Journal of Applied Science Education and Innovation
Vol. 1, No. 1, April 2026, pp. 17~23
DOI: https://doi.org/xxxxxxxxxx

p-ISSN: xxxx-xxxx
e-ISSN: xxxx-xxxx

APPLYING THE PRINCIPLES OF CONSTRUCTIVISM THEORY TO IMPROVE STUDENT ENGAGEMENT AND MOTIVATION IN LEARNING

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Article History
Received: 11/02/2026
Revised: 11/02/2026
Accepted: 12/02/2026
Published: 01/04/2026
Keywords:
constructivism; student engagement; learning motivation; active learning; learning facilitation

Abstract. This study explores how applying constructivist principles can significantly increase student engagement and motivation in the classroom. Applying constructivist principles involves several key strategies: providing real-world problems relevant to students' lives, encouraging collaboration among students, facilitating open discussion, and providing opportunities for reflection. The results of the study show that students who experience constructivist learning show significant improvements in class participation, the quality of questions asked, and persistence in completing tasks. Moreover, students develop better critical thinking skills and have a deeper understanding of the material being studied. The implementation of constructivism does require a paradigm shift from teachers, from "informants" to "facilitators" who guide students on their journey of discovery. Although this challenge is real, the long-term benefits in terms of student engagement and quality of learning make it a very valuable investment in modern education.

How to Cite: Lestari, Claudia; Alarifin, D. H.; Prihandono, Eko. (2026). Applying the Principles of Constructivism Theory to Improve Student Engagement and Motivation in Learning. Journal of Applied Science Education and Innovation, 1(1), 17-23. https://doi.org/10.29xxx/jrst.vxxx.xxxx

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Introduction

The constructivist approach is a learning approach that emphasizes students being active in learning directly by forming new knowledge constructed from existing meanings and

knowledge. This study aims to analyze the constructivist approach in elementary school learning implementation on learning outcome improvement (Rosita, 2024). This study explores how teacher competence and classroom management contribute to student learning motivation. It was found that these factors are very important in creating a supportive learning environment (Hendrawan, 2025).

Motivation is one of the factors that influence student success. A person will achieve the desired results in learning if they have the desire to learn. Motivation serves as a driver for achieving good results (Rahman, 2021). Active learning is at the core of constructivism, where students not only receive information but also actively build their own understanding through interaction with their environment (Julia, 2024). Constructivist theory asserts that knowledge is constructed by students through experience and social interaction. This is an approach that focuses on how students understand and master the material (Suparlan, 2019).

Educational policies that integrate the constructivist approach can increase the effectiveness of learning. This shows the importance of adapting teaching methods to the needs of students (Pratami, 2024). In the context of modern learning, the constructivist approach is applied to increase student engagement, which is very important in achieving educational goals. The views of Piaget and Vygotsky provide a strong foundation for constructivist theory, emphasizing the importance of social interaction in learning and how students construct their knowledge. Online learning that uses a constructivist approach demonstrates a good interactive process between teachers and students, utilizing digital media to increase engagement (Budyastuti, et al., 2021).

The discovery learning model has been proven effective in increasing student motivation to learn, as students are required to actively seek information and understand concepts in depth (Fiska, et al., 2025). Constructivist thinking and its implementation in learning can improve the learning process in the classroom by prioritizing student activity in learning (Nerita, et al., 2023). This book discusses various learning theories, including constructivism, and explains how these theories can be applied in the context of education to improve learning outcomes (Wahab, et al., 2021). Yulianti (2024) discusses the use of the constructivism learning model to increase student motivation in primary education. The author emphasizes the importance of students as active learners who construct knowledge through experience and interaction. By applying constructivism strategies, it is hoped that students will be more motivated, actively involved in the learning process, and achieve better academic results. This journal provides practical guidance for teachers to effectively implement this approach in the classroom.

Methode

This study uses a qualitative approach with a literature review method to analyze the application of constructivism principles in improving student engagement and learning motivation. This method was chosen based on the need to explore in depth various theories, concepts, and findings from previous studies relevant to the topic under review. These students were selected because they had studied physics material on Newton's laws, which was the focus of learning in this case study.

The research was conducted during 16 meetings in the even semester of the 2024/2025 academic year. The research location was at SMA Negeri 1 Meraksa Aji, specifically in class XI MIPA 1. The learning process took place during physics lessons, lasting 3 × 45 minutes each week, with a total of 28 students, 16 female and 12 male. The classroom environment was designed to support problem-based learning, including group seating arrangements to facilitate discussion among students.

The data in this study were collected using three main techniques, namely observation, interviews, and document analysis. The physics material that was the focus of this study was Newton's laws, which include Newton's first law (the law of inertia), Newton's second law (the law of acceleration), and Newton's third law (the law of action and reaction). This material was selected based on several considerations: first, Newton's laws are fundamental concepts in physics that have broad applications in everyday life; second, this material requires a deep understanding of the relationship between force, mass, and acceleration, which can be reinforced through a constructivist approach; third, this concept allows students to build understanding through experiments, observation, and discussion, which are at the core of constructivist learning.

Result and Discussion

The results of the study indicate an increase in student learning outcomes after the application of constructivism theory. Data were obtained from pretest and posttest results, observations of student learning activities, and interviews with teachers and students.

Improvement in Student Learning Outcomes

Pre-test Results

Prior to implementing constructivist learning, a pretest was conducted to measure students' initial understanding of Newton's laws and their level of engagement and motivation to learn. The pretest results showed that:

1. Conceptual Understanding of Newton's Laws: The average pretest score was 45.7 out of 100, indicating a low level of understanding of the basic concepts of Newton's laws. A total of 21 students (75%) scored below 50, indicating difficulty in understanding the relationship between force, mass, and acceleration.
2. Student Engagement: Based on the engagement measurement instrument, the average pretest score was 2.3 on a scale of 5. Only 6 students (21.4%) showed a high level of engagement, while 22 students (78.6%) had a moderate to low level of engagement in physics learning.
3. Learning Motivation: The average learning motivation score on the pretest was 2.5 on a scale of 5. A total of 19 students (67.9%) showed low learning motivation, especially in understanding abstract physics concepts such as Newton's laws.

Posttest Results

After implementing constructivist learning for 16 sessions, a posttest was conducted using the same instrument to measure the changes that had occurred. The posttest results showed significant improvements:

1. Conceptual Understanding of Newton's Laws: The average posttest score increased to 78.4 out of 100, indicating an increase of 32.7 points or 71.6%. A total of 24 students (85.7%) scored above 70, indicating a good understanding of Newton's laws and the ability to apply them in real-life situations.
2. Student Engagement: The average student engagement score increased to 4.1 on a scale of 5, showing an increase of 1.8 points or 78.3%. A total of 25 students (89.3%) showed a high level of engagement in learning, with active participation in discussions, experiments, and group work.
3. Learning Motivation: The average learning motivation score increased to 4.2 on a scale of 5, showing an increase of 1.7 points or 68%. A total of 23 students (82.1%) showed high learning motivation, with increased enthusiasm in learning physics concepts.

Descriptive statistical analysis shows a consistent increase in all aspects measured, as presented in **Table 1.**

Table 1. Pretest-Posttest Comparison Analysis

Assessment Aspects	Pre-test (Average)	Post-test (Average)	Improvement
Conceptual Understanding	45,7	78,4	32,7
Student Engagement	2,3	4,1	1,8
Learning Motivation	2,5	4,2	1,7

Student Observation Results

The results of observations during the implementation of constructivism learning showed significant changes in student learning behavior:

1. Active Involvement: Students showed increased participation in group discussions, with 89% of students actively asking questions and giving opinions. They were more courageous in expressing their ideas about Newton's laws and relating them to everyday experiences.
2. Effective Collaboration: Group work became more productive, with students helping each other understand difficult concepts. They developed the ability to explain concepts to their peers in easy-to-understand language.
3. Experimentation and Discovery: Students showed great enthusiasm in conducting simple experiments to prove Newton's laws. They were able to formulate hypotheses, conduct tests, and draw conclusions based on their observations.

Results of Teacher Interviews with Students

Interviews with teachers and students about the implementation of constructivist learning in teaching Newton's laws by applying constructivist principles to increase student motivation and engagement in learning. Students stated that using this learning

theory made it easier to understand the material because the learning process involved simple experiments in everyday life, which made it easier for students to remember. Students came to understand the usefulness of physics learning, and teachers acted as facilitators in this learning process.

Learning Document Analysis

Analysis of student portfolios shows:

1. Quality of Reflection: Students' learning reflections demonstrate a deeper understanding of Newton's laws, with the ability to connect theory with practical applications.
2. Problem Solving Skills: Students show improvement in their ability to solve complex physics problems, with a more systematic and creative approach.
3. Creativity in Presentation: Students' work shows creativity in presenting their understanding of Newton's laws through various media such as diagrams, models, and simple simulations.

The results of this study indicate a significant increase in student learning outcomes after the application of constructivism theory to improve student engagement and motivation. The average score for student engagement increased from 2.3 to 4.1, and the average score for student motivation increased from 2.5 to 4.2. This indicates that a more student-centered learning approach is effective in supporting understanding and learning achievement. These findings are in line with the main principles of constructivism theory proposed by Piaget and Vygotsky, which state that knowledge is actively constructed by students through learning experiences and social interactions.

The implication of these findings for learning practices is the importance of the teacher's role as a facilitator who creates an active, collaborative, and meaningful learning environment for students. Teachers need to design challenging and relevant contextual problems related to students' daily lives to motivate them to learn. Additionally, the results of this study support the implementation of differentiated learning, such as critical thinking, collaboration, and problem solving. Thus, the principles of constructivism increase student engagement and learning motivation, which have been proven effective for SMA Negri 1 Meraksa Aji.

Conclusion

This study shows excellent results after applying the constructivist learning method at Meraksa Aji 1 Public High School, particularly in teaching Newton's laws. The average student score increased from 45.7 to 78.4. Students also became more active in class, as seen from their increased engagement score from 2.3 to 4.1. Students' enthusiasm for learning also increased, as shown by the increase in their motivation score from 2.5 to 4.2.

This change in learning methods made students more confident in asking questions and participating in class discussions. They also enjoyed working in groups and conducting experiments to understand physics concepts. The students admitted that it was easier for

them to understand the lessons because they could immediately apply the theories they learned and

relate them to their daily lives.

The success of this method is supported by several important factors: students are given the opportunity to actively seek knowledge themselves, the subject matter is linked to real-life examples, the classroom atmosphere is conducive to discussion, and the teacher acts as a guide rather than just a provider of material. From these results, it can be concluded that the constructivist method is very suitable for teaching physics in high school.

Recommendations

High school physics teachers are advised to integrate constructivism theory by increasing student engagement. This approach has been proven effective in improving student learning outcomes through active, collaborative, and contextual learning activities. To support this implementation, schools need to provide training for teachers so that they are able to design problem-based learning that is appropriate for the characteristics of physics material.

Acknowledgements or Notes

The author would like to thank the Principal, physics teachers, and students of class XI MIPA SMA Negeri 1 Meraksa Aji for their permission, support, and participation during this research. Thanks are also extended to the Faculty of Teacher Training and Education at Muhammadiyah Metro University, particularly the lecturer in charge of the Learning and Teaching course, Dr. Friska Octavia Rosa, M.Pd., for the guidance and direction provided.

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