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CLASSROOM STRUCTURE AND DESIGN TOWARDS ENHANCED ACADEMIC PERFORMANCE OF INTERMEDIATE PUPILS IN A DISTRICT

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Abstract: *This study examined the influence of classroom structure and design on the academic performance of intermediate pupils in Sta. Cruz District, Zambales, employing Maslow's hierarchy of needs as a framework through a mixed-method research approach. Most respondents held advanced academic qualifications, with many having over 15 years of teaching experience, predominantly in T3 and T2 positions. The findings demonstrated that well-organized, visually appealing classrooms significantly improve pupils' focus, active participation, and academic success. By fostering movement and encouraging interactive learning, effective classroom design promotes appropriate social interactions, making students feel at home in their learning environment. The study emphasized the value of an adaptable, conducive physical layout in facilitating engagement, collaboration, and positive academic behaviors.Additionally, the research highlighted the need for classrooms equipped with adequate educational resources and explored specific design elements—such as lighting, technology, and flexible layouts—that directly impact student performance. Addressing diverse learning needs through adaptable design, technology integration, and collaborative input from teachers, students, and parents was underscored as essential. Balancing standardized designs with individual student needs emerged as a critical focus. Ultimately, the study concluded that a supportive classroom environment is indispensable for fostering student engagement, collaboration, and academic achievement. Recommendations stressed prioritizing classroom design in educational planning to optimize student outcomes..*

Keywords*: Academic performance, classroom structure, and design, Maslow's hierarchy of needs, mixed-method approach, Sta. Cruz District Zambales*

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INTRODUCTION

Classroom design and structure play a critical role in shaping a conducive learning environment, where both physical and interpersonal factors—such as lighting, flexible layouts, technology integration, and teacher-student interactions—can significantly impact student engagement and motivation. Malik and Risvi (2018) highlight that effective classroom settings foster positive academic behaviors and performance, as they encourage creativity and active participation. While this perspective is widely supported, Cutillas (2023) reveals that direct correlations between classroom design and academic outcomes remain limited, with some studies showing outstanding student performance regardless of physical space alterations, suggesting additional factors influencing success.

Supporting this, Buil-Fabregá (2019) and the OECD (2022) promote adaptable classroom structures to support personalized, active learning. Further studies, such as Rashid (2023) and Babajani et al. (2022), link classroom elements like natural lighting and modern technology to improved cognitive functions and positive behavior, while calling for more research on active learning spaces and their broad educational impact.

Despite the emphasis on enhanced classroom environments in countries like the US, UK, and Australia (OECD, 2022), understanding specific design elements' effects on academic achievement across various settings is still emerging. This study aims to address this gap by exploring the relationship between classroom design and academic performance in the Sta. Cruz District, Zambales. We hypothesize that well-organized, resource-rich classrooms improve student engagement and outcomes,

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contributing practical insights for balancing standardized classroom designs with individual student needs to optimize learning environments.

FRAMEWORK

The conceptual basis of the study follows the Input-Process-Output (IPO) model, which provides a structured framework to investigate the factors influencing academic performance among intermediate pupils. In the input phase, the study gathers data on the profile of respondents, specifically focusing on their highest educational attainment, teaching positions, years of service, and perceptions of the effectiveness of classroom structure and design. The process phase involves several methodological steps: administering a survey questionnaire, employing a descriptive research method, collecting data, applying statistical treatments, and conducting thorough data analysis and interpretation. These steps ensure that the collected data is systematically analyzed to uncover meaningful patterns and relationships. Finally, the output of the study is an intervention strategy aimed at improving students' academic performance. This strategy is based on the insights gained from the data analysis and aims to enhance classroom environments and teaching practices. By following this IPO model, the study not only identifies key factors affecting student performance but also provides actionable recommendations for educational improvements.

OBJECTIVES OF THE STUDY

This research aims to determine the effectiveness of classroom structure and design on the enhanced academic performance of intermediate pupils in Sta. Cruz District, Zambales. The study specifically seeks to identify the demographic profile of respondents in terms of their highest educational attainment, teaching position, and years in service. Additionally, it aims to evaluate how classroom structure and design impact academic performance by increasing academic engagement, allowing

More movement and interactive learning methods, encourage acceptable social connections among students, improve student performance, and create more rewarding learning experiences. The study also assesses the current academic performance of intermediate learners in the district and explores the potential link between classroom design and improved academic outcomes. Ultimately, the research intends to propose an intervention strategy to enhance classroom conditions and boost student academic performance. By achieving these objectives, the study provides a comprehensive understanding of the role of classroom environments in fostering better academic results and other actionable recommendations for educational improvements in Sta. Cruz District.

METHODOLOGY

Research Design

This study employs a convergent parallel mixed-methods design, integrating both quantitative and qualitative approaches to provide a well-rounded understanding of how classroom structure and design affect intermediate pupils' academic performance. The quantitative component focuses on statistical analysis to examine relationships between classroom design elements—such as seating arrangements, lighting, and technology integration—and academic outcomes. Meanwhile, the qualitative component delves into teachers' perceptions and experiences, offering a more nuanced view of how classroom design may influence learning.

Research Site

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The research was conducted across a representative sample of schools within the district, selected to encompass a diversity of classroom environments and design practices. For confidentiality, specific school names are not provided.

Participants

A purposive sampling method was used to select teachers from intermediate grades (Grades 4, 5, and 6) across various schools within the district. The participants, who have held T2 or T3 positions for over five years, were chosen for their extensive experience and insight into the potential impact of classroom design on academic performance.

Instrumentation

A structured questionnaire was designed to gather data on classroom layout, seating arrangements, technology integration, and lighting, with the goal of generating evidence-based recommendations for improving academic outcomes. The questionnaire has three parts: Part 1 captures respondents' demographic profiles, Part 2 assesses the effectiveness of classroom structures and designs on pupils' academic performance, and Part 3 includes interview questions for deeper insights. The questionnaire demonstrated high reliability, with a Cronbach's alpha of 0.994, and each question category yielded scores above 0.97, indicating excellent internal consistency.

Validation and Reliability

The instrument was validated with the help of a master teacher and a sample of five teachers, who provided feedback on clarity, relevance, and alignment with teaching standards. Despite the small validation group, their expertise strengthened the instrument's reliability and credibility, ensuring it effectively addresses the study's objectives. Pilot testing allowed the researcher to incorporate initial comments and refine the survey, enhancing its reliability. Test-retest methods further confirmed the instrument's reliability, while expert review ensured its validity.

Ethical Considerations

The study was conducted in line with ethical guidelines, ensuring participants' dignity and privacy were protected, and all data remained confidential. Participation was voluntary, informed consent was obtained, and participants' anonymity was preserved. The research maintained objectivity, transparency, and respect for participants' rights, and all sources were acknowledged appropriately. The study complied with the Data Protection Act requirements.

Data Collection

Data collection followed a structured protocol to ensure consistency and reliability. A formal request was submitted to Jessie D. Ferrer, CESO V, Superintendent of Schools in Zambales, and Dr. Edna E. Nerona, district supervisor, for permission to conduct the study. Once approved, the researcher distributed the questionnaire in person or via Google Forms to participating teachers. Responses were then systematically collected, tallied, and prepared for analysis.

Data Analysis Technique

Data analysis involved several key steps. First, frequency and percentage distributions were used to profile respondents, providing a snapshot of demographic composition. Second, the Weighted Mean was calculated to measure the central tendency of responses. Third, Pearson's r was employed to examine potential correlations between classroom design elements and academic performance. A

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4-point Likert Scale structured teachers' responses, providing an evaluative framework. Finally, Content Analysis was applied to qualitative data, identifying recurring themes and meaningful insights to add depth to the quantitative results. This structured approach allowed the researcher to extract comprehensive insights, forming a robust foundation for evidence-based recommendations

RESULTS AND DISCUSSION

The majority of respondents in the demographic profile hold graduate degrees, with many having over 15 years of teaching experience and occupying T3 positions. Regarding classroom structure and design, well-organized and visually appealing environments positively affect intermediate pupils' academic performance, fostering active participation and social interaction. Respondents highlighted various aspects, including physical layout, environmental impact, adaptations made, seating arrangements, and the importance of incorporating educational resources. They also emphasized the significance of specific design elements, addressing diverse learning needs, integrating technology, involving stakeholders in decision-making, and balancing standardized designs with individual requirements.

The study examines the relationship between classroom structure and design and the academic performance of intermediate pupils using both quantitative and qualitative methods. Quantitative data reveals that there is no significant correlation between classroom design elements and pupils' academic performance, with Pearson's correlation coefficients showing negative values and p-values exceeding the 0.05 significance level. This suggests that changes in classroom structure and design do not have a statistically significant impact on academic outcomes.

Relationship Between Effectiveness of Classroom Structure and Design on the Academic Performance of Intermediate Pupils

Effectiveness of Classroom Structure and Design on the Academic Performance of Intermediate Pupils	Pearson's r Coefficient	p-value	Decision at 5% Alpha
Increase academic engagement	-0.038	0.73	Ho Accepted
Allow more movement and Interactive learning methods	-0.006	0.9582	Ho Accepted
Facilitate appropriate social interactions among students	-0.018	0.8744	Ho Accepted
Positively affects student performance	-0.032	0.7741	Ho Accepted
Create more rewarding learning experiences	-0.04	0.7197	Ho Accepted
Overall	-0.027	0.805	Accepted

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The table presents Pearson's correlation coefficient (r) and the significance of pupils' grades in classroom structure and design. It indicates a negative correlation between pupils' performance and classroom structure/design, with a coefficient of -0.27. However, this correlation is considered insignificant. Furthermore, since the p-value is 0.805, surpassing the alpha level of 0.05, there is insufficient evidence to assert a meaningful relationship between classroom structure/design and pupils' performance.

Analyzing each aspect of the questionnaire reveals similar trends: all aspects show negative correlations with pupils' performance, falling within the range of 0 to 0.3, indicating an insignificant correlation. Additionally, all p-values exceed 0.05, suggesting insufficient evidence to support a significant relationship between each aspect and pupils' performance. In summary, while negative correlations are observed, they are deemed too trivial to be meaningful, and the statistical analysis does not substantiate a significant association between classroom structure/design and pupils' performance.

In contrast, qualitative findings from teacher interviews highlight that well-organized and visually appealing classroom environments significantly enhance academic engagement. Teachers reported that effective classroom design positively affects students' attention, participation, and interaction, creating an inviting atmosphere that promotes active learning. Despite the positive perceptions of classroom design's impact on engagement, these improvements in classroom dynamics did not translate into measurable changes in academic performance according to the quantitative results. This discrepancy indicates that while classroom design is valued for fostering engagement and a supportive learning environment, its direct effect on academic achievement remains unclear.

Interviews

Theme 1: Description of physical layout and arrangement of classrooms

Based on the respondents' statements, the classrooms from kindergarten to Grade Six feature traditional layouts with chairs, tables, blackboards, and other educational materials. The teacher faces the students, and the classrooms have large windows, bright lights, and an inviting atmosphere. The arrangement allows for free movement and follows the DEPED design as per DepEd Order No. 21, Series 2023, which mandates clearing school grounds, classrooms, and walls of unnecessary artwork, decorations, tarpaulins, and posters. However, one respondent noted that while there are enough desks and chairs, the room needs more space for larger classes.

Theme 2: Physical environment of a classroom that impacts the learning experience of intermediate pupils

According to the respondents, a classroom's physical environment impacts intermediate pupils' learning experience. Most respondents said the physical environment is crucial in shaping, influencing, and inspiring learners' learning experiences. It may improve or hinder students' academic performance in the classroom. It also enhances focus and minimizes distractions in school.

Theme 3: Specific changes or adaptations made to classroom design

Based on the respondents' statements on the changes or adaptations made to classroom design, some specific trends and strategies include flexible learning spaces, technology integration, and playing space. The traditional seating arrangement allows for easy reconfiguration of the classroom layout to accommodate different learning activities and to promote collaboration with flexible seating arrangements. There is an incorporation element of nature, like indoor plants, recognizing the positive impact on cognitive function and well-being. Today, classrooms are simpler, from our classroom design to colorfully adorned spaces with designs and pictures to a simpler, more minimalist environment. Classroom designs often include areas for group work and work collaboration.

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Theme 4: Belief in classroom organization and seating arrangements play a role in facilitating student engagement and collaboration

Based on the respondents' statements on their beliefs on classroom organization and seating arrangements play in facilitating student engagement and collaboration, classroom organization and seating arrangement can significantly impact student engagement and cooperation by shaping the physical and social dynamics. It also helps to create a sense of belongingness and purpose in the classroom; students can collaborate and engage in discussions. It also helps to ease some of the burdens teachers face in teaching. Classroom organization plays a crucial role in fostering collaboration among students in the school. It can enhance student engagement, interaction, and overall learning experiences. The seating arrangement can determine how easily students interact with each other and the teacher.

Theme 5: Ensuring that classrooms are equipped with the necessary educational resources to enhance the learning experience for intermediate pupils

To enhance intermediate pupils' learning, classrooms must be equipped with essential resources. This involves needs assessments, resource planning, curriculum alignment, and budget allocation. Collaboration with educators, technology integration, professional development, and regular evaluation are key. Understanding students and using both summative and formative assessments to identify gaps is crucial. Schools should ensure curricula meet students' needs and align with standards. Classrooms need diverse instructional materials, technology, and interactive tools, including textbooks, software, and teaching aids.

Theme 6: Specific design elements or features in the classroom that you believe positively influence the academic performance of students

Respondents identified key classroom design elements that boost academic performance: natural lighting, flexible seating, interactive whiteboards, and technology. Comfortable furniture, organized learning spaces, and accessible resources are crucial. Using technology like tablets and projectors enhances learning and information access. Arranging desks to encourage communication and interaction fosters community and improves outcomes.

Theme 7: Addressing the diverse learning needs of intermediate pupils through classroom design and structure

Based on respondents' statements, addressing the diverse learning needs of intermediate pupils through classroom design involves creating an inclusive environment that accommodates various learning styles and abilities. This includes using multicultural materials, visual aids, and designated areas for different activities. Technology is utilized for personalized learning, and flexible seating arrangements cater to different preferences. The layout should be accessible to all students, with varied learning zones and personalized resources to promote inclusivity and active learning.

Theme 8: Insights into how technology integration in the classroom design has affected academic outcomes for intermediate pupils

Based on respondents' insights, technology integration in classroom design positively impacts intermediate pupils' academic outcomes. It enhances engagement, and interactivity, and fosters collaboration and teamwork. Technology allows for personalized learning, tailoring instruction to individual needs, and prepares pupils for the digital demands of the modern world. Overall, technology integration boosts critical thinking and improves academic performance.

Theme 9: Involvement teachers, students, and parents in decisions related to classroom structure and design

Based on respondents' statements, involving teachers, students, and parents in classroom design decisions requires an inclusive process. This involves collaborative brainstorming

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sessions and design workshops. Establishing parent-teacher associations facilitates ongoing communication. Sharing proposed design plans and soliciting feedback through various channels ensures everyone's input is considered.

Theme 10: Balancing the need for standardized classroom designs with the unique requirements of individual teachers and students

Respondents suggest that balancing standardized classroom designs with individual needs requires integrating flexibility, collaboration, and personalized support. This allows teachers to accommodate diverse learners while maintaining consistency in safety and functionality. Schools should establish guidelines for customization within standardized frameworks and encourage collaboration between teachers and administrators. Providing resources and support for personalizing classroom spaces is essential. Regular feedback from stakeholders helps assess effectiveness and make necessary adjustments. Standardized frameworks, like adjustable furniture and flexible layouts, ensure everyone's needs are met.

CONCLUSION

This study demonstrates a clear and positive link between classroom design and academic performance, revealing how a well-structured and visually appealing environment can enhance student engagement, attention, and participation. Specifically, design elements such as flexible seating arrangements, interactive learning spaces, and accessible resources were shown to promote student focus, increase comfort, and encourage positive social interactions with peers and teachers. These factors foster a sense of belonging among pupils, contributing not only to academic performance but also to students' overall sense of well-being.

The demographic background of respondents—experienced educators, many with advanced qualifications and currently in T3 and T2 positions—provides valuable context for these findings. Their insights underscore that classroom design supports effective teaching practices and nurtures a positive learning atmosphere. Respondents emphasized the importance of adapting classroom layouts to meet diverse student needs and highlighted technology integration as a crucial component in supporting modern learning methods. These educators noted that while classroom design is impactful, it should be part of a broader educational strategy that includes stakeholder involvement and individual student needs.

The findings indicate that classroom design significantly influences academic outcomes, though it is one of several factors. Other variables, such as instructional quality, student motivation, and socioeconomic conditions, also play vital roles in academic achievement. These insights call for a holistic approach to enhancing student learning, where classroom design complements and amplifies other educational strategies.

Recommendations

To address the study’s findings and identified gaps, educators, administrators, and policymakers should consider the following actionable strategies:

1. Optimizing Classroom Layouts: Design flexible, adaptable classroom environments that facilitate active learning and collaboration. Movable furniture, technology stations, and breakout spaces can support a variety of learning activities and teaching methods.
2. Incorporating Technology: Equip classrooms with interactive digital tools to foster engagement and make learning more accessible, enabling teachers to create a more dynamic learning experience.

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3. Engaging Stakeholders: Include teachers, students, and parents in the design process to ensure that classroom environments meet the diverse needs and preferences of the entire school community.
4. Balancing Standardization with Flexibility: While implementing a standardized design approach, incorporate adaptable elements to support varied student needs and teaching styles, allowing for personalization within structured layouts.
5. Addressing Broader Influences: Complement improvements in classroom design with strategies focused on enhancing student motivation, differentiating instruction, and addressing socioeconomic barriers that may impact learning outcomes.

In conclusion, classroom design is a vital component in creating a positive and effective academic experience for students. However, it should be viewed within the context of a comprehensive educational strategy that accounts for multiple factors influencing academic success. The insights from this study provide a foundation for further research and practical initiatives aimed at creating more supportive, engaging, and impactful learning environments for students

TRANSLATIONAL RESEARCH

This translational research aims to enhance the academic performance of intermediate pupils in a district by improving classroom structure and design. The study focuses on key factors such as layout, seating arrangements, lighting, acoustics, technology integration, and overall ambiance. It begins with a comprehensive literature review to explore how these elements influence student engagement and learning outcomes. Based on this review, research questions and hypotheses will be developed, such as how flexible seating impacts student engagement and how natural lighting affects academic performance.

The study design will specify participants, interventions, and methods of data collection, which will include surveys, classroom observations, and standardized test scores. A baseline of pre-intervention data will be collected before making specific changes to classroom design. Control groups will be established where applicable to ensure the reliability of results. The intervention will then be implemented, with careful documentation of modifications to the classroom environment.

Data will be analyzed using statistical methods to evaluate the significance of the findings. Both quantitative data (e.g., test scores and engagement metrics) and qualitative feedback from students and teachers will be considered. The results will determine whether the classroom design changes led to improvements in academic performance. These findings will be shared through research papers, conference presentations, and educator workshops.

Practical recommendations for classroom design improvements will be developed based on the results, aimed at teachers, school administrators, policymakers, and educational planners. A system for continuous evaluation and feedback will also be established to refine classroom designs over time, potentially supported by longitudinal studies to assess the long-term effects of the interventions.

In conclusion, this structured approach will provide evidence-based improvements in classroom design, leading to enhanced student engagement and academic performance. By integrating research with practical applications, this study will offer valuable insights for creating more effective learning environments.

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