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Exploring the Dimensions of Differentiated Instruction on Student Achievement in Bagumbayan District III: A Sequential Explanatory Mixed Method

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Authors:

¹Cerelyn C. Aquino, TIII
Chua Integrated School

²Jaime Boy U. Ngag Jr., PhD
South Cotabato State College

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ABSTRACT

In contemporary classrooms characterized by diverse learning needs and abilities, educators are challenged to adopt instructional approaches that respond effectively to student differences. One instructional strategy that has gained considerable attention is differentiated instruction, which emphasizes the adaptation of teaching practices to accommodate learners' varied readiness levels, interests, and learning profiles. This study aimed to explore the dimensions of differentiated instruction and their influence on student achievement in science among schools in Bagumbayan District III. The research utilized a Sequential Explanatory Mixed Methods Design, which involved the collection and analysis of quantitative data followed by qualitative data to further explain and elaborate on the statistical results. The quantitative findings revealed that differentiated instruction in science classes was implemented to a great extent across the dimensions of content, process, product, and learning environment. These results indicated that teachers actively adjusted learning materials, applied varied instructional strategies, offered diverse assessment outputs, and maintained inclusive classroom environments that addressed the diverse needs of learners. In addition, students demonstrated an outstanding level of academic performance in science, suggesting consistently high academic achievement among the participants. Correlational analysis further revealed a strong and significant positive relationship between the extent of differentiated instruction and students' academic performance in science indicating that increased implementation of differentiated practices was associated with higher levels of student achievement. To address these issues, the study proposed a comprehensive differentiated instruction model that integrates learner profiling, flexible instructional strategies, contextualized learning materials, student choice, and continuous assessment within a supportive learning environment. These elements collectively contribute to improved engagement and enhanced science learning outcomes.

Keywords: learner diversity, instructional adaptability, academic success, classroom inclusivity



INTRODUCTION

Background of Study

In today's diverse and inclusive classrooms, educators face the challenge of meeting the unique learning needs of every student. One approach that has gained prominence in recent years is differentiated instruction, which tailors teaching methods and content to accommodate various learning styles, abilities, and interests of students. In the context of science education, implementing differentiated instruction is crucial to ensuring that all students have equal opportunities to engage with the subject matter and develop a deep understanding of scientific concepts.

In other South-Asian countries, differentiated instruction has been extensively studied and implemented across various disciplines, including science education. Researchers such as Tomlinson (2009) and Hall et al. (2012) have emphasized the significance of individualized learning plans and instructional strategies that cater to students' diverse needs and backgrounds. The findings of their studies have highlighted the positive impact of differentiated instruction on student motivation, engagement, and academic achievement.

Furthermore, the Program for International Student Assessment (PISA) conducted by the Organization for Economic Cooperation and Development (OECD) has also recognized the importance of individualized learning approaches in science education. PISA findings show that countries that adopt differentiated instruction in science classes tend to yield higher performance levels among their students (OECD, 2016).

In the Philippine, educational institutions have increasingly recognized the value of implementing differentiated instruction in science classes to cater to the diverse needs of students. The Department of Education (DepEd) has acknowledged the importance of providing equitable learning opportunities for all learners through the K-12 curriculum reform, which emphasizes the adoption of learner-centered approaches (DepEd, 2013). However, the effective implementation of differentiated instruction in science classes in the Philippines remains an area that requires further investigation and understanding.

As the country strives to enhance the quality of science education and ensure that it is accessible to all students, exploring the implementation of differentiated instruction becomes paramount. How teachers adapt their pedagogical strategies to accommodate diverse learning styles, abilities, and interests in science classes requires thorough investigation. This research seeks to contribute to the growing body of knowledge on differentiated instruction in science education, with a focus on the Philippine educational landscape.

This study aligns primarily with SDG 4: Quality Education, which advocates for inclusive and equitable education while promoting lifelong learning opportunities for all. By exploring the dimensions of differentiated instruction and its impact on student achievement in Bagumbayan District III, the study directly contributes to ensuring that teaching approaches



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respond to the diverse needs, abilities, and backgrounds of learners. Differentiated instruction embodies the principles of equity, as it seeks to bridge learning gaps, foster inclusivity, and provide equal opportunities for students to succeed, regardless of their circumstances. Furthermore, the study also supports SDG 10: Reduced Inequalities, as it emphasizes addressing disparities in learning outcomes by adapting instructional strategies to accommodate students with varied learning profiles. Integrating SDG principles in this research underscores its broader significance, showing how localized educational practices contribute to global commitments in advancing social justice, equity, and quality learning for sustainable development.

The primary purpose of this study is to examine the challenges and opportunities of implementing differentiated instruction in science classes among elementary schools in Bagumbayan III, division of Sultan Kudarat. By investigating the strategies used by science teachers to meet the diverse needs of their students, the study aims to provide valuable insights into the effectiveness of differentiated instruction and its impact on students' learning experiences and academic outcomes.

Research Questions

This study aimed to examine and explore the effects off implementing differentiated instruction in science classes among elementary schools in Bagumbayan III, division of Sultan Kudarat for school year 2025-2026.

Specifically, research problem revolved around understanding the following key questions:

1. What is the extent of the differentiated instruction in science classes per DepEd, in terms of:
 - 1.1.Content Differentiation;
 - 1.2.Process Differentiation;
 - 1.3. Product Differentiation; and
 - 1.4. Learning Environment Differentiation?
2. What is the level of learners academic performance in Science, in terms of:
 - 2.1.GPA?
3. Is there a significant relationship between the extent of the differentiated instruction in science classes and the level of learners' academic performance in Science?
4. What are the challenges experienced by students in classrooms implementing Differentiated Instruction in Bagumbayan District III?



5. What specific Differentiated Instruction model can be developed to effectively enhance student achievement in Bagumbayan District III.

METHODOLOGY

Research Design

In today's diverse and inclusive classrooms, educators face the challenge of meeting the unique learning needs of every student. One approach that has gained prominence in recent years is differentiated instruction, which tailors teaching methods and content to accommodate various learning styles, abilities, and interests of students. This study employed a Sequential Explanatory Mixed Methods Design, which integrates quantitative and qualitative approaches in two distinct phases to provide a more comprehensive understanding of the effects of differentiated instruction on student achievement. In the first phase, quantitative data will be gathered through test scores and performance assessments to determine the measurable impact of differentiated instruction on science learning outcomes. The second phase followed with qualitative methods, such as interviews and focus group discussions, to further explain and enrich the quantitative findings by capturing teachers' and students' perspectives on how differentiated strategies influence learning.

This design is appropriate because it not only allows for the identification of statistical trends but also provides deeper insights into the lived experiences behind the numbers, leading to a more nuanced interpretation of results (Creswell & Plano Clark, 2018; Feters & Molina-Azorin, 2020). By combining both strands, the research acknowledges the complexity of classroom realities and ensures that findings are both empirically grounded and contextually meaningful, which is essential in evaluating instructional innovations like differentiated instruction.

Respondents/Participants of the Study

The study involved thirty (30) Grade 6 Science teachers in Bagumbayan District III, Sultan Kudarat Division for SY 2024–2025. This group was selected because teachers are the most appropriate sources of data on differentiated instruction, as they directly implement and manage classroom strategies and observe learner responses (Creswell & Creswell, 2018). Grade 6 teachers were specifically chosen because they handle learners at a critical stage of basic education where foundational science competencies are developed, making their instructional practices highly relevant to the study (Tomlinson, 2017; Pozas et al., 2021). In addition, total enumeration was used since the population is small and accessible, allowing complete coverage of all qualified respondents and minimizing sampling bias (Taherdoost, 2020).

Sampling Technique

During this study, a purposeful sampling technique was intentionally utilized to carefully select the teachers in DepEd Esperanza District III, a division of Sultan Kudarat, who met the researcher's specified inclusion criteria established by the researcher.



Purposive sampling, or judgmental, selective, or subjective sampling, is a variant of non-probability sampling. In this approach, researchers exercise their judgment and discretionary acumen in selecting individuals from the population to participate in their survey endeavors (Alchemer, 2021).

This sampling method mandates that the researcher possess prior knowledge of the objectives underpinning this study to effectively pinpoint and contact eligible participants through online survey platforms (Ngag, 2023). The researcher resorts to purposive sampling to secure access to a distinct subgroup of individuals, whereby all survey participants are meticulously chosen based on their alignment with a specific demographic or criterion (Alchemer, 2021).

Research Instruments

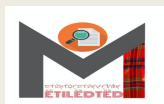
This study employed a researcher-made survey questionnaire to be evaluated by the panel of experts in research and Science education.

A Five-Point Likert Scale was also utilized in this study to analyze the survey questionnaire replies of the respondents on the extent of the differentiated instruction in science classes per DepEd,

RATING	RANGE OF MEANS	DESCRIPTIVE RATING	INTERPRETATION
5	4.500-5.000	Agree	Highly Acceptable
4	3.500-4.499	Fairly Agree	Acceptable
3	2.500-3.499	Neutral	Moderately Acceptable
2	1.500-2.499	Fairly Disagree	Fairly Acceptable
1	Below 1.499	Disagree	Not Acceptable

Another rating scale designed was used to evaluate the Student Academic Performance in Science anchored on DepEd Order No. 8 series 2015.

GRADING SCALE	DESCRIPTIVE RATING	REMARKS
90-100	Outstanding	Passed
85-89	Very Satisfactory	Passed



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80-84	Satisfactory	Passed
75-79	Fairly Satisfactory	Passed
Below 75	Did not Meet the Expectations	Failed

For the qualitative phase, an interview and FGD guide/protocols were used to explore open ended questions related to the study.

Data Gathering Procedure

To ensure reliable and authentic findings, the researcher adhered to a systematic methodology that aligned with the objectives of the study, which aimed to investigate the effects of differentiated instruction on student achievement in Bagumbayan District, Sultan Kudarat Division.

Initially, the implementation of the study required the endorsement and approval of the DepEd Division Superintendent and the Dean of the College of Graduate Studies (CGS) through the affixation of their respective signatures on formal authorization documents. This approval ensured that the research process complied with institutional and administrative requirements.

Subsequently, an additional letter of authorization was sent to the school principals and Science teachers of the selected schools to formally request their participation and support in the conduct of the study. To ensure the accuracy and reliability of the data gathered, the researcher utilized a carefully developed and validated survey questionnaire as the primary data-gathering instrument. The questionnaire underwent thorough review and evaluation prior to administration to ensure its clarity, relevance, and alignment with the objectives of the study.

The researcher employed a random sampling technique in selecting the participants. Specifically, self-generated random number tables were used to determine the respondents who would take part in the study, ensuring fairness and minimizing selection bias. This approach helped ensure that all eligible participants had an equal chance of being included in the research.

Prior to the actual conduct of the study, the research proposal underwent ethical review and consideration. The researcher secured ethical clearance from the EWMCI Research Ethics Committee (EREC) to ensure that the study adhered to established ethical standards, particularly with regard to informed consent, confidentiality, and the protection of participants' rights and welfare.

Data Analysis

Upon the conclusion of the study, the collected data were systematically organized, presented in tabular form, analyzed, and interpreted to ensure clarity and accuracy in addressing



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the research objectives. The statistical methods presented in Chapter I were applied to answer the research questions of the study.

In the first phase of the analysis, the Mean statistical measure was utilized to determine the extent of differentiated instruction in science classes in accordance with DepEd standards and to identify the level of students' academic performance in Science. The use of the mean allowed the researcher to determine the average responses of the participants and to interpret the overall level of implementation of differentiated instruction as well as the academic achievement of the learners.

Furthermore, the Pearson Product–Moment Correlation (Pearson r) was employed to determine whether a significant relationship existed between the extent of differentiated instruction in science classes and the level of learners' academic performance in Science. This statistical test helped identify the strength and direction of the relationship between the two variables and determine whether the relationship was statistically significant.

On the other hand, Thematic/Content Analysis, following the framework of Clark and Braun (2006), was utilized to analyze the qualitative data obtained from the participants. Through this analytical approach, meaningful patterns and recurring ideas were identified and organized into themes. These emerging themes served as the basis for identifying the specific components of a Differentiated Instruction Model that could be developed to effectively enhance student achievement in Bagumbayan District III.

Scope and Delimitation of the Study

The study focused on evaluating how differentiated instructional strategies influence student academic performance in a selected number of elementary and secondary schools within the district. The scope of the study includes examining different dimensions of differentiated instruction, such as content, process, and product, and assessing their impact on student engagement and achievement. Data were collected through student assessments, teacher observations, and surveys conducted with both teachers and students to gauge the effectiveness of these instructional strategies.

This study was conducted over one academic year, providing sufficient time to observe any meaningful changes in student performance attributable to the use of differentiated instruction. The participants will include teachers who implement differentiated instruction in their classrooms and students from various grade levels, allowing for an understanding of how this approach affects diverse age groups and learning profiles.

This study was limited to Bagumbayan District III, which may not fully represent the diverse educational settings in other districts or regions. Results may, therefore, not be generalizable to broader populations outside this specific district. Differentiated instruction may be applied inconsistently across classrooms due to varying levels of teacher training, experience, and access to resources. This variability may impact the comparability of results across different classrooms and grade levels. The study relies on assessments and teacher observations to gauge



student achievement. External factors such as family support, student motivation, and prior academic performance may also influence achievement, which could limit the attribution of academic improvements solely to differentiated instruction.

These limitations suggest that while the study aimed to provide valuable insights into the benefits and challenges of differentiated instruction, the findings should be interpreted with caution and may serve as a foundation for further, more comprehensive studies across different educational contexts.

RESULTS AND DISCUSSIONS

In today's diverse and inclusive classrooms, educators face the challenge of meeting the unique learning needs of every student. One approach that has gained prominence in recent years is differentiated instruction, which tailors teaching methods and content to accommodate various learning styles, abilities, and interests of students. This study employed a Sequential Explanatory Mixed Methods Design, which integrates quantitative and qualitative approaches in two distinct phases to provide a more comprehensive understanding of the effects of differentiated instruction on student achievement.

The findings of the study reveal that differentiated instruction in Science classes is implemented to a great extent across all dimensions, namely content, process, product, and learning environment. The overall mean scores ranging from 3.48 to 3.62 indicate that teachers consistently employ differentiated practices to address learners' diverse needs, readiness levels, interests, and learning profiles. This suggests that Science teachers recognize the importance of providing multiple pathways for learning and actively adapt instructional approaches to maximize student engagement and understanding. The result supports the principles of differentiated instruction proposed by Carol Ann Tomlinson, which emphasize modifying content, instructional processes, assessment products, and learning environments to ensure equitable access to learning opportunities. Recent studies have demonstrated that differentiated instruction promotes learner-centered education by allowing students to engage with content at appropriate levels of complexity while accommodating individual differences in learning preferences and abilities (Pozas et al., 2021; Whitley et al., 2022). Furthermore, differentiated instructional practices have been found to increase classroom participation, improve conceptual understanding, and enhance student motivation, particularly in science education where learners often possess varying levels of prior knowledge and scientific literacy (Suprayogi et al., 2020).

The study further reveals that learners attained an outstanding level of academic performance in Science, with a mean GPA of 92.00 and minimal variation among scores. This finding suggests that the learners consistently demonstrated mastery of science competencies and achieved high levels of academic success. Such performance may be attributed to the effective implementation of differentiated instructional strategies that provide learners with opportunities to learn according to their readiness and preferred learning styles. According to recent research, differentiated instruction enhances academic achievement by ensuring that learning experiences are tailored to students' individual needs, thereby improving comprehension, retention, and application of scientific concepts (Deunk et al., 2021). Similarly, Smale-Jacobse et al. (2021)



reported that students exposed to differentiated learning environments tend to demonstrate higher academic outcomes because instruction becomes more responsive to their strengths and learning challenges. The consistently high academic performance observed among the learners may therefore reflect the effectiveness of differentiated instruction in promoting meaningful and inclusive science learning.

Moreover, the study established a strong and statistically significant positive relationship between differentiated instruction and learners' academic performance in Science ($r = 0.78$, $p = 0.001$). This finding indicates that as the extent of differentiated instruction increases, student achievement likewise improves. The strong correlation suggests that differentiated instructional practices play a substantial role in enhancing learners' academic success. This result is consistent with contemporary educational research emphasizing that differentiated instruction positively influences student achievement by increasing engagement, addressing learning gaps, and fostering deeper understanding of subject matter (Maulana et al., 2023). In science education, differentiated strategies such as flexible grouping, scaffolded activities, inquiry-based learning, and varied assessment tasks have been shown to improve students' conceptual understanding and scientific reasoning skills (Pozas & Letzel, 2021). Furthermore, differentiated instruction supports the development of self-efficacy and learner autonomy, both of which contribute significantly to academic achievement (Van Geel et al., 2020). The strong association found in this study reinforces the view that differentiated instruction serves as an effective pedagogical approach for improving science learning outcomes.

Despite the positive outcomes associated with differentiated instruction, the findings reveal that learners in classrooms implementing differentiated strategies continue to encounter several challenges that hinder learning effectiveness. Among these challenges are difficulties in adjusting to varied learning tasks, limited access to instructional resources, gaps in prior knowledge and academic readiness, struggles with self-directed learning, and psychological barriers such as anxiety, low confidence, and lack of motivation. These challenges highlight that while differentiated instruction offers significant benefits, its effectiveness can be constrained by contextual and learner-related factors. Research conducted by Coubergs et al. (2020) found that students often experience adjustment difficulties when transitioning from traditional instruction to differentiated learning environments because differentiated tasks require greater independence and responsibility. Similarly, studies have shown that learners with limited foundational knowledge may struggle to fully participate in differentiated activities without adequate scaffolding and support (Smit & Humpert, 2021). In addition, educational inequalities, including limited access to learning resources and technology, continue to affect students' ability to benefit from differentiated instruction, particularly in rural and underserved communities (UNESCO, 2021). Psychological factors such as academic anxiety and low self-confidence further influence students' willingness to engage in challenging science tasks, thereby affecting their overall learning experiences (OECD, 2023).

The findings also indicate that effective implementation of differentiated instruction in Bagumbayan District III requires a comprehensive instructional model that incorporates learner assessment and profiling, flexible instructional strategies, contextualized and localized learning materials, varied learning tasks, continuous assessment, and a supportive classroom environment.



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These components collectively ensure that instruction is responsive to learners' needs while promoting active engagement and academic success. Learner assessment and profiling allow teachers to identify students' readiness levels, interests, and learning preferences, thereby facilitating more informed instructional decisions (Pozas et al., 2021). Flexible grouping and varied instructional strategies enable learners to collaborate, explore concepts at their own pace, and engage in meaningful learning experiences. Additionally, contextualized and localized materials make science concepts more relevant and accessible to students by connecting lessons to real-life experiences and local contexts, a practice strongly advocated in Philippine education reforms (Department of Education, 2023). Continuous assessment provides opportunities for teachers to monitor progress and adjust instruction accordingly, while a supportive classroom environment fosters psychological safety, inclusivity, and learner confidence. Together, these elements create conditions that maximize the effectiveness of differentiated instruction and contribute to improved science learning outcomes.

Overall, the findings underscore the critical role of differentiated instruction in promoting academic excellence in Science. While challenges remain, the significant relationship between differentiated instruction and academic performance demonstrates the potential of this approach to address learner diversity and enhance educational outcomes. Strengthening differentiated instructional practices through sustained teacher training, provision of learning resources, contextualized materials, and learner support mechanisms can further improve science achievement and contribute to the development of scientifically literate and academically successful learners.

Conclusion

The following inferences were made in light of this study's findings:

A well-structured differentiated approach enhances student engagement, motivation, and learning outcomes in science. By tailoring instruction to individual needs and providing flexible learning opportunities, educators create an environment where all learners can actively participate and succeed, emphasizing the value of responsive and inclusive teaching practices.

Also, the effectiveness of instructional approaches, suggesting that strategies tailored to students' needs, abilities, and learning styles can significantly enhance mastery of science concepts and overall academic success.

Further, the value of tailoring instruction to meet students' diverse needs, suggesting that differentiated approaches not only enhance engagement but also contribute meaningfully to improved academic outcomes in science.

Furthermore, addressing these challenges requires a holistic approach that combines accessible learning resources, targeted scaffolding, structured guidance for independent learning, and support for students' emotional well-being, ensuring that differentiated instruction achieves its intended impact on learning outcomes.



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Finally, it has been concluded that tailoring instruction to students' readiness, interests, and cultural contexts not only improves academic performance but also fosters autonomy, motivation, and inclusive learning experiences.

Recommendations

In the light of the findings, the following were recommended:

1. The Department of Education (DepEd) may strengthen support for schools by providing adequate science instructional materials, low-cost teaching aids, and digital resources to bridge resource gaps. Developing training programs focused on differentiated instruction for teachers, especially in remote areas, can help them address diverse learner needs effectively.
2. School Administrators may facilitate a supportive environment by ensuring smaller class groupings where possible, encouraging collaborative teacher planning, and monitoring student engagement to identify those struggling with self-directed tasks or motivational barriers.
3. Curriculum Planners/Developers may integrate more contextualized, culturally relevant, and tiered activities into the science curriculum that allow students to engage at different readiness levels and learning styles, helping to minimize academic gaps.
4. Teachers may continue implementing flexible, varied, and student-centered strategies while paying attention to learners' prior knowledge and confidence levels. Incorporate ongoing formative assessments and scaffolding to support self-directed learning and reduce anxiety among students.
5. Future Researchers may explore interventions targeting psychological and motivational barriers, strategies for improving student readiness, and the use of locally available materials to enhance differentiated instruction outcomes. Research on scalable models for resource-limited settings can provide actionable solutions for similar districts.

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Declaration AI Tools Utilization

I do hereby declare the use AI tools, such as Chat GPT and Grammarly for grammar checking and sentence organization purposes only.

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