

Transformation of Physics Learning: A Study of the Determinants of Active Student Participation

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Abstract

The aim of this study is to analyze the internal and external factors influencing student learning activeness and identify the most dominant factor among students in Class XI MIPA at MA Plus Nurul Islam. Focusing on internal factors (motivation, self-efficacy, and learning readiness), external factors (class environment, teacher support, peers, and facilities), media and teaching methods, and parental and home environment support, the research employs a quantitative descriptive approach with a case study method. Data were collected via questionnaires (Likert scale) and documentation from respondents. The results indicate that all factors positively contribute to learning activeness, with media and teaching methods achieving the highest mean score (4.12 or 82.4%), followed by external factors (3.95 or 79.0%), internal factors (3.87 or 77.4%), and parental and home support (3.72 or 74.4%). These findings emphasize the importance of interactive teaching methods and collaborative environments to enhance student engagement. Recommendations include teachers adapting methods for greater interactivity, schools improving facilities, and parents increasing academic involvement to optimize learning outcomes in senior high school physics education.

Keywords: Internal and External Factors; Parental Support; Student Learning Activeness.

Introduction

Education plays a crucial role in the development of human intellectual, moral, and social abilities. Through education, individuals not only acquire knowledge but also develop good morals and character and adapt their behavior through learning and training to become more mature individuals. Student active learning is a crucial indicator that the learning process is truly effective. Students who are active in class tend to delve deeper into the material, ask questions, engage in discussions, and be more critical of what is taught, ultimately impacting learning outcomes and long-term understanding (Rusdi *et al.*, 2019).

Learning is a phase of behavioral change in an individual who is able to consider events, thus enabling students to gain knowledge to prepare themselves as a quality future generation. The student's educational process is influenced by several factors, both internal and external. Internal factors that influence student persistence in learning include physiological factors, such as physical condition (five senses), and psychological factors, such as attention, response, and memory, which support student active learning. Meanwhile, physical condition is a factor that inhibits student active learning. External factors influencing student learning engagement include non-social factors, namely the setting and facilities, and social factors, namely teachers and peers. The setting, facilities, and teachers are supporting factors in student learning engagement. Meanwhile, peers can be a factor that can disrupt student learning engagement (Rahmadani *et al.*, 2023).

Tegeh & Pratiwi (2019) found that learning motivation and engagement significantly correlated with elementary school students' science learning outcomes. Suwarni & Muhudiri (2021) also confirmed that learning engagement and motivation significantly influenced junior high school students' learning outcomes. Another study by Andriani *et al.* (2024) showed that the use of problem-based learning models can increase high school students' engagement and interest in learning.

Theoretically, this research enhances understanding of student engagement in the context of senior high school education in Indonesia. Internal factors such as motivation, self-efficacy, and readiness to learn, as well as external factors such as learning methods, facilities, and the classroom environment, will be mapped as determinants of learning engagement (Basri & Irawati, 2023). The results of this study are useful for teachers and schools to improve the quality of learning. Teachers can adjust teaching methods to be more interactive, schools can improve learning facilities, and students can become more aware of the importance of active engagement in learning. Furthermore, the research findings can serve as a basis for educational policymakers in designing strategies to improve the quality of learning in secondary schools (Rosyadi & Utami, 2024).

Interest in the learning process is a crucial aspect of psychology that influences each individual's learning activities. A person's interest typically creates a sense of liking,

attraction, and attachment to a particular subject or activity without any element of compulsion. In education, interest in learning plays a significant role because it is one of the keys to student engagement. When students exhibit strong interest, they tend to demonstrate activeness within themselves. This directly impacts the quality of the learning process and the outcomes achieved. The research results show that students with a strong interest in learning are able to participate better in the teaching and learning process, thus increasing their chances of achieving optimal learning outcomes. Conversely, low interest in learning often leads to passive students, difficulty concentrating, reluctance to complete assignments, and failure to complete lesson notes provided by educators. This difference indicates that learning interest is a key factor that can encourage active engagement in learning. Therefore, a deep understanding of the factors that influence learning interest is crucial. This understanding includes examining how students perceive the causes of interest, which can then serve as a basis for more effective learning improvement (Muliani & Arusman, 2022).

Learning tends to be one-way, with teachers delivering material and students simply receiving it. This can lead to poor understanding, rapid forgetfulness, a lack of creativity, and poor critical thinking skills. Passive learning can also lead to decreased student motivation and the underdevelopment of their potential. In the context of Physics, for example, lessons that require observation, laboratory work, practical work, and discussion will be significantly impacted if students are inactive (Fadhilah, 2024). Therefore, analyzing these factors is crucial.

Method

This research uses a quantitative descriptive approach with a case study approach, mapping and explaining the factors influencing learning engagement in a single case: 11th-grade students in Mathematics and Natural Sciences at MA Plus Nurul Islam. The case study approach allows researchers to explore the phenomenon of learning engagement in a focused manner within a specific school context, while still relying on numerical data for descriptive analysis. Qualitative descriptive approaches focus on answering research questions related to the who, what, where, and how of an event or experience, ultimately examining it in depth to identify emerging patterns (Yuliani, 2018).

Data collection techniques in this study were conducted using questionnaires and documentation. The primary instrument was a closed-ended questionnaire using a five-level Likert scale, ranging from strongly disagree to strongly agree, structured based on indicators of internal factors (motivation, self-efficacy, and readiness to learn) and external factors (learning methods, learning facilities, and classroom environment). The questionnaire was administered directly to students to obtain objective and measurable data on their levels of engagement. In addition, documentation methods were used to collect supporting data

such as attendance lists, grades, and questionnaires to verify the accuracy of the data obtained. According to Arikunto (2019), using more than one data collection technique can increase the validity of research results because it allows for source triangulation.

The collected data were analyzed using descriptive statistics by calculating the average score (mean) and percentage for each factor indicator. This analysis aims to illustrate the tendency of each factor's influence on student learning engagement. The results of the analysis were then interpreted to determine the dominant factor with the greatest influence. A quantitative approach was used because it allows researchers to process data systematically, measurably, and statistically testable to objectively explain socio-educational phenomena (Sugiyono, 2022). Therefore, the results of this study are expected to provide an accurate and in-depth picture of the factors that play a role in increasing student learning engagement at MA Plus Nurul Islam.

Result and Discussion

Based on the results of descriptive statistical analysis of questionnaire data completed by class XI students of MA Plus Nurul Islam, a general overview was obtained regarding four factors that influence learning activity, namely internal factors, external factors, media and learning methods, as well as parental support and the home environment. The analysis was carried out by calculating the average score (mean) and percentage for each indicator to assess the tendency of the influence of each factor on student learning activity. In general, the results of the study showed that all four factors made a positive contribution to learning activity, with varying levels of influence. The media and learning methods factor obtained the highest average value, followed by external factors, internal factors, and parental support and the home environment.

Factors Influencing the Activeness of Physics Learning of Students

Internal Factors

Internal factors include indicators of student motivation, curiosity, self-confidence, and readiness to learn. Based on the analysis, this factor showed an average score of 3.87, or 77.4%, which is in the high category. This indicates that most students have a strong internal drive to participate in learning activities. These results align with research by Tegeh & Pratiwi (2019), which confirmed that learning motivation has a positive relationship with student activeness in the learning process.

Intrinsic motivation, such as curiosity and a passion to understand the material without pressure from the teacher, is key to increasing activeness. This finding also aligns with Suwarni & Muhudiri (2021), who stated that students with high levels of motivation and self-confidence are more easily involved in class discussions and activities. Therefore, it can

be concluded that internal factors play a crucial role in fostering self-directed learning awareness and active student participation at MA Plus Nurul Islam Sekarbela.

External Factors

External factors include the classroom environment, teacher support, peer support, and school facilities. Based on calculations, this factor had an average score of 3.95, or 79.0%, indicating a high score. This score reflects that the learning environment at school supports student engagement. Teachers are considered to provide opportunities for students to express their opinions and are able to create a pleasant learning atmosphere.

These findings are consistent with research by Rusdi *et al.* (2019), which shows that a positive classroom social climate and teacher-student interactions can increase engagement and active learning. Furthermore, peer factors also play a significant role in motivating students to be more active. A collaborative environment allows students to help each other understand the material, as explained by Basri & Irawati (2023), who found that harmonious social relationships in the classroom can create a productive and interactive learning environment.

The media and learning methods factor received the highest average score, at 4.12, or 82.4%, in the very high category. These results indicate that the media and variety of learning methods implemented by teachers are very effective in increasing student engagement. Questionnaire statements such as "Using learning media makes me more enthusiastic about learning" and "I learn more actively when teachers use discussion or practical methods" received positive responses from the majority of students.

This demonstrates that innovations in the use of media such as PowerPoint presentations, instructional videos, and project-based group assignments can create an engaging and interactive learning environment. Research by Andriani *et al.* (2024) also demonstrated that the implementation of Problem-Based Learning (PBL) and Project-Based Learning (PjBL) utilizing digital media can significantly increase student engagement.

Furthermore, Papageorgiou *et al.* (2025) found that a variety of technology-based teaching methods can strengthen students' intrinsic motivation and enhance the cognitive and affective dimensions of learning engagement. In this context, physics teachers at MA Plus Nurul Islam Sekarbela have successfully utilized a combination of visual media and collaborative methods such as discussions, group work, and practical demonstrations, resulting in more enthusiastic student participation in lessons.

The factors of parental support and the home environment had an average score of 3.72, or 74.4%, which is considered high but not optimal. These results indicate that although most students receive positive support from their families, some still experience limitations in terms of study time and parental attention to their learning activities.

Indicators such as "parents encourage diligent study" and "home conditions support quiet study" scored quite high, while "parents often discuss lessons" scored lower.

These results align with research by Fauziah & Wulandari (2022), which confirmed that family support, whether in the form of motivation, supervision, or home learning facilities, positively influences student engagement and learning outcomes. Parental support serves as an external motivational booster that complements students' internal factors. When the home environment is conducive and parents are actively involved in the learning process, student engagement in school increases (Fitrah, 2021). However, the findings of this study also indicate the need to increase parental awareness of the importance of academic communication with their children. Simple discussions about course material or learning progress can strengthen students' self-confidence and readiness to be more active in class.

Overall, the results of this study indicate that student engagement in learning at MA Plus Nurul Islam Sekarbela is influenced by a combination of internal and external factors. Media and learning methods were the dominant factors, scoring the highest (4.12; 82.4%), followed by external factors (3.95; 79.0%), internal factors (3.87; 77.4%), and parental support and the home environment (3.72; 74.4%). All of these factors were in the high category, indicating that students generally exhibited a good level of student engagement.

Optimal learning engagement will be achieved if teachers are able to manage the classroom interactively, utilize appropriate media, and collaborate with parents to build a conducive learning environment both at school and at home. Therefore, the results of this study provide a foundation for improving the quality of physics learning to be more participatory and oriented towards active student involvement.

The Most Dominant Factors Influencing Student Learning Engagement

Based on the results of the statistical analysis, the most dominant factors influencing the learning engagement of 11th-grade mathematics and natural sciences students at MA Plus Nurul Islam Sekarbela are learning media and methods, with an average score of 4.12, or 82.4%, the highest score compared to the other three factors.

These results indicate that the teacher's delivery method, the variety of methods used, and the quality of the learning media have the strongest influence on student engagement. When teachers use interactive learning methods such as group discussions, demonstrations, learning videos, or hands-on practice, students become more motivated and focused and participate more actively in class activities.

Furthermore, visual media and learning technology facilitate student understanding of the material, encouraging them to actively ask questions, answer questions, discuss topics, and complete assignments. Therefore, learning media and methods are dominant factors

because they provide a more engaging, challenging, and relevant learning experience for students, directly increasing their learning engagement.

Conclusion

This study concludes that the learning engagement of 11th grade MIPA students at MA Plus Nurul Islam Sekarbela is influenced by a combination of internal and external factors, with media and learning methods as the dominant factors (average score of 4.12, or 82.4%). This confirms the effectiveness of interactive and technology-based teaching methods in encouraging engagement. External (3.95 or 79.0%) and internal (3.87 or 77.4%) factors also play a significant role, while parental support and the home environment (3.72 or 74.4%) need to be further improved. To improve the quality of learning, teachers should prioritize varied and participatory methods, schools should improve facilities, and parents should be more involved in academic discussions. These insights provide a foundation for policymakers to design strategies to improve educational outcomes in Indonesian secondary schools, emphasizing active student engagement for long-term understanding and character development.

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