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Educational game model in Mathematics learning for private classes

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Abstract

In the context of private tutoring, innovative learning approaches are crucial for enhancing students' engagement and academic success. This study explores the application of educational games in mathematics learning within private tutoring sessions. Educational games, which combine elements of play with educational content, offer a more engaging and personalized method of instruction. The study focuses on the implementation of various game models, such as Snakes and Ladders, Ludo, Math Cards, and Trimino, to improve students' understanding of mathematical concepts in private settings. The findings demonstrate that these games can create a relaxed, enjoyable learning atmosphere, which increases student motivation, enhances their understanding, and boosts their interest in learning mathematics. By incorporating interactive elements, educational games support the development of critical mathematical skills, including numeracy, logical thinking, and problem-solving. Furthermore, these games foster active participation, which is essential for sustaining student engagement, particularly in one-on-one tutoring environments. Through the use of games, private tutors can tailor learning experiences to meet the individual needs of students, providing a more adaptive and effective educational experience.

INTRODUCTION

Learning in schools plays a crucial role in shaping students' understanding of various subjects, providing them with the foundational knowledge and skills required for academic and personal development. However, despite the importance of schooling, it is evident that the traditional school learning environment often fails to meet the diverse needs of every student. Variations in individual learning styles, previous experiences, cognitive abilities, and personal interests all contribute to the differences in how students engage with and process information. Moreover, factors such as limited classroom time, overcrowded curricula, and the constraints of standardized teaching methods often exacerbate the problem, making it difficult for teachers to address the unique learning needs of each student effectively. These challenges are compounded by the diverse socio-cultural backgrounds of students, which further complicates the learning process. Consequently, these factors significantly affect the effectiveness of the overall learning experience, limiting students' ability to fully grasp key concepts and apply them meaningfully.

This reality has led many students and parents to seek alternatives to traditional schooling methods, with a notable increase in demand for private tutoring services. Private

tutoring is seen as a valuable resource capable of providing more personalized, flexible support tailored to individual learning needs. By offering a more focused and customized approach, private tutoring has gained recognition as an effective way to address academic challenges and improve students' academic performance. Unlike the one-size-fits-all approach of conventional classrooms, private tutoring allows for a more adaptive and individualized learning experience, which can significantly enhance students' comprehension and retention of subject matter (Fransiska, 2022, p. 40). Additionally, private tutoring provides an opportunity for students to explore topics at their own pace, engage in more in-depth discussions, and clarify doubts without the pressures and time constraints typically associated with regular classroom learning.

One of the key advantages of private learning is its inherent flexibility. In private tutoring, both the methods employed and the materials used can be specifically tailored to meet the unique needs and characteristics of the student. Whether it is adjusting the pace of learning, employing different teaching strategies, or utilizing various forms of assessment, private tutors are able to design lessons that best support the student's learning style and areas of difficulty. This personalized approach is particularly beneficial in helping students catch up on missed content, reinforce previously learned material, and build a deeper understanding of key concepts, all of which contribute to improved academic achievement (Aji et al., 2025, p. 78). Moreover, private tutoring can complement the school curriculum by offering targeted assistance in areas where students may struggle, thereby promoting a more comprehensive and well-rounded educational experience.

However, while private tutoring has been shown to offer numerous benefits, it is important to recognize the role that teachers play in ensuring that the knowledge they impart is effectively received by students. Teachers are not only responsible for delivering content, but they also serve as facilitators of learning, guiding students through the process of engaging with and internalizing new information. According to Yestiani & Zahwa (2020, p. 42), effective teaching requires a balance between cognitive, emotional, and motivational aspects of learning. Teachers must create an environment where students feel motivated, supported, and encouraged to actively participate in the learning process. However, despite these potential advantages, many private tutors continue to rely on traditional methods such as lectures, repetitive drills, or assignments that do not adequately address students' affective needs or provide opportunities for creative engagement. This reliance on outdated and passive learning strategies can result in mental fatigue and decreased motivation, making it difficult for students to sustain their interest and enthusiasm for learning over time.

Moreover, the lack of engagement with students' emotional and recreational aspects of learning can lead to a reduction in active participation and a lack of resilience in the face of academic challenges. Private tutoring, when conducted in a rigid, unvaried manner, can contribute to feelings of burnout, particularly during intensive and individualized sessions. This may result in students feeling disengaged or disconnected from the learning process, ultimately undermining the positive effects that private tutoring can offer. It is therefore essential for private tutors to adopt more dynamic and student-centered approaches that not only focus on academic content but also incorporate elements of emotional support, encouragement, and motivation. By addressing both the cognitive and affective needs of students, private tutoring can foster a more sustainable and effective learning environment that supports long-term academic success.The ineffectiveness of private learning is further complicated when the subject being taught is mathematics. Many students consider mathematics a difficult subject to master (Lisa et al., 2024, p. 38). The method of delivering mathematics material is one of the determinants of successful mathematics learning. When delivered conventionally, it risks becoming rigid and boring. This condition can reduce

students' interest and motivation to learn. Learning that is less engaging and does not directly involve students makes achieving learning targets difficult, leaving students easily bored and unenthusiastic about learning (Nursafitri, Sarifah, & Imaningtyas, 2023, p. 1809). This challenge is even more pronounced in the context of private learning. The smaller number of students and the limited learning environment can leave students bored if the instructor does not use a creative, engaging approach.

One approach proven effective in increasing student engagement is the use of educational games. Educational games are games that incorporate learning elements and can be used as tools to deliver learning and optimally develop students' abilities (Andriansah et al., 2024, p. 17). Educational games create a fun learning atmosphere, encourage active student involvement, and design student enthusiasm for learning (Sinaga et al., 2025, p. 316). Pedagogically designed games not only enliven the learning atmosphere but also foster a sense of enjoyment, self-confidence, and motivation to overcome academic challenges (Suhendar & Yanto, 2023, p. 22). In mathematics education, educational games can be used to strengthen conceptual understanding, practice numeracy skills, and develop logical thinking through more engaging and communicative methods.

This study will discuss educational game models applied to mathematics learning in private classes. The study is based on the author's experience providing private mathematics lessons. This study is expected to serve as a reference for private tutors in implementing educational game models that are fun and meaningful for students.

METHOD

This study is based on the author's experience using an inductive reasoning approach to examine how children develop reasoning and learning behaviors over time. Data were collected through extensive observations of the subject during private learning sessions, which took place between October 2024 and May 2025 in Bantul, Yogyakarta, Indonesia. The subject of this study is a 7-year-old boy in the first grade of elementary school, an active student who demonstrates a strong willingness to engage and interact with others, which allowed for a rich analysis of his learning process. His openness and eagerness to communicate during learning activities provided significant insights into how young learners approach educational content and interact with their environment.

FINDINGS AND DISCUSSION

Learning through educational games is one way to increase student engagement and motivation. Teachers don't need to create new games but can modify existing ones. Some game models the author has implemented in private mathematics lessons include the following.

1. Snakes and Ladders Game Model

Snakes and Ladders is a very popular children's game. Most children have played it before, so introducing it to students is easy. Some necessary equipment includes a game board, two pawns, and dice. The Snakes and Ladders board can be slightly modified by adding questions to the columns, as shown in Figure 1.

Before using this Snakes and Ladders game, students must be introduced to adding two numbers. This game aims to encourage students to practice addition and subtraction problems up to 100 using a fun method. Students are challenged to complete each problem and reach the finish line. The winner is the participant who can get their pawn to the finish line before their opponent. When this Snakes and Ladders game is used in private lessons, students feel happy and challenged to reach the finish line. Because it is a private learning

session, the instructor must play along with the students. Based on the author's experience, when students lose, they want to play again to win.

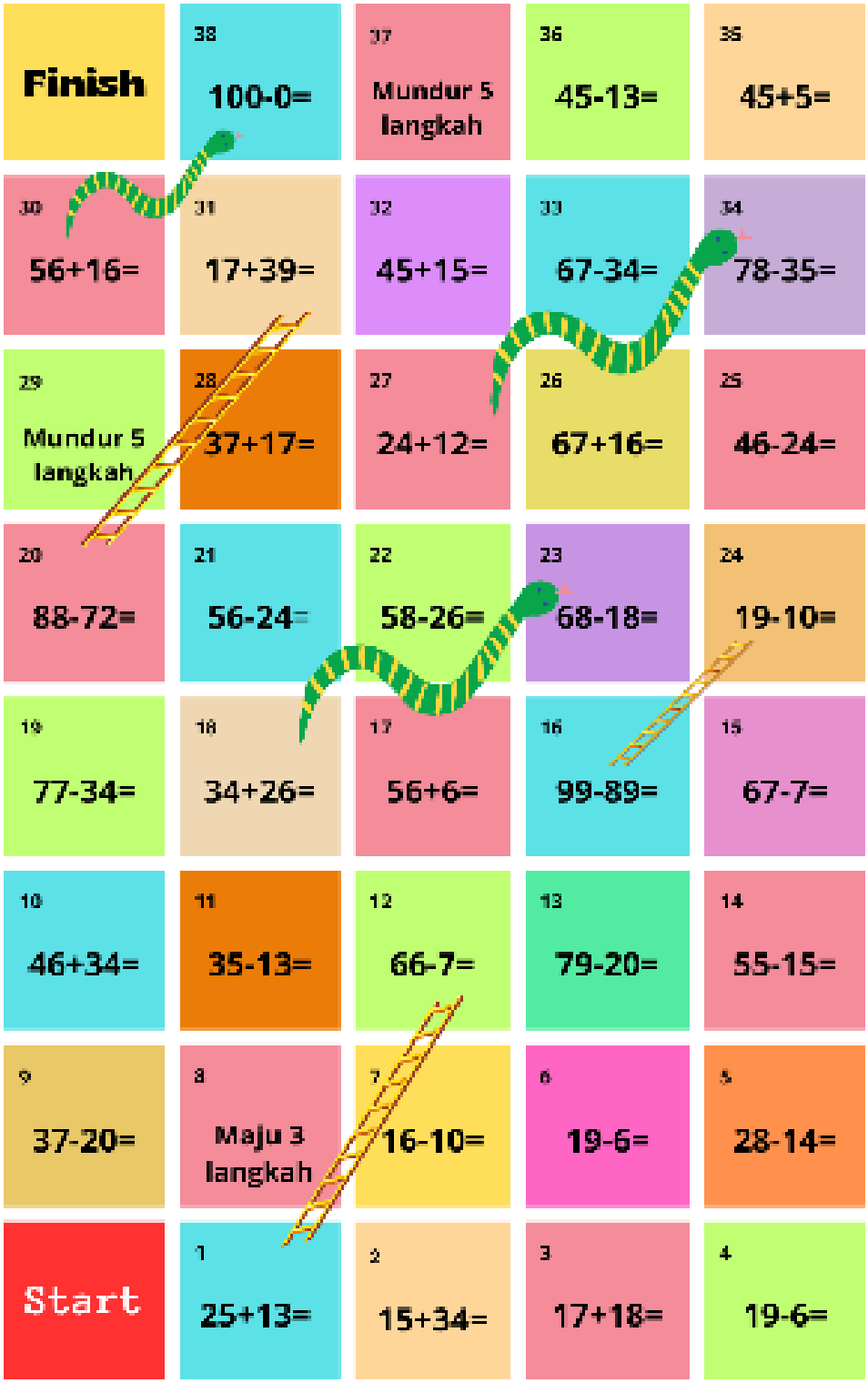

Figure 1. Snakes and Ladders Board Game

When students play again, they have unconsciously done more practice problems. This aligns with Firdaus' (2024, p. 1317) opinion that practice problems are a reliable way to learn

mathematics because they can deeply embed mathematical concepts in students' minds. Practice problems can make students proficient in calculations, whether they require formulas or are basic.

2. Ludo Game Model

Another children's game that can be used for learning is Ludo. Ideally, at least four children play Ludo. Items that must be prepared include a game board, four pawns, and a die. The game board has been modified for private learning. In practice, the teacher must play with the students. The rules of the game are that each player must roll the die and move their pawns according to the numbers it shows. The goal is for each participant to move two pawns to the center of the board. The player who first places all their pawns in the center of the board wins.

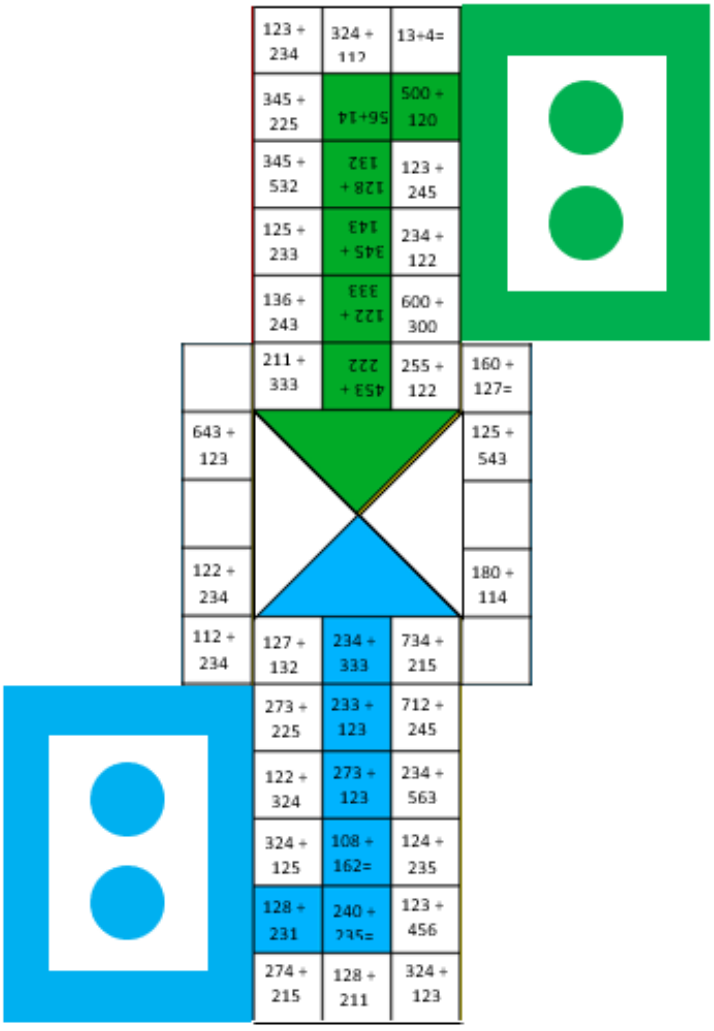

Figure 2. Ludo Game Board

3. Math Cards

Mathematics cards are a mathematics learning medium in the form of a collection of cards, each of which contains numbers or mathematical operation symbols. In private lessons, the teacher arranges the cards into an open mathematical sentence. Students are then asked to continue placing the cards until they obtain a suitable solution.

Furthermore, these number cards can also be used to teach place value. The math cards used are simply cards containing numbers. Then, we need to make square units that represent units, tens, and hundreds. The author arranged several number cards to form a number, such as 625. Then, students were asked to arrange squares representing the numbers on the number cards. The answer was considered correct when students arranged 6 square hundreds, then 2 square tens, and on the far left, 5 square units. Then the author gave students questions, including: what place the number 6 occupies in the number 625, what is the value of the number 5 in 625, how many units are in 625, and so on. When this game was applied to the subjects, the subjects enthusiastically arranged the squares. When they first arranged them, there was an error, but the subjects corrected it independently when told there was one. The subjects answered the questions correctly. After arranging the numbers several times and asking the subjects to arrange the square units, the next step was to ask questions about the number cards once they were arranged to form a number. The author occasionally asks students to arrange number cards and asks the subjects to explain the place value of each number in the arrangement.

4. Trimino

Trimino is a variation of dominoes, but uses three sides like a triangle. Each side contains a number or mathematical operation that must be matched with the sides of the other tiles. This game is effective for honing logic skills, pattern recognition, and number relationships. Trimino also encourages students to think strategically and to consider the appropriateness of mathematical concepts when arranging the tiles.

This Trimino game was obtained from the Children's Worksheet website. In this case, the author applies only the media provided in the Children's Worksheet. The author uses Trimino to teach the concept of the number bond of 10. Students are asked to combine triangles according to the numbers on their sides. The stipulation is that the sides that meet must total 10. This game is quite fun because students can freely combine the Trimino cards. When this game was applied to the subjects, they seemed enthusiastic about arranging the triangle pieces, and, on their own initiative, they made a diamond shape from the available triangles. Some benefits of using Trimino cards include helping students memorize the number bond of 10, making learning more interesting, and fostering students' creativity.

Some of the positive impacts that the author felt after using the educational game model include the following.

1. The subjects became more enthusiastic in subsequent meetings.
2. Subjects can more easily grasp the material being taught.
3. The learning atmosphere becomes more relaxed.
4. Increase students' interest in learning mathematics.

Here are some suggestions for using educational game models, including:

1. Educational games can be applied to other mathematics materials or even to other subjects.
2. Educational games can be made more interesting in terms of display design.
3. Educational game models can be applied to a wider range of levels to suit student characteristics.

CONCLUSION

Educational games can make private learning more engaging and enjoyable. Examples of games suitable for private math classes include Snakes and Ladders, Ludo, math cards, and

Trimino. Students understand the material more easily, the learning atmosphere becomes more relaxed, their interest in learning increases, and they are more enthusiastic about future sessions. This educational game model can be applied to other materials and levels, tailored to the students' characteristics.

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