Inquiry-Based Learning As Pathway To Enhanced Numeracy Skills: An Experimental Study

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Abstract

This study determined the effectiveness of Inquiry-Based Learning (IBL) in improving the numeracy skills of Grade 10 learners at New Albay National High School, Maragusan, Davao de Oro. The study employed a true experimental research design, specifically a randomized control group design, to examine the impact of the instructional strategy on learners' numeracy performance. A total of 60 learners participated, with 30 learners assigned to the experimental group, which was taught using Inquiry-Based Learning strategies, and 30 learners assigned to the control group, which was taught using traditional teaching methods. The Rapid Mathematics Assessment (RMA) was used as the research instrument to measure the numeracy skills of the subjects. The instrument was administered as both a pretest and posttest to determine the baseline numeracy level of the learners and their improvement after the intervention. Data were analyzed using paired t-test and independent samples t-test. The findings revealed that the pretest scores of the control group and the experimental group indicated comparable levels of numeracy skills prior to the intervention, with no significant difference between the groups. Both groups showed significant improvement from pretest to posttest The posttest mean score of the control group and the experimental group obtained a slightly higher mean score, both interpreted under the emerging proficiency level. However, the comparison of the gain scores between the two groups revealed no statistically significant difference. Based on the results, it was concluded that both instructional approaches contributed to the improvement of learners' numeracy skills. However, Inquiry-Based Learning did not produce a statistically significant difference in numeracy performance compared to the traditional teaching method within the duration of the study.

Keywords: *mathematics education, inquiry-based learning, numeracy skills, rapid mathematics assessment, true experimental design*

1. Introduction

Numeracy is a fundamental skill that enables individuals to interpret, analyze, and apply mathematical information in real-life situations, making it essential for both academic success and everyday decision-making. In the 21st century, numeracy is not limited to basic computation but extends to critical thinking, problem-solving, and the ability to use mathematics in meaningful contexts. However, traditional teaching approaches that focus primarily on memorization and procedural learning often fail to develop these competencies. As a result, there is a growing need to adopt instructional strategies that actively engage learners in constructing knowledge and applying mathematical concepts. One such approach is Inquiry-Based Learning (IBL), which aligns with the demand for deeper understanding and practical application of numeracy skills (OECD, 2019; Pedaste et al., 2015).

Inquiry-Based Learning (IBL) is an instructional approach that actively engages learners in exploring problems, asking questions, and constructing their own understanding of concepts through investigation and discovery. Research indicates that IBL promotes deeper learning by fostering critical thinking, reasoning, and the application of knowledge in meaningful contexts (Pedaste et al., 2015). In mathematics, this approach is particularly effective in strengthening numeracy skills because it shifts learning from rote memorization to active problem-solving and real-world application. Through inquiry-driven tasks, learners develop logical reasoning, conceptual understanding, and confidence in handling mathematical ideas, making IBL a suitable strategy for addressing gaps in numeracy development (Lazonder & Harmsen, 2016; Kogan & Laursen, 2014).

Despite the recognized importance of numeracy, many countries continue to face challenges in mathematics education. In the United States, less than half of the learners meet grade-level expectations in mathematics based on national assessment results, indicating persistent difficulties in achieving proficiency (National Center for Education Statistics [NCES], 2022). These findings suggest that conventional teaching strategies may not be sufficient to develop essential numeracy skills. Consequently, there is an increasing call for innovative and student-centered instructional approaches, such as Inquiry-Based Learning, to improve mathematics achievement and foster deeper understanding among learners (NCES, 2022; Lazonder & Harmsen, 2016).

The Philippines also faces significant concerns regarding learners' numeracy performance. Results from the Programme for International Student Assessment (PISA) revealed that Filipino learners ranked among the lowest in mathematics compared to other participating countries, highlighting serious gaps in mathematical understanding and application (Organization for Economic Co-operation and Development [OECD], 2019). Furthermore, local studies have shown that learners often struggle to apply mathematical concepts to real-life situations, which negatively affects their academic performance and problem-solving abilities (Gonzales & Espinosa, 2020). These issues emphasize the need for instructional approaches that promote active engagement and deeper learning, such as Inquiry-Based Learning, to address persistent numeracy challenges in the Philippine context (OECD, 2019; Gonzales & Espinosa, 2020).

At New Albay National High School, similar challenges in numeracy are evident among learners. Results from the Rapid Mathematics Assessment (RMA, 2023) indicate that 120 of 124 learners perform below the expected grade-level proficiency in numeracy skills. Teachers have observed that learners struggle with solving word problems, applying mathematical operations in real-life contexts, and demonstrating critical thinking in mathematics. The continued use of traditional lecture-based strategies, which emphasize memorization over understanding, has not effectively addressed these learning gaps. As a result, learners exhibit low confidence and underperformance in both classroom activities and standardized assessments.

Given these challenges, it becomes necessary to implement instructional approaches that actively involve learners in constructing knowledge and applying mathematical reasoning. Inquiry-Based Learning presents a promising alternative, as it encourages critical thinking, problem-solving, and meaningful engagement with mathematical concepts. By allowing learners to explore, investigate, and justify their ideas, IBL supports the development of strong numeracy skills needed in both academic and real-world contexts. In this light, the present study aims to investigate the effectiveness of Inquiry-Based Learning strategies in improving the numeracy skills of Grade 10 learners at New Albay National High School using a true-experimental research design.

1.1. Statement of the Problem

This study seeks to determine the effectiveness of using inquiry-based learning strategies in improving the numeracy skills of learners at New Albay National High School. Specifically, it aims to answer the following questions:

1. What is the level of numeracy skills of the pretest scores of the control group and experimental group?

2. What is the level of numeracy skills of the post-test scores of the control group and experimental group?
3. Is there a significant difference between the pretest of control and experimental group?
4. Is there a significant difference between the pretest and post-test scores of the control group?
5. Is there a significant difference between the pretest and post-test scores of the experimental group?
6. Is there a significant difference between post-test scores of learners in the control group and the experimental group?

2. Research Framework

This study is anchored on Lev Vygotsky's Sociocultural Theory (1978), which asserts that learning is a socially mediated process that occurs within the Zone of Proximal Development (ZPD), where learners can perform more complex tasks with the guidance of teachers or peers than they could accomplish independently. The theory emphasizes the importance of scaffolding, collaboration, and interaction in advancing learners' cognitive skills. Learning, therefore, is not an isolated activity but a dynamic process shaped through social engagement, dialogue, and guided participation. In mathematics education, this perspective highlights that learners develop deeper understanding when they are actively involved in constructing knowledge with support from more knowledgeable individuals.

In the context of this study, Inquiry-Based Learning (IBL) serves as the independent variable, while learners' numeracy skills constitute the dependent variable. The interplay between these variables is grounded in the principles of Sociocultural Theory, where instructional strategies directly influence the development of cognitive abilities. IBL, as an instructional approach, encourages learners to ask questions, investigate problems, and construct their own understanding through guided exploration. This process aligns with Vygotsky's notion of scaffolding, where teachers provide structured support that gradually decreases as learners gain competence. Through IBL, learners are not passive recipients of information; instead, they become active subjects in the learning process, engaging in meaningful mathematical discourse and collaborative problem-solving.

The effect of the independent variable (IBL) on the dependent variable (numeracy skills) can be explained through the mechanisms of interaction, scaffolding, and cognitive engagement. When learners are exposed to inquiry-based activities, they are encouraged to explore mathematical concepts in real-life contexts, which enhances their ability to perform computations, reason logically, and solve problems effectively. Teachers, acting as facilitators, guide learners within their ZPD by providing prompts, questioning strategies, and feedback that help bridge the gap between what learners already know and what they are capable of achieving. As a result, the instructional approach directly shapes the learners' cognitive development, leading to improved numeracy competencies.

Furthermore, the collaborative nature of IBL fosters peer interaction, which is a critical component of Sociocultural Theory. Through group work and discussions, learners exchange ideas, clarify misconceptions, and co-construct knowledge. This social interaction strengthens their understanding of mathematical concepts and enhances their ability to apply these concepts in various situations. The continuous engagement in inquiry-based tasks allows learners to internalize mathematical processes, gradually transforming guided learning into independent mastery. Consequently, the repeated exposure to scaffolded inquiry activities leads to measurable improvements in numeracy skills, as reflected in learners' performance in computation, reasoning, and problem-solving.

The relationship between IBL and numeracy skills is therefore not merely correlational but causal in nature within this theoretical framework. The independent variable influences the dependent variable through structured learning experiences that promote higher-order thinking and active engagement. As learners participate in inquiry-based lessons, they develop confidence, critical thinking, and analytical skills, which are essential components of numeracy. Over time, the scaffolding provided by teachers becomes less necessary,

indicating that learners have successfully internalized the knowledge and skills acquired during the learning process.

In the setting of New Albay National High School, the application of IBL creates a learner-centered environment where learners are encouraged to take ownership of their learning. Teachers design activities that challenge learners while providing appropriate support, ensuring that tasks remain within the learners' ZPD. This balance between challenge and support is crucial in maximizing learning outcomes. The consistent implementation of IBL strategies enables learners to progress from basic understanding to higher levels of numeracy proficiency, demonstrating the direct impact of the instructional approach on learning outcomes.

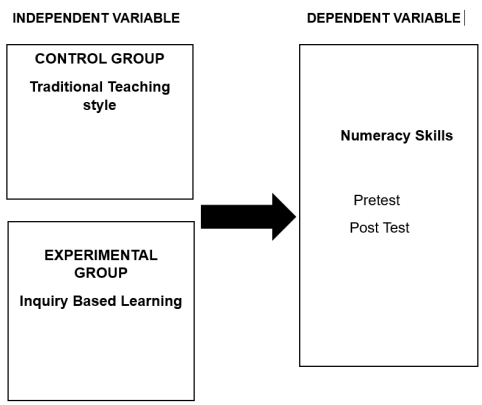

Fig. 1. Research Conceptual Framework

3. Methodology

3.1 Research Design

This study employed a true experimental research design, specifically a randomized control group design. True experimental designs are characterized by the random assignment of participants to experimental and control groups, which helps ensure group equivalence and strengthens the internal validity of the study. Through randomization, any observed differences between the groups can be more confidently attributed to the intervention rather than to pre-existing characteristics or external factors. According to Creswell and Creswell (2018), true experimental research is considered one of the most rigorous research designs because it allows researchers to establish cause-and-effect relationships through controlled conditions and random assignment. Similarly, Fraenkel, Wallen, and Hyun (2019) emphasized that random assignment minimizes selection bias and increases the likelihood that the groups are comparable before the treatment is implemented. Johnson and Christensen (2019) further explained that true experimental designs provide stronger evidence regarding the effectiveness of an intervention because they control for threats to internal validity and improve the credibility of the findingsTwo groups of Grade 10 learners at New Albay National High School, New Albay, Maragusan, Davao de Oro were utilized. One group served as the experimental group, which was taught using Inquiry-Based Learning (IBL) strategies, while the other group served as the control group, which was taught using traditional teaching methods. Both groups were given a pretest using the Rapid Mathematics Assessment (RMA) prior to the intervention to establish their baseline numeracy

skills. After the intervention period, both groups were administered a posttest using the same assessment tool to measure learning gains.

The independent variable of the study was the teaching strategy (Inquiry-Based Learning vs. traditional teaching), while the dependent variable was the numeracy skills of learners, as measured by their pretest and posttest scores.

The choice of a true-experimental design was considered suitable for this study because the classes could not be randomly reassigned due to existing school scheduling and administrative constraints. Despite this limitation, the design allowed for a meaningful comparison between groups, thereby providing evidence of the potential effectiveness of Inquiry-Based Learning in improving numeracy skills.

3.2 Research Subjects

The subjects of this study were Grade 10 learners of New Albay National High School, located in New Albay, Maragusan, Davao de Oro. A total of 60 learners participated, with 30 learners assigned to the experimental group (Inquiry-Based Learning) and 30 learners assigned to the control group (traditional teaching).

The study employed purposive sampling, a non-probability sampling method, in selecting subjects. This method was chosen because the study specifically required learners who were officially enrolled in Grade 10 mathematics classes and were available during the implementation of the intervention. Classes were not rearranged or randomly formed in order to preserve the school's academic schedule and organizational setup. Instead, intact classes were selected to serve as the experimental and control groups.

The subjects of the study met the following criteria to ensure the validity and reliability of the research results. First, they were officially enrolled as Grade 10 learners at New Albay National High School during the school year 2025–2026. Second, they belonged to the intact sections identified by the researcher as the experimental and control groups. Third, subjects were required to be present during the administration of the pretest, the implementation of the intervention, and the posttest to ensure consistency in data collection. Lastly, their participation was voluntary, and parental consent was secured prior to their inclusion in the study.

By applying these criteria, non–Grade 10 learners were excluded from participation. Subjects were also allowed to withdraw at any time without penalty or explanation. Furthermore, learners who did not complete the intervention or who had incomplete participation in the data collection process were excluded from the final analysis of the study.

3.3 Research Instrument

The main research instrument that was used in this study was the Rapid Mathematics Assessment (RMA). The RMA served as both the pretest and posttest to measure the numeracy skills of Grade 10 learners at New Albay National High School. It was an adopted standardized instrument, not a researcher-made tool, and is widely recognized for its reliability in assessing mathematics proficiency across multiple skill domains.

The RMA included items that measured basic computation, mathematical reasoning, problem-solving, and numerical fluency. Through these components, the instrument determined the learners' ability to perform fundamental operations, apply logical thinking to mathematical situations, and solve problems that required the use of mathematics in real-life contexts. The test was administered twice: first as a pretest before the intervention to establish the learners' baseline numeracy levels, and again as a posttest after

the intervention to measure improvements in their performance.

The use of the RMA was considered appropriate for this study because it provided a valid and reliable means of evaluating numeracy skills. Its standardized nature ensured consistency in administration and scoring, which allowed for accurate comparisons between the experimental group taught using Inquiry-Based Learning strategies and the control group taught using traditional methods. This enabled the researcher to objectively determine whether the intervention produced a significant improvement in learners' numeracy skills.

Competency Scaling

Rating	Description
Below 10	Not Proficient
10-14	Emerging
15-20	Low proficient
21-25	Proficient
26-30	Highly Proficient

3.4 Research Procedure

Data for this study were gathered through the administration of the Rapid Mathematics Assessment (RMA) to selected Grade 10 learners of New Albay National High School. Before the intervention, a pre-test was administered to both the experimental and control groups to establish their baseline numeracy skills. The pre-test results determined the learners' initial level of mathematical proficiency and served as the basis for comparison after the intervention.

Following the pre-test, the experimental group received instruction using inquiry-based learning strategies, while the control group continued with traditional teaching methods. The intervention lasted for a specified period sufficient to cover selected mathematics competencies aligned with the Grade 10 curriculum. During this period, the researcher coordinated closely with the mathematics teachers to ensure that the instructional procedures and learning activities were implemented properly and consistently according to the research design. Classroom observations and monitoring were also conducted to ensure that the intervention procedures were faithfully carried out throughout the duration of the study.

After the intervention, the same Rapid Mathematics Assessment was administered to both groups as a post-test. This allowed the researcher to measure improvements in the learners' numeracy skills and to compare the learning gains of the experimental and control groups. The collected data were then organized, tabulated, and analyzed using appropriate statistical tools to determine whether inquiry-based learning had a significant effect on learners' numeracy performance.

To ensure ethical considerations, informed consent was secured from the school administration, teachers, parents, and participating learners before the conduct of the study. Participation in the study was entirely voluntary, and the respondents were informed that they could withdraw from the study at any point without penalty or negative consequences. The confidentiality and anonymity of the respondents were strictly maintained, and all gathered data were treated with utmost confidentiality and used solely for academic and research purposes. Codes and labels were used instead of participants' names to protect their identities. Furthermore, the results of the study were presented only in aggregate form to ensure that no individual participant could be identified from the reported findings.

3.5 Research Procedure

Mean. It was used to summarize and describe the results of both the control and experimental groups, particularly in comparing their performance before and after the implementation of the intervention. Through the mean, the study was able to present a clear picture of the improvement in learners' numeracy skills and to support the analysis of differences between groups.

Paired t-test. Paired t-test was utilized to evaluate the significance of changes in numeracy levels within the same group before and after the intervention.

Independent t-test. The independent samples t-test was used to compare the mean gain scores of the experimental group and the control group in order to determine whether learners exposed to Inquiry-Based Learning strategies performed significantly better than those taught through traditional teaching methods.

The level of significance was set at 0.05 to determine statistical significance. All data analyses were conducted using appropriate statistical software to ensure the accuracy and reliability of the results.

4. Results and Discussion

Level of numeracy skills of the control group and experimental group as measured by the Rapid Mathematics Assessment and reflected in their pre-test.

Table 1
Pretest of Control and Experimental Groups in Numeracy Skills

Group	Mean score	Description
Control	10.03	Not Proficient
Experimental	10.2	Not Proficient

Table 1 presents the pretest mean scores for both the control group (10.03) and the experimental group (10.20). The results indicate that the initial performance of the subjects in both groups was below the expected level of numeracy proficiency prior to the intervention or not proficient to their grade level. Pretest of Control and Experimental Groups in Numeracy Skills

Pretest of Control and Experimental Groups in Numeracy Skills

The pretest results revealed that both the control and experimental groups were at the "Not Proficient" level in numeracy skills prior to the intervention. This indicates that learners in both groups had insufficient mastery of basic mathematical concepts, particularly in computation, reasoning, and problem-solving. Such findings are consistent with global trends in mathematics performance, where learners often demonstrate low numeracy proficiency. According to Pedaste et al. (2015), learners tend to struggle with deeper mathematical understanding when instruction is primarily traditional, highlighting the need for more engaging and inquiry-based approaches. Similarly, the Programme for International Student Assessment (PISA) results reported by the OECD (2019) revealed that many learners experience difficulties in mathematical literacy and problem-solving, emphasizing the persistent issue of weak numeracy skills among learners worldwide. TIMSS 2019 findings also showed that learners from many countries, including the Philippines, performed below the international average in mathematics, particularly in reasoning and

application skills. Furthermore, Rich et al. (2023) emphasized that learners who are exposed mainly to passive learning approaches often demonstrate weaker conceptual understanding and lower numeracy performance.

Table 2

Post test of Control and Experimental Groups in Numeracy Skills

Group	Mean score	Description
Control	14.23	Emerging
Experimental	14.9	Emerging

Table 2 presents the posttest mean scores of the control group (14.23) and the experimental group (14.90), both described under the "Emerging" proficiency level. The post test results showed improvement in both groups, with mean scores categorized under the "Emerging" level. This indicates that learning occurred during the intervention period regardless of the teaching strategy used. However, the slightly higher performance of the experimental group suggests the advantage of inquiry-based learning in enhancing understanding. This supports the findings of Kogan and Laursen (2015), who found that learners exposed to inquiry-based learning demonstrate improved engagement and conceptual understanding compared to traditional methods. Likewise, Pedaste et al. (2015) explained that inquiry-based learning promotes active participation and deeper understanding through investigation and exploration, which can enhance learners' mathematical performance. Lazonder and Harmsen (2016) further stated that guided inquiry approaches positively influence academic achievement because learners are encouraged to actively construct knowledge while receiving appropriate scaffolding from teachers. Moreover, Rich et al. (2023) emphasized that inquiry-oriented mathematics instruction develops learners' reasoning and confidence, leading to improved learning outcomes and stronger numeracy skills.

Table 3

Pretest of Control and Experimental Groups in Numeracy Skills

Group	Mean score	p-Value	Remarks
Control	10.03	0.883	Not significant
Experimental	10.2		

The pretest mean scores indicated that both groups had similar numeracy levels, and the p-value of 0.883 confirmed no significant difference, showing that the groups were comparable before the intervention.

The analysis of the pretest scores revealed no significant difference between the control and experimental groups, indicating that both groups were comparable prior to the intervention. This baseline equivalence ensures that any observed changes in performance can be attributed to the instructional strategies implemented rather than pre-existing differences. This condition is important in experimental studies to establish internal validity and fairness in comparison. According to Creswell and Creswell (2018), establishing equivalence between groups before treatment strengthens the credibility of experimental findings because it minimizes bias in the comparison of results. Similarly, Fraenkel, et al (2019) explained that comparable pretest scores indicate that participants possess relatively similar characteristics at the beginning of the study, making the intervention the primary factor influencing outcomes. In addition, Johnson and

Christensen (2019) emphasized that group equivalence is essential in experimental research to ensure that changes in performance are caused mainly by the treatment rather than external variables.

Table 4

Pretest and Post-test of Control Group

	Mean	p-Value	Remarks
Pretest	10.03	0.000	Significant
Post test	14.9		

Table 4 presents the pretest and post test results of the control group as measured by the Rapid Mathematics Assessment. The comparison between the pretest mean score (10.03) and the posttest results yielded a p-value of 0.00, which indicates a statistically significant difference at the 0.05 level of significance. This suggests that there was a measurable improvement in the numeracy performance of the control group after the period of instruction. However, since the control group did not receive the Inquiry-Based Learning (IBL) intervention, the improvement may be attributed to regular classroom instruction or other learning experiences during the study period.

The control group showed a statistically significant improvement between pretest and posttest scores, indicating that regular classroom instruction contributed to the development of learners' numeracy skills. This suggests that structured teaching and continuous practice remain effective in improving basic mathematical skills, even without the use of innovative strategies. However, such improvement may be limited in fostering deeper conceptual understanding compared to inquiry-based approaches. According to Hattie (2017), direct instruction and structured classroom teaching positively influence student achievement when lessons are systematically delivered and reinforced through practice. Similarly, OECD (2019) emphasized that continuous exposure to mathematical tasks and classroom exercises contributes to the gradual improvement of learners' numeracy performance. In addition, Boaler (2016) noted that while traditional instruction may improve procedural fluency, it may not always fully develop learners' higher-order thinking and problem-solving abilities. Pedaste et al. (2015) further explained that inquiry-oriented approaches are more effective in promoting deeper conceptual understanding than purely teacher-centered instruction.

Table 5

Post-test of Experimental Group in Numeracy Skills

	Mean	p-Value	Remarks
Pretest	10.2	0.00	Significant
Post test	14.9		

Table 5 presents the pretest and post test results of the experimental group as measured by the Rapid Mathematics Assessment. The results show that the pretest mean score of 10.20 increased to 14.90 in the posttest, indicating an improvement in the numeracy performance of the subjects after the implementation of the intervention. The p-value of 0.00, which is lower than the 0.05 level of significance, indicates that the

difference between the pretest and posttest scores is statistically significant. This suggests that the use of Inquiry-Based Learning (IBL) had a positive effect on enhancing the learners' numeracy skills and mathematical understanding. The findings imply that engaging learners in inquiry-oriented activities and problem-solving tasks can effectively improve their numeracy performance.

The experimental group also demonstrated a statistically significant improvement, with a higher increase in mean score compared to the control group. This indicates that inquiry-based learning had a positive effect on learners' numeracy skills. Through active engagement, exploration, and problem-solving, learners were able to construct their own understanding of mathematical concepts. This finding is supported by Lazonder and Harmsen (2016), who concluded that guided inquiry-based learning significantly enhances learners' academic performance when properly implemented. Similarly, Pedaste et al. (2015) explained that inquiry-based learning encourages learners to investigate problems, formulate explanations, and reflect on their understanding, resulting in deeper learning outcomes. Kogan and Laursen (2015) further emphasized that inquiry-oriented instruction improves learners' engagement and conceptual understanding in mathematics. Moreover, Rich et al. (2023) highlighted that inquiry-based mathematics instruction strengthens learners' reasoning, confidence, and ability to apply concepts in solving real-life problems.

Table 6

Difference Post-test score of Control and Experimental in Numeracy Skills

	Mean	**p-Value**	**Remarks**
Control	14.23	0.647	Not Significant
Experimental	14.9		

As shown in table 6 presents the comparison of the posttest mean scores of the control group (14.23) and the experimental group in terms of numeracy skills. The computed p-value of 0.647, which is greater than the 0.05 level of significance, indicates that there is no statistically significant difference between the two groups.

Despite the improvements observed in both groups, the comparison of gain scores showed no statistically significant difference between the control and experimental groups. This suggests that while inquiry-based learning contributed to improvement, its effect was not significantly greater than traditional instruction within the duration of the study. This may be due to factors such as limited intervention time or the need for more structured guidance during inquiry activities. Nonetheless, both instructional approaches were effective in improving learners' numeracy skills to the "Emerging" level. Similar findings were reported by Lazonder and Harmsen (2016), who noted that the effectiveness of inquiry-based learning depends greatly on the amount of guidance and duration of implementation provided to learners. Likewise, OECD (2019) emphasized that improvements in numeracy skills often require sustained interventions and long-term instructional support before significant differences become evident. In addition, Hattie (2017) explained that instructional innovations may not always produce statistically significant differences in a short implementation period, even when positive learning gains are observed. Furthermore, Rich et al. (2023) suggested that inquiry-based approaches become more effective when implemented consistently over longer periods with sufficient teacher facilitation and learner support.

5. Summary of Findings and Recommendation

Based on the results of the study, it can be concluded that both instructional approaches contributed to the improvement of learners' numeracy skills. The results showed that learners in both the control and experimental groups demonstrated better performance after the intervention, indicating that the learning activities implemented during the study helped enhance their understanding of mathematical concepts. However, the comparison between the two groups revealed that the improvement observed in the experimental group exposed to Inquiry-Based Learning (IBL) was not significantly different from that of the control group who received traditional instruction.

Although the inquiry-based approach did not produce a statistically significant advantage within the duration of the study, the results still suggest that IBL has the potential to support the development of learners' numeracy skills by encouraging active participation, reasoning, and problem-solving. The findings imply that the effectiveness of inquiry-based learning may depend on factors such as the length of implementation, the level of guidance provided by the teacher, and learners' familiarity with learner-centered instructional strategies. Therefore, when implemented consistently and supported by appropriate instructional scaffolding, Inquiry-Based Learning may serve as a valuable approach in enhancing learners' numeracy skills and promoting deeper mathematical understanding.

Recommendations

Based on the study results and findings, the researcher put forth the following Recommendations:

1. Learners should be encouraged to actively participate in inquiry-based learning activities in mathematics classes. Engaging learners in problem-solving, exploration, and collaborative discussions can help improve their numeracy skills and deepen their mathematical understanding.

2. Parents should support their children's learning at home by encouraging them to practice numeracy-related activities such as solving mathematical problems, engaging in logical thinking exercises, and applying mathematical concepts in everyday situations.

3. Teachers may incorporate Inquiry-Based Learning (IBL) strategies in mathematics instruction to promote critical thinking, curiosity, and active participation among learners. Providing meaningful mathematical problems and encouraging learners to investigate solutions can strengthen their numeracy skills.

4. Schools and administrators may organize workshops, seminars, and professional development programs to equip teachers with the necessary skills and knowledge in implementing Inquiry-Based Learning effectively in mathematics classrooms.

5. Teachers may utilize varied instructional materials, contextualized mathematical problems, and collaborative learning activities that align with learners' interests and learning needs to enhance engagement and improve numeracy development.

6. Future researchers are encouraged to conduct similar studies using a larger sample size and longer duration of intervention to further examine the effectiveness of Inquiry-Based Learning in improving numeracy skills.

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Appendix A. An example appendix

Authors including an appendix section should do so after References section. Multiple appendices should all have headings in the style used above. They will automatically be ordered A, B, C etc.

A.1. Example of a sub-heading within an appendix

There is also the option to include a subheading within the Appendix if you wish.