

Enhancing Mathematical Performance in Grade 3 Pupils through Flashcards

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ABSTRACT

This study investigates the effectiveness of using flashcards to enhance the mathematical performance of Grade 3 learners. Conducted during the 2024–2025 school year, the research took place in a public elementary school in Misamis Occidental with a purposively selected group of 43 Grade 3 pupils who exhibited low performance in Mathematics. Utilizing a classroom-based action research design, the study employed researcher-made lesson plans, pre-tests, and post-tests to assess improvement. Data were analyzed using descriptive statistics and a t-test to determine the significance of the learners' progress. Results revealed that before the intervention, most pupils did not meet the expected proficiency level, indicating difficulties in grasping fundamental math concepts. After the use of flashcards, students' performance significantly improved. These findings affirm the value of flashcards as a practical and effective instructional tool in Mathematics. The study recommends incorporating flashcards in daily instruction and exploring their use in other subjects to support active and visual learning among young learners.

Keywords: flashcards, instructional strategy, mathematics performance

INTRODUCTION

Mathematics plays a crucial role in developing students' reasoning skills, enabling them to think systematically, logically, and methodically. However, many pupils struggle with mathematical reasoning due to various challenges, including inadequate instructional strategies, limited resources, and a lack of engagement in learning activities. These difficulties often lead to poor performance, particularly among low-achieving learners, highlighting the need for targeted interventions.

Pupils have not been appropriately aided in the development of mathematical reasoning skills. Learning mathematics can cultivate your capacity to reason because mastering math involves systematic principles and conceptual connections. This will affect sensible, methodical, and logical approaches. Hence, educators need to be able to select instructional methods that can the capacity for mathematical reasoning. Project-based learning has the ability to provide contextual information alongside literacy projects that are created and encouraged to engage in the process of considering how mathematical settings are used in everyday life. In addition, students are able to create connections between mathematical concepts and real-world situations and use reasoning to effectively comprehend what they have taught (Abidin et al., 2020).

Teachers can use a variety of strategies to help children who struggle with mathematics. Three methods can be used to assess difficulties: exams, interviews, and observation. After receiving the diagnosis results, the teacher might then decide or create the necessary procedures to surmount the challenges faced by pupils. The strategies teachers employ to address the learning challenges in effective methods for teaching mathematics include remedial instruction, one-on-one tutoring, and offering extra learning hours, as well as engaging pupils in the process. The most crucial aspect of teaching when teaching mathematics, educators need to focus more on conceptual knowledge and procedural abilities—not just procedural abilities (Febriyanti et al., 2021).

Poor academic performance in mathematics at the ordinary level can be caused by a variety of factors, including teaching strategies, pupils', teachers', and parents' bad attitudes toward the subject, inexperienced teachers, teacher instability, and a lack of sufficient resources. To improve comprehension among pupils, math teachers should employ a range of teaching

resources and techniques (VaraidzaiMakondo & Makondo, 2020).

Since mathematics requires language and thought, it has historically been seen as a crucial subject for the basic development of abilities. Learners who have less expertise with mathematics must rely heavily on learning opportunities to acquire these necessary skills. Giving pupils opportunity to learn mathematics could motivate them to do their studies (Teoh et al., 2022).

High achievers in mathematics demonstrated proficiency in fluency and adaptability, but they continued to struggle with novelty. Although the average performers demonstrated a comprehension of mathematical problems, they struggled to choose effective solutions, which resulted in less structured and methodical responses. The underachievers shown a lack of comprehension of the issues. Their responses lacked organization, structure, and detail. This suggests that the poor achievers lacked the capacity for original thought in the areas of fluency, adaptability, and novelty (Yayuk & As`ari, 2020).

Children who struggle with math may continue to rely on their working memory resources when doing arithmetic problems because they are less able to use number sense during mathematical operations. This implies that in order to automatize mathematical skills later in life, children who struggle with math require assistance using working memory for math from a young age (Nelwan et al., 2022).

Flashcards are commonly used in vocabulary learning, but few studies have explored their use in mathematics problem-solving. This study aims to investigate how flashcards can be effectively utilized to improve mathematical problem-solving abilities, offering a new approach to a traditional teaching tool.

This action research aimed to enhance pupils' mathematical learning difficulties of the elementary schools in Misamis Occidental during the S.Y. 2024- 2025. The study focused on enhancing mathematical skills among elementary school pupils in Mathematics subject in Misamis Occidental during S.Y. 2024-2025 using flashcards interactive learning. It targeted a specific group of pupils, limiting generalizability to other contexts. The research centered on math skills development which can be connected to calculating and analyzing. It was conducted over a limited time-frame, capturing short-term impacts. Additionally, the study utilized pre-selected games, leaving other instructional tools unexplored. These parameters ensure a focused analysis while suggesting areas for future research.

This study addresses the challenge of skills development in Math among elementary school pupils, a critical skill for effective communication and academic success. The findings benefit pupils by improving their knowledge and performance, teachers by providing dynamic instructional methods, school administrators through actionable curriculum insights, and future researchers by contributing to the performance on interactive flashcard learning and mathematical education.

Intervention

When it comes to teaching mathematics, manipulatives are more effective than the traditional approach. This approach is helpful in meeting the various demands and learning styles of students (Bungao-Abarquez, 2020).

Using flashcards as a visual tool helps children with autism become more actively involved in the learning process and greatly improves their math knowledge (Sriyanti & Baharullah, 2024).

Learners' performance in mathematics is positively impacted by manipulatives. Using manipulatives as much as feasible is advised to improve primary school pupils' proficiency in math. When learners manipulate objects themselves, they are taking the crucial first steps toward internalizing and acquiring an understanding of mathematical processes and procedures. Through the use of manipulatives, learners can investigate the mathematical process from a physical to a representational and ultimately an abstract level of understanding (Muhammad et al., 2023).

The Program for International Student Assessment (PISA), 2002 results in Mathematics, the Philippines ranked sixth among ten participating countries. To address this challenge, the researcher proposes using flashcards as a tool to help improve pupils' mathematical performance. This intervention aims to make learning more engaging and interactive, support pupils in understanding math concepts more effectively, and ultimately boost their confidence and achievement in the subject.

Action Research Questions

This action research aimed to enhance learning difficulties of pupils in mathematics in one of the elementary schools in Misamis Occidental during the S.Y. 2024- 2025. . Specifically, this study will sought to answer the following questions:

1. What is the level of performance of the learners in mathematics before the use of flashcards?
2. What is the level of performance of the learners in mathematics after the use of flashcards?
3. Is there a significant difference in the learners level of performance before and after the use of flashcards?

ACTION RESEARCH METHODS

Research Design

This study used a classroom-based action research approach to improve pupil's performance in mathematics through the use of flashcards. Action research is a practical method that addresses real-world challenges while contributing to academic knowledge (Cronholm & Göbel, 2022).

Setting

The study took place in a public elementary school in Ozamiz City, Misamis Occidental, focusing on Grade 3 pupils, sy. 2024-2025. The school accommodates learners from Kindergarten to Grade 6. The school was dedicated to supporting pupils with diverse educational needs through its Special Education (SPED) programs, which catered specifically to learners requiring additional assistance. It also offered the Alternative Learning System (ALS) for out-of-school youth and adults, providing them with opportunities to gain vital skills and knowledge.

Additionally, it implemented Special Support and Enrichment Services (SSES) aimed at enhancing the overall learning experience for all students. This inclusive approach reflected the school's commitment to fostering an environment where every learner could achieve their potential and succeed academically. The school's initiatives were part of a broader commitment in the Philippines to enhance educational accessibility and inclusivity for all pupils, aligning with national education policies and programs aimed at improving learning outcomes across diverse learner populations. Purposive sampling was used to introduce and implement music-based teaching strategies, allowing the researcher to observe student reactions and gather data in a natural learning environment.

Participants

The participants of the study were the 41 Grade 3 pupils from one section that the researcher was teaching. They were selected through purposive sampling. The selection of the participants will be based on the following criteria: Pupils who were enrolled as Grade 3 pupils for the school year 2024–2025; pupils who were observed to have low performance; and pupils who were willing to participate in the study. The researcher ensured that these criteria were met prior to conducting the survey. However, the researcher did not include other sections of the same grade level in the study.

Instruments

The researcher used the following instruments in this study:

A. Mathematical Vocabulary Enhancer Test Questionnaire. The instrument used in the study was a 30-item researcher-made questionnaire covering topics such as reading and writing fractions in symbols and words from the Math 3 curriculum for the third grading period. These questions were used for both the pre-test and post-test. To ensure the validity of the test, the researcher asked five experts from the Math department to evaluate the questionnaire. A pilot test was conducted with a group of participants who were not included in

the actual study. The researcher ensured that the instrument achieved a Cronbach's Alpha between 0.7 and 1.0 to establish its reliability.

B. Lesson Plan. The researcher created a lesson plan centered on reading and writing fractions in symbols and words, integrating flashcards to address mathematical learning difficulties. Before its implementation, the lesson plan was carefully reviewed by the cooperating teacher and revised by the researchers. The implementation took place in one of the elementary schools in Misamis Occidental, specifically with the Grade 3 pupils during the school year 2024–2025.

Data Gathering Methods

A. Pre-Implementation Phase. The researcher first sought permission from the Schools Division Superintendent, the principal, and the participating teacher to conduct the study. Once approval was obtained, consent forms were sent to the parents of the pupils, and assent forms were collected from the pupils themselves. After securing all necessary permissions and forms, a pretest was administered to assess the pupils' baseline knowledge of the mathematical concepts targeted in the study. The researcher also prepared the lesson plans and relevant materials based on the integration of flashcards into the teaching intervention. Assessments and activities were also prepared during this phase based on the teacher's lesson plans and PowerPoint presentations.

B. Implementation Phase. The researchers presented and discussed the lessons with the help of flashcards in learning in the class. Detailed instructions were also given to the pupils regarding the function and use of flashcards for the activities and assessments. After a month of implementing the intervention, an assessment was administered to determine how much the pupils had improved their mathematical skills. Since data triangulation was used in this study, observations and interviews were also conducted alongside the assessment for additional data. To record the data, video recordings of the class lessons, photos, screenshots, and field notes were taken by the researchers throughout the entire duration of the implementation. Semi-structured interviews were also conducted to gather specific data regarding the pupils' and teachers' feelings and perceptions concerning the use of flashcards in learning. The interviews were done after the duration of the intervention and were audio-recorded by the researchers for future reference.

C. Post-Implementation Phase. The post-implementation stage included tallying the data, analyzing the tallied data, interpreting the data in order to report findings and draw conclusions. Recommendations were given, and proofreading, editing, and finalizing the research study were also conducted afterward. It also involved the proper dissemination of the research results to a specific group of people.

Data Analysis

The researcher calculated descriptive statistics, specifically the mean and standard deviations, to assess the level of performance both before and after implementing the intervention, while qualitative analysis of the observation and interview data was conducted using Thematic Data Analysis with the aid of Hype research.

Frequency and Percentage were used to determine the distribution of student performance across different score ranges before and after the intervention.

Mean and Standard Deviation were used to summarize the level of performance of students before and after the use of flashcard in learning.

T-Test was used to explore the significant difference in pupils' performance before and after the use of flashcards in learning.

RESULTS AND DISCUSSION

This action research aimed to enhance the mathematical performance of elementary learners in one of the schools in Misamis Occidental through the use of flashcards, an interactive and visual learning tool. The strategy was intended to address learning difficulties by making mathematical concepts easier to understand

and more engaging. Before the intervention, most of the learners showed low performance, indicating challenges in comprehension and retention.

The following tables present and interpret the results of the learners’ performance before and after the use of flashcards. The discussion includes an analysis of their performance levels, the observed improvements following the intervention, and the statistical significance of the change in scores. These findings offer insight into the effectiveness of flashcards as a teaching strategy in improving Mathematics learning among elementary pupils.

Before the use of flashcards, most of the learners in Mathematics were struggling. As shown in Table 1, 83.72% of the pupils fell under the “Did Not Meet Expectation” level, while only 16.28% were in the “Fairly Satisfactory” category. The overall mean score of the learners was 15.628, which is within the “Did Not Meet Expectation” range based on the given scale. This result clearly indicates that majority of the learners had difficulty understanding mathematical concepts, which may be due to a lack of engaging or interactive learning tools.

This finding shows the need for an intervention to support learners who are having challenges in Mathematics. The standard deviation (SD) of 2.171 shows a moderate spread of scores, which means there were still some variations in the learners’ understanding, but most of them were performing poorly. This suggests that traditional teaching methods may not be effective enough in meeting the learners’ needs and that new approaches such as using visual aids or interactive materials like flashcards, may help improve their performance.

It works well for pupils to master as well as for improving and growing their cognitive abilities and attentiveness. Flashing cards with addition, subtraction, multiplication, and division equations or number sentences on them greatly encourage pupils to pay attention and concentrate. When utilized for improved learning performance and enhancement, flashcards are most successful when the teacher and pupil complete them together (De Guzman, 2022).

Using visual aids like flashcards greatly enhances children's understanding of math. This encourages children to participate more actively in the educational process. Using flashcards as a useful teaching tool for arithmetic instruction for children (Mustafa & Baharullah, 2024).

The findings imply that using flashcards in teaching Mathematics can be a helpful and effective strategy, especially for learners who struggle with understanding basic concepts. Since most pupils had low scores before the intervention, it shows that traditional teaching methods alone may not be enough to support their learning. Flashcards, being visual and interactive, can make lessons more engaging and easier to understand. They help pupils stay focused, remember information better, and actively participate in class. This suggests that teachers should consider using flashcards regularly to improve the performance of their students in Mathematics, especially in early grades where basic skills are being developed.

Table 1. Level of Performance of the Learners in Mathematics Before the Use of Flashcards

Domain	Machine Learning Applications	Deep Learning Applications
Retail	Recommendation systems	Visual search, sentiment analysis
Transportation	Route optimization	Self-driving cars

After implementing the use of flashcards in teaching Mathematics, the performance of the learners significantly improved. Based on Table 2, the majority of the learners reached higher levels of performance: 53.49% achieved “Very Satisfactory” and 32.56% even reached the “Outstanding” level. Only 13.95% remained in the “Satisfactory” category, with no learners scoring in the lower categories. The mean score increased to 24.419, falling within the “Very Satisfactory” range.

This result shows that flashcards are effective in helping pupils understand mathematical concepts better. The standard deviation decreased to 1.816, indicating that the learners’ scores were more consistent and closer to each other. The use of flashcards likely made lessons more visual, interactive, and easier to understand, which

encouraged active participation and better retention of mathematical ideas. These results support the use of flashcards as a practical and helpful tool in teaching elementary Mathematics.

When flashcards are used, students become more motivated and engaged, which is demonstrated by improved comprehension of mathematical ideas and more interaction during class. Flashcards are a useful tool for improving student's arithmetic comprehension and interest. This encourages the adoption of more interactive teaching strategies to boost students' enthusiasm to learn (Rohmah et al., 2024).

Both pupils' math performance and math anxiety are improved when flash cards are used in the classroom (Zarif et al., 2024). Math facts lay the foundation for future success in mathematics; pupils must be motivated and want to learn; manipulatives are required in the teaching and learning of mathematics; and mathematics is essential to each pupil's overall education. Effective strategies are required to maintain math facts to aid with other mathematical concepts (Nickel, 2021).

The results suggest that using flashcards in teaching Mathematics can greatly help pupils improve their performance. After the intervention, more learners reached higher achievement levels, showing that flashcards made math lessons more understandable and engaging. This means that flashcards do not only help learners remember math facts better but also make them more interested and involved during lessons. Because the scores became more consistent, it shows that most pupils benefited from this strategy. Therefore, teachers are encouraged to use flashcards regularly as a simple but effective way to make math lessons more interactive, reduce math anxiety, and improve learners' understanding and participation.

Table 2. Level of Performance of the Learners in Mathematics After the Use of Flashcards

Table 3 presents a comparison of learners' performance before and after using flashcards, and the results show a significant improvement. The mean score before the intervention was 15.628, while after using flashcards it increased to 24.419. The computed t-value of 29.80 and p-value of 0.000 strongly indicate a statistically significant difference in performance. Because the p-value is less than 0.01, the null hypothesis (H_0), which states that there is no significant difference, is rejected.

Various motivational actions with relation to memory retention activities and encounters greatly influence the students' memory recall, which helps children perform better in math. It highlights how crucial interesting learning exercises, such using flashcards, are to raising students' mathematical ability and retention (Orejudo & Fabricate, 2023).

It is strongly advised to use manipulative to give students tangible, significant, and practical learning experiences that can improve their numeracy abilities and deliver lessons in a more dynamic, inventive, and engaging way (Vendicacion et al., 2025).

The findings clearly show that flashcards are a powerful tool for helping pupils do better in Mathematics. The big improvement in scores after using flashcards means that this method really works in helping learners understand and remember math lessons. Since flashcards are visual and hands-on, they make learning more fun and easier to follow. This also helps pupils focus and remember the lessons better. Because of this, teachers should consider using flashcards and other similar learning tools in their regular classroom teaching, especially to support students who are struggling. Making lessons more interactive and enjoyable can lead to better results and stronger math skills.

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This action research aimed to enhance the mathematical performance of Grade 3 learners in a public elementary school in Misamis Occidental during the school year 2024–2025 through the use of flashcards. The study was motivated by the observed low performance of learners in Mathematics, where most pupils struggled to meet the expected level of proficiency. Flashcards, as visual and interactive tools, were introduced to help pupils better understand mathematical concepts and improve retention.

A total of 43 Grade 3 pupils participated in the study. They were selected through purposive sampling based on their low performance in math and willingness to participate. A pre-test and post-test using a researcher-made 30-item questionnaire were administered to assess improvement in performance. The study adopted a classroom-based action research design. Data were analyzed using descriptive statistics, and t-test for paired samples.

Findings

The key findings of the study are as follows:

1. Before the intervention, the learners' mean score in Mathematics was 15.628, with most pupils (83.72%) falling under the "Did Not Meet Expectation" category, confirming their struggle in understanding basic mathematical concepts.
2. After the intervention, there was a notable improvement in the learners' mean score, which rose to 24.419. Most pupils achieved scores within the "Very Satisfactory" and "Outstanding" ranges.
3. A t-test analysis revealed a computed t-value of 29.80 and a p-value of 0.000, indicating a highly significant difference in learners' performance before and after using flashcards.

CONCLUSIONS

Based on the findings, the following conclusions were drawn:

1. Before the use of flashcards, Grade 3 pupils demonstrated low performance in Mathematics, indicating the need for more engaging and effective instructional strategies.
2. The use of flashcards significantly improved learners' performance in math by making lessons more visual, interactive, and easy to understand.
3. The statistical results confirmed that the improvement was not due to chance, proving that flashcards are an effective tool for helping young learner's master fundamental mathematical concepts.

RECOMMENDATIONS

1. Teachers are encouraged to integrate flashcards into their regular Mathematics instruction to enhance learner engagement and improve comprehension, especially among struggling pupils.
2. Schools may consider supporting the use of visual and hands-on materials, such as flashcards and manipulatives, as part of their instructional resources.
3. Teacher training programs should include workshops on designing and using flashcards effectively in classroom settings.
4. School administrators may explore the inclusion of similar interactive methods across other grade levels and subjects to foster active learning.
5. Future researchers may replicate this study in different contexts or subjects, or explore the long-term effects of flashcard use on learners' academic performance and attitude toward Mathematics.

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