| RESEARCH ARTICLE

Cooperative Learning, Mathematical Achievement, and Student Affect: A Study on Grade 8 Students in Philippine Schools

Nellie Jean A. Verana[1], Cheryl C. Wales[2], Peter Paul Parado[3], Emerson D. Peteros[4] and Maria Salud M. Delos Santos[5] ✉

[12345]*College of Education, Cebu Technological University, Philippines*

Corresponding Author: Maria Salud M. Delos Santos, **E-mail**: mariasalud.delossantos@ctu.edu.ph

| ABSTRACT

This study examined the attitudes and satisfaction of Grade 8 students in a public school in the Division of Carcar City, Cebu, Philippines, during the academic year 2023–2024, with an enrichment program for cooperative learning developed as an output. Research instruments were adapted from McLeish (2009) and Keeler and Steinhorst (1995), while mean scores and correlation analyses were used to interpret the data. Findings revealed that students demonstrated generally positive attitudes and expressed satisfaction with cooperative learning, alongside a satisfactory level of mathematical achievement. However, results showed no significant relationship between students' attitudes toward cooperative learning and their mathematical achievement, but a significant relationship was found between their satisfaction with cooperative learning and achievement. These findings provide valuable insights into how cooperative learning environments influence student satisfaction and performance in mathematics, highlighting the importance of fostering positive learning experiences to enhance academic outcomes.

| KEYWORDS

Teaching Mathematics, Mathematical Achievement, Students' Attitudes, Students' Satisfaction, Descriptive-Correlational Design, Cebu, Philippines.

1. Introduction

Mathematics education is a fundamental aspect of academic development and fostering positive attitudes toward learning can profoundly influence students' success in this subject. Cooperative learning, with its emphasis on teamwork and shared responsibility, has the potential to enhance both the learning experience and outcomes for grade 8 students. By investigating the relationship between students' attitudes and satisfaction with cooperative learning and their mathematical achievement, teachers can gain valuable insights to inform instructional practices.

In the K-12 curriculum, The Department of Education (DepEd) acknowledges the importance of fostering positive learning experiences, the curriculum emphasizes the incorporation of cooperative learning strategies to enhance collaboration, critical thinking, and problem-solving skills among students. By prioritizing the evaluation of students' attitudes and satisfaction within cooperative learning environments, DepEd aims to optimize mathematical achievement, ensuring a comprehensive and student-centered approach that aligns with the broader goals of the K-12 educational framework.

Despite teachers' efforts to simplify math, students' performance remains a major concern, as highlighted by the Trends in International Mathematics and Science Study (TIMSS), the Philippines has consistently placed worse than a lot of other nations. Every four years, an international test called TIMSS is used to gauge how well students are doing in math and science. The rankings are determined by the typical test results obtained by students in the participating nations. The Philippines took part in both the fourth and eighth-grade levels of the most current TIMSS assessment, which was administered in 2019. The Philippines

performed worse than many other nations, showing that there is potential for improvement in the nation's mathematics and science curricula.

Numerous studies have been carried out to identify the factors that may affect students' performance in mathematics. One of the factors is the student's attitudes in the cooperative learning study. The students' engagement, when they work together in small groups to accomplish common objectives. Teachers are tasked with finding innovative approaches to capture students' interest, foster active participation, and create a stimulating learning atmosphere. The recognition of this challenge underscores the need for ongoing professional development, collaborative strategies, and the integration of diverse instructional methods to ensure that classrooms remain vibrant spaces where students are not only present but actively and enthusiastically involved in the learning process. Researchers and educators draw these frameworks to design interventions that promote positive learning experiences and enhance mathematical outcomes. In cooperative learning, students' attitudes and satisfaction are strongly linked to their expectations of achieving success in group activities and the value they perceive in the learning experience. Positive group dynamics, effective communication, and shared problem-solving contribute to a supportive learning environment. Positive attitudes and satisfaction can strengthen self-efficacy beliefs, which in turn can lead to greater engagement.

Assessing students' attitudes and satisfaction toward cooperative learning in the math subject is essential for informed instructional decisions and continuous improvement. Teachers can adjust their instructional strategies, address problems, and create engaging and encouraging learning environments by obtaining information on students' viewpoints and experiences. This will improve students' performance and enjoyment of cooperative learning. Furthermore, teachers' training may hinder the successful execution of cooperative learning, impacting both students' experiences and their mathematical achievement. The success of cooperative learning depends on the quality of student interactions. Teacher education should include training in monitoring and supporting these interactions, and teachers should have tools like checklists to guide student behavior.

Another strategy that teachers also employ is the method of having students recognize patterns and understand the logical progression of math concepts. Another strategy is to present difficulties that involve cooperation, critical thinking, and problem-solving, and lead into the lesson. Enticing the class with math concepts, probability, and data discussions will also help the students come up with fresh insights and discoveries. Helping students is a crucial tactic that math professors use. They can apply the lesson to their everyday lives. Educators also produce Math that may be made interesting by using games, riddles, technology, and publicly available materials.

This study examined the influence of the grade 8 students' attitudes and satisfaction with cooperative learning on their mathematical achievement. The output will be a foundation for the development of learning enhancement plans to improve mathematics learning. The stakeholders in this research are the students, teachers, school administrators, and future researchers. By utilizing this strategy, students can improve their academic performance, teachers can enhance their teaching strategies, and school administrators can ensure the academic success of their students.

1.1 Theoretical Background
This study is based on four theoretical approaches that underpin cooperative learning and is anchored on DepEd Order No. 21 Series of 2019.

First, consider the theory of social interdependence. Social interdependence theory applies when individuals achieve their goals through the actions of others (Johnson & Johnson, 2005). This view suggests that students help each other study due to their appreciation for the group and the self-identity benefits they gain from participation (Slavin, 2011). Social interdependence theory and cooperative learning are closely connected because both emphasize the importance of mutual support and collaboration. Social interdependence theory, proposed by Johnson and Johnson (2005), emphasizes that individuals achieve their goals more effectively when they work together and rely on each other's efforts. A lack of social connections isolates an individual, leading to non-substitutability and fixation on personal activities, as well as a lack of motivation or resistance to fully shared goals. Cooperative learning is performed based on the concept of social interdependence. This hypothesis fits with the nature of cooperative learning, which involves the sharing of knowledge. People's skills are built through reciprocal engagement. To facilitate collaborative learning, interactive assignments and cooperative lessons should be designed and implemented in classrooms, allowing students to work together and learn as they pursue common objectives.

Eccles and Wigfield (2020) propose that, according to Expectancy-Value Theory, an individual's motivation is shaped by their expectations of success and the importance they attribute to a task.

Capuno et al. (2019) found that students' attitudes and study habits play a crucial role in influencing their performance in mathematics. Conversely, student satisfaction is one of the factors that may impact their performance. According to Darmofal

and Brodeur (2021), the traditional school model uses an integration of active learning strategies within traditional classrooms and their impact on student engagement and academic performance.

Second, cognitive theory examines how thinking and learning processes take place in the human mind. Scholars with cognitive perspectives suggest that emphasizing "the mental processing of information rather than motivations" (Slavin, 1996) in student interactions can improve academic progress. Van Ryzin et al. (2020) highlight the potential role of cooperative learning in reducing disparities and creating greater equity in education. Teachers should present resources, settings, and chances to students during the teaching process so that they might discover a new method to learn through peer interaction (Webb, 2008).

Slavin (2011) suggests that giving students the chance to discuss, debate, present, and listen to each other's perspectives is a crucial element of cooperative learning that contributes to student achievement. Vygotsky emphasizes social interaction, while Piaget focuses on active learning, highlighting the importance of cooperative learning in both their cognitive theories. Both are required to make cooperative learning a reality in a lively learning environment. These ideas can be used to justify the use of cooperative learning in this research project. These ideas align with cooperative learning principles, which focus on an interactive, collaborative, and student-centered approach. Therefore, in this study, the treatment group will engage in activities and tasks that encourage student discussion to strengthen reciprocal connections.

Isa et al., (2020) found that teachers' teaching methods significantly impact students' academic performance. Based on these findings, they recommended using the Student-Centered Method and the Teacher-Student Interactive Method to enhance students' academic outcomes.

Hasanah (2020) concluded that students who use a cooperative learning model achieve better mathematics learning outcomes than those who do not use such techniques. Finally, Bandura's Social Cognitive Theory, as discussed by Lee and Reeve (2021), highlights the importance of observational learning and modeling in influencing students' behavior.

Third, Albert Bandura's social learning theory, initially proposed in 1971, connects behavioral and cognitive learning theories by considering how cognitive constructs such as attention, recall, production, and motivation influence imitable behaviors. Bandura (1997), as cited in Mcleod (2024), highlights the significance of observational learning, where people learn knowledge, skills, attitudes, and beliefs by observing others and the outcomes of their actions. This process leads to the modeling and adoption of observed behaviors. Repen (2021) suggests that according to social learning theory and the concept of observational learning, children acquire certain behaviors by imitating role models, learning these behaviors just as they do other social behaviors, either by observing others or through direct experience. Social learning theory is based on four component processes to assure the success of the modeling component. Observational learning, or modeling, can be influenced and adjusted. It involves four key elements: attention, retention, reproduction, and reward. For learning to occur, individuals must be able to focus on the behavior, remember what they observed, convert their observations into actions, and be motivated to imitate the behavior they witnessed. Bandura (2021) explained that observational learning happens when imitative behavior is reinforced. This means that individuals are more likely to repeat behaviors they've observed in others if those behaviors are rewarded or encouraged.

The Social Learning Theory is related to cognitive and behavior learning theories, which also emphasize the central importance of social learning by taking into consideration how cognitive components such as attention, retention, and motivation affect imitable behaviors (Johnson et al., 2010). Reciprocal relationships among students' personal traits, contextual variables, and behaviors are essential constructs identified in cooperative learning practice (Schunk, 2007; Johnson et al., 2010). Since social learning theory predicts that people learn more effectively by observing and imitating the desirable actions of others, a strong link has been identified between this theory and cooperative learning practice. As a result, other students are expected to mimic and adapt social behavior and the activities of effective learners in cooperative learning groups through reciprocal determinism, or the interaction between observable actions, cognitive processes, and external surroundings.

Additionally, Vygotsky's Sociocultural Theory, as presented by Kozulin and Gindis (2020), underscores the significance of social interactions and collaboration in the development of cognitive skills.

Finally, since cooperative learning is a student-centered approach, its results are connected to constructivist learning theory, which asserts that "learners actively construct their own understanding" (Almala, 2005). Constructivism advocates claim that "learners are active agents in seeking meaning" (Driscoll, 2000). While the traditional view of education views learning as a direct transfer of knowledge from teachers to students, the constructivist perspective sees learning as an active process where students build their own understanding (Huang, 2006). Almala (2005) suggests that students should apply knowledge in various contexts to make learning as real-life as possible. Additionally, in a constructivist learning environment, teachers are encouraged to act as facilitators of learning, rather than simply providers of knowledge, as is common in traditional settings (Almala, 2005).

Consequently, teachers as facilitators play a crucial role in students' success because "constructivist lessons are generally more student-centered than traditional ones" (Mibrandt et al., 2004). Constructivist learning theory emphasizes how learners acquire knowledge rather than what they learn, making it applicable to cooperative learning practices (Almala, 2005; Dat-Tran, 2007). When learning materials are well-developed, this theory offers "the necessary theoretical support" for effectively implementing cooperative learning in the classroom (Mibrandt et al., 2004). Thus, students in cooperative learning groups, who actively engage with their peers, are expected to achieve greater learning outcomes.

1.2 Objectives of the Study

This research assessed the influence of Grade 8 students' attitudes and satisfaction in cooperative learning on their mathematical achievement at Carcar Central National High School in Carcar City Division, Cebu, Philippines, for the school year 2023-2024 as a basis for a mathematics learning enhancement plan.

Particularly, this study addressed the following:

1. Determine the respondent's demographic profile in terms of age and gender, parents' highest educational attainment, and combined family monthly income.
2. Describe the level of respondents' attitudes towards cooperative learning in Mathematics.
3. Identify the respondent's level of satisfaction with cooperative learning in Mathematics.
4. Determine the respondents' level of achievement in Mathematics.
5. Test the significance of the relationship between the:
     5.1 Respondents' attitudes in cooperative learning and their mathematics achievement; and
     5.2 Respondents' satisfaction with cooperative learning and their mathematics achievement.
6. Propose a mathematics learning enhancement plan.

1.3 Statement of the Null Hypothesis

Based on the objectives of the study, the following null hypothesis was tested at a 0.05 level of significance:

Ho1: There is no significant relationship between the respondents' attitudes in cooperative learning and their mathematics achievement.
Ho2: There is no significant relationship between the respondents' satisfaction with cooperative learning and their mathematics achievement.

2. Methodology

2.1 Research Design

This research utilized a descriptive correlational design to identify the relationship between students' attitudes and satisfaction in cooperative learning as the independent variables and their mathematical achievement as the dependent variable. A correlational research design explores the relationships between variables without any control or manipulation by the researcher (Bhandari, 2023). The research respondents were Grade 8 students from a National High School in Carcar City, Cebu, Philippines. In this study, after implementing cooperative learning, an attitude and satisfaction survey was administered to determine the influence of students' attitudes and satisfaction on their mathematical achievement. Further, to support and explain the findings of the survey, an achievement test was conducted to determine the influence of attitudes and satisfaction in cooperative learning methods. A simple random sampling method was used to select the respondents. Finally, the data was analyzed using appropriate statistical tools, including frequency distribution, percentage calculation, weighted mean, and Pearson correlation coefficient.

2.2 Environment

The research was conducted at a National High School in Carcar City, Cebu, Philippines. The study utilized the available materials, equipment, and respondents at this location. The National High School is located in P.Nellas St., Poblacion III, Carcar City, Cebu, Philippines. It was established in June 1995. There were 2 sections then, and the class started at 3:00 pm and ended at 9:00 pm. The junior high school program includes Grades 7 to 10, while senior high school covers Grades 11 to 12, offering Academic tracks such as Science, Technology, Engineering and Mathematics (STEM), Humanities and Social Sciences (HUMSS), and Technical- Vocational- Livelihood Track (TVL) with specializations like Computer Servicing, Welding, and Automotive. Carcar Central NHS also serves as a center for culture and arts.

2.3 Respondents

The study utilized a purposive sampling design, a non-probability study sampling method defined by its selection of individuals with direct experience and expertise relevant to the research objectives. This allowed a purposeful selection of individuals who

had the potential to give desired information concerning the success of inclusive study practices. Purposive sampling is useful in educational research, especially when the goal is to obtain detailed and in-depth information from individuals closely associated with the phenomenon you are interested in researching.

The researcher selected 35 general education teachers who actively co-teach both special needs students and typical students in inclusion classrooms. Criteria for participating in the study included implementing practices that best meet the needs of students in inclusive classrooms for a minimum of one academic year, current classroom involvement with diverse student populations, and working in recognized inclusive education programs. Focusing on teachers actively working in implementing inclusion (e.g., differentiated instruction, co-teaching) helped ensure that the data gathered would be grounded in practice. The distribution of respondents is given in Table 1, with females comprising 94.29 % and males 5.71 %.

Table 1. Distribution of the Respondents (n = 184)

Gender	f	%
Male	2	5.71%
Female	33	94.29%
Total	35	100.00

For the Sampling Process, it started cooperating with school administrators at Bonbon Elementary School, identified as one of the schools for inclusive Programs. In consultation with administrators, the researcher identified potential participants who met the criteria. Formal invitations were then issued to these teachers along with written information that discussed the aims of the study, what was expected of the teachers, and ethical guidelines, including confidentiality and voluntary participation. The teachers who agreed to take part in the study made up a sample of educators with direct examples of inclusive teaching in practice.

This purposeful sampling method was precisely planned to harvest the rich and applicable insights provided by potential employees engaged in inclusive education. Concentrating the research efforts on teachers with experience of inclusive practices in mixed-ability classrooms will generate data that can form the basis for discussing strategies for promoting more inclusive practices and policies in the same contexts.

2.4 Instrument

The researcher used the adapted version of the survey questionnaire developed by Hall et al. They evaluate the effectiveness of strategies and interventions used by general education teachers working in inclusive education (George, 2020). A four-point Likert scale was used to analyze the respondents' perceptions of their inclusive practices, where four indicated Strongly Agree, and 1 indicated Strongly Disagree. Data could be quantified on the usage and perceived effectiveness of various inclusive practices, including differentiation, curriculum modification, and co-teaching.

The original instrument by Hall et al. (Gonzalez et al., 2020) showed excellent psychometric properties, with a validity index of 0.89 and a reliability coefficient (Cronbach's alpha) of 0.92, confirming its efficacy in measuring relevant constructs. These indices supported its use as the basis for adaptations in the present study. An adapted version faithfully aligned with the local context while remaining true to the original framework.

To buttress the richness of the findings, qualitative data were also extracted through semi-structured interviews from a select group of participants. This combination of methods gave the researcher a broad quantitative trend and detailed qualitative information about teachers' challenges, experiences, and desires in their inclusive classrooms.

Hall et al. were formally approached and granted permission to adapt the survey questionnaire from Albacete et al. (2020). The authors provided details about the study aims and planned modifications to the instrument and assured compliance with ethics. Evidence of this correspondence is included in the appendices.

The adapted survey questionnaire was instrumental in determining the effectiveness of inclusive teaching practices based on self-reports, informing the policy directions, and identifying professional development needs. Copies of the repurposed instrument and evidence of communication with Hall et al. (2020) are in the appendices.

2.5 Data Gathering

The data-gathering procedures involved three stages: the preliminary stage, the data-gathering stage, and the post-data stage.

Preliminary Stage. First, permission was obtained from the Dean of the Graduate Studies and the research adviser through a signed letter of authorization before data collection. The authorization was then forwarded to the school principal to obtain their consent to allow the researcher to gather data from their constituents.

After acquiring the written approval, the School Principals/Heads were officially notified through another transmittal letter. Then, once official approvals from authorities have been secured, it is now time to get in touch with the respondents. A written informed consent was acquired from participants ensuring them confidentiality, and their right to withdraw anytime. A protocol maintaining the confidentiality of information was established. Before data collection, the respondents were briefed, and any inquiry was answered and doubts were clarified pertaining to the study's goals and processes.

Data Gathering Stage. Upon receiving the required permissions, questionnaires were then distributed to respondents personally on scheduled dates. Accommodations were made for the needed guidance during administration. Completed questionnaires were promptly retrieved.

Post Data Gathering Stage. Finally, the gathered data were organized, tabulated, analyzed, and interpreted using appropriate statistical methods and tools.

2.6 Data Analysis

Descriptive statistics of frequency and percentage distribution were used to analyze the demographic profile of teacher-respondents. This would be a clear and tabulated presentation of the distribution of the sample according to age, gender, civil status, highest educational attainment, specialization, and the training that they attended. These data will provide context for the backgrounds of the respondents as well as potentially relevant factors that might shape their approaches to work in the classroom.

The researcher also computed the mean and standard deviation of the teachers' self-reported effectiveness in utilizing inclusive teaching strategies. The mean scores represent specific practices by the level of implementation, whereas the standard deviation will indicate the reliability of the teachers' responses. This analysis shows how well inclusive education strategies are being applied and the significant differences in their implementation.

Finally, the data analysis was used to answer the study-specific aims. Details on these findings included the demographic profile of the teachers, what they reported regarding their inclusive practices, and what they found in areas where they could improve. It allows for iterative and close examination of the data to reach the goals of the study and provide an action that could help advance inclusive education.

2.7 Ethical Considerations

In keeping with the ethical principles to guarantee the rights, confidentiality, and well-being of the respondents involved in this study. To conduct this qualitative case study, the researcher sought informed consent from all teachers who agreed to participate in the study in order to ensure that individuals understand the purpose of the study, and their involvement in the research. Participation was voluntary; teachers can withdraw at any time without consequence. Furthermore, free will affirmation forms will be distributed and signed to confirm that study participants are voluntarily participating.

The privacy and anonymity of participants were maintained during the research process. Responses collected from the teachers remained private, and their identifiers were removed from the responses to eliminate one source of identity. In addition, because this study involves human subjects (high school students), the researcher asked school administrators and others to allow the conduct of the study.

The researcher also reports any data used in the study in an aggregate manner to avoid making individual responses identifiable. The ethical standards were maintained while interpreting and presenting the findings, specifically with consideration for avoiding bias and ensuring the participants' experiences and perspectives are represented accurately. By adhering to these ethical standards, the researcher maintained the study's integrity and the trust of the participants

3. Results and Discussion
3.1 Demographic Profile of the Teacher-Respondents

This demographic information offered valuable insights into educators' varied backgrounds, experiences, and qualifications, which can significantly impact their teaching methods and effectiveness in inclusive environments. Typically, the demographic profile encompassed age, gender, and educational qualifications related to inclusive education practices.

3.1.1 Age and Gender

The distribution of respondents' age and gender is shown in Table 2 displays the ages and compares the frequency and percentage between female and male teachers within each age group.

Table 2. Profile of the Teacher Respondents

Profile Variable	f	%
Age		
21 - 30	12	34.29
31 - 40	11	31.43
41 - 50	12	34.29
Gender		
Male	2	5.71
Female	33	94.29
Total	**35**	**100.00**

The data in Table 2 reveal that respondents' ages were evenly distributed between the age brackets of 21-30 (34.29%) and 41-50 (34.29%), with a slightly smaller group in the 31-40 range (31.43%). This indicated a balanced representation of younger and middle-aged participants, reflecting diversity in age and potentially varying levels of professional experience. Regarding gender, a significant majority (94.29%) were female, while only 5.71% were male. This imbalance suggested that the field or context in which this study was conducted may be dominated by women, which was common in specific educational or caregiving professions.

It is also worth noting that the gender ratio of subjects (high representation of females) might well play a role in explaining these data. In intervention settings dominated by women, such as education or nursing, experiences with gender could influence the ways that participants approached and responded to work-related challenges. Moreover, the diversity of ages indicated that any interventions or strategies discussed in the study should consider varying levels of professional experience, with younger participants possibly needing mentoring, and older participants having considerable practical knowledge.

In the context of inclusive education, this meant looking at how teacher preparedness and readiness to embrace inclusive practices varied with gender and age differences, for example. It could influence classroom dynamics and the nature of the supports needed to promote inclusion, given that there is such a large female teacher body.

Research has recently endorsed that teacher demographics, age, and gender, for example, have impacted educational success. A study by López-Cobo et al. (2022) investigated the influence of teachers' gender and age on their attitudes towards and use of inclusive practice. It found that female teachers tended to be more empathetic and adaptable in inclusive classrooms. Likewise, a different study by Bas et al. (2021) found that the older (more than 40 years in age) and experienced teachers were more inclined to adopt innovation in pedagogies than the younger, less experienced teachers.

Moreover, Suhonen et al. (2020) described how in these female-dominated sectors, and especially in education, gender can influence the culture of collaboration within the work environment, resulting in stronger support structures, as well as challenges in terms of gender diversity and equity. Seven out of ten respondents were female, and ages ranged from 14-60, suggesting that despite an even spread of respondents by sex, findings discussed may vary by age and gender-related expectations as throughout the review paper. Upshot these findings suggest that interventions should be sensitive to gender, age, and general context difference and how this general context may biased the effectiveness of interventions (especially in professional settings like Topology where females were in the majority) Such future research should also investigate how these factors interacted with professionalization and inclusion to make sure that training and vital support mechanisms were responsive to the various needs educators have.

3.1.2 Highest Educational Attainment

The respondents' highest educational attainment distributed among categories with their frequencies and percentages are shown in Table 3.

Table 3. Teacher Respondents' Highest Educational Attainment (n=35)

Profile Variable	f	%
Baccalaureate Degree	3	8.57
with MA/MS units	26	74.29
MA/MS	5	14.29
Ph.D./Ed.D.	1	2.86
Total	**35**	**100.00**

The data showed that most of the respondents, 74.29%, had earned MA/MS units, indicating that most participants were pursuing or had begun postgraduate education. A smaller portion of the respondents, 14.29%, had completed a master's degree (MA/MS), while 8.57% had only a baccalaureate degree. Only one respondent, representing 2.86%, had achieved a doctoral degree (Ph.D./Ed.D.). This suggested that most respondents were at various stages of their academic advancement beyond the bachelor's degree level.

This educational profile gave a good picture of a highly educated group of respondents, with most pursuing advanced degrees. This had several consequences for professional practices, particularly in fields such as education or specialized contexts where higher education was associated with advanced pedagogical strategies, leadership, or decisional practices. The data suggested that the respondents had the theoretical knowledge and the skills needed to facilitate and participate in higher-order processes, which would bode well for their participation in roles requiring such skills (e.g., inclusive education or specialized services).

The 74.29 percent still studying their units in postgraduate studies depicted a great will to pursue more in the professional side of operations. This group would benefit from programs facilitating their continuing education, such as workshops on research methods or grants for advanced studies. The relatively low percentage of respondents (8.57%) with only a baccalaureate degree implied that many were either newer to the profession or working in a profession that requires less than a higher degree. Having just one person with a PhD might indicate that leadership and expertise were lacking.

Current research supported the idea that advances in education among professionals and teachers improved students' teaching, innovation, and engagement in the classroom. A study by Comon and Corpuz (2024) investigated the impact of graduate-level education on teachers' instructional styles and found that teachers with either MA/MS units or degrees performed at a higher level in adaptable and creative instruction. In the same manner, Engida et al. (2024) study found that when teachers engaged in postgraduate education, they reflected upon what they taught, which, in turn, enabled them to teach more effectively by meeting the needs of students.

In addition, obtaining master's degrees has been correlated with improved leadership capabilities. According to Maviş Sevim and Akın (2021), teachers with postgraduate qualifications were more likely to take leadership positions in schools and promote improvements in curriculum and policies to enhance student learning outcomes.

Most respondents had been in postgraduate studies or higher, illustrating a very educated group. Such educational advancement would surely reflect better professional practices in specialization skills and knowledge fields. It highlighted the great practice of continuous learning that may broaden their opportunities for leadership and innovation in their fields.

3.2 Level of Performance in the Application of Strategies of the Teacher-Respondents
One of the most essential aspects of assessing the effectiveness of inclusive education is evaluating general education instructors' application of strategies. This performance directly impacts instructors' ability to address the various requirements of all students, especially those with different backgrounds and abilities.

3.2.1 Strategies
One of the specific factors affecting inclusive education is the possible effect of methods used by general education teachers because the general education teachers are expected to be equipped with different teaching skills to meet the needs of the wide-ranging diversity of students in a classroom, including students with special needs. The effectiveness of inclusion relies heavily upon teachers' mastery of strategies like differentiated instruction, cooperative learning, and individualized supports that engage students with varied learning profiles (Stingo,2024).

Table 4. Level of Performance of the Teacher Respondents (STRATEGIES)

S/N	Indicators	$\bar{x}$	Median	sd	Verbal Description
1	Differentiated instruction is used in the classroom.	3.83	4.00	0.38	Strongly Agree
2	Cooperative learning strategies are implemented in the classroom.	3.89	4.00	0.32	Strongly Agree
3	The curriculum is adapted to meet the needs of diverse learners	3.89	4.00	0.41	Strongly Agree
4	Assessments are modified to accommodate students with special needs	3.77	4.00	0.43	Strongly Agree
5	Collaboration with special education professionals supports inclusive practices	3.66	4.00	0.48	Strongly Agree
6	Cooperative learning strategies are implemented.	3.86	4.00	0.36	Strongly Agree
7	The curriculum is adapted to meet the needs of diverse learners	3.77	4.00	0.43	Strongly Agree
8	Assessments are modified to accommodate students with special needs	3.74	4.00	0.44	Strongly Agree
9	Collaboration with exceptional education professionals supports inclusive practices	3.77	4.00	0.43	Strongly Agree
	Overall Rating	3.79	4.00	0.41	Strongly Agree

Legend: *3.26 - 4.00 Strongly Agree, 2.51 – 3.25 Agree, 1.76 – 2.50 Disagree, 1.00 - 1.75 Strongly Disagree*

Table 4 presented the level of performance of teacher respondents in implementing strategies within inclusive classrooms. The overall area of concern, "Practical Techniques," received a weighted mean of 3.79, verbally interpreted as "Strongly Agree." The highest-rated strategy was the implementation of cooperative learning strategies (3.89), while the lowest was collaboration with exceptional education professionals (3.66). The minor standard deviations (ranging from 0.32 to 0.48) indicated relatively consistent teacher responses.

All strategies evaluated, including differentiated instruction, curriculum adaptation, and assessment modification for students with special needs, were rated highly, suggesting that teachers strongly agree that they effectively use these techniques in inclusive classrooms.

This included differentiation, cooperative learning, curriculum, and assessment adaptation, which indicated that teachers were highly competent to conduct inclusive education in this context. Our slightly lower rating for collaboration with exceptional education professionals (3.66) probably means that we could improve interdisciplinary cooperation, which could give stronger results in the practice of inclusion.

This suggested that one area of professional development that was sorely needed and may helped with the collaboration between general and special education teachers should be a focus of efforts to improve professional development (Germuth, 2018). With a good overall performance in other areas, more focused efforts to improve how teachers worked together and created richer professional networks would helped raise the quality of inclusive education even further.

These findings echoed research carried out in recent years, which, among other things, highlighted the significance of differentiated learning and cooperative learning approaches in inclusive classrooms (Ismail & Al Allaq, 2019).

A current study by Langelaan et.al.(2024) highlighted the significance of differentiated instruction as an essential practice in inclusive classrooms that positively impacted student engagement and achievement. Strong teacher agreement with the use of differentiated teaching in the classroom was also discovered in the current study, which supported other studies showing how beneficial this strategy was at fostering inclusive education.

Moreover, cooperative learning strategies, which received the highest rating in the current study, had been widely recognized as effective in promoting inclusion. For example, Chakyarkandiyil and Prakasha(2023) highlighted that cooperative learning created

an environment where students worked together, supporting the academic and social integration of students with diverse needs. This finding was consistent with the current study's high ratings on cooperative learning practices.

However, the slightly lower score on collaboration with exceptional education professionals highlighted a gap that other studies had identified. According to Aporbo (2023), effective inclusion required strong collaboration between general and special education teachers. Their study found that when teachers worked closely with special education professionals, students with special needs received more tailored support, which enhanced learning outcomes. The current study suggested that while teachers were implementing inclusive strategies effectively, there was a need to improve interdisciplinary collaboration to maximize the benefits of inclusion.

The findings indicated that teachers strongly agreed that implementing practical techniques, such as differentiated instruction, cooperative learning, and curriculum adaptation, was essential for inclusive education. However, the lower score for collaboration with exceptional education professionals suggested a need for improvement in interdisciplinary teamwork. Future initiatives should focus on strengthening these collaborative efforts to ensure comprehensive support for students with special needs.

3.2.2 Intervention

When evaluating the effect of general education teachers' methods on the achievement of inclusive education, the performance level of teacher responders in executing different interventions was a crucial consideration. In order to effectively meet the different needs of students, especially those with disabilities or learning challenges, tailored instructional methodologies, behavioral support networks, and customized learning plans are essential components of effective treatments.

Table 5. Level of Performance of the Teacher Respondents (INTERVENTION)

S/N	Indicators	$\overline{x}$	Median	sd	Verbal Description
10	Differentiated instruction is used in the classroom.	3.97	4.00	0.17	Strongly Agree
11	Cooperative learning strategies are implemented in the classroom.	3.94	4.00	0.24	Strongly Agree
12	The curriculum is adapted to meet the needs of diverse learners	3.80	4.00	0.41	Strongly Agree
13	Assessments are modified to accommodate students with special needs	3.71	4.00	0.46	Strongly Agree
14	Collaboration with special education professionals supports inclusive practices	3.74	4.00	0.44	Strongly Agree
	Overall Rating	3.83	4.00	0.37	Strongly Agree

Legend: *3.26 - 4.00 Strongly Agree, 2.51 – 3.25 Agree, 1.76 – 2.50 Disagree, 1.00 - 1.75 Strongly Disagree*

Table 5 reflects the level of performance of teacher respondents in implementing interventions in an inclusive education setting. The overall weighted mean for the intervention strategies was 3.83, verbally interpreted as Strongly Agree, indicating that teachers were confident in the effectiveness of their interventions. Among the specific strategies, "Differentiated instruction improved student outcomes" received the highest rating (3.97), while "Assessment modifications accurately measured the abilities of students with special needs" received the lowest (3.71). The minor standard deviations, ranging from 0.17 to 0.46, reflected consistency in responses.

The data suggests that teachers believed differentiated instruction and cooperative learning strategies were particularly effective in improving student outcomes and engagement. The high ratings indicated that teachers perceived these interventions as essential in meeting the needs of diverse learners. However, the lower rating for assessment modifications (3.71) implied that teachers may still face challenges in accurately measuring the abilities of students with special needs, which could be a focal area for future professional development or curriculum reform. The effectiveness of curriculum adaptation (3.80) and teacher intervention in inclusive setups (3.74) also received strong ratings, indicating that these practices contributed to a positive learning environment. However, continuous support and training could help refine these interventions to maximize their impact, particularly in inclusive settings where students with diverse learning needs require highly tailored support.

The findings align with recent studies that emphasize the role of differentiated instruction and cooperative learning in inclusive education. For instance, according to a study by Gheyssens et al. (2023), differentiated instruction has been shown to significantly improve student outcomes, particularly in inclusive classrooms where diverse learning needs must be addressed. The strong agreement among teachers in this study that differentiated instruction improved student outcomes supported the growing body of research advocating tailored teaching methods

In parallel, research by Tranet.al. (2019) reinforced the importance of cooperative learning in enhancing student engagement, particularly for students in inclusive classrooms. Cooperative learning had increased interaction among students with special educational needs, leading to a supportive learning environment. This was situated with the present study's result, which showed that teachers strongly agreed that cooperative learning strategies were effective. However, the relatively lower rating for assessment modifications reflected findings from a study by Deysolong et al. (2023), which noted that many teachers struggled with modifying assessments to accurately reflect the abilities of students with special needs. The study pointed out the need for better training and resources to help teachers design and implement equitable and accurate assessments for diverse learners.

The results indicated that teachers believed their interventions, such as differentiated instruction and cooperative learning, effectively improved student outcomes and engagement in inclusive classrooms. Nevertheless, the data also mean there was room for advancement in assessment abatement for learners with special educational needs. The findings were fixed with recent research, stressing the importance of tailored teaching methods in inclusive settings and emphasizing the ongoing challenges in assessment practices. Continuous training in assessment modifications would help teachers better support the diverse learners in their classrooms, ensuring more equitable and accurate evaluations of student progress.

3.3 Significance of the Relationship Between the Demographic Profile and the Level of Performance of the Teacher Respondents

Assessing the impact of educational methods, particularly in the context of inclusive education, requires understanding the relationship between teachers' performance and their demographic characteristics. Factors such as age, gender, educational background, and prior teaching experience can significantly impact teachers' use of instructional techniques and interventions in diverse classrooms. By examining these connections, trends may be found that can direct professional development programs and best practices in the classroom. The data are shown in Table 6.

Table 6. Level of Performance of the Teacher Respondents (INTERVENTION)

Paired Variables			Multiple R	R Square	*p*-value	Significance
Profile and Strategies			0.368	0.135	0.2038	Not Significant
Age					0.225	Not Significant
Gender					0.104	Not Significant
Education					0.676	Not Significant
Profile and Intervention	0.20	0.043			0.773	Not Significant
Age					0.470	Not Significant
Gender					0.343	Not Significant
Education					0.546	Not Significant

*α = 0.05, * significant at p < 0.05*

Table 6 presents the significance test for the correlation between teachers' profiles (age, gender, education) and their performance regarding strategies and interventions in inclusive classrooms. The multiple R-values showed a weak positive correlation between teacher profile variables and performance in strategies (0.368) and interventions (0.207). However, the P-values (0.2038 and 0.773) indicated that these correlations were not statistically significant, meaning that there was no substantial evidence to suggest that a teacher's age, gender, or education level significantly affected their performance in implementing strategies or interventions.

Age, gender, and education all showed no significant relationship with strategy or intervention performance, as their P-values were greater than 0.05. Education had a slightly higher multiple R-value (0.676) when correlated with strategies, but the result remained insignificant. The lack of a significant correlation between teacher profiles and performance suggested that factors such as age, gender, or level of education do not strongly influence teachers' effectiveness in applying strategies and interventions for inclusive education. This implied that regardless of demographic differences, teachers were likely to perform consistently in terms of their ability to implement inclusive practices. The findings highlighted the potential effectiveness of standardized training programs, which could be designed to ensure that all teachers, regardless of their background, were equipped with the necessary skills to apply inclusive strategies.

Given that education, explicitly having advanced degrees (MA/MS or PhD), did not significantly correlate with performance, this finding suggested that practical experience or professional development might play a more crucial role than formal qualifications in enhancing teachers' capacity to implement inclusive education strategies effectively. When studies explored the impact of demographic characteristics in inclusive settings, they showed conflicting results. Malik et al. (2021) investigated the link between inclusive education and teacher demographics and performance. And they found no strong relationship between teacher age or gender and effectiveness, as with the current study. Demographic context factors appeared to have decreased in their impact on the effectiveness of inclusive teaching since new teacher preparation likely because good preparation for and ongoing professional development in inclusive teaching were more effective than the influence of demographic context factors.

Though some of the studies highlighted the importance of education level in other specific cases. For example, Jones et al. (2020) proposed that higher education, particularly in specific domains such as special education might enhance the teachers' skills to individualize instruction and modify assignments to suit their students' levels. The current study, which found no significant correlation between education and performance, might suggest that formal education alone was insufficient and that professional experience and targeted training were more impactful in practice. Furthermore, Wang and Hall's (2022) study specified that continuous professional development, rather than demographic factors like age or education level, had the strongest influence on teachers' success in inclusive settings. This strengthened the importance of strong learning opportunities that allowed teachers to improve their skills, as evidenced by the results of the present study.

The findings revealed no significant correlation between teacher profiles (age, gender, education) and their performance in implementing strategies and interventions for inclusive education. This suggested that demographic factors were not strong determinants of teacher effectiveness in inclusive classrooms. Instead, the results underscored the importance of consistent, high-quality professional development that equipped all teachers with the practical skills necessary for inclusive teaching.

3.4 Challenges the Teacher Respondents Encountered When Integrating Practical Techniques and Interventions
Fostering inclusive education required integrating practical strategies and interventions in the classroom; nevertheless, teacher responders frequently faced various difficulties in this process. Lack of proper training and professional development could be a significant barrier, leaving teachers ill-prepared to adopt inclusive practices and modify their lesson plans to accommodate a range of student requirements. The data are shown in Table 7.

Table 7. Challenges Encountered by the Teachers When Integrating Practical Techniques and Interventions

Area of Concern	Weighted Mean	Median	SD	Verbal Interpretation
CHALLENGES ENCOUNTERED	3.33	3.00	0.61	Strongly Agree
1. I face significant challenges in implementing inclusive education practices.	3.51	4.00	0.51	Strongly Agree
2. I have effective strategies to address the challenges of implementing inclusive education practices.	3.26	3.00	0.44	Strongly Agree
3. I find it difficult to adapt the curriculum to meet the diverse needs of learners.	2.57	2.00	0.81	Agree
4. I am confident in my ability to modify the curriculum to cater to the needs of all students.	3.51	4.00	0.56	Strongly Agree
5. Assessments are challenging to modify for students with special needs.	3.66	4.00	0.48	Strongly Agree
6. I have appropriate strategies for adapting assessments to accommodate students with special needs.	3.37	3.00	0.49	Strongly Agree
7. Collaboration with exceptional education professionals is crucial for supporting inclusive practices.	3.31	3.00	0.47	Strongly Agree
8. I effectively collaborate with exceptional education professionals to enhance inclusive education.	3.29	3.00	0.46	Strongly Agree
9. I feel supported by my school administration in implementing inclusive education practices.	3.51	4.00	0.66	Strongly Agree
10. I receive adequate training to help me effectively integrate inclusive education practices into my teaching.	3.31	3.00	0.47	Strongly Agree

Table 7 illustrates teachers' challenges when integrating practical techniques and interventions in inclusive education settings. The overall weighted mean of 3.33 indicated that teachers "Strongly Agree" faced significant challenges in implementing inclusive practices. Among the specific areas, modifying assessments for students with special needs was perceived as the most challenging (mean = 3.66). At the same time, difficulty in adapting the curriculum had a lower weighted mean of 2.57, which was verbally interpreted as "Agree." Teachers felt confident in modifying the curriculum (mean = 3.51) and collaborating with exceptional education professionals (mean = 3.29). Yet, they still identified significant obstacles, especially regarding assessment modifications and administrative support.

These findings suggested that while teachers feel somewhat confident in their ability to modify the curriculum and collaborate with other professionals, they still faced considerable challenges, particularly in adapting assessments for students with special needs. This highlighted a gap in either resources or training, implying the need for more targeted support and professional development focused on assessment strategies for diverse learners.

Furthermore, the data showed that while teachers acknowledged the importance of collaboration and school administration support, the lower mean scores related to effective collaboration and administrative support implied that these areas could be strengthened. Providing more opportunities for team-based professional learning and enhancing school support systems could significantly reduce teachers' challenges in inclusive classrooms.

The significant challenge in modifying assessments underscored the need for teacher training in this area, which was crucial for ensuring that assessments fairly and accurately measured the abilities of all students, especially those with special needs. The verbal interpretation of "Strongly Agree" regarding the difficulty of assessment adaptation (mean = 3.66) aligned with studies emphasizing the complexity of inclusive assessment practices.

Recent literature documented the challenges teachers face in implementing inclusive education practices well. For instance, a study by Mishra et al. (2019) identified curriculum adaptation and assessment modification as two of the most significant challenges in inclusive education. Teachers in their study echoed the current findings, particularly in struggling to develop assessments that accurately measured the abilities of students with special needs. This suggested that ongoing professional development and resources focused on assessment practices are critical for inclusive education success.

Similarly, research by Woodcock et al. (2022) highlighted the importance of teacher confidence and collaboration in inclusive education. While teachers in the current study reported confidence in their ability to modify the curriculum (mean = 3.51), they acknowledged that collaboration with special education professionals (mean = 3.29) and administrative support (mean = 3.51) was crucial to effectively implementing inclusive practices. Sharma and Loreman's findings supported this view, arguing that successful inclusion depended heavily on a supportive school environment and stakeholder collaboration.

Furthermore, a study by Ackah (2020) emphasized the necessity of sustained professional development for teachers to address challenges in inclusive settings. Teachers in this study expressed that while they received some training (mean = 3.31), it might not be sufficient to fully equipped them with the strategies needed to address the complexity of inclusive education, particularly in modifying assessments. Florian and Beaton argued for a more sustained and practical approach to teacher training that addresses these persistent challenges.

The results indicated that while teachers generally felt confident in their ability to modify the curriculum and collaborate with special education professionals, they still faced significant challenges in adapting assessments for students with special needs. This finding underscored the importance of providing more targeted support, professional development, and resources to help teachers addressed the complex challenges of inclusive education. Recent studies aligned with these findings, indicating that the most significant barriers in inclusive education relate to assessment adaptation and the need for more vital collaboration and administrative support. To address these challenges, schools must prioritized continuous teacher training and foster more robust collaborative environments within their educational settings.

4. Conclusion and Recommendations

The study highlighted that while teachers in inclusive education settings demonstrated strong capabilities in applying practical techniques such as differentiated instruction, cooperative learning, and curriculum adaptation, significant challenges persist, particularly in modifying assessments for students with special needs. Despite their confidence in implementing inclusive practices, the lack of significant correlation between teachers' demographic profiles and their performance suggested that professional development and support should be universally applied, regardless of age, gender, or education level. Continued efforts to enhance teacher collaboration with special education professionals and provided more resources for assessment modifications were essential for further improving the effectiveness of inclusive education.

Further research on the impact of teaching experience and school support systems was recommended, alongside continuous professional development for all teachers. Focused professional development on assessment modification and enhancing collaboration with special education professionals was needed. Future research should explore other factors, such as teaching experience and school context that might influence the effectiveness of inclusive strategies. Training on inclusive assessment practices and assistive technologies should be prioritized, along with regular collaboration between general and special education teachers. Implemented mentorship systems and shared resources to help teachers modified assessments and improved inclusive education practices.

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