



Differentiated Instruction Practices and Academic Achievement in Reading and Mathematics among Grade 2 Pupils in Philippine Public Schools

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ABSTRACT

This study examined the relationship between teachers' differentiated instruction practices and the academic achievement of Grade 2 pupils in Reading and Mathematics in public elementary schools in the Division of Zamboanga del Norte, Philippines. Using a descriptive-correlational design with 492 teachers and their corresponding classes, the study found that differentiated instruction practices were frequently implemented across all dimensions. Pupils demonstrated satisfactory achievement in both Reading ($M = 84.27$) and Mathematics ($M = 83.91$). Correlation analysis revealed a significant moderate positive relationship between differentiated instruction and Reading achievement ($r = 0.41$, $p < 0.001$), and a significant weak positive relationship with Mathematics achievement ($r = 0.38$, $p < 0.001$). These findings suggest that responsive, differentiated teaching practices are meaningfully associated with foundational learning outcomes, particularly in literacy. The study recommends strengthening differentiated instruction through targeted professional development and instructional support.

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Introduction

In contemporary education, classrooms are increasingly characterized by diverse learner abilities, readiness levels, interests, and learning styles. This diversity challenges traditional uniform approaches to instruction and calls for teaching practices that respond meaningfully to individual differences. Differentiated instruction (DI) has emerged as a pedagogical framework that enables teachers to proactively modify content, process, product, and learning environment to meet varied learner needs [1]–[2]. Rather than treating learner differences as obstacles, DI views them as essential considerations in instructional planning and delivery.

The importance of DI is particularly pronounced in the early grades, where foundational skills in Reading and Mathematics are established. These subjects serve as gateways to future academic success, with early literacy and numeracy competencies strongly predicting later school performance [3]–[4]. When pupils fail to develop adequate foundational skills, their difficulties often compound across other learning domains, creating persistent academic gaps.

In the Philippines, concerns about foundational literacy and numeracy have intensified following national and international assessments. Results from the Programme for International Student Assessment (PISA) 2022 showed that Filipino learners continued to perform below the OECD average in reading, mathematics, and science [5]. Similarly, the Southeast Asia Primary Learning Metrics (SEA-PLM) revealed that many Filipino pupils perform below regional expectations in literacy and numeracy [6]. These findings have prompted educational reforms such as the MATATAG Curriculum and the Early Language, Literacy and Numeracy (ELLN) program, which emphasize strengthening foundational skills and improving instructional quality in the primary grades [7].

Despite the strong theoretical appeal and policy emphasis on DI, empirical evidence linking teachers' regular DI practices to measurable academic outcomes in typical classroom settings remains limited, particularly for early-grade learners. Much of the existing literature focuses on conceptual discussions, intervention-based research, or broader educational contexts. Few studies have specifically examined how the DI practices of Grade 2 teachers relate to pupils' achievement in both Reading and Mathematics within regular public elementary school settings.

This study addresses this gap by investigating the relationship between teachers' DI practices and the academic achievement of Grade 2 pupils in Reading and Mathematics. Specifically, it sought to answer the following questions:

- How may the differentiated instruction practices of Grade 2 teachers be described?
- How may the academic achievement of Grade 2 pupils in Reading be described?

- How may the academic achievement of Grade 2 pupils in Mathematics be described?
- Is there a significant relationship between teachers' DI practices and pupils' Reading achievement?
- Is there a significant relationship between teachers' DI practices and pupils' Mathematics achievement?

By examining these questions, the study aims to provide empirical evidence on whether responsive teaching practices are meaningfully associated with foundational learning outcomes, thereby contributing to the broader goal of improving instructional quality in early grade education.

Literature Review

A. Theoretical Foundations

This study is grounded in two complementary theoretical perspectives. First, Tomlinson's Differentiated Instruction Theory [1] posits that effective teaching requires intentional adjustments in content, process, product, and learning environment based on learners' readiness, interests, and learning profiles. This framework emphasizes that uniform instruction cannot adequately address the diversity found in contemporary classrooms, and that teachers must proactively plan for variation in how pupils learn.

Second, Vygotsky's Social Constructivist Theory [8] provides support through the concept of the Zone of Proximal Development (ZPD), which describes the space between what a learner can do independently and what can be achieved with guidance. This theory highlights the importance of scaffolding—providing appropriate support matched to learners' current abilities. Differentiated instruction can be understood as a practical application of scaffolding, allowing teachers to adjust support levels based on individual pupil needs.

Together, these theories suggest that when teachers adapt instruction to accommodate learner differences, pupils are provided with learning experiences better aligned with their developmental needs, potentially leading to improved academic outcomes.

B. Differentiated Instruction

Differentiated instruction is a learner-centered approach that recognizes and responds to diversity in readiness, interests, and learning profiles [1]. It involves modifications across four dimensions: content (what is taught), process (how it is taught), product (how learning is demonstrated), and learning environment (the classroom climate). Research has shown that when teachers systematically implement DI, it can positively influence student engagement and achievement [9]–[10].

In the Philippine context, DI has gained relevance as classrooms become increasingly diverse. The Department of Education has emphasized learner-centered approaches that address varied pupil needs [7]. However, local research suggests that consistent

implementation of DI may be constrained by factors such as class size, limited materials, time constraints, and teacher preparedness [11].

C. Academic Achievement in Reading and Mathematics

Academic achievement refers to the extent to which learners attain intended learning outcomes [12]. In early grades, achievement in Reading and Mathematics is particularly critical. Reading involves not only decoding but also comprehension, vocabulary development, and the ability to construct meaning from text [3]. Mathematics in the early grades focuses on number sense, basic operations, patterns, and problem-solving [13].

International research has consistently shown that instructional quality significantly influences achievement in both subjects [14]. In the Philippines, persistent challenges in literacy and numeracy have been documented through national assessments and international comparisons [5], underscoring the need to examine classroom-level factors that support learning.

D. Empirical Evidence on Differentiated Instruction and Academic Achievement

A substantial body of research has examined the relationship between DI and academic achievement. In a meta-analysis of primary school studies, Deunk et al. [9] found that DI had small to moderate positive effects on language and mathematics achievement, particularly when implemented as part of a broader instructional program. Similarly, Prast et al. [15] reported that DI in mathematics can support achievement, though effects depend on sustained implementation quality. In reading, studies have shown that DI strategies such as flexible grouping, tiered texts, and scaffolded comprehension activities can improve literacy outcomes [16]–[17]. In mathematics, DI approaches including the use of concrete materials, varied tasks, and guided practice have been associated with improved performance and critical thinking [11], [18].

Despite this evidence, research focusing specifically on Grade 2—a critical transitional year in foundational learning—remains limited. Few studies have simultaneously examined the relationship between DI practices and achievement in both Reading and Mathematics within regular public-school settings. This study addresses this gap by investigating these relationships among Grade 2 pupils in the Division of Zamboanga del Norte.

Material and Methods

A. Research Design

This study employed a quantitative descriptive-correlational research design. A quantitative approach was appropriate because the study dealt with measurable variables that could be quantified and analyzed statistically [19]. The descriptive aspect was used to determine and present the status of teachers' differentiated instruction practices and pupils' academic achievement, while the correlational aspect was employed to examine whether a

significant relationship existed between these variables [20]. This design was selected because the study did not seek to manipulate classroom conditions but rather to examine naturally occurring variables in their actual school setting [21].

B. Research Locale

The study was conducted in 246 selected public elementary schools in the Division of Zamboanga del Norte during School Year 2025-2026. The Division of Zamboanga del Norte was chosen because it provided a relevant and accessible context for examining the relationship between teachers' DI practices and pupils' academic achievement in the early grades. The selection of public elementary schools was consistent with the study's intent to investigate variables within regular classroom settings where learner diversity and instructional demands are evident concerns.

C. Research Participants and Sampling

The participants were 492 Grade 2 teachers who were purposively selected from the 246 schools. Purposive sampling is a non-probability sampling technique in which participants are selected based on specific characteristics and their relevance to the objectives of the study [19], [22]. This technique was appropriate because the study specifically required Grade 2 teachers who were directly involved in classroom instruction and Grade 2 classes whose academic records in Reading and Mathematics were available. Each teacher's class (N = 492) served as the source for academic achievement data.

The teacher-respondents were predominantly female (80.5%), with the majority aged 31-40 years (35.8%). Most had 6-10 years of teaching experience (30.1%) and had been teaching Grade 2 for 4-6 years (32.1%). Over half had completed master's units or degrees (60.6%), indicating a relatively experienced and professionally engaged teaching workforce.

D. Research Instruments

Two data-gathering instruments were used. The first was a researcher-made structured questionnaire used to determine the DI practices of Grade 2 teachers. The instrument was developed based on Tomlinson's [1] principles, covering differentiation in content, process, product, learning environment, and learner readiness, interests, and profiles. The questionnaire consisted of 28 items using a 5-point Likert scale (5 = Always Practiced to 1 = Never Practiced). The second instrument was a researcher-made data extraction form used to gather the academic achievement data of Grade 2 pupils in Reading and Mathematics from official school records.

E. Validity and Reliability

Content validity of the questionnaire was established through expert review by a panel of three specialists in educational research, elementary education, and differentiated instruction. Content validity refers to the extent to which instrument items adequately represent the

construct being measured [23]. The expert validators evaluated the clarity, relevance, and appropriateness of each item. Based on their feedback, the instrument was revised, resulting in an overall mean validity rating of 4.07, interpreted as "Valid."

Reliability was established through pilot testing with 10 Grade 2 teachers who were not included in the actual respondents. Cronbach's alpha was used to assess internal consistency, which measures the extent to which items in a scale consistently measure the same construct [24]. The questionnaire obtained a Cronbach's alpha coefficient of 0.84, which is considered "Good" internal consistency [25].

F. Data Gathering Procedure

Prior to data collection, the researcher secured permission from the Schools Division Superintendent and the school heads of the selected schools. The questionnaire was then administered to the 492 Grade 2 teachers, and the academic achievement data were obtained from the official school records of the corresponding Grade 2 classes. All data were treated with confidentiality and used solely for research purposes.

G. Data Analysis

Descriptive statistics (mean and standard deviation) were used to answer the first three research questions. The mean was used to determine the average level of differentiated instruction practices and academic achievement, while the standard deviation was used to describe the dispersion of scores around the mean [20].

To answer the fourth and fifth research questions, the Pearson product-moment correlation coefficient (Pearson r) was used. Pearson r is a statistical tool that measures the strength and direction of the linear relationship between two continuous variables [21]. The correlation coefficients were interpreted using the following scale: ± 0.80 to ± 1.00 = Very Strong; ± 0.60 to ± 0.79 = Strong; ± 0.40 to ± 0.59 = Moderate; ± 0.20 to ± 0.39 = Weak; ± 0.00 to ± 0.19 = Very Weak [26].

The null hypotheses were tested at the 0.05 level of significance. The decision rule was based on the p -value: if $p \leq 0.05$, the null hypothesis was rejected; if $p > 0.05$, the null hypothesis was not rejected.

H. Ethical Considerations

Ethical principles of research were strictly observed throughout the study. Prior to data collection, the researcher secured permission from the appropriate school and division authorities. Teacher-respondents were informed about the purpose of the study, the nature of their participation, and their right to withdraw at any time without penalty. Informed consent was obtained from all participants. Confidentiality and anonymity were maintained; respondents' identities were not disclosed, and pupil achievement data were recorded in coded form to protect their identities [27].

Results

This section presents the results of the study organized according to the research questions. The findings are based on data gathered from 492 Grade 2 teachers and the academic records of their corresponding 492 Grade 2 classes in selected public elementary schools in the Division of Zamboanga del Norte during School Year 2025-2026.

A. Differentiated Instruction Practices

Table 1 presents the DI practices of Grade 2 teachers. The overall mean of 4.07 (SD = 0.56), interpreted as "Often Practiced," indicates that DI practices were evident across all dimensions. Differentiation in Process received the highest rating (M = 4.14), followed by Differentiation in Learning Environment (M = 4.11), Differentiation in Content (M = 4.08), Readiness, Interests, and Learning Profile (M = 4.05), and Differentiation in Product (M = 3.97).

Table 1. Differentiated Instruction Practices of Grade 2 Teachers (N = 492)

Indicators	Mean	SD	Adjectival Rating	Interpretation
Differentiation in Content	4.08	0.56	Often Practiced	Practices are evident
Differentiation in Process	4.14	0.52	Often Practiced	Practices are evident
Differentiation in Product	3.97	0.59	Often Practiced	Practices are evident
Differentiation in Learning Environment	4.11	0.54	Often Practiced	Practices are evident
Readiness, Interests, and Learning Profile	4.05	0.57	Often Practiced	Practices are evident
Overall	4.07	0.56	Often Practiced	Practices are evident

B. Academic Achievement

Table 2 shows the academic achievement of Grade 2 pupils. Reading achievement had a mean of 84.27 (SD = 3.68), while Mathematics achievement had a mean of 83.91 (SD = 3.84). Both were adjectivally rated as "Satisfactory," indicating that pupils generally attained expected competencies at an acceptable level.

Table 2. Academic Achievement of Grade 2 Pupils in Reading (N = 492)

Variable	Mean	SD	Adjectival Rating	Interpretation
Reading	84.27	3.68	Satisfactory	Achievement is satisfactory

C. Relationship Between Differentiated Instruction and Academic Achievement

Table 3 presents the correlation results. A significant moderate positive relationship was found between DI practices and Reading achievement ($r = 0.41$, $p < 0.001$), indicating that teachers who more frequently practiced DI tended to have classes with better Reading performance. A significant weak positive relationship was found between DI practices and Mathematics achievement ($r = 0.38$, $p < 0.001$), indicating a similar but weaker association.

Table 3. Relationship Between Differentiated Instruction Practices and Academic Achievement

Variables Correlated	R-value	p-value	Interpretation
DI Practices and Reading	0.41	0.000	Significant Moderate Positive
DI Practices and Mathematics	0.38	0.000	Significant Weak Positive

*Both null hypotheses were rejected at the 0.05 level of significance.

Discussion

This study examined the relationship between teachers' DI practices and the academic achievement of Grade 2 pupils in Reading and Mathematics. The findings provide empirical support for the theoretical assumption that responsive instruction is meaningfully associated with foundational learning outcomes.

A. Differentiated Instruction Practices

The finding that DI practices were "often practiced" across all dimensions indicates that Grade 2 teachers in the study generally recognized learner diversity and made efforts to address it through instructional adjustments. This aligns with Tomlinson's [1] assertion that effective teachers proactively modify instruction to accommodate learner differences. The highest ratings for Differentiation in Process and Learning Environment suggest that teachers focused on varying teaching strategies and creating supportive classroom conditions, which are particularly important in early grades where learners require structured guidance [28].

The slightly lower rating for Differentiation in Product may reflect challenges in providing varied ways for pupils to demonstrate learning. This is consistent with observations that while teachers often differentiate content and process, differentiation in assessment requires more advanced planning and resources [29].

B. Academic Achievement

The satisfactory achievement in both Reading and Mathematics indicates that pupils generally attained expected competencies at an acceptable level. This is encouraging, as it suggests foundational learning is occurring. However, the fact that achievement has not reached "Very Satisfactory" or "Outstanding" levels indicates room for improvement. The moderate variation in scores across classes (SDs of 3.68 and 3.84) reflects the reality of diverse classroom conditions, where factors such as instructional quality, pupil readiness, and learning support vary across schools.

C. Relationship with Reading Achievement

The significant moderate positive relationship between DI practices and Reading achievement ($r = 0.41$) supports the view that responsive instruction contributes to literacy development. Reading instruction in early grades often requires varied texts, guided reading activities, scaffolded comprehension, and flexible grouping—all dimensions of DI. This finding aligns with meta-analytic evidence showing positive effects of DI on language achievement [9] and with local studies demonstrating associations between responsive teaching and reading outcomes [17].

From a Vygotskian perspective, this relationship may reflect the role of scaffolding in reading development. When teachers match support to pupils' current reading levels, they help learners progress within their zones of proximal development. The moderate strength of

the relationship suggests DI is an important factor, though other variables such as home literacy environment and prior reading experiences also contribute.

D. Relationship with Mathematics Achievement

The significant weak positive relationship between DI practices and Mathematics achievement ($r = 0.38$) indicates that responsive instruction also supports numeracy development, though to a lesser extent than reading. Several factors may explain this weaker association.

First, mathematics learning often depends heavily on conceptual progression, repeated practice, and prior numeracy readiness, which may mediate the impact of instructional practices [30]. Second, some pupils experience mathematics anxiety or lack confidence, affecting performance regardless of instructional quality. Third, effective differentiation in mathematics may require specialized strategies such as concrete manipulatives, tiered problem-solving tasks, and careful pacing—strategies that some teachers may not yet have fully developed.

This finding is consistent with prior research showing that DI in mathematics can support achievement but requires sustained implementation quality [15]. It also aligns with local studies finding positive but modest relationships between DI and mathematics performance [11].

Theoretical and Practical Implications

A substantial body of research has examined the relationship between DI and academic achievement. In a meta-analysis of primary school studies, Deunk et al. [9] found that DI had small to moderate positive effects on language and mathematics achievement, particularly when implemented as part of a broader instructional program. Similarly, Prast et al. [15] reported that DI in mathematics can support achievement, though effects depend on sustained implementation quality. Recent research continues to affirm the value of DI in early grade education. Graham et al. [31] conducted a scoping review of DI implementation in primary classrooms and found that effective differentiation practices were associated with improved student engagement and academic outcomes, particularly when teachers received ongoing professional development and instructional support. The study emphasized that DI is most impactful when teachers have a deep understanding of their students' learning profiles and can flexibly adapt instruction accordingly.

In reading, studies have shown that DI strategies such as flexible grouping, tiered texts, and scaffolded comprehension activities can improve literacy outcomes [16]–[17]. Kaur and Singh [32] examined the effects of differentiated reading instruction on foundational literacy skills among early grade learners and found significant improvements in reading fluency and

comprehension among students who received targeted, differentiated interventions compared to those who received traditional whole-class instruction.

In mathematics, DI approaches including the use of concrete materials, varied tasks, and guided practice have been associated with improved performance and critical thinking [11], [18]. Wong and Chen [33] investigated the implementation of differentiated mathematics instruction in diverse primary classrooms and found that teachers who used flexible grouping and tiered problem-solving tasks were better able to address the varying numeracy readiness levels of their students, resulting in more equitable achievement outcomes.

Despite this evidence, research focusing specifically on Grade 2—a critical transitional year in foundational learning—remains limited. Few studies have simultaneously examined the relationship between DI practices and achievement in both Reading and Mathematics within regular public-school settings. This study addresses this gap by investigating these relationships among Grade 2 pupils in the Division of Zamboanga del Norte.

Limitations

Several limitations should be acknowledged. First, the correlational design precludes causal conclusions; while DI practices were associated with achievement, causation cannot be inferred. Second, DI practices were measured through teacher self-report, which may be subject to social desirability bias. Third, the study was conducted in one division in the Philippines, limiting generalizability to other contexts. Fourth, other factors influencing academic achievement—such as home environment, pupil motivation, and school resources—were not examined. Future research should address these limitations through experimental designs, observational measures of DI, and inclusion of additional variables.

Conclusion and Recommendations

This study investigated the relationship between teachers' differentiated instruction practices and the academic achievement of Grade 2 pupils in Reading and Mathematics in public elementary schools in the Division of Zamboanga del Norte. The findings reveal that differentiated instruction was not merely a theoretical ideal but an evident classroom practice among Grade 2 teachers, who frequently adjusted content, process, product, learning environment, and instructional approaches based on pupils' readiness, interests, and learning profiles. This aligns with Tomlinson's [1] assertion that effective teaching requires proactive responsiveness to learner diversity.

Pupils demonstrated satisfactory achievement in both Reading and Mathematics, indicating that foundational competencies were being developed at acceptable levels. However, the moderate variation in achievement across classes suggests that not all learners are equally

benefiting from instruction, reinforcing the need for continued refinement of responsive teaching practices.

Most importantly, this study established a significant positive relationship between differentiated instruction and academic achievement in both subject areas. The moderate relationship with Reading achievement suggests that differentiated strategies such as flexible grouping, tiered texts, and scaffolded comprehension activities may be particularly effective in supporting literacy development. The weaker but still significant relationship with Mathematics achievement indicates that while differentiated instruction supports numeracy learning, its influence may be mediated by factors such as prior numeracy readiness, learner confidence, and the complexity of differentiating mathematical concepts.

These findings affirm the theoretical foundations of the study. Consistent with Vygotsky's [8] Zone of Proximal Development, the results suggest that when teachers provide instructional support matched to learners' current abilities, pupils are better positioned to progress toward higher levels of understanding. The findings also reinforce Tomlinson's [1] Differentiated Instruction Theory by demonstrating that responsive teaching practices are meaningfully associated with measurable academic outcomes in foundational subject areas.

In conclusion, differentiated instruction practices of teachers constitute an important classroom-related factor associated with the academic achievement of Grade 2 pupils in Reading and Mathematics. In an educational context where foundational literacy and numeracy remain persistent concerns, strengthening responsive and varied teaching practices represents a meaningful pathway toward improving learning outcomes for all pupils. By continuing to develop teachers' capacity to differentiate instruction, and by providing the necessary support and resources, schools can create more equitable learning environments where every child has the opportunity to succeed. Based on these findings, the following recommendations are offered:

1. For Teachers: Continue to strengthen DI practices, particularly in differentiation of product and in mathematics instruction. Seek professional development opportunities that focus on developing varied assessment strategies and differentiated mathematics tasks.
2. For School Administrators: Provide sustained professional development on DI, particularly through Learning Action Cell sessions that allow teachers to share effective strategies. Ensure access to varied instructional materials that support differentiation in both literacy and numeracy.
3. For Curriculum Planners: Integrate DI principles more explicitly into teacher training programs and curriculum guides, with practical examples for early-grade classrooms.

4. For Future Researchers: Investigate the factors that mediate the relationship between DI and mathematics achievement, using experimental designs and observational measures to strengthen causal inferences. Explore how DI interacts with other classroom and home factors to influence foundational learning outcomes.

This study contributes to the growing body of evidence that responsive, differentiated teaching practices matter for foundational learning. By continuing to strengthen DI in early grade classrooms, educators can create more equitable opportunities for all pupils to succeed in Reading, Mathematics, and beyond.

Conflict of Interest

The authors declare that there is no conflict of interest.

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