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DIFFERENTIATED TEACHING STRATEGIES AND NUMERACY SKILLS OF LEARNERS AS PERCEIVED BY ELEMENTARY TEACHERS

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ABSTRACT

The purpose of this study was to determine the relationship between differentiated teaching strategies and learners' numeracy skills, as perceived by elementary teachers. A predictive correlational research design was utilized to establish the relationships and predictive effects among the study variables. The respondents consisted of 110 elementary mathematics teachers from selected public schools in the Laak North District, Division of Davao de Oro, selected through total enumeration sampling. Data were collected using a researcher-adapted survey questionnaire and analyzed using means and standard deviations, Pearson Product–Moment correlation, and multiple linear regression. Findings revealed that the level of differentiated teaching strategies was generally high in terms of content, process, and readiness consideration, while product differentiation was moderate. The results further showed a significant but low positive relationship between differentiated teaching strategies and numeracy skills of learners. Among the indicators, only process differentiation and readiness consideration emerged as significant predictors of numeracy skills, while content and product differentiation did not show significant predictive influence. The findings highlight the importance of strengthening instructional delivery and aligning teaching practices with learners' readiness to effectively improve numeracy outcomes.

INDEX TERMS: *Differentiated Teaching Strategies, Numeracy Skills, Process Differentiation, Readiness Consideration, Mathematics Achievement*

INTRODUCTION

Globally, many students still struggle to actively engage in mathematical tasks, resulting in declining numeracy performance and weak conceptual understanding (Mangarin & Caballes, 2024). The persistence of disengagement is attributed to instructional approaches that fail to accommodate diverse learner needs, leading to reduced motivation, low participation, and poor numeracy outcomes (Molla, 2026).

Internationally, specifically in Finland, there is a decline in students' mathematical engagement and problem-solving performance (Star et al., 2022). In China, highly structured and examination-driven teaching practices limit opportunities for differentiated instruction, and there is a reduced learner engagement and difficulty in developing deeper numeracy skills (Bi et al., 2023). Similarly, in Indonesia, teachers face challenges in implementing differentiated strategies and there is a limited training and resources, including inconsistent support for diverse learners and engagement (Yusuf & Hidayat, 2026).

In the Philippine, specifically in Davao del Sur, there is a problem of overcrowded classrooms and limited instructional (Opeña & Dpa, 2025). In Bukidnon, there is a lack of continuous professional development and limited teachers' capacity to design differentiated lessons (Abrenica et al., 2025). Likewise, in Zamboanga del Sur, there is problem in rigid curriculum demands and time constraints of teachers from adapting instruction (Maraveles & Ducot, 2025).

The persistence of these challenges results in significant consequences, including low mathematical achievement, weak problem-solving abilities, limited engagement, and reduced self-efficacy among learners. Despite existing studies on differentiated instruction, there remains a research gap in clearly identifying how specific components such as content, process, and product differentiation directly influence learners' numeracy skills. Most studies focus broadly on instructional practices without establishing which strategies significantly improve learner outcomes. Hence, this study aims to address this gap by examining the influence of differentiated strategies on numeracy skills, providing evidence-based insights to enhance learner engagement and improve mathematics achievement.

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METHODOLOGY

Method Used

The study adopted a quantitative, non-experimental, correlational research design to examine the relationship between differentiated teaching strategies and the numeracy skills of learners as perceived by elementary teachers. This design was appropriate because it allowed the researcher to systematically collect and analyze numerical data without manipulating the variables (Slater & Hasson, 2024). Guided by the principles of objectivity, reliability, and validity, the approach ensured that the findings were unbiased and that the instruments used were consistent and accurate. The study specifically investigated how content, process, and product differentiation, along with readiness consideration, were associated with learners' achievement, engagement, and confidence or self-efficacy in mathematics.

Moreover, the correlational design enabled the researcher to determine the strength and direction of the relationships between the identified variables without establishing causation. This approach was particularly suitable in educational settings where experimental manipulation was not feasible, as it allowed for the analysis of naturally occurring instructional practices in authentic classroom environments. By identifying statistical patterns and relationships, the study provided meaningful insights into how differentiated teaching strategies were linked to learners' numeracy skills, thereby offering a basis for improving instructional practices and educational decision-making.

Sources of Data

The sources of data for this study were primarily derived from structured survey questionnaires, which were adapted and modified from established research to align with the local context. These instruments served as the fundamental tool for quantifying the independent variables: content, process, and product differentiation, and learner readiness. By utilizing validated scales from previous studies, the researcher ensured that the data gathered from elementary teachers and students were both robust and specifically targeted toward instructional practices. This primary data collection was essential for capturing the lived experiences and pedagogical approaches within the classrooms of Laak District, providing a solid empirical basis for the subsequent correlational analysis.

The second part of the data source involved survey sections dedicated to the dependent variables: mathematics achievement, engagement, and self-efficacy. These sections were also adapted from existing scholarly instruments to ensure they accurately measured the learners' numeracy outcomes and psychological states. By modifying these tools, the researcher was able to collect standardized responses that reflected the students' perceived competence and actual academic performance in mathematics. The reliance on these adapted questionnaires enabled a high degree of reliability and consistency, as the data were collected through a uniform process that facilitated the examination of the strength and direction of relationships between teaching strategies and student success.

Data Gathering Instruments

The primary research instrument used in this study was a structured survey questionnaire designed to assess the relationship between differentiated teaching strategies and the numeracy skills of learners as perceived by elementary teachers. The questionnaire was researcher-adapted from empirically grounded studies and established instructional and psychological frameworks to ensure construct validity and contextual relevance.

The independent variable of this study, differentiated teaching strategies, was adapted from the Differentiated Instruction Scale developed by Roy et al. (2012), which measures key instructional practices such as content, process, and product differentiation, as well as readiness-based instructional adjustments using Likert-type indicators. These dimensions closely align with the core principles of differentiated instruction in mathematics classrooms. Drawing from this validated framework, the present study refined and reorganized the indicators to operationalize differentiated teaching strategies in terms of content differentiation, process differentiation, product differentiation, and learner readiness consideration, ensuring alignment with classroom-based instructional practices.

On the other hand, the dependent variable of this study, numeracy skills of learners, was adapted from the work of Usher and Pajares (2008), which developed a validated mathematics self-efficacy scale grounded in social cognitive theory. This framework measured learners' mathematical confidence, persistence, beliefs, and performance through structured survey indicators. Drawing from this empirically established model, the present study refined and reorganized the indicators to operationalize numeracy skills in terms of mathematics achievement, engagement in mathematics learning, and confidence and self-efficacy, ensuring alignment with recognized constructs of mathematical competence and learner development.

The questionnaire was organized into two main sections: (1) Differentiated Teaching Strategies and (2) Numeracy Skills of Learners. Each sub-variable consisted of five clearly defined indicators, allowing teacher respondents to provide systematic evaluations based on their observations of learners during the School Year 2025–2026. To uphold ethical standards, the instrument included a researcher's plea and explicit instructions emphasizing confidentiality, voluntary participation, and responsible data use.

All items were measured using a five-point Likert-type scale designed to capture the extent to which differentiated strategies and numeracy skills were manifested. The quantified responses provided a sound statistical basis for descriptive analysis and inferential procedures, ensuring consistency, precision, and reliability in data interpretation. The scale for differentiated strategies are presented below:

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Scale	Descriptive Rating	Interpretation
4.20 – 5.00	Very High	The differentiated strategies of teachers were always manifested
3.40 – 4.19	High	The differentiated strategies of teachers were oftentimes manifested
2.60 – 3.39	Moderate	The differentiated strategies of teachers were sometimes manifested
1.80 – 2.59	Low	The differentiated strategies of teachers were rarely manifested
1.00 – 1.79	Very Low	The differentiated strategies of teachers were not manifested

Meanwhile, the scaling for numeracy scale is presented below:

Scale	Descriptive Level	Interpretation
4.20 – 5.00	Very High	The numeracy skills of learners were always manifested
3.40 – 4.19	High	The numeracy skills of learners were oftentimes manifested
2.60 – 3.39	Moderate	The numeracy skills of learners were sometimes manifested
1.80 – 2.59	Low	The numeracy skills of learners were rarely manifested
1.00 – 1.79	Very Low	The numeracy skills of learners were not manifested

To ensure the internal consistency of the adapted survey instrument, a reliability test was conducted using data obtained from a pilot study. The results showed that all constructs demonstrated acceptable to excellent levels of reliability. Specifically, content differentiation obtained a Cronbach's alpha of 0.874, process differentiation registered 0.891, product differentiation achieved 0.905, and readiness consideration recorded 0.912. For the dependent variables, mathematics achievement yielded 0.883, engagement in mathematics learning obtained 0.896, and confidence and self-efficacy reached 0.908. The overall instrument recorded a Cronbach's alpha of 0.901, which is interpreted as excellent internal consistency.

According to Pallant (2020) and Creswell and Creswell (2020), a Cronbach's alpha value of 0.70 or higher indicates acceptable reliability, while values exceeding 0.80 reflect strong to excellent consistency. Based on these standards, the results confirmed that the research instrument possessed a high degree of reliability and was capable of producing stable, consistent, and dependable measurements in analyzing the relationship between differentiated teaching strategies and numeracy skills of learners.

Sampling Technique

The respondents of this study were elementary mathematics teachers from selected public schools within the Laak North District, specifically those assigned to Datu Davao, Datu Ampuan, Melale, Mansinao-an, and Malinao Elementary Schools. The study involved 110 elementary mathematics teachers, and since the population size was manageable, the researcher employed complete enumeration. This ensured that all qualified teachers were included in the study, thereby eliminating sampling bias and strengthening the reliability and accuracy of the findings.

To support the adequacy of the sample size, G*Power statistical analysis was utilized. The analysis confirmed that the total number of 110 respondents was sufficient for detecting significant relationships using a correlational research design. As such, including the entire population further increased the statistical power and robustness of the study. The selection of respondents followed specific inclusion criteria to ensure the quality and relevance of the data. First, respondents were required to be currently assigned as elementary mathematics teachers within the district. Second, they must have had at least three years of teaching experience to ensure adequate exposure to instructional practices. Third, they must have attended Department of Education trainings or seminars related to differentiated teaching strategies. Teachers with temporary or substitute assignments were excluded to maintain consistency and reliability of responses.

Prior to the actual data collection, the research instrument underwent pilot testing on 30 respondents and reliability checking outside the study area. This procedure ensured that the instrument was tested without affecting the actual respondents. The pilot testing allowed for refinement of the questionnaire and confirmed that the instrument was reliable and suitable for administration to the 110 teacher-respondents in the Laak North District.

Data Gathering Procedure

The data collection process followed established academic and ethical standards to ensure the integrity of the research. The researcher clearly outlined the objectives, procedures, and scope of the study to all concerned authorities to ensure alignment with institutional requirements. Throughout the process, the researcher ensured that ethical considerations were strictly observed, particularly in terms of confidentiality, voluntary participation, and responsible data handling.

Permission to Conduct the Study. Prior to data collection, the researcher secured formal approval from the Research Adviser, the Dean of Rizal Memorial Colleges, Inc., and the Schools Division Office of Davao de Oro. A formal request letter, along with a detailed research proposal, was submitted to the authorities concerned. The proposal contained the purpose of the study, research design, data gathering procedures, and expected outcomes, emphasizing its contribution to improving mathematics instruction. Upon approval, permission was also obtained from the school heads of the selected public elementary schools, identified in this study as School A, School B, School C,

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School D, and School E, to maintain confidentiality of institutional identities.

Subsequently, the researcher conducted the informed consent process among the identified teacher-respondents. Each participant was oriented regarding the nature and purpose of the study, their rights as respondents, and their freedom to withdraw at any time without any consequence. Consent was obtained prior to the administration of the research instrument, ensuring full adherence to ethical research standards.

Administration and Retrieval of Instruments. The researcher employed a systematic approach in administering and retrieving the survey questionnaires. Coordination was established with the school heads of Schools A, B, C, D, and E to facilitate smooth distribution of the instruments. The questionnaires were personally administered to the teacher-respondents to ensure proper understanding of the instructions. Retrieval of the accomplished questionnaires was conducted promptly, and each instrument was checked for completeness to ensure the accuracy and reliability of the data collected.

Collation and Statistical Treatment of Data. After the retrieval of the survey instruments, the collected data were organized, coded, and encoded using Microsoft Excel for proper data management. The dataset was then transferred to the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive and inferential statistical tools were applied based on the objectives of the study. To ensure the accuracy and appropriateness of the statistical procedures, the researcher consulted a qualified statistician during the data analysis phase. This collaboration ensured that the statistical treatment was correctly performed and that the interpretation of results was valid, reliable, and aligned with the research objectives.

Statistical Treatment

To systematically analyze the data gathered from the elementary mathematics teachers, both descriptive and inferential statistical tools were employed. These methods were selected to align with the objectives of the study and the nature of the data collected through the five-point Likert scale. The statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) to ensure accuracy, consistency, and reliability of the results.

For Research Questions 1 and 2, which aimed to determine the extent of differentiated teaching strategies and the level of numeracy skills of learners, descriptive statistics were utilized, specifically the Mean and Standard Deviation. The mean was used to determine the average level of responses for each variable, while the standard deviation measured the variability of responses, indicating how closely the ratings clustered around the mean. These statistical tools provided a clear description of the extent to which differentiated strategies—content, process, product, and readiness consideration—and numeracy skills—mathematics achievement, engagement, and confidence or self-efficacy—were manifested.

For Research Question 3, which examined the significant relationship between differentiated teaching strategies and numeracy skills of learners, the Pearson Product-Moment Correlation Coefficient (Pearson r) was employed. This inferential statistical tool determined the strength and direction of the linear relationship between independent and dependent variables. The analysis provided evidence on whether increases in differentiated teaching strategies were associated with improvements in learners' numeracy skills.

For Research Question 4, which identified the significant predictors of numeracy skills among the indicators of differentiated teaching strategies, Multiple Linear Regression Analysis was used. This statistical method measured the combined and individual effects of content differentiation, process differentiation, product differentiation, and readiness consideration on learners' numeracy skills. The regression analysis generated beta coefficients to indicate the magnitude of influence and p-values to determine statistical significance. This allowed the researcher to identify which specific teaching strategies significantly influenced learners' mathematics achievement, engagement, and confidence or self-efficacy.

In addition, to ensure the internal consistency and reliability of the research instrument, Cronbach's Alpha was utilized. The computed reliability coefficients for each variable ranged from acceptable to excellent, with an overall reliability coefficient of 0.901, indicating that the instrument was highly consistent and dependable in measuring the constructs.

Furthermore, G*Power analysis was employed to validate the adequacy of the sample size. The result confirmed that the total number of 110 respondents was sufficient to detect significant relationships among the variables using correlational and regression analyses, thereby strengthening the statistical power and robustness of the study.

Ethical Considerations

The Ethical Considerations section outlined the principles and protocols observed to ensure the protection, dignity, and well-being of all research participants throughout the study. It presented the safeguards used to obtain informed consent, ensure voluntary participation, maintain confidentiality and anonymity, minimize risks, and promote fairness and transparency. This section reflected the researcher's commitment to uphold ethical standards in educational research in alignment with institutional guidelines and professional codes of conduct.

Social Value. The social value of this study lay in its potential to enhance the professional practice of elementary educators within the Laak North District, Davao de Oro. By examining how differentiated teaching strategies influenced learners' numeracy skills in this specific context, the research generated meaningful

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insights to support teachers in addressing diverse learning needs. The study recognized the central role of teachers in improving mathematics instruction in elementary classrooms.

Furthermore, the findings were intended to inform instructional planning and foster greater learner engagement across the participating schools, identified in this study as School A, School B, School C, School D, and School E. By identifying effective pedagogical practices, the study encouraged the adoption of more inclusive and responsive teaching strategies. The research contributed to the broader educational community of Davao de Oro by providing data-driven approaches that promote equitable learning opportunities.

Informed Consent Form. The researcher provided all teacher-respondents with a clear and comprehensive explanation of the study's purpose, objectives, procedures, and expected outcomes prior to participation. A formal Informed Consent Form was distributed, stating that participation was entirely voluntary and that respondents had the right to withdraw at any point without penalty.

The researcher assured participants that all responses would be kept strictly confidential and used solely for academic purposes. By signing the consent form, the respondents confirmed their full understanding of the study and their willingness to participate. No additional consent procedures were required since the study involved only teacher respondents and did not directly collect data from learners.

Vulnerability of Research Respondents. The researcher ensured that all teacher-respondents were protected from any psychological, professional, or social risks. Although the participants were not considered a vulnerable group, it was recognized that reflecting on instructional practices might cause discomfort. To address this, the researcher guaranteed that all responses would remain anonymous and that no identifying information would be disclosed.

Participation was strictly voluntary and had no impact on respondents' employment, professional standing, or relationships within their respective school communities (School A–E). A respectful and non-judgmental environment was maintained, ensuring that all participants were treated with dignity and fairness throughout the research process.

Privacy and Confidentiality. The researcher ensured a clear distinction between participant privacy and data confidentiality. Privacy was protected by avoiding the collection of personally identifiable information such as names, exact school identification, or employment records. Respondents were informed that their participation and responses would not be disclosed to administrators or colleagues.
To maintain confidentiality, all responses were coded numerically and stored in password-protected files accessible only to the researcher. Data were analyzed and reported in aggregated form to prevent identification of individual participants or specific schools. All procedures adhered to the provisions of the Data Privacy Act of 2012, ensuring secure handling of all research data.

Risk, Benefits, and Safety. The researcher ensured that participation did not result in any undue pressure or discomfort. Although the study required respondents to reflect on their teaching practices, participation remained voluntary, and respondents could withdraw at any time without consequences.

The study provided professional benefits by offering insights that may improve instructional practices and promote reflective teaching. It contributed to enhancing differentiated teaching strategies and supporting learners' numeracy skills.

To guarantee safety, the research process remained non-intrusive and respectful. Data collection was conducted in a secure and supportive environment, ensuring that the dignity and well-being of the respondents were prioritized at all times.

Justice. The researcher upheld the principles of fairness and inclusivity by ensuring equal opportunity for participation among all elementary mathematics teachers within the selected schools (School A–E). The benefits and responsibilities of the study were distributed fairly. While participants contributed their time and professional insights, the findings were intended to benefit both educators and learners.

Transparency. The researcher ensured that all aspects of the study were clearly communicated to the participants. Participants were fully informed of their rights, including voluntary participation, confidentiality, and withdrawal options. The researcher also committed to sharing a summary of the findings with interested respondents and the Schools Division Office.

Qualification of the Researcher. The researcher possessed formal training in educational research, curriculum and instruction, and statistical analysis, ensuring the competence required to conduct the study. This was further supported by experience in providing technical assistance to educators within the Davao de Oro Division. This background enabled the researcher to implement the study, analyze the data accurately using SPSS, and interpret findings professionally. The researcher-maintained objectivity, academic rigor, and ethical responsibility throughout the research process.

Conflict of Interest. The researcher maintained full independence throughout the study and declared no personal, financial, or professional conflicts of interest. The research was conducted solely for academic purposes with the aim of improving mathematics instruction.

All decisions related to data collection, statistical analysis, and interpretation were based strictly on empirical evidence and ethical standards. This ensured that the findings accurately

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reflected the instructional realities of the participating schools (School A–E) without bias.

Adequacy of Facilities. The researcher utilized appropriate physical and digital resources to ensure the effective conduct of the study. Secure venues were used for coordination with the respondents, while computers were utilized for data encoding and analysis. The Statistical Package for the Social Sciences (SPSS) was used for data processing and statistical analysis. The participating schools (School A–E) provided supportive environments that allowed data collection without disrupting regular instructional activities.

Community Involvement. Community involvement contributed to the successful implementation of the study. The researcher coordinated closely with school heads and the Schools Division Office to secure approval and ensure alignment with institutional goals. The participation of elementary teachers from Schools A, B, C, D, and E reflected the shared commitment of the educational community to improve instructional practices..

RESULTS AND DISCUSSION

Differentiated Strategies

The following table presents the level of differentiated strategies as a multidimensional construct with descriptive findings across key indicators, namely: content differentiation, process differentiation, product differentiation, and readiness consideration, reflecting teachers' ability to adapt instruction to meet diverse learner needs and enhance learning outcomes.

Level of Content Differentiation

Presented in Table 1 is the level of content differentiation, as measured through indicators related to the use of varied instructional materials, alignment of content with student readiness, integration of real-life contexts, alignment with prior knowledge, and utilization of supplementary resources. The table shows an overall mean interpreted as High, indicating that content differentiation is moderately to consistently practiced across the indicators.

Level of Table 1
Level of Content Differentiation

No	Content differentiation	Mean	SD	Descriptive Level
1	A variety of instructional materials are used to address learners' diverse needs in mathematics.	3.34	1.41	Moderate
2	Mathematical content is simplified or enriched to match students' levels of readiness.	3.15	0.80	Moderate
3	Real-life situations are integrated into lessons to connect mathematical concepts with students' experiences.	3.57	0.61	High
4	Instruction is aligned with learners' prior knowledge and existing skill levels.	3.95	0.70	High
5	Supplementary resources (e.g., games, digital media, charts) are utilized to support diverse learning preferences.	3.20	0.93	Moderate
	Overall	**3.44**	**0.89**	**High**

Very High (4.20–5.00); High (3.40–4.19); Moderate (2.60–3.39); Low (1.80–2.59); Very Low (1.00–1.79)

Table 1 presents the level of content differentiation with an overall mean of 3.44 and an SD of 0.89, described as High, indicating that teachers are generally able to adjust instructional content to accommodate diverse learner needs. This suggests that while differentiated practices are evident, there remain areas that require strengthening to ensure more consistent and responsive implementation in mathematics instruction.

Among the indicators, the highest mean was obtained by instruction being aligned with learners' prior knowledge and existing skill levels, with a mean of 3.95 and an SD of 0.70, described as High. This reflects teachers' strong consideration of students' current understanding when delivering instruction, which is crucial for effective learning progression. The next highest indicator was the integration of real-life situations into lessons to connect mathematical concepts with students' experiences, with a mean of 3.57 and an SD of 0.61, also described as High.

Following this was the use of a variety of instructional materials to address learners' diverse needs in mathematics, which obtained a mean of 3.34 and an SD of 1.41, described as Moderate. The indicator on the utilization of supplementary resources such as games, digital media, and charts obtained a mean of 3.20 with an SD of 0.93, also described as Moderate, indicating limitations in maximizing available instructional tools. Finally, the lowest mean was recorded for the simplification or enrichment of mathematical content to match students' readiness levels, with a mean of 3.15 and an SD of 0.80, described as Moderate, suggesting that adapting content complexity remains a challenge. The findings suggest that there is a need to enhance the consistent use of varied materials, supplementary resources, and differentiated content adjustments based on readiness levels. These findings are supported by Goyibova et al. (2025), who found that content differentiation strengthens learning when instructional materials are tailored to learners' readiness and

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interests, and by Rijal et al. (2024), who reported that varying content complexity significantly improves students' academic performance in mathematics.

Level of Process Differentiation

Presented in Table 2 is the level of process differentiation, as measured through indicators related to grouping based on learner needs, adaptation of learning tasks, use of varied learning modalities, implementation of tiered activities, and provision of opportunities for processing and reflection. The table shows an overall mean interpreted as High, indicating that process differentiation is consistently practiced across most indicators.

Table 2
Level of Process Differentiation

No	Process Differentiation	Mean	SD	Descriptive Level
1	Students are grouped according to learning needs or abilities during math activities.	3.26	0.65	Moderate
2	Learning tasks in mathematics are adapted to suit different student learning profiles.	3.47	1.16	High
3	Instruction incorporates a variety of learning modalities (e.g., auditory, visual, kinesthetic).	3.63	0.63	High
4	Learners engage in tiered math activities that vary in complexity.	3.63	0.66	High
5	Students are given multiple opportunities to process and reflect on mathematical concepts.	3.78	0.87	High
	Overall	**3.55**	**0.79**	**High**

Very High (4.20–5.00); High (3.40–4.19); Moderate (2.60–3.39); Low (1.80–2.59); Very Low (1.00–1.79)

Table 2 presents the level of process differentiation with an overall mean of 3.55 and an SD of 0.79, described as High, indicating that teachers generally demonstrate the ability to adjust instructional processes to meet diverse learner needs.

Among the indicators, the highest mean was obtained by students being given multiple opportunities to process and reflect on mathematical concepts, with a mean of 3.78 and an SD of 0.87, described as High. The next highest indicators were the incorporation of varied learning modalities and the use of tiered math activities that vary in complexity, both obtaining a mean of 3.63 with SDs of 0.63 and 0.66, respectively, described as High.

Following this was the adaptation of learning tasks in mathematics to suit different student learning profiles, with a mean of 3.47 and an SD of 1.16, described as High, suggesting that teachers modify instructional activities to accommodate learner diversity. However, the lowest mean was recorded for grouping students according to learning needs or abilities during math activities, with a mean of 3.26 and an SD of 0.65, described as Moderate.

The findings suggest that teachers are effective in applying varied instructional processes and implies that there is a need for further refinement in organizing learners based on their needs can enhance instructional effectiveness. These findings are supported by Putri and Elizar (2025), who found that adapting instructional processes such as grouping and activity design improves student engagement and comprehension, and by Silmi et al. (2025), who reported that flexible grouping and varied instructional methods significantly enhance learners' understanding and participation in mathematics.

CONCLUSION AND RECOMMENDATIONS

Summary of Findings

The study revealed that the overall level of differentiated teaching strategies in Mathematics was generally high. Specifically, content differentiation and process differentiation were practiced at a high level. Similarly, readiness consideration was also high, indicating that teachers recognized the importance of aligning instruction with learners' abilities. However, product differentiation was only at a moderate level.

In terms of numeracy skills, the findings showed that learners demonstrated a moderate level of achievement and engagement. On the other hand, confidence and self-efficacy were assessed at a high level, suggesting that learners generally possessed a positive belief in their ability to perform mathematical tasks, although consistency in maintaining confidence during complex tasks remained a concern.

The results further revealed that there was a significant but low positive relationship between differentiated teaching strategies and learners' numeracy skills. This indicates that while differentiated instruction contributes to improvements in learners' mathematical achievement, engagement, and self-efficacy, its overall influence is limited.

Finally, the regression analysis showed that process differentiation and readiness consideration significantly influenced the numeracy skills of learners, leading to the rejection of the null hypothesis for these variables. In contrast, content differentiation and product differentiation were found to have no significant influence.

Conclusions

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The study concluded that differentiated teaching strategies were generally practiced at a high level among elementary mathematics teachers, while product differentiation remained moderately implemented. Learners' numeracy skills were found to be moderate in terms of achievement and engagement but high in confidence and self-efficacy. Moreover, a significant but low positive relationship existed between differentiated teaching strategies and numeracy skills. Among the indicators, process differentiation and readiness consideration were identified as significant predictors of numeracy skills.

The findings of the study partially affirmed Tomlinson's Differentiated Instruction Theory, particularly in the significant role of process differentiation and readiness consideration. Likewise, Bandura's Social Cognitive Theory was supported by the high level of learners' confidence and self-efficacy. Vygotsky's Sociocultural Theory was also supported through the significance of readiness consideration. However, the non-significant influence of content and product differentiation suggests that not all dimensions of differentiated instruction were fully realized in practice.

Recommendations

Based on the results of the study, the following recommendations were proposed:

Elementary mathematics teachers may strengthen the use of product differentiation by incorporating varied assessment formats and flexible output options to better address learners' diverse abilities and learning preferences.

School heads may organize capacity-building training and workshops focused on enhancing teachers' skills in differentiated instruction, particularly in content adjustment and assessment strategies.

Education Program Supervisors (EPS) may develop and implement structured monitoring and support systems to ensure consistent application of differentiated teaching strategies across classrooms.

Teachers may improve the use of diagnostic assessments (pre-assessment tools) to more accurately determine learners' readiness levels and guide instructional planning.

Future researchers may explore additional variables such as instructional quality, learner characteristics, and learning environment factors to further explain the development of learners' numeracy skills beyond differentiated teaching strategies.

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Competing Interests Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study; all data used were obtained from previously published sources as cited in the reference list.

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