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Assessing the Role of Adaptive Materials in Inclusive Classrooms at Colon Integrated School

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ABSTRACT: *This study explored the level of access to inclusive education resources among teachers and its relationship to learners' academic performance. It focused on three key resources: adaptive materials, assistive technology, and classroom aides. Descriptive method of research was utilized, using frequency and percentage for the relevant information of teachers, while, mean for the level of access to resources and correlation analysis for the test of relationship. Data showed that teachers had positive access to these resources, with adaptive materials rated as effective and relevant, assistive technology seen as enhancing student independence, and classroom aides viewed as collaborative and supportive. However, despite these positive evaluations, no significant relationship was found between the level of access to these resources and learners' academic performance, suggesting that other factors may play a role in influencing outcomes. The study also highlighted areas for improvement, such as the need for enhanced teacher training, better integration of resources into the curriculum, and improved technical support and maintenance for assistive technology. Based on these findings, the study recommends a strategic plan to address these gaps, focusing on teacher training, resource integration, collaboration among staff, and holistic support for learners. The plan aims to maximize the impact of inclusive education resources, ensuring that they contribute more effectively to both academic and non-academic outcomes. This study underscores the importance of a comprehensive approach to inclusive education, where resources are not only accessible but also strategically utilized to meet the diverse needs of learners. The findings provide valuable insights for educators, policymakers, and stakeholders working towards inclusive and equitable education for all.*

Key words*: Adaptive materials in inclusive Classrooms, Inclusive classrooms, Integrated school, Special education.*

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1. Introduction

The push for inclusive education has gained traction worldwide, as countries aim to provide equitable learning opportunities for all students, regardless of abilities or needs (Bosio & de Wit, 2024). Global initiatives, such as the United Nations' Sustainable Development Goals, advocate for inclusive and quality education, recognizing that educational equity is essential for social justice and societal progress

(Bombardelli, 2020). National education policies increasingly support inclusive schooling, enabling students with diverse backgrounds and abilities to participate in general education settings, a step forward in dismantling discriminatory barriers in education (Shaeffer, 2019). Research highlights that inclusive education not only fulfills human rights commitments but also enriches learning environments by fostering diversity and mutual understanding (Óskarsdóttir et al., 2020).

To implement inclusive education effectively, specific resources, such as adaptive materials, assistive technology, and classroom aides, are necessary (Hoogerwerf et al., 2021). These tools can bridge the gap in diverse learning needs, providing personalized support to students who might otherwise struggle in traditional settings (Baldiris et al., 2016). Adaptive materials, for example, allow students with different physical or cognitive abilities to engage with the same content, while assistive technologies facilitate independence and communication (Óskarsdóttir et al., 2020). Classroom aides also support teachers by providing targeted assistance, allowing them to manage a diverse classroom effectively (Arnaiz Sánchez et al., 2019).

Educational institutions face several challenges in establishing inclusive classrooms, primarily due to budget limitations, insufficient infrastructure, and a lack of specialized resources. These constraints hinder schools from providing necessary adaptive tools or hiring additional support staff, which are critical for inclusive education (Mostafa, 2020). Additionally, limited access to professional development for teachers on inclusive practices exacerbates these issues, as many educators feel unprepared to meet diverse student needs (Bombardelli, 2020).

Access to resources such as adaptive materials and assistive technology greatly improves teacher confidence and preparedness in inclusive classrooms. When educators have access to adequate tools and training, they feel more competent and equipped to support students with diverse learning needs effectively (Óskarsdóttir et al., 2020). Professional development programs focused on using these resources also enhance teachers' abilities to implement inclusive practices, making them more adaptable and responsive to various challenges (Baldiris et al., 2016). Adequate resources in inclusive classrooms positively impact students' academic, social, and emotional development by promoting engagement and improving learning outcomes. Tools like assistive technology and adaptive learning materials help students actively participate in lessons, fostering a sense of belonging and value within the classroom community (Anis, 2023). The inclusive environment nurtured by these resources encourages students' confidence, peer interactions, and emotional well-being (Lo et al., 2019).

Despite growing awareness about the importance of inclusive education, disparities in resource allocation continue to exist, significantly impacting the effectiveness of teaching in diverse classrooms. Many schools, like NPC - Colon Integrated School in the City of Naga, lack sufficient tools and materials specifically designed for inclusive settings, which hinders both teacher performance and student learning. This gap suggests a pressing need to investigate how these shortages affect the educational experience in inclusive classrooms and to identify strategic measures that can bridge these gaps, ensuring all students receive the support they need to thrive academically, socially, and emotionally.

For Colon Integrated School in the City of Naga, this study offers insights into the benefits of equipping schools with resources tailored to inclusive education. Identifying effective practices and addressing gaps in current infrastructure, the school can enhance both teaching quality and student success. The findings may guide policy adjustments, resource allocation, and professional development that support a more inclusive and equitable learning environment for all students.

2. Review of Literature

Adaptive materials are educational resources that are customized to accommodate the unique requirements of students with disabilities (Ingavelez-Gueverra et al., 2022). These materials may encompass Braille versions of reading materials, simplified literature, and large-print textbooks. Students' capacity to engage with the curriculum effectively is directly influenced by the quality and availability of adaptive materials. According to research, students with disabilities are more likely to engage in the general education curriculum when educators provide suitable adaptive materials, which in turn improves their learning experiences (Alnahdi, 2019). Tools and devices that assist students in surmounting or circumventing their learning obstacles are collectively referred to as assistive technology (AT). Examples consist of speech-to-text applications, audiobooks, and text-to-speech software. The incorporation of AT in classrooms has been demonstrated to enhance students' motivation, participation, and autonomy. A study has demonstrated that AT

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can substantially enhance the accessibility of education for students with disabilities by offering personalized assistance that caters to their unique learning requirements (Dell et al., 2017). In inclusive classrooms, students with disabilities receive critical assistance from classroom aides, including paraprofessionals and teaching assistants (Fritzsche & Kopfer, 2022). They provide support in the areas of behavior management, individualized instruction, and the implementation of accommodations. Improved academic outcomes and increased engagement among students with disabilities have been linked to the presence of well-trained assistants. In order to effectively support inclusive education practices, research underscores the significance of collaboration between instructors and aides (Giangreco et al., 2010).

3. Methodology

This study employed a descriptive-correlational research design to examine teachers' access to inclusive education resources at NPC - Colon Integrated School, City of Naga, and its relationship with learners' academic performance. The research utilized the INPUT-PROCESS-OUTPUT approach to systematically analyze the data. Data collection was conducted at a specific point in time, using structured questionnaires adapted from Netherton & Deal (2006) and Manrique et al. (2019), which assessed the availability, accessibility, and perceptions of adaptive materials, assistive technology, and classroom aides in inclusive settings. The study respondents included both teachers and learners within the research environment. Descriptive statistical methods, such as means and frequency distributions, were used to analyze the level of access to inclusive education resources. To determine the relationship between teachers' access to these resources and learners' academic performance, the study utilized the correlation coefficient as a statistical tool. This method allowed for an in-depth understanding of how access to inclusive education resources may influence students' academic achievements without manipulating any variables.

Table 1. Adaptive materials.

Indicators	Mean	Verbal Description
The frequency with which adaptive materials (e.g., large-print books, tactile aids) are readily available for use in the classroom.	4.07	A
Teachers' ease of access to adaptive materials that meet diverse student needs.	4.10	A
Perceived effectiveness of adaptive materials in enhancing student engagement and comprehension.	4.00	A
Relevance and suitability of adaptive materials to students' specific learning challenges and curriculum needs.	4.20	A
Availability and quality of training for teachers on how to use and integrate adaptive materials effectively in lesson plans.	3.93	A
Grand Mean	4.06	A

4. Results and Discussion

The data presents the level of access to inclusive education resources, specifically adaptive materials. The results show a positive overall assessment, with a grand mean of 4.06, indicating a rating of Agree. Teachers find adaptive materials relevant and suitable for students' specific learning challenges and curriculum needs, with the highest mean of 4.20. Ease of access to these materials also scored well at 4.10. The availability of adaptive materials for classroom uses and their perceived effectiveness in enhancing student engagement and comprehension scored similarly at 4.07 and 4.00, respectively. Training availability and quality for using these materials received the lowest, though still positive, mean of 3.93. This suggests that while adaptive materials are generally accessible and effective, there may be room for improvement in teacher training.

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Table 2. Assistive technology.

Indicators	Mean	Verbal description
Availability of essential assistive technology tools (e.g., screen readers, speech-to-text software) in the classroom.	4.23	A
Teachers' ability to incorporate assistive technology seamlessly into daily lessons and activities.	4.30	SA
Teachers' perceptions of how well assistive technology enhances student independence and learning outcomes.	4.27	SA
Availability of technical support and regular maintenance for assistive technology devices.	3.93	A
Access to professional development or training on the use of assistive technology for diverse student needs	4.20	A
Grand Mean	4.19	A

The data presents the use and support of assistive technology in the classroom. Overall, the grand mean is 4.19, indicating a rating of Agree. Teachers perceive the availability of essential assistive tools as strong, with a mean of 4.23, and their ability to seamlessly incorporate these tools into lessons received the highest score of 4.30 verbally described as strongly agree. Teachers also strongly agree with a mean of 4.27 that assistive technology enhances student independence and learning outcomes. Access to professional development and training scored positively at 4.20, while the availability of technical support and regular maintenance scored slightly lower at 3.93. This suggests that while assistive technology is generally accessible and effective, technical support and maintenance could be areas for further improvement.

Table 3. Classroom Aids.

Indicators	Mean	Verbal description
Consistency and adequacy of classroom aide support for students with special needs.	4.13	A
Teachers' views on how well classroom aides assist in managing student behaviors and supporting individualized instruction	4.13	A
The degree to which teachers and classroom aides work together effectively to support student learning.	4.30	SA
Teachers' assessment of classroom aides' training, skills, and preparedness for inclusive classroom tasks.	4.20	A
Aides' ability to adapt to various student needs and classroom situations, enhancing the inclusive learning environment.	4.17	A
Grand Mean	4.19	A

The data presents teachers' perspectives on the effectiveness of classroom aides in supporting inclusive education. Overall, the grand mean is 4.19, reflecting a positive evaluation which verbally described as agree. Teachers strongly agree with a mean of 4.30, describe that they collaborate effectively with classroom aides to support student learning. Classroom aides' training, skills, and preparedness scored well, with a mean of 4.20, indicating that teachers generally find them capable of handling inclusive classroom tasks. The ability of aides to adapt to diverse student needs and classroom situations received a mean of 4.17. Teachers also agree with a mean of 4.13, that aides consistently provide adequate support and help manage student behavior and individualized instruction. This suggests a strong overall performance by classroom aides, with particularly effective collaboration between aides and teachers.

Table 4. Learners' Academic Performance.

Y	Average	Description
English	83.81	Satisfactory
Science	82.54	Satisfactory
Math	81.35	Satisfactory

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The data shows the average academic performance of students across three subjects. Students achieved a satisfactory performance in all subjects, with the highest average score in English at 83.81. Science followed closely with an average of 82.54, while Math had the lowest average score at 81.35. Overall, the data indicates consistent performance across subjects, with room for improvement to elevate their performance.

Table 5. Significant relationship on the level. of access to inclusive education resources and learners' performance in English subject

Constructs	r-value	t-value	P value	Remarks	Decision
Adaptive Materials	0.148756	0.795998	0.43273	Not significant	Do not reject
Classroom Aids	0.139287	0.744293	0.462901	Not significant	Do not reject
Assistive Technology	0.070805	0.37561	0.710038	Not significant	Do not reject

The data presents the relationship between teachers' access to inclusive education resources (adaptive materials, classroom aids, and assistive technology) and learners' performance in the English subject. The results indicate weak positive correlations for all three resources, with r-values of 0.15, 0.14, and 0.07, respectively. However, the P-values for all three (0.43, 0.46, and 0.71) are greater than 0.05, meaning the correlations are not statistically significant. The t-values also confirm this lack of significance. Based on these findings, we cannot conclude that access to these resources has a significant impact on students' performance in English. Therefore, the null hypothesis is not rejected for any of the constructs, suggesting that other factors may play a more critical role in determining learners' success in English subject.

Table 6. Significant relationship on the level. of access to inclusive education resources and learners' performance in science subject

Constructs	r-value	t-value	P value	Remarks	Decision
Adaptive Materials	0.125096	0.667186	0.510115	Not significant	Do not reject
Classroom Aids	0.09534	0.5068	0.616263	Not significant	Do not reject
Assistive Technology	0.030702	0.162535	0.872052	Not significant	Do not reject

The data presents the relationship between teachers' access to inclusive education resources and learners' performance in the Science subject. The results show very weak positive correlations, with r-values of 0.13 for adaptive materials, 0.10 for classroom aids, and 0.03 for assistive technology. However, none of these correlations are statistically significant, as indicated by the P-values (0.51, 0.62, and 0.87), which are all greater than 0.05. The corresponding t-values also confirm the lack of significance. These findings suggest that access to these resources does not have a significant impact on students' Science performance.

Table 7. Significant relationship on the level. of access to inclusive education resources and learners' performance in math subject

Constructs	r-value	t-value	P value	Remarks	Decision
Adaptive Materials	0.232487	1.264862	0.216347	Not significant	Do not reject
Classroom Aids	0.189251	1.019851	0.316531	Not significant	Do not reject
Assistive Technology	0.149869	0.802092	0.429255	Not significant	Do not reject

The data explores the relationship between teachers' access to inclusive education resources and learners' performance in Math. The results show weak positive correlations, with r-values of 0.23 for adaptive materials, 0.19 for classroom aids, and 0.15 for assistive technology. However, these relationships are not statistically significant, as indicated by the P-values (0.22, 0.32, and 0.43), which are all above the standard threshold of 0.05. The corresponding t-values further support this lack of significance. Therefore, we cannot conclude that access to these resources has a significant impact on students' performance in Math subject.

5. Conclusion

The results of this study suggest that instructors at NPC - Colon Integrated School, City of Naga generally have positive access to inclusive education resources. Adaptive materials, assistive technology, and classroom aides all received favorable assessments. Nevertheless, the statistical analysis did not identify a significant correlation between the academic performance of learners in English, Science, and Math and the availability and efficacy of these resources in promoting inclusive education. The faint positive correlations, as well as p-values greater than 0.05, indicate that inclusive education resources may offer valuable classroom support, but

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they do not directly affect academic performance in these academic subjects. These findings suggest that learners' academic outcomes may be more significantly influenced by other factors, including socio-economic conditions, student engagement, and teaching strategies. Furthermore, the results underscore the potential necessity for enhanced technical support and training to optimize the advantages of these resources. In the future, research should investigate additional variables that may influence academic performance and investigate how inclusive education resources can be more effectively employed to improve student learning outcomes.

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