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The Effect of Qreativ Educative Games on Improving Currency Transaction Skills in Hearing-Impaired Students

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Creative Educational Games;
Currency Transaction Skills;
Deaf Children;
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Abstract
This study aims to examine the effect of the Qreatif Educative game on improving currency transaction skills among second-grade deaf students at SMPLB SKhN 01 Pandeglang. This study employed an experimental method with a Single Subject Research (SSR) approach and an A-B-A design, consisting of three phases: baseline (A1), intervention (B), and second baseline (A2), which were conducted over 11 sessions. The study's results showed a significant increase in transaction skills, with an average score of 91.6% in the intervention phase, compared to 46.7% in baseline A1 and 66.7% in baseline A2. These findings suggest that the Qreatif Educative game, particularly the "Playing with Rupiah Money" feature, is effective in helping students understand currency values, perform simulated transactions, and develop basic decision-making skills. The contribution of this research demonstrates that educational games can serve as an innovative learning medium for enhancing functional numeracy skills in deaf students.

Kata Kunci
Permainan Edukatif Kreatif;
Keterampilan Transaksi Mata Uang;
Anak Tunarungu;
Anak Berkebutuhan Khusus

Abstrak
Penelitian ini bertujuan untuk menguji pengaruh permainan Qreatif Educative dalam meningkatkan keterampilan transaksi mata uang pada siswa tunarungu kelas dua di SMPLB SKhN 01 Pandeglang. Penelitian ini menggunakan metode eksperimen dengan pendekatan Single Subject Research (SSR) dan desain A-B-A yang terdiri dari tiga fase: baseline (A1), intervensi (B), dan baseline kedua (A2), yang dilaksanakan dalam 11 sesi. Hasil penelitian menunjukkan peningkatan signifikan pada kemampuan transaksi, dengan skor rata-rata 91,6% pada fase intervensi, dibandingkan dengan 46,7% pada baseline A1 dan 66,7% pada baseline A2. Temuan ini menunjukkan bahwa permainan Qreatif Educative, terutama fitur "Bermain Uang Rupiah," efektif dalam membantu siswa memahami nilai mata uang, melakukan transaksi simulasi, dan mengembangkan keterampilan pengambilan keputusan sederhana. Kontribusi penelitian ini menunjukkan bahwa permainan edukatif dapat menjadi media pembelajaran inovatif untuk meningkatkan keterampilan numerasi fungsional pada siswa tunarungu.

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INTRODUCTION

This study is motivated by the finding that one of the eighth-grade deaf students at SKhN 01 Pandeglang has not yet been able to perform independent currency transactions, including addition and subtraction operations. This ability should have been mastered in Phase B, which corresponds to grades 3–4 of elementary school, as outlined in the Ministry of Education and Culture's Mathematics learning outcomes (Manurung, 2022). This initial finding indicates a significant gap in learning achievements, which is suspected to be caused by the lack of varied learning media used during the teaching and learning process.

Functional numeracy skills, particularly the ability to perform currency transactions, are essential competencies that support individual independence in daily life (Royyana et al., 2024), especially for students with special needs, such as those who are deaf. Ideally, deaf students are expected to understand the value of money, perform addition and subtraction operations with denominations, and calculate change independently as part of life skills (Bouck & Joshi, 2012; Kritzer, 2009).

The issue lies in the limited access to language and communication, which often causes deaf students to face difficulties in understanding abstract and contextual mathematical concepts, including those related to currency transactions (Marschark & Hauser, 2012; Pagliaro & Kritzer, 2013). Previous studies have shown that mathematics learning for deaf students is still dominated by conventional methods with limited media, resulting in less optimal engagement and concept understanding (Suparno, 2017; Wijaya, 2016; Zainuddin & Saputra, 2025).

Several studies report that the use of interactive learning media and digital-based educational games can improve motivation, understanding, and learning outcomes for students with special needs (Yusran & Revita, 2021; Hwang et al., 2019; Zhang & Lin, 2020). However, most of these studies focus on the development or general effectiveness of learning media and have not specifically examined the impact of educational games on currency transaction skills in deaf students using the Single Subject Research (SSR) approach, which allows for in-depth and individual analysis of learning behavior changes.

Although previous studies have revealed that the use of interactive learning media and digital-based educational games can enhance students' abilities, there is still limited empirical evidence regarding the effectiveness of digital educational games in improving currency transaction skills as part of functional numeracy for deaf students. Therefore, this study is both important and urgent in addressing the need for more contextual, adaptive, and meaningful learning. The purpose of this study is to analyze the effect of Qreativ Educative games on improving currency transaction skills in deaf students.

The goal of this study is to examine the effect of Qreativ Educative games in improving currency transaction skills in eighth-grade deaf students at SMPLB SKhN 01 Pandeglang. Based on the initial assessment conducted on January 30, 2025, it was found that the students had not yet mastered basic financial transaction skills, especially in calculating money using addition and subtraction operations. This limitation affects the students' independence in daily life activities. This study employs an experimental method with a Single Subject Research (SSR) approach and an A-B-A design, comprising three phases: baseline (A1), intervention (B), and second baseline (A2), conducted over 11 sessions. Therefore, this study aims to evaluate the effectiveness of Qreativ Educative games in improving currency transaction skills.

METHOD

This study is quantitative research with an experimental approach, using the Single Subject Research (SSR) design type A-B-A, which aims to test the effect of the Qreativ Educative game media on recognizing Rupiah currency skills in deaf students. The research was conducted at SKh Negeri 01 Pandeglang in January 2025, with a subject, a 14-year-old deaf eighth-grade student, who had not yet

mastered the basic competency of money transactions, as outlined in the mathematics learning outcomes of Phase B in the Ministry of Education and Culture curriculum.

The SSR A-B-A design consists of three stages: baseline 1 (A1), which measures the initial ability repeatedly and consistently; intervention (B), involving the provision of treatment using game media; and baseline 2 (A2), which observes changes after the intervention is discontinued. The procedure begins with an initial observation to determine the research subject, followed by the experimental stages as outlined in the design.

The data collection instrument is an observation sheet for currency transaction skills, developed by the researcher and validated through expert judgment by two lecturers from the Special Education Department at Sultan Ageng Tirtayasa University. Content validity was ensured by assessing the alignment of indicators with the competencies being measured. Data collection was done directly through structured observation of the student's performance in completing currency transaction tasks during each phase. The data were analyzed both quantitatively and descriptively, using graphs to observe trends, levels, and data stability across the phases. Comparisons were made between each phase to determine the effectiveness of the game media. The effectiveness criteria were measured by the consistent improvement in students' abilities during the intervention compared to the initial baseline, as well as the stability of the results in the final baseline.

RESULTS AND DISCUSSION

Result

This study aims to determine the effect of using the Qreativ Educative game media (Recognizing Rupiah Money) in improving currency transaction skills in eighth-grade deaf students. The research design employs a Single Subject Research (SSR) approach, type A1–B–A2, comprising 11 sessions: 3 baseline sessions (A1), five intervention sessions (B), and three final baseline sessions (A2). In the A1 phase, the results showed a flat score (no change) in sessions 1, 2, and 3, with a percentage of 46.7%. In the intervention phase (B), there was a progressive and significant improvement in the student's ability. In the first session, the subject scored 83%, which increased to 86% in the second session, 93% in the third session, 96% in the fourth session, and reached 100% in the fifth session. This increase demonstrates the effectiveness of game media in helping students understand and perform currency transactions independently.

In the second baseline phase (A2), where the intervention was stopped, and learning continued without the game media, there was a slight decrease in performance. The first session yielded a score of 63.3%, which increased to 66.7% in the second session and to 70% in the third session. The results of currency transaction skills from baseline A1, intervention, and baseline A2 showed an increase during the intervention phase (when the treatment was given using the Qreativ Educative game). In contrast, the initial currency transaction ability of the subject showed flat results (no improvement). The researcher made this decision based on the percentage obtained by the subject in the A1 baseline phase (no increase/flat results) to proceed with the treatment using the Qreativ Educative game (Recognizing Rupiah Money). The treatment had a positive impact on the subject's currency transaction skills, which is evident from the upward trend in the graph. A change occurred again after teaching without the use of the Qreativ Educative game in the A2 baseline phase. The score obtained in the A2 phase did not exceed the intervention stage but improved compared to the A1 baseline phase.

Based on the results obtained from the assessment phase, A1 baseline phase, intervention phase, and A2 baseline phase, it was found that in the assessment phase, the subject was able to write currency denominations but was not able to perform addition and subtraction of currency denominations. In the last phase, at the third session of baseline 2, the subject was able to perform addition and subtraction correctly with the denominations 100 + 500, 500 + 1,000, 2,000 + 2,000, 5,000 + 20,000, 20,000 + 50,000, 100,000 + 100,000, 5,000 - 2,000, 100,000 - 5,000, 50,000 - 10,000, 100,000 - 50,000, and 200,000 - 100,000 without assistance from the researcher. However, for the addition and subtraction of denominations

like 200 + 10,000, 500 + 100,000, 1,000 + 100,000, 200 + 50,000, 10,000 + 100,000, 500 - 100, 2,000 - 200, 10,000 - 500, 100,000 - 500, and 20,000 - 2,000, the subject was not able to answer correctly.

The data obtained during the study, with a baseline range of 1 (A1) for three sessions, intervention (B) for five sessions, and baseline 2 (A2) for three sessions, showed satisfactory results where the use of the Qreativ Educative game affected the subject in improving currency transaction skills in deaf students. As stated by Yusran and Elinda Revita (2021:55) in their research article titled "Development of Learning Media and Interactive Games for Students with Special Needs," they highlight the importance of learning media as an effective communication tool between teachers and students. Yusran and Elinda Revita (2021:55) emphasize that learning media serve as a tool to deliver material in a way that is easier to understand and more engaging for students, especially those with special needs. This reinforces the idea that the use of learning media and interactive games can help students with special needs better understand the material.

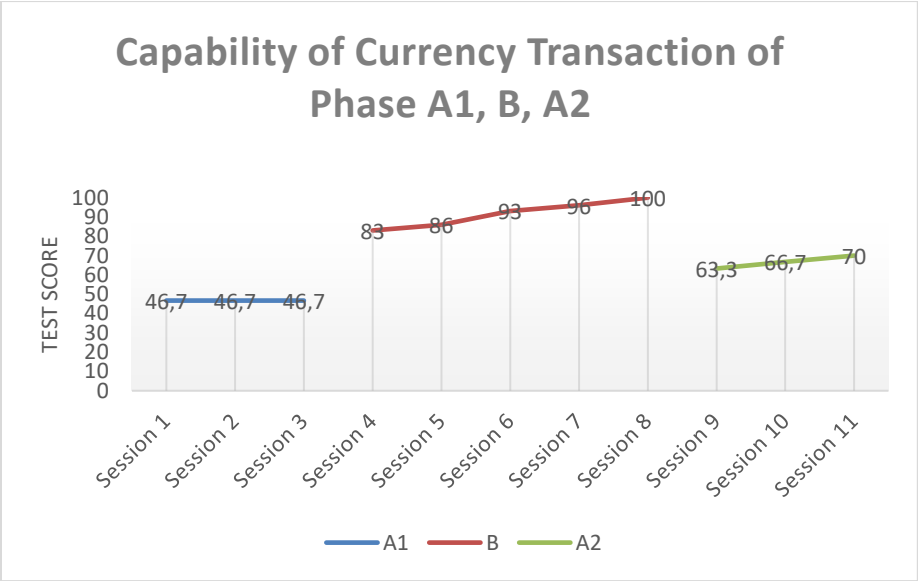

Figure 1. Test Scores of Each Session During Phases A1, Intervention, and A2

The graph above shows a significant improvement in currency transaction skills during the intervention phase, indicating that the Qreativ Educative game plays an effective role as a learning medium for functional numeracy for deaf students. This game provides a concrete learning experience through the visualization of currency denominations and transaction simulations, helping students understand mathematical concepts that were previously abstract.

The results of this study show that the use of the Qreativ Educative game media (Recognizing Rupiah Money) has a positive impact on improving students' currency transaction skills. This is demonstrated by the increase in the subject's average score during the intervention phase, which reached 91.6%, significantly higher than the average scores in both the initial baseline phase (46.7%) and the final baseline phase (66.7%). This significant difference indicates a direct and substantial effect of the treatment provided.

Discussion

This finding aligns with Vygotsky's (1978) social constructivism theory, which emphasizes that tools and interactions play a crucial role in building conceptual understanding, especially for learners with communication barriers. The results of this study support Yusran and Revita's (2021) view, which states that interactive learning media can enhance understanding for students with special needs by providing more concrete and engaging learning experiences. In this study, when game media was used,

the subject showed consistent performance improvement throughout the five intervention sessions, increasing from 83% to 100%. Conversely, when the intervention was stopped, there was a decrease in performance in phase 2 of the baseline. However, it remained higher than the initial baseline, indicating that most of the learning had persisted.

This finding is also supported by Vygotsky's (1978) theory, which emphasizes the importance of tools as mediators in cognitive processes. The educational game in this study functions as such a tool, effectively bridging the abstract concept of currency transactions with concrete learning experiences (Pratama & Zubaedi, 2025). In addition to enhancing motivation and engagement, this game also promotes collaboration and communication, two key aspects of learning that are particularly important for children with special needs (Junari et al., 2025). Furthermore, from the information processing theory perspective, as outlined by Atkinson and Shiffrin (1968), the use of game media enhances the encoding process into long-term memory by involving attention, active participation, and repetition, all of which were applied through the interactive game sessions in this study. These results reinforce that currency transaction skills, which were previously not mastered, became easier for the subject to understand and apply after the intervention sessions. From a behavioral approach, as described by Skinner (1954), the use of game media also provides positive reinforcement, both through the visualization of success and immediate responses to students' answers (Komarudin & Sukarno, 2025). Features like instant feedback in the Qreativ Educative game enable students to understand their mistakes and correct them immediately, aligning with the main principle of this theory: stimulus-response reinforced by rewards.

From the perspective of information processing theory, the improvement in student performance during the intervention can be attributed to the active involvement that increases attention and repetition, thereby strengthening the storage of information in long-term memory (Atkinson & Shiffrin, 1968; Mayer, 2009). This study's results also support the findings of Moreno and Mayer (2007) and Clements and Sarama (2014), which suggest that multimedia-based learning and interactive games can significantly enhance comprehension of mathematical concepts. Additionally, the consistent improvement in scores during the intervention phase shows that the educational game can create a meaningful and sustainable learning environment (Slavin, 2018; Squire, 2011).

From a behavioral perspective, the improvement in currency transaction skills was also influenced by the positive reinforcement and immediate feedback provided through the digital game. Skinner (1954) explains that learning behavior increases when followed by appropriate reinforcement. In this study, the instant feedback feature in the Qreativ Educative game helped students recognize their mistakes and correct them directly, thus promoting the formation of more effective learning behaviors. This finding aligns with research by Bouck and Joshi (2012) and Pratama and Widodo (2020), which emphasizes that interactive media can enhance functional math skills in students with special needs.

Furthermore, the results of this study support the findings of Hwang et al. (2019) and Zhang and Lin (2020), which show that digital educational games not only improve learning outcomes but also enhance students' motivation and independence. This is particularly relevant for deaf students, who require contextual learning to support everyday life skills (Kritzer, 2009; UNESCO, 2017). However, this study has limitations, including the small number of subjects and the reliance on media that require access to technology and the internet, as reported in previous studies (Marschark & Hauser, 2012). Therefore, future research is recommended to involve more subjects and combine digital games with non-digital concrete media to make learning more inclusive and equitable. Interactive games support the learning of deaf students through social, cognitive, and behavioral approaches. According to Vygotsky (1978), educational games help bridge abstract concepts into concrete ones, thereby increasing engagement. Atkinson and Shiffrin (1968) emphasize the importance of attention and active engagement for information to be stored in long-term memory, a concept supported by games. Meanwhile, Skinner (1954) states that positive reinforcement and immediate feedback in digital games promote effective changes in learning behavior. Therefore, the Qreativ Educative game has proven

effective in increasing motivation, understanding, and active participation in learning currency transactions for deaf students.

The use of the Qreativ Educative game also has limitations. This media is internet-based, so access to a stable connection is essential for its use. This, of course, presents a challenge for schools or students in areas with insufficient technological infrastructure. This study contributes to enriching learning strategies for deaf students, particularly in practical mathematics related to everyday life. Through the implementation of digital educational games, the learning process becomes more inclusive, enjoyable, and effective. Therefore, this finding presents opportunities for the development of other interactive and adaptive learning media as solutions to the limitations of conventional approaches in special education.

CONCLUSION

The conclusion of this study reveals that the Qreativ Educative game, particularly the "Bermain Uang Rupiah" feature, has a significant impact on enhancing currency transaction skills in deaf students. Based on the results obtained, a clear improvement is seen in the students' ability to count money and perform simple transactions, from an average score of 46.7% in the first baseline phase (A1) to 91.6% in the intervention phase (B). This suggests that the learning method using educational games can be effective in addressing the limitations in basic financial transaction skills among deaf students.

Additionally, the improvement recorded in the second baseline phase (A2), with a score of 66.7%, indicates a lasting effect after the intervention. This suggests that the Qreativ Educative game not only provides instant learning but also supports a deeper understanding of the value of money and transaction skills, which are essential for the students' independence in daily life. The use of this game feature has proven to enhance the students' ability to make better financial decisions.

In the context of learning theory, these findings support the application of cognitive, social, and behavioral approaches to learning. The positive reinforcement received by the students during the game, along with their active engagement in learning activities, played a crucial role in facilitating the development of transactional skills. Therefore, the Qreativ Educative game can be considered an innovative and enjoyable alternative learning medium to improve functional numeracy skills for deaf students, with the hope that it can be more widely applied in inclusive schools to support the learning of students with special needs.

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