Self-Efficacy of 12th Grade Students in Physics Learning Across Islamic, Private, and Public Schools

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Abstract *- This study examines differences in students' self-efficacy in physics learning across Islamic, public, and private schools. Using a quantitative approach, data were collected from twelfth-grade students in the 2024/2025 academic year through a questionnaire adapted from the Physics Learning Self-Efficacy (PLSE) instrument. The 31-item questionnaire measured five key indicators, and responses were analyzed using one-way ANOVA at a 5% significance level. Results showed that Islamic school students had the highest self-efficacy (M = 86.3), followed by public (M = 79.7) and private school students (M = 73.8). The Everyday Application (EA) indicator had the highest mean score across all groups, particularly in Islamic schools. The Tukey HSD test confirmed significant differences between Islamic and both public (p = 0.000) and private schools (p = 0.049), while no significant difference was found between public and private schools (p = 0.096). These findings highlight the importance of structured learning environments, hands-on activities, and problem-based teaching in enhancing self-efficacy. Educators should integrate practical applications and scientific communication exercises into physics instruction. Furthermore, future research should utilize qualitative approaches, including interviews and focus group discussions, to gain deeper insight into the factors shaping self-efficacy.*

Keywords*: Physics Learning; Self-efficacy; Islamic Schools; Private Schools; Public Schools*

INTRODUCTION

Since 2018, the science performance of Indonesian students has shown a continuous decline, as indicated by assessment data over time (OECD, 2022). Although many studies have explored strategies to improve the quality of student learning in recent years, intrinsic factors within students remain crucial. Self-efficacy, which refers to students' perception of their ability to solve problems, learn a task, or achieve a desired level of performance (Bandura, 1997), plays a key role in shaping academic success.

However, self-efficacy alone is not enough—learning environments and instructional methods significantly impact how effectively students develop and apply their knowledge. Research shows that schools with more adequate resources tend to produce higher student performance (OECD, 2009). If students with high self-efficacy demonstrate low science knowledge, this is due to ineffective teaching methods and learning conditions (Said et al., 2018). Self-efficacy is linked to students' experiences and achievements in dealing with various situations, which are influenced by the applied learning models. Several studies also emphasize that the school system plays a crucial role in shaping students' self-efficacy (Ding et al., 2024; Dorfman & Fortus, 2019; Hasanah et al., 2021).

The education system in Indonesia is diverse, reflecting various curricula and pedagogical approaches. Islamic-based schools integrate moral and religious teachings into academic learning, creating a distinctive educational environment. Public schools generally follow the national curriculum set by the Ministry of Education and Culture, which emphasizes a comprehensive and broad-based educational framework. Private schools that use the international curriculum tend to provide

more global learning experience and prioritize foreign language proficiency, while those adhering to the national curriculum follow government-mandated standards (Hendajany, 2016; Maruta Pradana et al., 2023). Differences in curriculum management, resource allocation, and teaching methods suggest that learning conditions and self-efficacy development can vary significantly across these types of schools.

Given these differences, an important research gap arises: why compare self-efficacy in physics learning across these three different educational contexts? The unique teaching methods and learning environments in Islamic, public, and private schools may lead to varying levels of self-efficacy among students. Focusing on these three types of schools, this study aims to explore how educational context affects students' self-efficacy in physics. The insights gained are expected to inform more targeted strategies and educational policies to enhance science learning and overall student performance in Indonesia.

RESEARCH METHODS

The main objective of this study is to examine the differences in self-efficacy across three types of schools using a comparative quantitative research design. This research is non-experimental, meaning no intervention affects individuals, environments, or research variables. The sample was selected using a convenience sampling technique (Creswell, 2015), with each school representing each category selected based on availability and accessibility to the researcher.

Participants in this study were twelfth-grade students from Islamic schools, public schools, and private schools. Twelfth graders were selected because they are assumed to have significant experience in studying physics, both in theory and practice. A total of 78 students participated in the research, with 26 representing each school type.The research instrument was adapted from the Physics Learning Self-Efficacy (PLSE) questionnaire proposed by (Tzung Jin Lin & Chin Chung Tsai, 2013) which consists of five indicators, as shown in Table 1. The PLSE questionnaire has been translated into Indonesian and includes 31 statements rated on a 1-4 scale.

Table 1. Five Indicators of Physics Learning Self-Efficacy (PLSE)

Indicator	Description
Conceptual Understanding (CU)	Assesses students' confidence in their ability to use basic cognitive skills such as concepts, laws, or theories of physics.
Higher-order Cognitive Skills (HCS)	Assesses students' confidence in their ability to use advanced cognitive skills like problem-solving, critical thinking, or scientific inquiry within the domain of physics.
Practical Work (PW)	Measures students' confidence in their ability to conduct physics experiments in laboratory activities.
Everyday Application (EA)	Measures students' confidence in their ability to apply physics concepts and skills in everyday life.
Science Communication (SC)	Measures students' confidence in their ability to communicate and discuss

The validity test of 31 questionnaire statements (N = 78) shows that all items met the validity criteria based on the r-table with df = 76, which is 0.223. Furthermore, the reliability test using Cronbach's alpha yielded a coefficient of 0.895 with a standard deviation of 11.17, indicating a high level of internal consistency in the research instrument.

A One-Way ANOVA was conducted to compare three data groups, requiring an assessment of normality and homogeneity of variance assumptions. The analysis proceeds

if both assumptions are met with a significance level > 0.05. If the ANOVA results showed significance < 0.05, the Tukey HSD post hoc test was applied to identify groups with significant differences while controlling for family-wise error rates to ensure the validity of the results (Gliner et al., 2017).

RESULTS AND DISCUSSION

Results

The normality test confirmed that the data were normally distributed (sig. > 0.05) with values of 0.468 (Islamic schools), 0.672 (public schools), and 0.176 (private schools). Homogeneity of variance was also met (sig. 0.920 > 0.05). These results allowed the application of One-Way ANOVA to analyze differences in self-efficacy across the groups.

The results of the one-way ANOVA analysis in Table 2 show a significant difference in self-efficacy levels among students from the three school groups. The F value of 10.139 with a significance (Sig.) value of 0.000 < 0.05 indicates a significant difference in self-efficacy levels between the schools.

Table 2. One-Way ANOVA Test of Self-Efficacy Across Three Types of Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1332.026	2	666.013	10.139	.000
Within Groups	4926.846	75	65.691		
Total	6528.872	77			

Table 3. Comparison of Student Self-Efficacy Across Three Types of Schools Using the Tukey HSD Test

(I) School	(J) School	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Islamic	Public	10.115*	2.248	.000	4.74	15.49
	Private	5.385*	2.248	.049	.01	10.76
Public	Islamic	-10.115*	2.248	.000	-15.49	-4.74
	Private	-4.731	2.248	.096	-10.11	.64
Private	Islamic	-5.385*	2.248	.049	-10.76	-.01
	Public	4.731	2.248	.096	-.64	10.11

Based on the results of the Tukey HSD test in Table 3, there are significant differences between Islamic Schools and Public Schools (mean difference 10.115, Sig. 0.000), as well as between Islamic Schools and Private Schools (mean difference 5.385, Sig. 0.049). However, the comparison between Public and Private Schools did not show a significant difference (mean difference -4.731, Sig. 0.096). The 95% confidence interval for the differences between Islamic Schools and Public Schools is 4.74–15.49, between Islamic Schools and Private Schools is 0.01–10.76, and between Public Schools and Private Schools is -10.11 to 0.64. Overall, there are significant differences between Islamic Schools and both Public and Private Schools, but not between Public and Private Schools.

Discussion

These three educational institutions are in the center of Malang and have different characteristics based on the education system implemented. The Islamic school, a state-run Madrasah Aliyah, integrates the national curriculum with strengthened Islamic values. Located strategically, the school provides a conducive learning environment with comprehensive facilities, including modern science laboratories, a well-stocked library, a large mosque, and student dormitories. Its flagship programs, such as *Tahfidz Al-Qur'an*, contribute to students' religious character development while supporting their academic achievements.

The top-ranked public school is known for its strong academic reputation and is supported by adequate educational infrastructure, including modern science laboratories, digital libraries, and sports facilities. The institution's competitive learning environment has contributed to students' success in various academic competitions, including the National Science Olympiad. In addition, the school's emphasis on discipline and independence fosters both academic and non-academic achievements.

Meanwhile, the private school, also located in the city center, offers a personalized approach to learning personalized to the students' needs. With adequate facilities and a variety of extracurricular programs. However, the gap between theoretical and practical aspects remains challenging in improving students' applicative skills across various fields.

The graph in Figure 1 illustrates the comparison of average self-efficacy scores across three types of schools: Islamic schools, public schools, and private schools. The data shows that Islamic schools have the highest self-efficacy levels compared to the other two school types, followed by public schools, while private schools have the lowest scores.

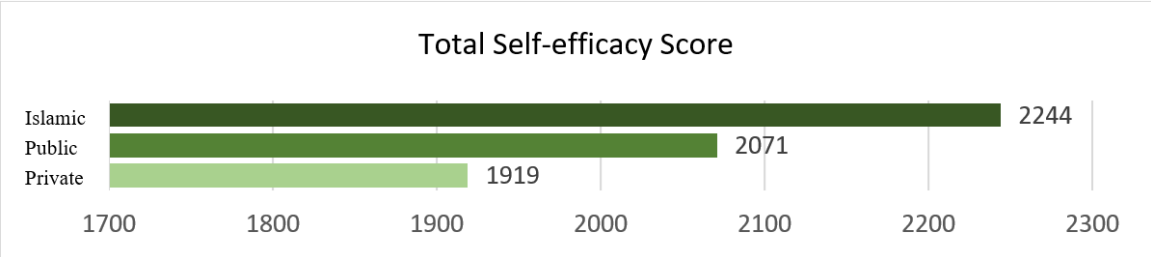

Figure 1. Graph of Total Self-Efficacy Scores in Private, Public, and Islamic Schools

The graph in Figure 2 shows the total combined scores for the five self-efficacy indicators of students. The highest scoring indicator is EA, with a total score of 1600. This reflects students' strong confidence in applying physics concepts to everyday life, highlighting the relevance of physics learning to real-world issues they encounter. The second-highest scoring indicator is PW, with a score of 1507, indicating students' self-assurance in conducting experiments and practical activities, emphasizing the importance of hands-on experience in supporting learning.

The SC indicator recorded a score of 1185, placing it in the middle range. This score suggests that students have a fairly good level of confidence in their ability to explain concepts and scientific findings, although not as strong as their practical or everyday application skills. Meanwhile, HCS scored 996, slightly higher than CU, which had the lowest score of 946. Both of these indicators reflect the challenges

students face in analyzing, evaluating, and deeply understanding fundamental physics concepts.

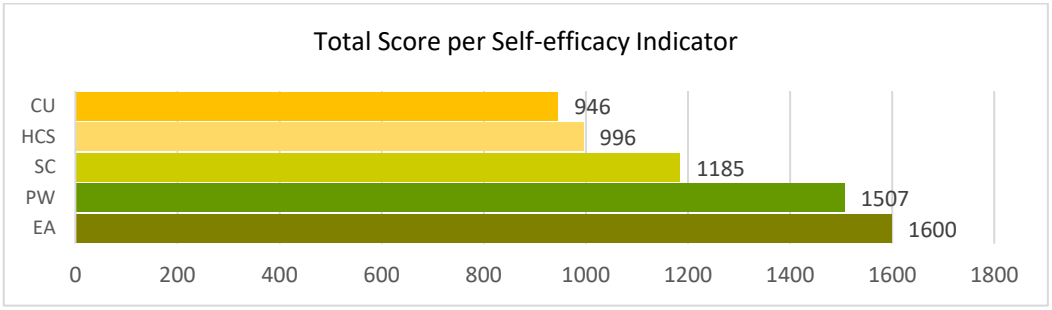

Figure 2. Graph of Total Combined Scores for Each Self-Efficacy Indicator

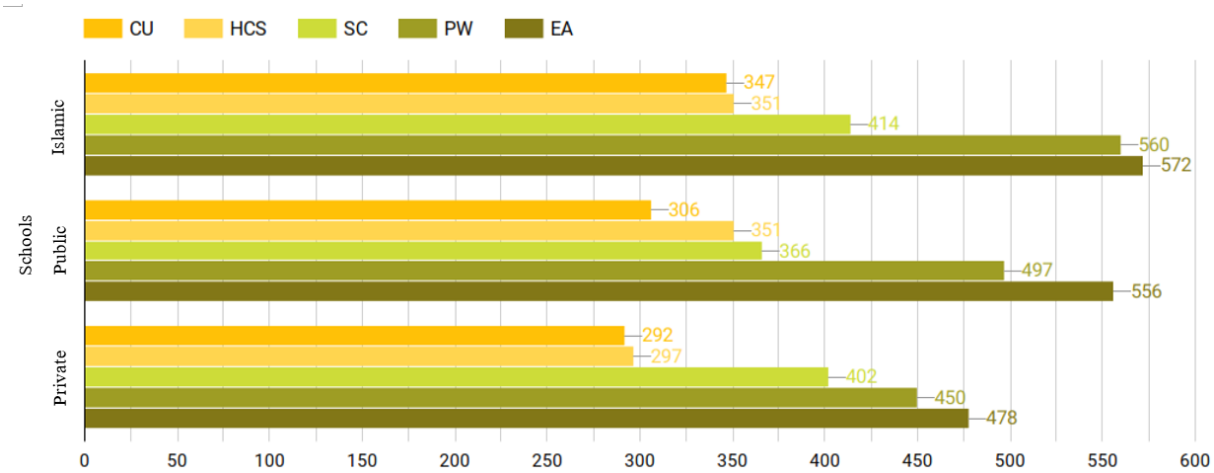

Figure 3. Graph of Indicator Scores in Private, Public, and Islamic Schools

Students' Physics Learning Self-Efficacy in Islamic School

Based on the analysis in Figure 3, Islamic schools' success in achieving high performance across all self-efficacy indicators is closely linked to the pedagogical approach applied. This approach balances theory and practice, emphasizing practical activities as the main means of linking theoretical concepts to empirical results. Teachers also use a Problem-Based Learning (PBL) model to encourage students to solve real-world problems, effectively honing their critical thinking skills (Iwan et al., 2024; Nicholus et al., 2023). Intensive and structured practical work helps students master the PW indicator well. Meanwhile, the routine application of HOTS-based questions strengthens their critical and analytical thinking skills (Muhibbuddin et al., 2023), which is reflected in the high achievement of the HCS indicator.

This school consistently outperforms both public and private schools. The EA and SC indicators stand out as the most significant strengths, with Islamic school students showing exceptional ability to apply scientific concepts to everyday life and effectively communicate scientific ideas. The high achievement in the PW indicator also reflects the school's success in providing intensive and relevant practical activities, directly strengthening students' theoretical understanding through empirical experiences.

Additionally, the exceptionally high SC indicator reflects the school's success in training students to effectively communicate experimental results and scientific ideas, both orally and in writing. Activities such as scientific discussions, presentations, and

debates regularly held at school significantly strengthen students' scientific communication skills (Faber et al., 2024). By adopting a comprehensive and integrative approach, the Islamic school excels not only in producing academically successful students but also in shaping a generation with high self-confidence, critical thinking abilities, and strong religious values.

Students' Physics Learning Self-Efficacy in Public School

Referring to the analysis shown in Figure 3, public schools perform reasonably well on the CU and HCS indicators, with scores of 306 and 351, respectively. This places public schools in the middle position, above private schools but below Islamic schools. The strengths in the CU and HCS indicators suggest that students have adequate conceptual understanding and fairly good higher-order thinking skills. However, compared to Islamic schools, the lower scores in the PW, EA, and SC indicators indicate a gap in the practical application of knowledge and scientific communication.

In terms of teaching approach, public schools emphasize independent learning methods, where students are encouraged to seek and understand material independently. This approach effectively develops the CU and HCS indicators, as students are accustomed to thinking analytically and solving HOTS-based problems. However, the lack of practical activities and insufficient empirical engagement has led to lower results in the PW and EA indicators, which reflect the students' limitations in connecting theory with real-world practice. This reduces their ability to solve contextual problems and apply scientific concepts in everyday life.

Overall, while the cognitive aspect shows competitive results, the low scores in the SC indicator suggest that students are undertrained in presenting their thoughts and experiments scientifically. This lack of scientific communication skills is one of the reasons for students' lack of confidence in sharing their ideas in various academic forums. To improve performance in this area, teachers need to adopt a more balanced pedagogical approach, increasing the intensity of practical activities and implementing scientific communication programs that involve discussions, presentations, and debates. Through these strategies, public schools can strengthen all aspects of students' self-efficacy while enhancing their competitiveness in producing academic and practical graduates.

Students' Physics Learning Self-Efficacy in Private School

The data presented in Figure 3 indicates that private schools have the lowest scores in almost all self-efficacy indicators compared to Islamic and public schools. The scores obtained by private school students on several self-efficacy indicators consistently fall below those of the other two school types. Notably, there is a significant gap in the PW and SC indicators, where the results are far behind those of Islamic schools, which achieved the highest scores. This highlights a substantial weakness in the teaching approach, particularly in terms of practical activities and the development of scientific communication skills. While the scores for CU and HCS are slightly better, they still suggest substantial improvement in teaching methods.

The scarcity of practical activities directly impacts the low achievement in the PW and EA indicators, where students have limitations in applying scientific concepts to real-life situations. The school tends to focus

on theoretical mastery, but the weak reinforcement of empirical aspects hinders students from connecting theoretical concepts with empirical results. Additionally, the low performance in the SC indicator suggests that students are insufficiently trained in presenting ideas and scientific results effectively, both orally and in writing, which reduces their confidence in academic communication.

The Differences of Student Self-efficacy Across the Types of Schools.

Tukey HSD analysis in Table 3 shows there are significant differences between Islamic Schools with both Public and Private Schools. The high self-efficacy scores in Islamic schools indicate that the teaching model applied is more effective in building students' confidence in facing various learning situations. Factors such as the utilization of adequate facilities, the integration of theory and practice, and the application of Higher-Order Thinking Skills (HOTS) play a crucial role in supporting the development of student's cognitive abilities (Amali et al., 2022). This approach is in line with the Problem-Based Learning (PBL) model, which is especially relevant for physics learning (Istiqomah et al., 2023). In this model, students are not only allowed to apply physics concepts directly but also face challenges that can strengthen their belief in their abilities (Nicholus et al., 2023).

In addition, students' past experiences of success in completing similar tasks are a key factor in building high self-efficacy. Students tend to be more confident if they have successfully faced challenges, especially when those tasks require critical thinking and real-world problem-solving (Haryanto & Arty, 2019). If students have developed high self-efficacy, occasional failure does not diminish their optimistic attitude; rather, it provides valuable lessons to improve performance in the future. This aligns with Bandura's theory, which states that success experiences in challenging tasks help students develop resilient and strong self-efficacy (Bandura, 1997).

On the other hand, although public and private schools have adequate facilities, the self-efficacy scores of students in these schools are still lower than those in Islamic schools. However, public schools have higher self-efficacy scores compared to private schools. This contrasts with the study by (Chandra Shekhar & Rajinder Kumar, 2016) which stated that private schools have higher self-efficacy than public schools. Nonetheless, these results align with a study by Hasanah et al. (2021), which revealed that in public schools, students' self-efficacy was categorized as very high (2.9%), high (11.8%), and medium (78.8%). This indicates that, overall, self-efficacy in public schools is higher than in private schools.

This difference can be explained by the fact that public schools encourage students to study independently. The focus on independent learning supported by (Nenny Hendajany, 2021) which shows a positive influence of self-efficacy on students' learning independence. In other words, even though still lower compared to Islamic schools, the approach in public schools that encourages students to learn independently may be one of the factors that make their self-efficacy higher than that of private schools.

To enhance the quality of education, the private school needs to adopt a more integrated approach, balancing theoretical knowledge with practical skills. Intensive practical activities, HOTS-based exercises, and scientific communication programs that emphasize discussion and scientific presentations should be increased to strengthen all self-efficacy indicators. By doing so, the private school has a great

opportunity to improve students' academic achievements and produce graduates who are competent both intellectually and personally.

This highlights the need for adjustments in teaching approaches, especially in public and private schools, with a greater emphasis on practical activities and effective scientific communication. Therefore, a more interactive and contextual teaching approach is necessary to enhance students' self-efficacy (Adi Prasetyo, 2023; Nugraha & Wulansari, 2023). In conclusion, this study emphasizes that a structured learning environment, adequate practice, and experience-based teaching strategies can significantly enhance students' self-efficacy, regardless of the type of school.

CONCLUSION

This study aims to analyze students' self-efficacy in physics learning across three different types of schools: Islamic, public, and private. The results revealed that students' self-efficacy in Islamic schools is higher compared to the other two types of schools. This is linked to the implementation of Problem-Based Learning (PBL), the effective use of resources, the integration of theory and practice, and Higher-Order Thinking Skills (HOTS) exercises, which support cognitive development and students' confidence in facing challenges.

The findings highlighted that learning environment factors, pedagogical strategies, and successful experiences play significant roles in shaping students' self-efficacy in physics learning. Problem-based learning and structured hands-on activities can help students connect theoretical concepts with real-world applications. Teachers should also emphasize scientific communication skills through discussions and presentations.

Policymakers are advised to invest in modern educational infrastructure to support these teaching strategies. Providing ongoing professional development for teachers will help them implement innovative pedagogical approaches. Future research should employ qualitative methods to explore the factors influencing self-efficacy more deeply. In-depth interviews and focus group discussions can provide valuable insights. These findings will help develop more targeted educational interventions and policies.

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