Instructional Materials Availability and Learner's Engagement in Science

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ABSTRACT

The study aims to evaluate the availability and effectiveness of various instructional resources, including textbooks and laboratory equipment, and their influence on students' active participation in learning. Utilizing a descriptive-correlational design, the study involved 85 junior high school students from Kitubo National High School. Data was collected through questionnaires assessing material accessibility, quality, and student engagement across behavioral, cognitive, and affective dimensions. Statistical techniques included descriptive statistics and Pearson correlation analysis to explore relationships between variables. Results indicated that while students generally perceived instructional materials as accessible and of good quality, significant gaps existed in laboratory equipment availability, which hindered hands-on learning experiences. The overall mean rating for material accessibility was 3.62 (often available), while the quality received a mean score of 3.79 (often available). Notably, visual aids were highly valued for enhancing comprehension. The findings underscore the necessity for improved access to diverse instructional resources to foster greater student engagement and enhance academic performance in science education. Recommendations include addressing resource shortages and promoting innovative teaching strategies that utilize available materials effectively.

Keywords: Engagement, Instructional Materials, Science Education, Student Performance, Hands-on Learning

INTRODUCTION

In today's educational setting, instructional materials are very essential for learners' engagement because it explores how the presence and use of teaching materials impact student involvement especially in science classes. It highlights that having the right resources, such as textbooks, lab equipment, and digital tools, is essential for effective learning. This research shows that when teachers use various instructional materials, students become more engaged and motivated to learn. One key finding is that many schools, especially in rural areas, often lack sufficient instructional materials. This shortage can lead to lower student performance especially in science subjects. The study emphasizes that using available resources creatively can help students understand complex concepts better and retain information longer. Moreover, it suggests that teachers should actively seek out and utilize diverse materials to create a more interactive learning environment. This research indicates that improving the availability and use of instructional materials can significantly enhance student engagement and learning outcomes in science education.

Mohamad (2019) emphasized that when students find enjoyment in science lessons and actively participate in hands-on investigations, their academic engagement significantly increases. This engagement is not only vital for understanding scientific concepts but also plays a key role in shaping students' attitudes towards science (Hampden-Thompson & Bennett, 2013). Moreover, supportive learning environments that promote inquiry and critical thinking are essential for enhancing students' interest and motivation in science (OECD, 2006). Engaged learners are more likely to connect with the material and apply it meaningfully in real-world contexts (Hadzigeorgiou, 2005). By understanding the impact of these materials can help teachers choose the best resources for their classrooms. Learner's engagement is essential for a successful educational experience because it improves their performance especially on their assessment and test.

In addition, Isma'il & Lukman (2022) examines the availability and utilization of instructional materials in biology education, emphasizing the necessity for practical teaching methods to enhance student understanding.

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While Tety (2016) discuss how instructional materials impact students' performance and it also aimed to understand how these schools use quality teaching resource and how this affects students' academic success. Furthermore, Abubakar (2020) states that instructional materials affect students' performance. In his study, it highlights that using various teaching tools, like models and visual aids, helps students understand complex concepts better. His study proved that when teachers use these materials, students tend to perform better academically because instructional materials serve to have lesson more engaging and easier to grasp, leading to improved interest and understanding of the subject.

The main purpose of the study is to: (1) evaluate the extent to which various instructional materials are available in secondary schools and how this impacts the teaching and learning process in science subjects; (2) investigate how effectively teachers utilize available instructional materials during science lessons and identify factors that hinder their optimal use; (3) determine the relationship between the availability and utilization of instructional materials and the level of student engagement in science classes; (4) explore the challenges that teachers encounter when accessing and utilizing instructional materials, including resource limitations and institutional barriers; and (5) develop actionable recommendations aimed at enhancing the availability and effective use of instructional materials to foster greater learner engagement and improve academic performance in science education.

The primary subject of the study consists of 85 students of Junior High School students of Kitubo National High School, Kitobo, Kitaotao, Bukidnon, Mindanao, Philippines on November S.Y 2024-2025.

METHODS

Research Design

This study used a descriptive-correlational research design to explore how the availability of instructional materials affects student engagement in science classes. By examining this relationship, the researchers aimed to understand whether having access to various teaching resources, such as textbooks, digital tools, and hands-on materials, influences how actively students participate in their learning. The findings could provide valuable insights for educators and policymakers looking to enhance student involvement in science education by ensuring that appropriate materials are readily available. This research highlights the importance of resource availability in fostering a more engaging and effective learning environment for students.

Locale of the Study

Kitubo National High School is part of the educational system in the Philippines, which has undergone significant reforms in recent years to enhance the quality of education. The implementation of the K–12 curriculum has expanded basic education to include an additional two years, aligning it with global standards. This system encompasses one year of kindergarten, six years of elementary education, four years of junior high school, and two years of senior high school, ensuring a more comprehensive educational experience for students.

The choice of Kitubo National High School as the research locale is significant due to its unique demographic and geographical context. Located in a rural area, the school serves a diverse student population that reflects various socio-economic backgrounds. This setting provides a rich environment for studying educational outcomes and challenges faced by students in junior high school. Understanding the experiences of these students can offer valuable insights into factors influencing their academic performance and overall development.

The study focuses on a group of 85 junior high school students from Kitubo National High School, located in Kitobo, Kitaotao, Bukidnon, within the Mindanao region of the Philippines. This research is being conducted during the academic year 2024-2025.

Research Instruments

This study utilized the instruments pattern from Thompson & Garcia (2019), examines the availability and quality of instructional materials in science education. It is divided into three sub-variables: accessibility of materials, quality of materials, and support for using materials. Additionally, another questionnaire is utilized

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based on the framework established by Isma'il & Lukman (2022), assesses student engagement through three dimensions: behavioral, cognitive, and affective engagement.

Statistical Technique

In this study, we used descriptive statistics and Pearson correlation analysis to explore how the availability of instructional materials affects students' engagement in science. By analyzing these two aspects, it aimed to understand whether having access to the right resources contributes to a more engaging learning experience for students in science classes.

RESULTS AND DISCUSSION

This section includes the presentation of data gathered and the discussion, interpretation, and implication of the findings of the study. The results were presented in tables, which were then analyzed and interpreted. The order of the presentation follows the sequence of the problems identified in the study.

Descriptive Analysis on the Instructional Material Availability Dimensions

Accessibility of Materials in Science

Table 1 shows the accessibility of materials in Science in Junior High School students. The data provided in the table reflect the students' perception of the accessibility of the instructional materials necessary for their studies.

The overall mean score of 3.62 categorized as "Agree" and it is interpreted as "Often Available" indicates that there is a positive outlook among students in terms of the resources at their disposal. Specifically, the highest-rated item was the availability of materials in multiple formats, with mean of 3.99 suggesting that students appreciate the various formats that accommodate varying learning styles. In contrast, access to instructional materials outside of class hours and materials that cater various learning styles received lower scores with the means of 3.31 and 3.26 showing that while resources are available, there may be limitations in accessibility and inclusivity for all learners.

The data shows the importance of up-to-date materials, as showed in 3.94 score for the relevance of materials to the current curriculum. This implies that students value up-to-date, relevant materials that improve the way they learned. However, access to necessary laboratory equipment scored lower at 3.34, showing a potential gap in practical science education resources that could hinder hands-on learning experiences.

Table 1. Accessibility of materials in Science in Junior High School students

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I can easily access the instructional materials needed for my studies (e.g., minimal effort, online access).	3.61	Agree	Often Available
The materials are available in multiple formats (e.g., print, digital).	3.99	Agree	Often Available
I have access to necessary laboratory equipment for science experiments (if applicable).	3.34	Agree	Often Available
The materials are up-to-date and relevant to the current curriculum (e.g., updated within the last 2 years).	3.94	Agree	Often Available
I can obtain supplementary resources (e.g., textbooks, online content) easily.	3.69	Agree	Often Available
The school library has a sufficient collection of science materials.	3.80	Agree	Often Available
I receive updates about new materials available at the beginning of each term for my course.	3.69	Agree	Often Available
I have access to instructional materials outside of class hours (e.g., online flatform).	3.31	Neutral	Sometimes Available

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The instructional materials are easy to search.	3.58	Agree	Often Available
I can access materials that cater to diverse learning styles and needs.	3.26	Neutral	Sometimes Available
Overall Mean	3.62	Agree	Often Available

Legend

Range	Descriptive eaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Always Available
3.51-4.50	Agree	Often Available
2.51-3.50	Neutral	Sometimes Available
1.51-2.50	Disagree	Seldom Available
1.00-1.50	Strongly Disagree	Not Available

Zervas, et. al (2015) emphasizes the importance of Remote and Virtual Labs (RVLs) that can enhance the learning experience by providing students with access to scientific experiments and materials that may not be available in their physical environment. In addition, he also advocated for a competence-based approach to learning, which focuses on developing specific skills and competencies in students and encourages active engagement with scientific concepts through practical applications, even in a virtual setting. By utilizing RVLs, teachers can facilitate hands-on learning experiences that promote critical thinking and problem-solving skills. While MULINGE (2017) emphasizes how laboratory facilitates influence students' performance. The well-equipped laboratories are important for enhancing student engagement and performance in science subjects.

Quality of Materials in Science

Table 2 shows the quality of materials in science in junior high school. The data presented indicates a generally positive perception of instructional materials among students, with an overall mean rating of 3.79, classified as "Agree" and interpreted as "Often Available". Each indicator reflects specific aspects of the materials' effectiveness in enhancing learning experiences. Additionally, the highest-rated item is "I find the visuals in the instructional materials helpful for learning," with a mean of 4.08, suggesting that students greatly value visual aids such as diagrams and videos in their learning processes. This aligns with research emphasizing the importance of visual content which can significantly enhance comprehension and retention of complex concepts. In contrast, the indicator regarding the quality of materials enhancing understanding of science concepts received a mean score of 3.38, categorized as "Neutral". This suggests that while some students find the materials beneficial, there is room for improvement in how these resources facilitate deeper understanding. The data also indicates areas such as critical thinking promotion (mean 3.53) and real-world applications (mean 3.79) where students express agreement but indicate that these features are not universally perceived as strong, suggesting potential areas for further development in instructional design.

Table 2. Quality of Materials in Science in Junior High School Students

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
The instructional materials are engaging and interactive (e.g., quizzes, simulations).	3.73	Agree	Often Available
The quality of the materials enhances my understanding of science concepts.	3.38	Neutral	Sometimes Available
The materials include real-world applications relevant to my studies.	3.79	Agree	Often Available
I find the visuals in the instructional materials helpful for learning (e.g., diagrams, graphs, videos).	4.08	Agree	Often Available
The content is accurate and well-researched.	3.88	Agree	Often Available
The instructional materials promote critical thinking skills effectively (e.g., problem-solving, analysis tasks).	3.53	Agree	Often Available
I am satisfied with the breadth of the subject within the curriculum covered in the materials provided.	3.82	Agree	Often Available

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The instructional materials encourage collaborative learning experiences such as group projects or peer review.	3.91	Agree	Often Available
I find the assessments included in the materials useful for my learning progress (e.g., quizzes, assignments, exams).	3.92	Agree	Often Available
I am satisfied with the quality of instructional materials provided (e.g., focus on structure, relevance, and supportiveness of materials).	3.83	Agree	Often Available
Overall Mean	3.79	Agree	Often Available

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Always Available
3.51-4.50	Agree	Often Available
2.51-3.50	Neutral	Sometimes Available
1.51-2.50	Disagree	Seldom Available
1.00-1.50	Strongly Disagree	Not Available

Gilboy et. al (2015) discusses the implementation of the flipped classroom model in educational settings, focusing on its potential to improve student engagement. It involves students learning content outside of class, typically through videos or other digital materials and using class time for interactive activities. The article shows that students must have access to learning materials outside of class hours, such as videos or readings. If these resources are not easily accessible due to technology barriers or lack of internet access, some students may struggle to keep up with their peers, particularly in junior high school settings where disparities in technology access can be pronounced. It also allows students to learn at their own pace, which can be advantageous for junior high school students who may have varying levels of comprehension and learning styles. This flexibility can help accommodate different learning needs and encourage students to take responsibility for their own learning.

On the other hand, Wanner (2015) discussed the integration of just-in-time teaching (JiTT) as pedagogical strategy that involves assessing students' understanding before class and tailoring instruction based on their responses. In the context of science education, implementing JiTT can help teachers identify misconceptions early and adjust their teaching strategies, accordingly, creating a deeper understanding of scientific concepts. Wanner points out the effective use of PowerPoint as a visual aid that can enhance learning when combines with active teaching methods. For science lesson, incorporating multimedia elements into presentations can make complex topics more accessible and engaging, which is important for maintaining student interest in subjects that may be considered as challenging. Wanner emphasizes different active learning techniques that can be integrated into science instruction, such as group discussions, problem-solving sessions, and hands-on experiments.

Support for Using Materials in Science

Table 3 shows the support for using materials in science in junior high school students. The data shows the perception of students regarding the availability and effectiveness of instructional resources and support within their educational environment. The overall mean score of 3.76 indicates that resources and support are often available. The highest-rated indicator was "Faculty provide guidance on selecting appropriate resources for assignments", with a mean score of 3.91, indicating that students value faculty involvement in directing them to

suitable materials. This is supported by indicator "Peer support is available for discussing and sharing resources", which received a mean score of 3.98, reinforcing the importance of collaborative learning and peer assistance in utilizing instructional materials effectively. However, some areas indicate room for improvement. For instance, the statement "There are workshops available for students on utilizing instructional resources" received a neutral rating with the mean score of 3.31 suggesting that while some workshops may exit, they are not sufficient promoted or utilized by students. In addition, technical support for digital resources scored well at 3.71, indicates a need for continuous improvement in ensuring that all students feel comfortable seeking help when needed with the mean score of 3.64.

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The data shows that technical support for digital resources is perceived as readily available with the mean score of 3.71 which is important in today's technology-driven educational landscape. The consistent ratings around clear instructions with the mean of 3.52 and regular feedback from teachers with the mean of 3.57 and regular feedback from teachers with the mean of 3.57 indicates that students value structured guidance in their learning processes.

Table 3. Support for Using Materials in Science in Junior High School Students

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I receive adequate training on how to use the instructional materials effectively (e.g., workshops, tutorials).	3.51	Agree	Often Available
Faculty provide guidance on selecting appropriate resources for assignments.	3.91	Agree	Often Available
There are workshops available for students on utilizing instructional resources.	3.31	Neutral	Sometimes Available
I feel comfortable asking for help regarding material usage when needed.	3.64	Agree	Often Available
Technical support is readily available for digital resources.	3.71	Agree	Often Available
Faculty encourage the use of various resources in their teaching methods.	3.52	Agree	Often Available
There are clear instructions provided with the instructional materials.	3.52	Agree	Often Available
Peer support is available for discussing and sharing resources.	3.98	Agree	Often Available
Feedback on material usage is regularly provided by instructors.	3.57	Agree	Often Available
I am aware of all available resources that can aid my learning through announcement or, emails.	3.54	Agree	Often Available
Overall Mean	3.76	Agree	Often Available

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Always Available
3.51-4.50	Agree	Often Available
2.51-3.50	Neutral	Sometimes Available
1.51-2.50	Disagree	Seldom Available
1.00-1.50	Strongly Disagree	Not Available

The study of Hattie et al. (2013) emphasizes that there is the need for empirical support in teaching science specifically in materials, where strategies should be grounded in research to improve student outcomes. The study shows that the important theme in the guide is the student engagement. It discusses how behavioral engagement, goal setting, and self-efficacy contribute to academic success. Promoting an engaging learning environment can enhance their motivation to utilize materials effectively. The study emphasizes the various instructional strategies, including individualized instruction and the use of multimedia learning tools.

Topping (2017) in his study emphasizes the benefits of peer assessment in learning process, particularly through the evaluation and discussion of each other's work. It shows that when students assess their peers, they engage deeply with the properties and uses of different materials. By this, it encourages them to think critically about how materials are chosen for specific applications. Moreover, peer assessment offers collaboration and communication skills that allow students to articulate their understanding of materials and their properties effectively.

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Summary of the Results for Instructional Materials Availability in Science

Table 4 shows the summary of instructional materials availability in science in junior high school. The result of the data across all sub-variables suggests that respondents feel that instructional materials are not only accessible but also of good quality and supported adequately for educational purposes. This is important for effective teaching and learning where hands-on experience and visual aids can enhance comprehension and retention.

Table 4. Summary of Instructional Materials Availability in Science in Junior High School

Sub-variables	Mean	Descriptive Rating	Qualitative Interpretation
Accessibility of Materials	3.62	Agree	Often Available
Quality of Materials	3.79	Agree	Often Available
Support for Using Materials	3.76	Agree	Often Available
Overall Mean	3.72	Agree	Often Available

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Always Available
3.51-4.50	Agree	Often Available
2.51-3.50	Neutral	Sometimes Available
1.51-2.50	Disagree	Seldom Available
1.00-1.50	Strongly Disagree	Not Available

Ismail et. al (2022) examines the availability and use of instructional materials for teaching. It highlights that while some materials are available, their utilization is often low. For instance, the chalkboard is always available, but other important resources like textbooks and laboratory equipment are only partially accessible. The study identifies key barriers such as insufficient funding that instructional materials are not only available but also effectively utilized is crucial for enhancing the quality of science education at all levels. On the other hand, Sirajo and Abdullahi (2023) explores how the availability of instructional resources impacts learning. The study highlights the importance of having adequate materials for effective teaching and learning. Various instructional materials like models, experiments, and visual aids can significantly enhance understanding. When students access the right tools, they are more likely to engage with the material and grasp complex concepts.

Descriptive Analysis on the Student Engagement in Science

Behavioral Engagement

Table 5 shows the behavioral engagement of junior high school students in science. The data provided reflects the behavioral engagement of junior high school students in science classes, measured through various indicators. The highest mean score is 4.08 for actively participating in science class discussions, indicating that students generally agree that they are moderately engage in discussions. This suggest that students feel comfortable sharing their thoughts and ideas. With a mean of 4.13, students also agree that they attend all their science classes, which is a positive sign of commitment to their education. The mean score for engaging in a group project is 4.28, but it is rated as neutral. This indicates that while students participate, there may be room for improvement in their engagement level during these activities. A mean score of 3.46 shows that students agree that they frequently ask questions during lessons, reflecting an interest in clarifying concepts. The score with 3.72 shows that students also agree that they collaboratively work with peers during lab activities that fosters teamwork and practical application of science concepts. Whereas the mean score of 3.77 indicates moderate engagement with online resources, suggesting that students are utilizing supplementary materials to enhance their learning. Participation in extracurricular activities has a lower mean of 3.31 indicating a neutral level of engagement and suggesting potential for increased involvement. The lowest mean score of 2.92 for volunteering in community service projects indicates that this area may need more encouragement or opportunities for students to engage. Lastly, the mean score of 3.80 shows that students agree that they seek help from teachers when struggling with concepts which is important behavior for academic success.

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Table 5. Behavioral Engagement of Junior High School Students in Science

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I actively participate in science class discussions.	4.08	Agree	Moderately Engaged
I attend all my science classes in the past	4.13	Agree	Moderately Engaged
I engage in group projects related to science topics.	4.28	Neutral	Fairly Engaged
I frequently ask questions during science lessons.	3.46	Agree	Moderately Engaged
I collaborate with peers on science experiments during our laboratory activities.	3.72	Agree	Moderately Engaged
I utilize online resources for my science studies (e.g., videos, articles).	3.77	Agree	Moderately Engaged
I participate in extracurricular science activities (e.g., clubs, fairs).	3.31	Neutral	Fairly Engaged
I volunteer for science-related community service projects during science fair.	2.92	Neutral	Fairly Engaged
I seek help from teachers when I struggle with science concepts (e.g., tutoring).	3.80	Agree	Moderately Engaged
Overall Mean	3.63	Agree	Moderately Engaged

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Highly Engage
3.51-4.50	Agree	Moderately Engage
2.51-3.50	Neutral	Fairly Engage
1.51-2.50	Disagree	Seldom Engage
1.00-1.50	Strongly Disagree	Not Engage

Fredricks and McColskey (2012) provides a comprehensive analysis of different methods for measuring student engagement which is important for understanding the behavioral engagement of junior high school students in science. Their study shows that effective measurement tools can help educators identify students' levels of engagement and the factors influencing it. For junior high school students, particularly in science, fostering a positive learning environment—where lessons are enjoyable and interactive—can significantly enhance their behavioral engagement. This aligns with the idea that when students find science lessons engaging, they are more likely to participate actively and show interest in the subject. Additionally, the study emphasizes the importance of teacher support and collaborative activities in promoting behavioral engagement, suggesting that creating a supportive classroom atmosphere can lead to better academic outcomes in science education.

Cognitive Engagement

Table 6 shows the cognitive engagement of junior high school students in science. The given data presented reflects the cognitive engagement of junior high school students in science measured through various indicators. A mean score of 3.60 shows that students find the science material challenging which can be good sign as it indicates that they are being pushed to think critically and engage deeply with the content. For the scientific concepts, it has a mean score of 3.52 where students feel that they can apply scientific concepts to real-world situations, such as biodiversity conservation. This ability to connect classroom learning to real-life scenarios is important for meaningful learning. The high mean score of 3.68 for reflecting on learning suggests that students are actively thinking about what they have learned which enhances retention and understanding. A score of 3.8 in engaging in critical thinking indicates that students are not just passively receiving information but are actively analyzing and solving problems.

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Table 6. Cognitive Engagement of Junior High School Students in Science

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I find the science material challenging.	3.60	Agree	Highly Available
I apply scientific concepts to real-world situations (e.g., conservation of biodiversity).	3.52	Agree	Highly Available
I reflect on my learning after completing a science task.	3.68	Agree	Highly Available
I make connections between different scientific concepts.	3.50	Neutral	Moderately Available
I engage in critical thinking when solving scientific problems.	3.80	Agree	Highly Available
I enjoy exploring new scientific ideas even without guidance from teachers.	3.34	Neutral	Moderately Available
I use various strategies to understand complex scientific topics (e.g., visual aids, group discussions, utilizing technology).	3.57	Agree	Highly Available
I feel confident in analyzing data and draw conclusions from scientific experiments.	3.49	Neutral	Moderately Available
I do extra research beyond what is taught in class to deepen my understanding (e.g., Through reading articles, Google, YouTube).	3.79	Agree	Highly Available
I discuss scientific ideas with my peers outside of class settings.	3.53	Agree	Highly Available
Overall Mean	3.58	Agree	Highly Available

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Highly Engage
3.51-4.50	Agree	Moderately Engage
2.51-3.50	Neutral	Fairly Engage
1.51-2.50	Disagree	Seldom Engage
1.00-1.50	Strongly Disagree	Not Engage

Research in science education underscores the importance of challenging material and its impact on student engagement and critical thinking. For instance, Lai and Hwang (2016) highlight that flipped learning environments, which often present complex tasks, significantly enhance student engagement and critical thinking skills. This aligns with your observation of a mean score of 3.80 in critical thinking among students.

Additionally, Bennett and Holman (2019) conducted a meta-analysis demonstrating that applying scientific concepts to real-world problems, such as biodiversity conservation, enhances students' understanding and retention of material, supporting your mean score of 3.52. The role of reflective learning is further emphasized by Moon (2017), who argues that actively reflecting on learning experiences significantly improves comprehension and retention, which corresponds to your high mean score of 3.68 in this area. Hattie and Donoghue (2016) also assert that challenging educational environments are crucial for fostering critical thinking and engagement, reinforcing your finding of a mean score of 3.60. Lastly, Freeman et al. (2014) provide evidence that active learning strategies improve performance across STEM disciplines by promoting deeper engagement with content. Collectively, these studies affirm the positive implications of challenging science material on students' critical thinking, real-world application of concepts, and reflective practices.

Affective Engagement

The survey results on student engagement in science classes presented in Table 7 reveal a generally positive outlook, with an average engagement score of 3.58, indicating moderate engagement. Students feel a strong sense of belonging in their classrooms (3.87) and appreciate the relevance of science to their everyday lives (3.73). However, excitement about learning new concepts scored lower at 3.50, suggesting that while students are somewhat engaged, there is room for improvement in stimulating their interest. Additionally, students reported feeling supported by teachers and peers (3.93) and enjoy discussing science topics (3.76), which

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highlights the importance of collaboration in enhancing their learning experience.

Despite these positive aspects, the enthusiasm and curiosity necessary for deeper understanding received a lower score of 3.48, indicating potential for growth in fostering passion for science. Interestingly, the belief that learning science will aid in achieving future career goals scored the highest at 4.00, demonstrating students' recognition of the subject's value in their aspirations. By focusing on enhancing excitement about learning and connecting scientific concepts to real-life applications and career opportunities, educators can create a more engaging and supportive environment for students.

Table 7. Affective Engagement of Junior High School Students in Science

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I feel excited about learning new things in science class to discover new concepts (e.g., plant growth investigation).	3.50	Neutral	Fairly Engaged
I feel a sense of belonging in my science classroom environment.	3.87	Agree	Moderately Engaged
My interest in science motivates me to learn more about it outside of school hours.	3.63	Agree	Moderately Engaged
I feel supported by my teachers and peers in my pursuit of scientific knowledge.	3.93	Neutral	Fairly Engaged
I enjoy discussing science topics (e.g., group discussions).	3.76	Agree	Moderately Engaged
I feel confident in my ability to succeed in science subjects.	3.58	Agree	Moderately Engaged
My enthusiasm and curiosity in science enhance my understanding and retention of the material.	3.48	Neutral	Fairly Engaged
I appreciate the relevance of science to everyday life and personal interests (e.g., how base react with acid to produce carbon dioxide, how plants grow under different conditions).	3.73	Agree	Moderately Engaged
I feel motivated by the success of my peers in science activities	3.70	Agree	Moderately Engaged
I believe learning science will help me achieve my future career goals.	4.00	Agree	Moderately Engaged
Overall Mean	3.58	Agree	Moderately Engaged

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Highly Engaged
3.51-4.50	Agree	Moderately Engaged
2.51-3.50	Neutral	Fairly Engaged
1.51-2.50	Disagree	Seldom Engaged
1.00-1.50	Strongly Disagree	Not Engaged

To enhance student engagement in science classes, it is essential to recognize the positive aspects already present, such as a strong sense of belonging and appreciation for the relevance of science in everyday life. However, there remains a need to stimulate greater excitement and curiosity about learning new concepts. Research indicates that fostering a positive emotional connection to science can significantly enhance student engagement and motivation. For instance, a study by Hidi and Renninger (2019) emphasizes the importance of interest in learning, suggesting that when students are emotionally invested in the subject matter, their engagement levels increase.

Moreover, collaboration among peers and support from teachers play crucial roles in creating an engaging learning environment. According to Johnson and Johnson (2018), cooperative learning strategies not only improve academic achievement but also enhance students' social skills and sense of belonging. This aligns with the findings that students enjoy discussing science topics and feel supported by their peers and teachers. Furthermore, connecting scientific concepts to real-life applications and future career opportunities can significantly boost student enthusiasm. A study by Sadler et al. (2020) highlights that when students understand

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how science relates to their personal goals and career aspirations, their motivation to learn increases. This suggests that educators should focus on integrating real-world examples and career relevance into their teaching strategies.

Summary of the Results for Student Engagement in Science

The results for learners' engagement in science at the junior high school level reveal interesting insights into their behavioral, cognitive, and affective engagement. Behavioral engagement, with a score of 3.63, indicates that students are actively participating in science activities, such as attending classes, completing assignments, and engaging in discussions. This level of participation is essential for fostering a dynamic learning environment where students feel motivated to explore scientific concepts. However, while the score is relatively high, it suggests there may still be room for improvement in encouraging even more active involvement.

Cognitive engagement scored slightly lower at 3.58, which reflects how students are thinking about and processing the material they learn in science. This suggests that while students are participating, they may not always be deeply analyzing or connecting concepts to real-world applications. On the other hand, affective engagement scored the highest at 3.72, indicating that students generally have a positive emotional connection to science. They likely find the subject interesting and enjoy learning about it. This emotional investment is crucial as it can enhance both behavioral and cognitive engagement. Overall, these findings highlight the importance of fostering not only active participation but also deeper thinking and emotional connections to improve students' overall engagement in science education.

Table 8. Summary of Learners Engagement in Science in Junior High School in the aspect of Behavioral, Cognitive, and Affective Engagement

Sub-variables	Mean	Descriptive Rating	Qualitative Interpretation
Behavioural Engagement	3.63	Agree	Often Available
Cognitive Engagement	3.58	Agree	Often Available
Affective Engagement	3.72	Agree	Often Available
Overall Mean	3.64	Agree	Often Available

Legend

Range	Descriptive Meaning	Qualitative Interpretation
4.51-5.00	Strongly Agree	Always Available
3.51-4.50	Agree	Often Available
2.51-3.50	Neutral	Sometimes Available
1.51-2.50	Disagree	Seldom Available
1.00-1.50	Strongly Disagree	Not Available

Engagement in science education is crucial for fostering a positive learning environment and enhancing students' understanding of scientific concepts. Research indicates that behavioral engagement, which encompasses active participation in class activities and discussions, plays a significant role in students' academic success (Fredricks et al., 2016). Engaged students are more likely to attend classes, complete assignments, and collaborate with peers, which can lead to improved academic outcomes. However, while behavioral engagement is essential, it must be complemented by cognitive engagement, where students actively think about and connect the material to real-world situations. A study by Wang and Eccles (2019) emphasizes that cognitive engagement is vital for deeper learning, as it encourages students to analyze information critically and apply their knowledge effectively.

Moreover, affective engagement, which reflects students' emotional responses to learning, is equally important. Positive emotions associated with learning science can enhance both behavioral and cognitive engagement (Pekrun et al., 2021). When students find science interesting and enjoyable, they are more likely to participate actively and think critically about the subject matter. This emotional investment can create a cycle of engagement that reinforces their interest in science. Therefore, educators should focus on strategies that promote not only active participation but also foster deep thinking and positive emotional connections to science, ensuring a well-

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rounded approach to student engagement in the classroom.

Correlation Analysis on the Instructional Material Availability and Learner's Engagement

The data presented in Table 9 highlights the relationships between various types of engagement: behavioral, cognitive, and affective; and factors such as the accessibility and quality of materials used in educational settings. The Pearson correlation coefficients indicate strong positive correlations, particularly between the quality of materials and all three types of engagement, with values ranging from 0.634 to 0.714, all statistically significant ($p < 0.001$). This suggests that as the quality of educational materials improves, so does student engagement on multiple levels. Similarly, accessibility of materials also shows significant correlations with engagement types, emphasizing that both the quality and availability of resources are crucial for enhancing student involvement and learning outcomes.

Table 9. Correlation of Instructional Materials Availability and Learner's Engagement in Science in Junior High School

Variables		Behavioral Engagement	Cognitive Engagement	Affective Engagement
Accessibility of Materials	Pearson Correlation Sig. (2-tailed)	.512(**) .000	.576(**) .000	.598(**) .000
Quality of Materials	Pearson Correlation Sig. (2-tailed)	.634(**) .000	.714(**) .000	.675(**) .000
Support for Using Materials	Pearson Correlation Sig. (2-tailed)	.583(**) .000	.686(**) .000	.643(**) .000

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

Research has consistently shown that the quality and accessibility of educational materials significantly influence student engagement across behavioral, cognitive, and affective dimensions. For instance, a study by Wang and Holcombe (2019) found that high-quality instructional materials not only enhance students' understanding but also increase their motivation to participate actively in learning activities. Similarly, Lee et al. (2020) emphasized that when students have access to well-designed resources, they are more likely to engage deeply with the content, leading to improved academic performance. Furthermore, a meta-analysis by Hattie (2021) highlighted that effective teaching materials contribute to higher levels of student engagement, which correlates positively with learning outcomes. These findings align with the data indicating strong correlations between material quality and various engagement types, reinforcing the idea that both the quality and accessibility of educational resources are essential for fostering an engaging learning environment.

CONCLUSION

The study highlights the significant role of instructional materials in enhancing student engagement and academic performance in science education. It found that when students have access to a variety of teaching resources, such as textbooks, digital tools, and hands-on materials, their involvement in learning increases. This is particularly important in rural areas where schools often face shortages of these essential resources. The research indicates that students generally perceive the availability of instructional materials positively, noting that diverse formats cater to different learning styles. However, there are still gaps, especially regarding access to laboratory equipment and materials that promote deeper understanding of scientific concepts. Moreover, the study emphasizes that effective use of these materials can foster not only academic engagement but also a more profound interest in science. Visual aids and interactive content were particularly valued by students, suggesting that these elements are crucial for effective learning. While many students reported satisfaction with the quality and relevance of the materials, there remains room for improvement in how these resources facilitate critical thinking and real-world applications. Overall, the findings underscore the need for schools to enhance the availability and utilization of instructional materials to create more engaging and effective science education environments.

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