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Research Article

Enhancing Grade 6 Learners' Performance in Mathematical Fractions through Differentiated Instruction

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ABSTRACT

This study examined the effectiveness of differentiated instruction in enhancing Grade 6 learners' p The research explored the efficacy of differentiated instruction in improving the academic achievement of Grade Six students in the topic of mathematical fractions at Manggahan Elementary School, Zambales. Given the concern of addressing the continuous difficulties encountered by students in the topic of fractions, the paper used a quantitative pretest-posttest quasi-experimental design to identify how instructional strategies that are responsive to students' differences in readiness levels, prior knowledge, and learning preferences can be beneficial to them. Differentiated instruction as a strategy was carried out by means of flexible grouping, scaffolded learning tasks, visual models, manipulatives, technology-supported activities, guided practice, and problem-based learning experiences. Learners' conceptual understanding, procedural fluency, engagement, and confidence in solving fraction-related tasks were expected to be developed with the use of these strategies. Results showed that differentiated instruction was one of the factors to learners' performance upgrading even after the intervention. Through structured support and interactive classroom experiences, the intervention addressed the learners' prior knowledge gaps in equivalent fractions, simplification, comparison and ordering, operations, conversion, and word problem solving. With the help of the intervention, learners were able to progress from basic understanding to independent and advanced application of fraction concepts. In fact, the study after taking into consideration these results recommended Project DIFF-MATH FRACTIONS which integrates diagnostic assessment, targeted remediation, enrichment activities, continuous monitoring, and teacher-guided support as a school-based intervention program. Through the proposed program, such a practical framework is offered to mathematics teachers for designing inclusive, learner-centered, and evidence-based instruction. Overall, the study underscores the importance of adaptive pedagogy in diminishing learning gaps, enhancing mastery of basic mathematical competencies, and fostering meaningful participation among diverse learners. Besides, it also provides some insights into the curriculum implementation, instructional planning, and teacher professional development within a similar educational context.

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Introduction

Mathematical fractions are crucial in Grade Six Mathematics as an avenue for learners to develop number sense, proportional reasoning, algebraic readiness, and problem-solving skills. Besides, a robust grasp of fractions is vital for understanding several other mathematical concepts such as decimals, percentages, ratios, measurement, geometry, and algebra. However, fractions remain a problem both for many learners and teachers since some of the learning areas that pose difficulty to students are equivalence, comparing and ordering fractions, performing operations, and solving word problems. It is even believed that these difficulties can negatively affect learners' confidence, willingness to participate in class, and achievement in mathematics later on (Dyson et al., 2020; Jordan et al., 2024). Therefore, it is important that we make use of teaching methods that cater to the different readiness levels of students and also help in the meaningful learning of fraction concepts.

Besides striving to enhance mathematical proficiency, differentiated teaching is also very much connected to the issues of educational fairness and social development at a wider level. Being numerate at a fundamental level is not simply one of the academic requisites; it also determines how confident learners feel, their participation in class, their access to more advanced learning, and even their educational prospects in the long run. If learners continue to struggle with fractions, the divide between those who are capable of independently engaging with more abstract mathematical concepts and those who will need extra instructional support may become even more pronounced. Under these circumstances, differentiated instruction can be seen as a tool to bridge the educational inequalities by offering different, scaffolded, and responsive learning experiences that make it possible for learners at different readiness levels to participate in a meaningful and enjoyable way in the mathematics classroom. For this reason, implementing differentiated instruction in the teaching of fractions can help achieve academic success as well as inclusive classroom practices and the promotion of equal learning opportunities.

Differentiated instruction is a promising method to help bridge these gaps in learning as it consists of changing the learning activities, instructional materials, grouping arrangements, pacing, and assessment to align with the learners' readiness, interests, and needs. Hence, when teaching fractions, this will mean such approaches as regrouping, giving different levels of tasks, using pictures, handing out concrete objects, assigning technology-based tasks, and guided practice, in addition to the problem-solving tasks based on real-life situations. Scholars lately have revealed that differentiated instruction can up-grade mathematics performance by catering to learner diversity and offering proper instructional support (Aguhayon et al., 2023; Hu, 2024; Insorio, 2024). As to the effective teaching practice of the classrooms, Espiritu (2021) pointed out that teachers' understanding and proficiency are the basis for the improvement of instructional practice and for becoming professional teachers. On the other hand, Eustaquio and Espiritu (2025) highlighted that teachers' academic credentials and their realized teaching performance have a bearing on the quality of classroom instruction and pupil development.

This study, therefore, was conducted to know the effectiveness of differentiated instruction as a tool in changing the performance of Grade Six students in mathematical fractions in Manggahan Elementary School in Zambales. More specifically, it is a description of learner profiles, comparison of learner's performance before and after the intervention, testing the significant difference in learners' pretest and posttest scores, and designing an intervention program based on results. Through this, the study intended to back up the usage of differentiated instruction as a learner-centered approach for mastery of mathematical fractions, remediation of learners' learning gaps, and promotion of inclusive mathematics instruction among Grade Six learners.

Literature Review

Fractions serve as the basis in math learning, helping kids understand rational numbers, reason proportionally, get ready for algebra, and solve problems in daily life. A solid knowledge of fractions is key if students are to grasp other mathematical notions that are closely linked to fractions like decimals, percentages, ratios, measurement, and algebraic expressions. Unfortunately, a lot of kids still find fractions hard to learn. Dyson et al. (2020) pointed out that students who find math difficult usually lack an intuitive grasp of fractions. On the other hand, Jordan et al. (2024) showed that fraction interventions in the schooling environment have the power to make learners' conceptions deeper. Hence, teachers may want to focus their strategies on both conceptual and procedural issues of learners in fractions.

Researchers are making a case for targeted, planned teaching of fractions to kids in the early grades. Jayanthi et al. (2021) saw that the most effective instruction for the least performing students combined understanding at the conceptual level and practice at the procedural one. Likewise, Rojo et al. (2023) recognized that interventions on rational numbers had great impacts on students with math difficulties, especially in topics related to fractions, decimals, and percentages. These three pieces of research are clear that learning fraction will be more efficient if however, learners are also given time to conceptualize, relate, represent and apply fractions besides practice the computations.

There are good grounds for applying differentiated teaching techniques in math as various studies suggest that the approach is effective. Hu (2024) sees a great deal of merit in K-12 differentiated teaching for the reason that it can cater to a wider spectrum of learner diversity. Aguhayon et al. (2023) confirmed that differentiated teaching led to lesser gaps in learners' performance, increased confidence and overall progress in Mathematics. The implication here is that with differentiated instruction, one can alter the teaching of fractions even to those having varied levels of comprehension.

Moreover, teacher-led differentiated instruction can only be successful if the classroom experiences are engaging, interactive, and centered on learners besides being content-rich. In fact, Insorio (2024) insists that differentiated strategies do enhance the level of math achievement through better addressing of learner variation that leads to greater success. Quite similarly, Kara (2025) revealed that differentiated teaching contributed to academic excellence among the subjects in such heterogeneous classes. It is also worth mentioning that apart from a child's academic readiness, there are other factors such as behavior, motivation, and participation that come into play and may also affect classroom engagement and learning experiences; therefore, these need to be considered when designing responsive instructional strategies not only addressing cognitive but also affective aspects of learning have been highlighted by researchers Lonzon and Espiritu (2024).

Tools for technology-assisted instruction and visuals also open up avenues for fraction teaching by taking wonderful care of symbolic and abstract math ideas or concepts, making them more concrete and accessible. Polydoros and Antoniou (2025) have shown in their studies that computer-assisted instruction was very beneficial to students with special needs in math and it helped them a lot in their understanding of fractions. Based on a few local studies, technology-mediated learning can surely support student learning. Guerrero and Espiritu (2025) argued that smartphones bring academic benefits when used rightly, although they do not rule out the potential drawbacks when students are not properly supervised. Quintino and Espiritu (2025) also highlighted the importance of screen time and present-day literacy in student learning, thus emphasizing that technology-supported teaching must be well planned, properly balanced, intentional and appropriate to the learners' level of growth. Pullido and Espiritu (2026) reported multimedia presentations to be quite effective in raising the phonetic and speaking abilities of kindergarten children, which shows the possibility of multimedia-based instruction in enhancing foundational learning skills.

On the whole, published research reveals that fractions constitute a major barrier for students but they are a very important element of elementary math as well. Differentiated

instruction is a fitting solution to challenges caused by the school environment in modern times and by the varied learning requirement of students as this kind of teaching method allows for flexible, scaffolded, visual, interactive, and learner centered strategies. When combined with proper intervention and meaningful learning experiences as well as appropriate technology-based resources, differentiated instruction could help learners to better understand, be more confident and perform better in mathematical fractions. In that light, this research is providing evidence from our own setting on the positive impact of differentiated instruction on the performance of Grade 6 learners in mathematical fractions.

Objectives of the Study

This research was conducted to find out whether differentiated instruction could be an effective teaching method to improve the Grade Six students' performance in mathematical fractions at Manggahan Elementary School, Zambales. The study, more specifically, aimed to: portray the background of the learner-respondents along the lines of sex, age, and academic performance in Mathematics; assess their level of proficiency in mathematical fractions before and after the use of differentiated instruction; identify whether a significant difference existed between their pretest and posttest performance; and formulate a differentiated instructional program that may help the learners in mastering mathematical fractions. The study, through these goals, expected to give evidence-based support to the use of differentiated instruction as a learner-centered strategy in closing learning gaps and enhancing mathematics performance of Grade Six learners.

Limitations of the Study

The study was confined to 61 Grade 6 learners from Grade 6 Aquamarine and Grade 6 Malachite of Manggahan Elementary School, Subic, Zambales. As the respondents were from only one school and two intact sections, the results may not be representative of all Grade 6 learners in other schools or districts. Also, the research employed a quasi-experimental pretest-posttest design without having a control group; hence, even though the results indicated a significant change post the application of differentiated instruction, other classroom-related factors such as learner motivation, teacher support, repeated exposure to fraction lessons, and regular classroom practice may have also played a part in the improvement.

Besides this, random allocation was not utilized because the study happened in real classroom sections. The teaching intervention was carried out during the usual lesson time; hence the results revealed are the immediate effects of differentiated instruction on students' achievements in mathematical fractions. Scholars in the future may overcome these shortcomings by recruiting a bigger participant pool, including a control or comparison group, prolonging the intervention time, and performing the study in several schools or districts.

Methodology

Research Design

The researchers used a quantitative quasi-experimental pretest-posttest design to check if differentiated instruction could enhance the academic performance of Grade Six students in mathematical fractions. This design was chosen as the study aimed at evaluating the variations in the students' performance after and before the use of the teaching intervention. Differentiated instruction became the independent variable with the students' achievement in mathematical fractions as the dependent variable.

Due to the fact that the respondents were the students in the Grade Six sections, random distribution for participants was not done. The intervention was carried out in the natural classroom setting to maintain the existing class organization and to depict real instructional conditions. This way, the research was able to find out how much differentiated instruction helped the students to the mastery of fraction-related skills after the intervention.

Respondents and Locale

The respondents of the study were 61 Grade 6 learners enrolled at Manggahan Elementary School, Subic, Zambales. They were composed of learners from Grade 6

Aquamarine and Grade 6 Malachite, the two sections where the differentiated instruction intervention was implemented. The study used non-probability purposive sampling in selecting the school and grade level, while total enumeration was used for the selected sections. All learners from the two sections were included because they directly participated in the intervention and provided the necessary pretest and posttest data.

The inclusion criteria considered learners who were officially enrolled in Grade 6 during the conduct of the study, were members of the selected sections, and were present during the administration of the pretest, intervention, and posttest. Learners who were not part of the selected sections or who did not complete the required assessment activities were excluded from the final analysis.

Instruments

The researcher-customized ten-item fraction test served as the main data collection instrument and was scored on a 50-point scale. Students' use of math fractions before and after the rolling out of differentiated instruction was the main focus of the test. It stemmed from DepEd Grade 6 Mathematics materials and was aligned with the Most Essential Learning Competencies of Grade 6 Mathematics. The test dealt with topics such as equivalent fractions, simplifying fractions, comparing and ordering fractions, operations on fractions, conversion of fractions to decimals, and solving word problems.

A Table of Specification was created to guarantee that test questions matched desired competencies, cognitive levels, and difficulty levels. The test consisted of short-answer constructed-response questions, and scoring of each question was done using a five-point rubric. The pretest and posttest were developed as parallel forms, measuring the same competencies and levels of difficulty but using different numerical values and problem contexts.

Validity was first tested by procedure of an extensive review by Master Teachers in Mathematics and Mathematics Coordinators who are experts in the field. The validators examined the test in terms of clarity, relevance, alignment with the competencies, appropriateness of language, and suitability of Grade 6 learners. The instrument was revised and enhanced from their comments and suggestions before it was administered. Reliability was checked when the tool was pilot tested using a sample of Grade 6 students of Subic Central Elementary School. The result of the reliability coefficient calculation was 0.796, which represents a fair to good level of internal consistency.

Data Gathering Procedures

The researcher complied with the necessary steps to carry out the research. A formal letter-request was initially sent to the Schools Division Office of Zambales for the acquisition of a permission and endorsement. When the approval was given, a letter was again sent to the School Principal of Manggahan Elementary School to request for the authorization of the actual conduct of the study. In case of the approval, the researcher liaised with the school head and Grade 6 teachers on the schedule, procedures, and classroom arrangements.

Consent forms informed about the data gathering to parents or guardians and assent to learners were done. Implementation of the study shall not interfere with regular classes and school activities, the researcher confirmed. The pretest was carried out to assess the learners' initial level of understanding in mathematical fractions, the pretest was then given.

Upon the completion of the pretest, the differentiated instruction was the teaching of mathematical fractions. Intervention strategies consisted of flexible grouping, scaffolded activities, manipulatives, visual aids, technology-supported activities, and problem-based learning tasks. These techniques were chosen based on the learners' readiness levels and learning needs. The posttest was given to the same group of students after the intervention period to assess their performance following the exposure to differentiated instruction.

Once the pretest and posttest were done, results were taken, verified, and tallied. They were then encoded and analyzed. The comparison of the learners' pretest and posttest scores was the main means of determining the effectiveness of differentiated instruction in

enhancing their performance in mathematical fractions.

Data Analysis

The data gathered were analyzed using appropriate descriptive and inferential statistical tools. Frequency and percentage were used to describe the profile of the respondents in terms of sex, age, and academic performance in Mathematics. These were also used to present the distribution of learners according to their performance levels in the pretest and posttest.

The mean was used to determine the average performance of learners in mathematical fractions before and after the implementation of differentiated instruction. Proficiency levels were used to interpret the learners' scores based on the categories of Advanced, Proficient, Approaching Proficiency, Developing, and Beginning.

A paired sample t-test was used to determine whether there was a significant difference between the learners' pretest and posttest performance. This statistical test was appropriate because the same group of learners was assessed before and after the intervention. The level of significance was set at 0.05. If the computed p-value was less than 0.05, the null hypothesis was rejected, indicating a significant difference between the pretest and posttest scores.

Ethical Considerations

Ethical considerations were respected at every stage of the study. Authorization was obtained from the Schools Division Office of Zambales and the Principal of Manggahan Elementary School prior to the conduct of the research. Informed consent of parents or guardians and assent of the learner-respondents were taken before the participation.

The study involvement was voluntary. The students were informed that they participating would be for academic and research purposes only. Confidentiality and anonymity of the respondents were kept by making sure that in the presentation and interpretation of data, no names or personal identifiers would be disclosed. The information collected was handled with the utmost confidentiality and was only used for the purposes of the study.

The researcher also made sure that no regular classes were interrupted during the conduct of the study. The intervention was carried out with the guidance of the school authorities and teachers so that the risks and inconveniences to learners would be kept to a minimum. Respondents were selected on the basis of the character and objective of the study and without any discriminatory criteria. The results of the research might be made available to teachers, school administrators, and other relevant stakeholders for the further development of mathematics teaching, especially the teaching of mathematical fractions through differentiated instruction.

Result and Discussion

Profile of the Learner Respondents

Table 1 presents the frequency and percentage distribution of the Grade 6 learner-respondents according to sex, age, and academic performance in Mathematics. These variables were included to describe the general profile of the respondents before determining their performance in mathematical fractions.

Table 1

Frequency and Percentage Distribution of the Respondents

Profile	Category	Frequency	Percentage
Sex	Female	33	54.1
	Male	28	45.9
Age **(Mean = 11.90 or 12 years old)**	11 years old	13	21.3
	12 years old	42	68.9
	13 years old	5	8.2
	14 years old	1	1.6
Academic Performance in Mathematics	90 and above	6	9.8
	85-89	21	34.4
	80-84	14	23.0

(Mean=83.66 Satisfactory)	75-79	20	32.8

The results indicated that majority of the respondents were female at 33 learners or 54.1 percent while the male respondents were 28 learners or 45.9 percent in number. Concerning the ages, the majority were at 12 years old with 42 learners or a proportion of 68.9 percent and the calculated average age was 11.90 which is roughly 12 years old. This shows that the respondents were mainly in the age group expected of Grade Six learners.

On the matter of academics particularly in Mathematics, the biggest category managed to get grades between 85 to 89 consisting of 21 learners or 34.4 percent. The next category was 20 learners or 32.8 percent who got grades between 75 to 79. The calculated average grade was 83.66 which was rated as Satisfactory. These findings imply that the learners were generally capable of showing a reasonable level of prior achievement in Mathematics however, there was still a necessity for a more intense mastery of mathematical concepts, especially in fractions.

In summary, the results showed that the respondents were fairly divided in terms of gender, were mostly at the correct age level for Grade Six, and had done fairly well in their previous performance in Mathematics. Nevertheless, the fact that only a small number of students scored 90 and above points to a requirement for teaching methods that can cater to different levels of readiness and assist learners in a way that they move towards higher achievement. This are the reasons why differentiated instruction is advocated as learner-related factors such as prior achievement, confidence, and self-efficacy have an impact on mathematics learning outcomes (Zakariya, 2022).

Level of Performance of Grade 6 Learners in Mathematical Fractions Before the Use of Differentiated Instruction

Table 2 presents Grade 6 learners' mathematical fraction performance levels before the use of differentiated instruction. The table represents the learners' pretest results, which became the point of reference for figuring out their initial comprehension and mastery of fraction concepts before the intervention.

Table 2

Level of Performance of Grade 6 Learners in Mathematical Fractions Before the Use of Differentiated Instruction

Performance in Mathematical Fractions	Frequency	Percentage
74 and below	61	100.0
Mean	**39.92 - Beginning**	

Legend: 90 and above- Advanced; 85-89-Proficient; 80-84-Approaching Proficiency; 75-79-Developing; 74 and below-Beginning

The findings show that prior to the implementation of differentiated instruction, the learners' performance in mathematical fractions was at the Beginning level. The computed average score was also interpreted as Beginning, indicating that the learners demonstrated very limited understanding of fraction concepts. This suggests that they had not yet attained mastery of the expected competencies in fractions, particularly in understanding concepts, applying procedures, and solving problems involving fractions.

The results clearly indicate that the learners experienced considerable difficulty in mathematical fractions before the intervention. This finding justifies the use of differentiated instruction, as the learners required targeted support, scaffolded learning activities, and varied instructional strategies aligned with their readiness levels and learning needs. Through differentiated instruction, teachers can provide more responsive learning experiences that address gaps in understanding and guide learners toward the gradual mastery of fraction concepts. This is supported by Dyson et al. (2020), who emphasized that structured fraction interventions are often necessary for learners with, or at risk of, mathematics

difficulties to improve their conceptual understanding and overall performance.

Level of Performance of Grade 6 Learners in Mathematical Fractions After the Use of Differentiated Instruction

Table 3

Level of Performance of Grade 6 Learners in Mathematical Fractions After the Use of Differentiated Instruction

Performance in Mathematical Fractions	Frequency	Percentage
74 and below	2	3.3
75 – 79	2	3.3
80 – 84	2	3.3
85 – 89	11	18.0
90 and above	44	72.1
Mean	**91.08 - Advanced**	

Legend: 90 and above- Advanced; 85-89-Proficient; 80-84-Approaching Proficiency; 75-79-Developing; 74 and below-Beginning

Table 3 illustrates how well grade 6 learners performed in mathematics fractions after using differentiated instruction. Besides showing the posttest results, the table depicts the learners' level of mastery after exposure to varied instructional strategies. It was the posttest results that the researcher used as a reliable source for assessing the level of learners' proficiency in mathematical fractions.

The scores of 44 learners or 72.1% at or above 90, Advanced range, while 11 learners or 18.0% attained 85, 89, Proficient range are the main findings of the study. Besides that, only 2 learners or 3.3% were in the category of 74 and below, 2 learners or 3.3% were in the 75, 79 range, and 2 learners or 3.3% were in the 80, 84 range. The calculated average score was 91.08, categorized as Advanced, which reflects a highly satisfactory achievement level after the treatment.

These results indicate that differentiated instruction brought about a great change in learners' achievement in mathematical fractions. The fact that most learners were classified as Advanced could mean that the implementation of flexible grouping, scaffolded activities, visual aids, manipulatives, and problem-based tasks not only met various learners' needs but also enhanced their grasping of fraction concepts. This result is in line with Jayanthi et al. (2021), who observed that well-organized fraction instruction focusing on both conceptual understanding and procedural practice lead to significant improvement of students' mathematics performance.

Test of Significant Difference in the Performance of Learners in Mathematical Fractions Before and After the Use of Differentiated Instruction

Table 4 shows the statistical analysis of whether Grade 6 students improved their performance in mathematical fractions after the use of differentiated instruction. The paired samples t-test was employed to find if the difference in the learners' pretest and posttest scores was significant from a statistical point of view.

Table 4
Test of Significant Difference in the Performance of Learners in Mathematical Fractions Before and After the Use of Differentiated Instruction

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Grade 6 Pre Test – Post Test	-51.16393	12.50224	1.60075	-54.36591	-47.96196	-31.963	60	.000

The results show that before the differentiated instruction was implemented, all of the learners scored at the level labeled as Beginning. The overall average score was also at the Beginning level, which means that the learners showed a very low level of performance in mathematical fractions before the intervention. This is an indication that they were still in the process of acquiring mastery of the fraction-related skills that are expected, especially understanding, applying, and solving problems with fractions.

These results reveal that the learners were severely challenged by mathematical fractions prior to their being introduced to the intervention. This is the very reason why the implementation of differentiated instruction has a solid foundation because the learners need a combination of support, learning activities that are scaffolded, and various instructional strategies that are appropriate for their levels of readiness and learning needs. Differentiated instruction allows teachers to craft learning experiences that are more responsive to the learners' needs, particularly in terms of filling gaps, and guiding them step by step to the mastery of fraction concepts. The authors Dyson et al. (2020) also concur with this finding when they said that learners who have or are at-risk of having, difficulties in mathematics generally need well-structured interventions in fractions in order to enhance their conceptual understanding and overall performance.

Proposed Intervention Program

The proposal for an intervention program was formulated from the findings of the research which pointed out that Grade 6 students need more time and practice to fully comprehend mathematical fractions. Before carrying out differentiated instruction, learners had was estimated to be the Beginning level and the mean score from the pretest showed that the students still greatly struggled to understand and apply fraction concepts. The posttest, however, showed greater students' performance and was labeled as Advanced skill level. The paired-sample t-test also revealed a statistically significant difference between the pretest and posttest mean scores. Based on these evidences, a well-planned intervention program that can maintain and even enhance learners' mastery of mathematical fractions is warranted.

The proposed intervention program, titled Project DIFF-MATH FRACTIONS: Differentiated Instruction Framework for Fraction Mastery among Grade 6 Learners, is a school-based program rolled out to help learners acquire fraction skills through Responsive Inclusive Learner-Centered (R.I.L.C.) teaching/learning strategies. It sets out to identify the least mastered competencies, provide differentiated and scaffolded learning activities, strengthen conceptual understanding and procedural fluency, increase learner participation, and monitor learning progress through continuous assessment. Included in the program are diagnostic assessment, learner profiling, flexible grouping, scaffolded remediation, use of

manipulatives and visual aids, technology-supported activities, problem-based tasks, enrichment activities, and monitoring and evaluation.

The program operation is anticipated to significantly help in enhancing learners' competence in mathematical fractions by narrowing the learning gaps and enhancing mastery of the concepts and operations of fractions. Besides that, it could also lead to an increase in learners' confidence, engagement, and active participation in their Mathematics classes. More importantly, it could become a practical resource guide for teachers and school administrators in their plan and execution of differentiated instruction as a sustainable method to learner diversity and stepping up mathematics achievement.

The results of this study also point towards notable policy directions for Mathematics instruction, learner support, and inclusive education, etc. Given that the study documented enhancement in learners' achievement after differentiated instruction, school leaders may consider officially adopting differentiated instruction as a routine part of Mathematics remediation and enrichment programs. At the school level, Project DIFF-MATH FRACTIONS may be used as a structured intervention model for identifying least-mastered competencies, grouping learners according to readiness, providing scaffolded learning tasks, and monitoring learner progress.

On the district level, the intervention program may be used as a part of the design of capacity-building activities for Math teachers. In-service training sessions, school-based training, pitch mentoring may emphasize lesson differentiation, use of manipulatives, development of visual learning materials, formative assessment, and progress monitoring. These activities may equip the teachers to provide more differentiated and targeted interventions to the students and consequently reduce the persistent learning gaps in foundational numeracy.

Besides that, the study also indicates that the policy of making available sufficient instructional materials and technology-assisted learning resources should be supported. The successful implementation of differentiated instruction depends on adequate learning materials, teacher preparation, and administrative support. Hence, school heads and district supervisors might incorporate differentiated instruction in their school improvement plans, mathematics intervention plans, and professional development priorities. With these activities, Project DIFF-MATH FRACTIONS may help in the creation of more inclusive learning environments where learners who are low performers in mathematics are provided with adequate support to improve their performance, confidence, and active participation in the classroom.

Conclusion

The study found that differentiated instruction can be a potent mechanism for improving the performance of Grade Six learners in mathematical fractions. Learners showcased a limited grasp of fraction concepts and operations before the treatment, which pointed to the necessity for more learner-oriented instructions. The learner's performance improved distinctly after the effective implementation of differentiated instruction. This shows that the use of varied, scaffolded, and learner-centered strategies enabled them to gain a deeper conceptual understanding as well as procedural fluency in fractions.

The great distinction in the learners' pretest and posttest scores further attests to the fact that differentiated instruction played a role in achieving good results in mathematical fractions. The implementation of flexible grouping, scaffolded activities, use of manipulatives, visual aids, technology-supported tasks, guided practice, and problem-based learning were able to cater to learners' varying levels of readiness as well as their learning needs. These kinds of strategies gave learners opportunities to engage with fraction concepts in ways that are meaningful, accessible, and aligned with their developmental stages.

Moreover, the study revealed that differentiated instruction is instrumental in delivering inclusive Mathematics instruction as it recognizes the diversity of learners and offers focused support to those who are having difficulties. Learners had chances, through responsive teaching methods, to engage actively, gain confidence, and elevate their level of mastery in

foundational Mathematics skills. However, since the study was made on selected Grade Six learners from the intact classes and there was no inclusion of a comparison group, the findings should be regarded within the framework of the participating learners and the real classroom setting where the intervention was carried out.

Recommendations

To continue supporting the differentiated instruction teaching approach in Mathematics especially in mathematical fractions and other difficult competencies, it is advised that Mathematics teachers keep on incorporating differentiated instruction as part of their teaching method. Teachers can employ techniques such as flexible grouping, creating scaffolded learning tasks, using manipulatives and visual models, offering guided practice sessions, conducting problem-solving activities that are contextualized, and preparing technology-supported lessons that match the diverse readiness levels, learning needs, and pace of understanding of the learners.

Besides giving support to teachers, school administrators can play a role by ensuring that there are enough instructional materials, that teachers have access to learning technologies, and by creating teacher collaboration opportunities for lesson planning. They can also advocate the diagnosing of students' learning needs through assessments and continuous monitoring and encourage remediation and enrichment activities.

The suggested intervention scheme, Project DIFF-MATH FRACTIONS, can be taken up and developed as a school-based Mathematics intervention program. It may act as an organised reference for detecting learner deficiencies, sorting learners into groups based on readiness, offering scaffolded instruction, tracking learner progress, and maintaining fractional concepts and operational skills. The program can also be a part of school enhancement projects, Mathematics remedial plans, and learner assistance programs.

Education supervisors and school leaders at the district level can think about harnessing the results of this study as a platform for conducting capacity-building activities for Mathematics teachers. Learning Action Cell sessions, school-based training, peer mentoring, and professional development programs may highlight aspects such as differentiated lessons, use of concrete and visual materials, formative assessment, integration of technology, and strategies for inclusive education.

Researchers who wish to continue this line of investigation may want to replicate the study with a larger population of respondents, a longer intervention time, and a control or comparison group in order to further establish the effectiveness of differentiated instruction. They may also study differentiated instruction in other Mathematics competencies, grade levels, and learning areas to generate broader evidence on its contribution to learner achievement, confidence, engagement, and inclusive classroom practice.

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References

Aguhayon, H. G., Tingson, R. D., & Pentang, J. T. (2023). Addressing students' learning gaps in mathematics through differentiated instruction. *International Journal of Educational Management and Development Studies, 4*(1), 69–87. https://doi.org/10.53378/352967

Dyson, N. I., Jordan, N. C., Rodrigues, J., Barbieri, C., & Rinne, L. (2020). A fraction sense intervention for sixth graders with or at risk for mathematics difficulties. *Remedial and Special Education, 41*(4), 244–254. https://doi.org/10.1177/0741932518807139

Espiritu, Raymond. (2021). Awareness And Competency Of Pre-Service Teachers On The Philippine Professional Standards For Teachers (Ppst): A Basis For Training Program. Vol. 7 No. 11. 83-105. 10.17605/OSF.IO/FY8MC. https://doi.org/10.17605/OSF.IO/FY8MC

Eustaquio, Ryan & Espiritu, Raymond. (2025). Elementary Teachers' Academic Preparation and Performance. *International Journal of Multidisciplinary Applied Business and Education Research. 6*. 5448-5459. 10.11594/ijmaber.06.11.06. https://doi.org/10.11594/ijmaber.06.11.06

Guerrero, Jonna & Espiritu, Raymond. (2025). Benefits and Drawbacks of Smartphone Use on English Academic Performance of Grade 3 Learners. *International Journal of Multidisciplinary Applied Business and Education Research. 6*. 5658-5670. 10.11594/ijmaber.06.11.25. https://doi.org/10.11594/ijmaber.06.11.25

Hu, L. (2024). Utilization of differentiated instruction in K–12 classrooms: A systematic literature review. *Asia Pacific Education Review, 25*, 507–525. https://doi.org/10.1007/s12564-024-09931-y

Insorio, A. O. (2024). Addressing student diversity to improve mathematics achievement through differentiated instruction. *International Journal of Professional Development, Learners and Learning, 6*(1), Article ep2403. https://doi.org/10.30935/ijpdll/14462

Jayanthi, M., Gersten, R., Schumacher, R. F., Dimino, J., Smolkowski, K., & Spallone, S. (2021). Improving struggling fifth-grade students' understanding of fractions: A randomized controlled trial of an intervention that stresses both concepts and procedures. *Exceptional Children, 88*(1), 45–63. https://doi.org/10.1177/0014402921100851

Jordan, N. C., Dyson, N., Guba, T.-P., Botello, M., Suchanec-Cooper, H., & May, H. (2024). Exploring the impact of a fraction sense intervention in authentic school environments: An initial investigation. *Journal of Experimental Child Psychology, 244*, Article 105954. https://doi.org/10.1016/j.jecp.2024.105954

Kara, S. (2025). The effect of differentiated instruction on the academic achievement of students: A meta-analysis*. Journal of Intelligence, 13*(10), Article 126. https://doi.org/10.3390/jintelligence13100126

Lonzon, Miriam & Espiritu, Raymond. (2024). Phenomenological Behavioural Problems Manifested by High School Students Enrolled in Subic National High School. *International Journal of Multidisciplinary: Applied Business and Education Research. 5*. 3411-3421. 10.11594/ijmaber.05.08.34. https://doi.org/10.11594/ijmaber.05.08.34

Polydoros, G., & Antoniou, A.-S. (2025). Optimization of fraction learning for students

with learning difficulties in mathematics: Computer-assisted educational environments. *International Journal of Educational Methodology, 11*(2), 127–141. https://doi.org/10.12973/ijem.11.2.127

Pullido, Cherrylyn & Espiritu, Raymond. (2026). Implementation of Multimedia Presentations in Enhancing the Phonetic and Speaking Abilities of Kindergarten Pupils. *International Journal of Multidisciplinary Applied Business and Education Research. 7*. 138-148. 10.11594/ijmaber.07.01.14. https://doi.org/10.11594/ijmaber.07.01.14

Quintino, Bea & Espiritu, Raymond. (2025). Assessing the Role of Screen Time and Digital Literacy in Student Learning at Learning Circle Inc., Olongapo City. *International Journal of Multidisciplinary Applied Business and Education Research. 6*. 5574-5584. 10.11594/ijmaber.06.11.18. https://doi.org/10.11594/ijmaber.06.11.18

Rojo, M., King, S. G., Gersib, J., & Bryant, D. P. (2023). Rational number interventions for students with mathematics difficulties: A meta-analysis. *Remedial and Special Education, 44*(3), 225–238. https://doi.org/10.1177/07419325221105520

Zakariya, Y. F. (2022). Improving students' mathematics self-efficacy: A systematic review of intervention studies. Frontiers in Psychology, 13, Article 986622. https://doi.org/10.3389/fpsyg.2022.986622