The Relationship between Instructional Materials Availability and Student Engagement in Science

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ABSTRACT

Student engagement is essential for effective science education, with the availability of teaching materials being a critical factor in promoting participation and understanding. This study was conducted at Little Baguio National High School, a rural public school in San Fernando, Bukidnon, Philippines, where limited resources significantly affect student engagement in science.

While some research has explored how the availability of teaching materials impacts engagement, there is little evidence from rural areas in the Philippines, particularly regarding teaching methods and local factors. Based on engagement theory, this study examined the availability of science teaching materials—such as physical resources, technology, and instructional support—and assessed their relationship with the engagement of Grade 10 students in three dimensions: behavior, emotion, and cognition.

Using a descriptive-correlational design, a validated survey was administered to 150 students. The results indicated that students felt they had sufficient access to teaching materials (average score = 4.28) and reported moderate to high levels of engagement (average score = 4.28). There was also a moderately strong positive relationship ($r = 0.619$) between resource availability and student engagement.

These findings emphasize the need for equitable distribution of resources in rural schools and suggest that enhancing both resource availability and teacher training can improve student engagement. The study recommends further research that includes qualitative methods, examines teaching practices and school leadership, and compares rural and urban settings to better understand student engagement in science.

Keywords: Science Instructional Materials, Student Engagement, Junior High School Students, Science Education

INTRODUCTION

Science instructional materials are vital to effective education, especially in the sciences, where hands-on learning fosters deep understanding. These materials—encompassing textbooks, laboratory equipment, and digital resources—serve as essential links between theoretical concepts and practical application. They enhance students' critical thinking skills, promote scientific inquiry, and encourage active participation in learning activities (DepEd, 2020). In science education, the availability of these instructional materials significantly influences teaching effectiveness and engages students across behavioral, emotional, and cognitive dimensions.

However, many educational institutions face substantial challenges regarding the availability and quality of instructional materials. In the Philippines, public schools often grapple with shortages of essential resources due to budget constraints and logistical issues (DepEd, 2020). Rural schools are particularly affected by these shortages, which can hinder effective teaching practices and limit students' opportunities for experiential learning. Research indicates that access to appropriate instructional materials directly correlates with student

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engagement. When students have access to laboratory equipment or digital tools that align with their learning preferences, they are more likely to engage actively in class discussions and develop a genuine interest in scientific concepts. Conversely, limited access to these resources can lead to disengagement and diminished enthusiasm for STEM fields.

Numerous studies have investigated the relationship between the availability of instructional materials and student engagement. For instance, Arumuru Lawrence et al. (2024) explored the influence of instructional resources on academic achievement, while Lazaro and Paglinawan (2025) demonstrated that adequate laboratory resources significantly enhance student involvement in STEM activities. Similarly, Pagutayao and Paglinawan (2024) reported a positive correlation between access to digital tools and increased levels of engagement in science classes. These findings underscore the necessity of providing sufficient instructional materials to cultivate an engaging learning environment. Nonetheless, there remains a gap in understanding how these dynamics specifically affect junior high school students in rural contexts, such as those at Little Baguio National High School.

This study seeks to address this gap by evaluating the availability of science instructional materials among Grade 10 students at Little Baguio National High School during the 2024-2025 academic year. Specifically, it examines how access to instructional materials, the quality of instructional support, and the overall learning environment influence students' behavioral, emotional, and cognitive engagement. By analyzing these relationships within a localized context, this research aims to offer actionable recommendations for improving resource allocation and teaching practices in science education.

Conducted at Little Baguio National High School in San Fernando, Bukidnon, this study provides an ideal setting for exploring how the availability of instructional materials impacts student engagement levels, particularly in a rural public school that serves diverse learners with limited resources. Understanding the intricate relationship between instructional resources and student engagement is essential for informing educational policies, enhancing teaching methodologies, and ultimately contributing to improved educational outcomes in the sciences for future generations.

Objectives

This study investigated the availability of science instructional materials and student engagement in science at Little Baguio National High School. Specifically, it aimed to:

1. Assess the level of availability of science instructional materials among Grade 10 students at Little Baguio National High School in terms of:

a. Physical resources

b. Technology and digital resources

c. Instructional support

2. Evaluate the level of student engagement among Grade 10 students at Little Baguio National High School in terms of:

a. Behavioral engagement

b. Emotional engagement

c. Cognitive engagement

3. Analyze the relationship between the availability of science instructional materials and student engagement among Grade 10 students.

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METHODOLOGY

Research Design

This study utilized a descriptive-correlational research design to quantitatively analyze the relationship between the availability of science instructional materials and student engagement among Grade 10 students at Little Baguio National High School. This design was appropriate for assessing the levels of the variables and determining the extent of their relationship, allowing for the examination of existing conditions without manipulating any variables.

Locale of the Study

This study was conducted from February to April 2025. Little Baguio National High School is a public secondary educational institution serving the rural community of Little Baguio and its surrounding areas. This locale was chosen due to its accessibility for the researcher and its potential to provide valuable insights into an under-researched region. Data collection took place during the second semester of the 2024-2025 academic year, focusing on participants from Little Baguio National High School, ensuring a relevant and context-specific exploration of the research objectives.

Participants of the Study

To ensure the appropriateness of the sample, a set of inclusion criteria was established for participant selection. Firstly, participants had to be currently enrolled as Grade 10 students at Little Baguio National High School. Secondly, they were required to be officially registered in a science subject during the data collection period. Based on these criteria, the accessible population comprised Grade 10 junior high school students during the designated timeframe. To access information-rich cases, a purposive sampling technique was employed, allowing for the selection of participants specifically enrolled in science classes.

The final sample consisted of 150 Grade 10 participants, selected not only for their enrollment in a science subject but also for their willingness to provide informed consent for participation. This ensured the sample was representative of the Grade 10 population at Little Baguio National High School, enhancing the validity and reliability of the data analysis process.

Research Instrument

The research instrument for this study was a structured survey designed to gather quantitative data on the availability of science instructional materials and the level of student engagement in science among Grade 10 students. The survey consisted of two main sections, each patterned after established and validated studies.

The first section, based on the work of Arumuru Lawrence et al. (2024) titled "The Impact of Instructional Resources on Academic Achievement," assessed the availability of science instructional materials in terms of physical resources, technology and digital resources, and instructional support. The second section, adapted from the research of Joanna Marie V. Lazaro and James L. Paglinawan (2024) titled "Laboratory Resource Availability and Students' Engagement in Science," evaluated student engagement across three dimensions: behavioral engagement, emotional engagement, and cognitive engagement.

Both sections employed a five-point Likert scale ranging from 5 (Strongly Agree) to 1 (Strongly Disagree) to facilitate response collection and ensure clarity in measuring students' perceptions and experiences. The use of Likert-scale items allowed for nuanced analysis of the variables under study.

To ensure the validity of the survey instrument, content validation was conducted by experts in science education and research methodology. Reliability was assessed through pilot testing with 30 Grade 10 students, yielding a Cronbach Alpha score of 0.921 for the student engagement questionnaire, indicating excellent internal consistency among the items. This rigorous validation process ensured that the instrument provided reliable and valid data for analyzing the relationship between instructional material availability and student engagement in science.

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Data Gathering Procedure

The data gathering procedure for this study began with a formal request for permission to conduct the research. A letter of consent was sent to the principal of Little Baguio National High School, detailing the objectives, purpose, and potential benefits of the study. Upon receiving approval, the researcher proceeded with data collection.

Data collection was facilitated through a structured survey questionnaire distributed to Grade 10 students who met the inclusion criteria. On the first page of the questionnaire, participants were presented with a letter of consent that outlined the research goals, their rights as participants, and assurances of confidentiality regarding their responses.

Under the researcher's supervision, participants received clear instructions on completing the survey. They were encouraged to respond honestly and thoughtfully while being given sufficient privacy to ensure comfort in answering. The survey was administered in a controlled classroom setting to minimize distractions and enhance response rates.

Data Analysis

This study utilized descriptive and inferential statistical methods. Descriptive statistics, including means and standard deviations, were computed to summarize the levels of availability of science instructional materials and student engagement. To measure the degree of correlation between these variables, Pearson Product Moment Correlation Analysis was employed. This statistical method assessed the strength and direction of the linear relationship between the availability of instructional materials and students' engagement in science. All analyses were conducted using SPSS software to ensure accuracy and reliability.

RESULTS AND DISCUSSIONS

Table I Descriptive Analysis of Science Instructional Materials Availability

Indicators	Mean	Descriptive Analysis	Qualitative Interpretation
Physical Resources	4.267	Agree	Adequate access
Technology and Digital Resources	4.302	Agree	Adequate access
Instructional Support	4.276	Agree	Adequate access
Overall Mean:	4.282	Agree	Adequate access

Legend:

Range	Descriptive Rating	Qualitative Interpretation
1.00-1.49	Strongly Disagree	Significant deficiency
1.50-2.49	Disagree	Insufficient access
2.50-3.49	Neither	Neutral perspective
3.50-4.49	Agree	Adequate access
4.50-5.00	Strongly Agree	Abundant resources

Table 1 presents students' perceptions of the availability of science instructional materials. The overall mean score of 4.282 suggests that students believe resources are generally adequate.

Subcategories reveal similar findings: physical resources (mean = 4.267), technology and digital resources (mean = 4.302), and instructional support (mean = 4.276) all fall within the "agree" range.

These results suggest that students at Little Baguio National High School feel they have sufficient access to materials for science learning. However, this perception should be viewed with caution. National reports (DepEd, 2020) and international studies (Akiba & Liang, 2016) indicate that rural schools often experience resource gaps due to budget and logistical challenges. While students report adequate resources, disparities

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may still exist compared to urban or wealthier schools. The slightly higher mean for technology and digital resources may reflect recent efforts to incorporate digital tools into classrooms, as supported by Tamim et al. (2011), who found that technology can improve learning outcomes.

Importantly, having resources does not ensure effective use. Evers and Lakens (2019) stress the need for ongoing professional development for teachers to ensure that instructional materials are used effectively to support student learning. Therefore, while the data indicate a positive foundation, ongoing investment in both materials and teacher training is crucial.

Table II Descriptive Analysis of Students' Engagement in Science

Indicators	Mean	Descriptive Analysis	Qualitative Interpretation
Behavioral Engagement	4.287	Agree	Moderate Engagement
Emotional Engagement	4.282	Agree	Moderate Engagement
Cognitive Engagement	4.276	Agree	Moderate Engagement
Overall Mean:	4.282	Agree	Moderate Engagement

Legend:

Range	Descriptive Rating	Qualitative Interpretation
1.00-1.49	Strongly Disagree	Minimal engagement
1.50-2.49	Disagree	Low engagement
2.50-3.49	Neither	Neutral engagement
3.50-4.49	Agree	Moderate engagement
4.50-5.00	Strongly Agree	High engagement

Table 2 shows moderate levels of student engagement across all dimensions: behavioral engagement (mean = 4.287), emotional engagement (mean = 4.282), and cognitive engagement (mean = 4.276), with an overall mean of 4.282. This indicates that students are generally involved in science activities, but there is room to strengthen their emotional and cognitive connections to the subject.

These results align with the multidimensional model of engagement described by Fredricks, Blumenfeld, and Paris (2004), which highlights behavioral, emotional, and cognitive aspects as key components of student engagement. The moderate scores may reflect the interaction between available resources, teaching quality, and specific challenges faced in rural education.

International research (Jang, Kim, & Reeve, 2016) emphasizes that teacher support, classroom climate, and student autonomy are crucial for fostering engagement. Even with available resources, the way teachers interact with students and structure learning activities significantly impacts engagement. Klem and Connell (2004) found that students who feel their teachers are caring and supportive are more likely to be engaged, regardless of resource levels.

Additionally, factors such as school leadership, teacher competence, and socio-economic status can also influence engagement (Akiba & Liang, 2016). These findings suggest that enhancing student engagement requires not only adequate resources but also supportive teaching practices and a positive school environment.

Table III Correlation Analysis on Availabilability of Science Instructional Materials and Students' Engagement

	Pearson r value	*Significance*
Variables	Student Engagement	
Science Instructional Materials	.619**	0.00
Grand Mean	.619**	0.00

** Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows a significant positive correlation (r = 0.619, p = 0.00) between the availability of science instructional materials and student engagement. This indicates that better access to instructional resources is linked to higher levels of behavioral, emotional, and cognitive engagement among students.

These findings are consistent with local studies (Lazaro & Paglinawan, 2022; Pagutayao & Paglinawan, 2023) and international research (Tamim et al., 2011), which highlight that both physical and digital resources can enhance student engagement and achievement. However, Evers and Lakens (2019) and Jang, Kim, and Reeve (2016) note that the impact of resources depends on how they are utilized. Effective teacher training, a positive classroom climate, and innovative teaching strategies are crucial for transforming resource availability into meaningful engagement.

Additionally, Akiba and Liang (2016) emphasize that differences in professional development and instructional support, especially between rural and urban schools, can affect how effectively resources are used. This suggests that simply providing resources is not enough; schools must also invest in teacher development and supportive leadership to fully benefit student engagement.

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

This study investigated how the availability of instructional resources influences student engagement in science among Grade 10 students at Little Baguio National High School. The analysis showed that students generally perceive adequate access to physical resources (mean = 4.267), technology and digital resources (mean = 4.302), and instructional support (mean = 4.276), with an overall mean of 4.282. These findings indicate that sufficient resources are important for supporting science education.

In terms of student engagement, moderate levels were observed in all areas: behavioral engagement (mean = 4.287), emotional engagement (mean = 4.282), and cognitive engagement (mean = 4.276), with an overall mean of 4.282. This suggests that while students are involved in science activities, there is room to enhance their emotional and cognitive involvement.

The correlation analysis revealed a strong positive relationship (r = 0.619, p = 0.00) between resource availability and student engagement. This means that better access to instructional materials is linked to higher levels of participation and interest in science learning. These results are consistent with findings by Lazaro and Paglinawan (2025), who noted a similar positive correlation between laboratory resources and student engagement, and Pagutayao and Paglinawan (2024), who highlighted the role of digital tools in enhancing engagement.

Conclusions

This study confirms that the availability of science instructional materials has a significant impact on student engagement among Grade 10 students in a rural Philippine context. Students' perceptions of having adequate physical, technological, and instructional resources support their learning and contribute to moderate levels of engagement.

The strong positive correlation between resource availability and engagement emphasizes the importance of well-equipped learning environments in motivating students' interest in science. These findings suggest that providing diverse instructional materials, along with effective teaching strategies, can enhance engagement and improve learning outcomes in science.

Additionally, this research contributes to the broader field by showing how resource availability interacts with teaching quality and contextual factors in rural schools, offering insights that may help inform educational policies and practices beyond the local area.

Implications

These findings hold significant implications for Little Baguio National High School and similar institutions aiming to enhance science education. First, schools should ensure consistent access to both physical and digital instructional materials, as these are key for boosting student engagement.

Teachers should be supported in integrating these materials effectively through interactive, student-centered teaching methods that promote deeper engagement. Professional development programs focusing on innovative uses of instructional resources and teaching strategies are essential for maintaining student motivation.

Regular monitoring of student engagement can help educators identify areas needing targeted support, ensuring that assistance meets learners' needs. At both school and district levels, establishing equitable support systems to address individual differences and resource gaps will further enhance student participation and achievement.

Finally, future research should include urban schools and explore additional factors influencing engagement, such as family support and community involvement. Qualitative studies, including interviews or classroom observations, could provide deeper insights into how instructional materials and teaching practices interact to affect engagement.

By addressing these areas, Little Baguio National High School and similar schools can create a more engaging and supportive science learning environment that fosters higher student motivation and academic success.

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