha > 0.7$) for survey items and inter-rater agreement (Cohen's $\kappa > 0.8$) for observations.

Data collection involves a three-phase procedure: (1) pre-test administration, (2) a 4-week intervention where the experimental group plays the modified game twice weekly, and (3) post-test and questionnaire deployment. The control group follows regular math instruction. SPSS v26 is used for quantitative analysis, employing paired t-tests to compare pre-post scores and independent t-tests for group differences. Qualitative data from open-ended questions are analyzed thematically using NVivo 12. Triangulation of methods strengthens the findings' robustness (Patton, 2002).

RESULTS AND DISCUSSION

❖ SCHOOL PROFILE

✓ HISTORY OF ESTABLISHMENT

This school is called MI MUHAMMADIYAH SIWAL then this school and the building is waqf named after the waqf was established on June 1, 1967.

✓ LAND AND BUILDING AREA

304m2

✓ LOCATION

BLOTAN RT.01RW.02 SIWAL-BAKI-SUKOHARJO.

✓ NUMBER OF STUDENTS

For this year's school year, Male 69 students, Female 60 students, So the total is 129 students, It is for the time being

✓ FACILITIES

Head room, Teacher's room, Computer and internet room, Prayer room , Classroom 1-6 , Library room, Science lab room, Bathroom room, Uks room, And the facilities are complete.

A. SUBJECTS USED

The basic math subject, which we take is addition material, multiplication and division reduction, the reason is because the mathematics subjects we take can educate the player to be better in basic calculations to train our memory again.

B. TARGET PLAYERS

On this board game is used for grade 6 elementary school or 10 - 11 years old, the reason is so that the player is more free/practice his memory better

C. BOARDGAME DESIGN DESIGN

We Make This BoardGame Using Paper And Finished Plastic Boards, And Magnets

1) GAME BOARD DESIGN

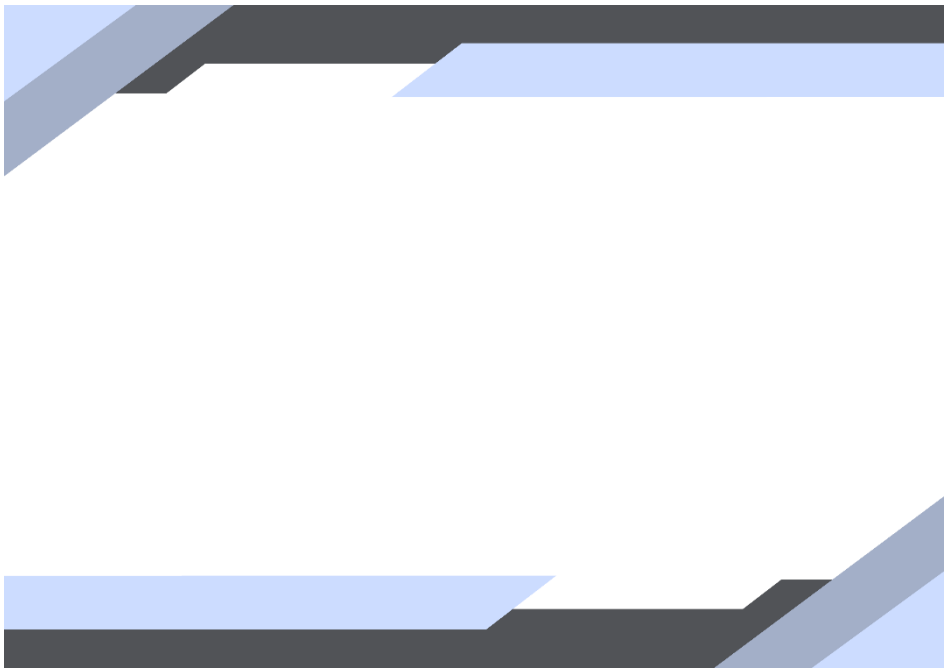
2) EQUIPMENT USED

Pieces and dice

The use of the piece is to put people in the boardgame
Uses of Dice
Throwing Tools that contain numbers 1 to 6 so that the pieces can walk

Question Card

Question Card Function
For Students to Learn About the Material We Provide



Penalty Card
Function to Punish the Student to Learn More

3) GAME RULES
The rule on this board game is that every child will roll the dice if it has stopped at multiples of 6, then the child will be given a question if he succeeds in answering then he will be able to continue if he can't then go back 1 step

4) IMPLEMENTATION AND TESTING RESULTS
As well as the results of boargame testing with questionnaires or questionnaires to friends in other groups and students who use boardgames in implementation. We Have Tried to Reach 10 Elementary School Children

Table 1. Sample Questionnaire for Boardgame Testing

No.	Rule	Is it easy to understand	
		Yes	Not
1.	Start the game by rolling the dice	✓	
2.	Players run the pieces according to the number of dice	✓	
3.	If you stop at the question mark tile (?) take the question card	✓	
4.	The player answers the question, if it is true the question card is saved, if it is false, the question card is returned and retracts 2 tiles.	✓	
5.	Dst	✓	

CONCLUSION

In the modified board game of the snake and ladder game, the first meaning can be seen from the faces of students sitting alone while contemplating. gain knowledge that they have never had during their learning experience. And all of that is included in the meaning of the proof of the learning media that I use because it is to make the child comfortable learning and educating. The visual meaning can be seen from the process of taking pictures, colors to design

techniques for learning media that can give meaning to the game. For example, in a good composition setting with more meaning in it. Then in terms of objects, in this case objects contained in the game that can associate something. There are also poses, in which everything is evoked through gestures, some expressions, which can impress something other than what is seen. Moreover, the photos taken are playful, so the tendency to show a certain situation can occur.

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