

Intellectual Intelligence, Empowering School Environment and Economics Learning Outcomes among High School Students

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Received: 03 June 2026

Accepted: 19 August 2026

Published: 03 October 2026

Abstract: This study aims to analyze the influence of intellectual intelligence and an empowering school environment on students' economics learning outcomes at the senior high school level. This research employed a quantitative approach with a causal associative design. Data were collected using questionnaires and documentation of students' learning outcomes. The findings revealed that intellectual intelligence significantly influenced students' economics learning outcomes. In addition, the empowering school environment also had a significant positive effect on learning outcomes. Simultaneously, intellectual intelligence and the empowering school environment contributed significantly to students' economics learning outcomes. The findings indicate that intellectual intelligence and empowering school environment significantly influence students' economics learning outcomes. It can be concluded that improving students' cognitive abilities and creating an empowering school environment are essential for enhancing academic achievement in economics. These findings imply that economics teachers and school administrators should implement student-centered learning strategies and foster supportive learning environments to promote meaningful learning and improve students' learning outcomes.

Keywords: economics learning outcomes, economics education, empowering school environment, intellectual intelligence.

Article's DOI: <https://doi.org/10.23960/jpp.v16i3.pp1877-1897>

■ INTRODUCTION

Education plays a fundamental role in improving human resource quality and supporting national development in the era of globalization and rapid technological transformation. Recent studies emphasize that education not only builds human capital but also equips individuals with the competencies needed to adapt to rapidly changing economic and social environments (Hanushek et al., 2012). Through quality education, students develop critical thinking, problem-solving, and decision-making skills that are essential for personal empowerment and sustainable development. A country's progress is strongly influenced by the quality of its

education system, as education contributes to the development of knowledgeable, creative, independent, and responsible individuals. In Indonesia, the importance of education is emphasized in Law Number 20 of 2003 concerning the National Education System, which states that education aims to develop students' potential to become knowledgeable, creative, independent, and responsible citizens. Learning should not merely focus on mastering theoretical concepts but also on empowering students to understand economic realities and make rational economic decisions in everyday life. Economics education should encourage students' analytical thinking, active participation, and independent

learning as part of empowerment-based education. Recent studies also emphasized that active and engaging learning approaches in economics education can significantly improve student participation, conceptual understanding, and learning outcomes through more student-centered instructional practices (Perwita et al., 2026; Salong & Ansiska, 2025). Previous studies also highlighted that student-centered and empowering learning approaches can improve engagement and learning outcomes in economics education (Astuti & Purnamasari, 2025).

However, schools still frequently adopt teacher-centered approaches, where students tend to be passive recipients of information, resulting in monotonous learning processes and less optimal learning outcomes (Hidayat & Kamalia, 2022). Students' learning outcomes are an important measure of educational success because they reflect the extent to which learners acquire knowledge, develop analytical skills, and achieve the intended learning objectives throughout the instructional process (Schunk & DiBenedetto, 2020). Learning outcomes are increasingly viewed as multidimensional constructs that encompass not only academic achievement but also the development of critical thinking, problem-solving skills, and learners' capacity to apply knowledge in real-world situations (Schneider & Preckel, 2017). In economics learning, passive classroom conditions may limit students' opportunities to develop critical thinking, analytical reasoning, and active participation. As a result, students often struggle to understand economics concepts contextually and apply them in real-life situations. Therefore, economics education requires empowering learning practices that actively engage students and support the development of their cognitive and analytical capacities.

Economics is an essential subject taught at the senior high school level because it equips

students with knowledge and skills in economic reasoning, decision-making, and problem-solving in everyday life. However, implementing economics learning in schools still faces several challenges, particularly in achieving optimal learning outcomes. Preliminary observations at SMA Hang Tuah 2 Sidoarjo revealed that students' economics learning outcomes remained relatively low. Based on documentation of students' assessment results as presented in Table 1, a considerable number of students had not achieved the minimum learning criteria established by the school. Of 120 students, 69 scored below the minimum achievement criteria, while only 51 achieved satisfactory scores. This condition indicates that students' understanding of economics concepts and their learning achievement still need improvement. One factor contributing to this issue is the dominance of teacher-centered learning practices, where classroom activities focus primarily on teachers' explanations. At the same time, students tend to become passive learners. These learning conditions may reduce students' engagement, participation, and opportunities to develop critical and analytical thinking skills during the learning process (Hidayat & Kamalia, 2022). Student engagement is one of the strongest predictors of learning outcomes because engaged students tend to show higher participation, motivation, and academic achievement during the learning process (Amaliana & Kardoyo, 2024; Reeve et al., 2025). Previous studies also reported that passive learning environments and limited student participation can negatively affect learning outcomes and decrease students' motivation in economics learning (Astuti & Purnamasari, 2025). Therefore, improving economics learning outcomes requires approaches and classroom environments that encourage students' active participation and empowerment.

Table 1. Learning results of high school students at hang tuah 2 sidoarjo

No	Learning Outcomes	Frequency
1.	65 – 75	69
2.	76 – 85	8
3.	86 – 90	34
4.	91 – 100	9
Total		120

Source: Processed Data (2025)

One internal factor that may influence students' learning outcomes is intellectual intelligence (IQ). Intellectual intelligence refers to an individual's cognitive ability to think logically, analyze information, solve problems, and understand abstract concepts effectively. In economics education, intellectual intelligence matters because students must interpret economic phenomena, evaluate information critically, and make rational economic decisions based on analytical reasoning. Students with higher intellectual intelligence generally show stronger cognitive capacity to understand learning materials and respond to academic challenges. In addition, intellectual intelligence can support cognitive empowerment by strengthening students' analytical capacity, learning independence, and problem-solving abilities during the learning process. Previous research shows that students with higher cognitive abilities tend to achieve better academic outcomes because they can process information, apply analytical reasoning, and adapt to complex learning tasks. These cognitive capacities have been identified as important determinants of academic achievement across various educational contexts (Liu & Nesbit, 2024; Meyer et al., 2024). Students with strong intellectual abilities tend to perform better academically because they can process information, identify relationships between concepts, and apply knowledge in various learning situations. However, previous studies have also reported inconsistent findings

regarding the relationship between cognitive ability and academic achievement. Some researchers found that cognitive ability alone does not necessarily guarantee higher learning outcomes, as academic performance may also be influenced by motivational, behavioral, and environmental factors that interact with students' intellectual capacities (Shi & Qu, 2022). These findings suggest that the effect of intellectual intelligence on academic achievement may vary across educational and learning conditions. These inconsistent findings indicate that the relationship between intellectual intelligence and learning outcomes remains debatable and requires further investigation, particularly in economics education. Therefore, examining the role of intellectual intelligence in supporting students' economics learning outcomes is important for understanding how cognitive capacities contribute to empowerment-oriented learning processes.

In addition to internal factors, students' learning outcomes are also influenced by external factors, particularly the school environment. The school environment encompasses the physical and learning-resource conditions available within the school that support students' learning activities. An empowering school environment is reflected in the adequacy of the school building, the optimization of learning media and tools, class quantity and quality, and library functionality. These conditions matter because they provide students with appropriate spaces, resources, and facilities to participate effectively in learning activities. In economics education, an empowering school environment is essential because it can encourage students' active participation, collaborative learning, and engagement in classroom activities. A supportive learning environment enables students to express ideas, build confidence, and strengthen their analytical and problem-solving skills in understanding economic concepts. Recent studies also found that empowering learning environments positively

influence students' behavioral engagement, motivation, and participation by fostering supportive interactions and learner autonomy (Lee & Kim, 2024; Pan, 2023). According to Social Cognitive Theory proposed by Bandura et al. (1999), learning is shaped through reciprocal interactions between personal factors, behavior, and environmental influences. This theory suggests that a positive and supportive educational environment may strengthen students' motivation and academic achievement. Previous studies have shown that the school environment significantly affects students' learning outcomes (Peterria & Suryani, 2016; Siahaan & Pramusinto, 2018). Adequate facilities, conducive classroom conditions, and positive teacher-student interactions can support more meaningful learning experiences and increase student engagement. However, Kibriya & Jones (2021) found that the school environment did not significantly influence students' learning outcomes, indicating inconsistent findings in previous research. These contradictions suggest that further investigation is needed to examine how empowering school environments contribute to economics learning outcomes, particularly in fostering student empowerment and active learning participation.

Previous studies have extensively examined the influence of intellectual intelligence and school environment on students' academic achievement. However, most of these studies focused on general learning outcomes and did not specifically address economics learning from an empowerment-based education perspective. Despite numerous studies examining intellectual intelligence and Empowering School Environment, limited research has specifically investigated the role of empowering school environments in strengthening economics learning outcomes among high school students within the framework of empowerment-based economics education. Recent international studies have increasingly highlighted the importance of active

learning environments and student engagement in improving learning outcomes; however, studies integrating empowerment perspectives into secondary-level economics education remain limited (Choi et al., 2025; Li & Xue, 2023). In addition, previous research generally conceptualized the school environment as a conventional learning setting related to facilities, discipline, and classroom conditions, while paying limited attention to an empowering school environment that encourages student participation, engagement, critical thinking, and learning autonomy. In economics education, empowering learning environments matter because economics learning requires students not only to understand theoretical concepts but also to develop analytical reasoning and decision-making abilities in response to real economic issues. Therefore, integrating empowerment perspectives into economics education becomes essential to strengthen students' cognitive and learning capacities. This study contributes empirical evidence by examining intellectual intelligence and an empowering school environment together to explain economics learning outcomes among high school students. Unlike previous studies that primarily emphasized cognitive achievement, this research highlights the importance of empowerment-oriented learning environments in supporting students' active engagement and learning development in economics education. Thus, this study is expected to enrich the literature on economics education by providing empirical evidence regarding the role of cognitive factors and empowering educational environments in improving students' learning outcomes.

Based on this gap, this study aims to examine the influence of intellectual intelligence and an empowering school environment on senior high school students' economics learning outcomes. Specifically, this study addresses the following research questions: (1) Does intellectual

intelligence significantly influence students' economics learning outcomes? (2) Does the empowering school environment significantly influence students' economics learning outcomes? (3) Do intellectual intelligence and an empowering school environment simultaneously influence students' economics learning outcomes? Answering these questions is expected to enrich the literature on empowerment-based economics education and provide empirical evidence for developing more effective learning environments that support students' academic achievement.

■ METHOD

Research Design

This study used a quantitative correlational research design to examine the influence of intellectual intelligence and an empowering school environment on students' economics learning outcomes. A quantitative approach was appropriate because the study aimed to test hypotheses and objectively analyze relationships among variables through statistical procedures. The causal-associative design was selected to identify the extent to which the independent variables contribute to variation in the dependent variable without manipulating existing conditions. This design is widely used in educational research to investigate cause-and-effect relationships among naturally occurring variables (Creswell & Creswell, 2017).

The research was conducted at SMA Hang Tuah 2 Sidoarjo, Indonesia, during the 2025 academic year. The study focused on senior high school students because economics learning at this educational level requires students to develop analytical thinking, problem-solving abilities, and decision-making skills, which are closely related to intellectual intelligence and learning environments. Furthermore, this is considered appropriate for examining how cognitive characteristics and empowering school environments jointly contribute to students'

economics learning outcomes within formal education settings

This research followed the stages of quantitative research, including research planning, instrument preparation, data collection, statistical analysis, and interpretation of findings. Since the study did not involve any treatment or intervention, all variables were observed as they naturally occurred in the educational setting. This approach enabled the researcher to obtain empirical evidence on the relationships among intellectual intelligence, empowering school environment, and economics learning outcomes while maintaining the authenticity of participants' learning experiences (Fraenkel & Wallen, 1990).

Population and Sample

The population of this study consisted of all eleventh-grade students enrolled in the Social Sciences (IPS) program at SMA Hang Tuah 2 Sidoarjo during the 2025 academic year, totaling 171 students. This population was selected because students at this level had completed the prerequisite economics learning materials and had received intellectual intelligence (IQ) assessments administered by the school. Consequently, they represented an appropriate population for examining the relationships among intellectual intelligence, empowering school environment, and economics learning outcomes. According to Fraenkel & Wallen (1990), the target population should have characteristics relevant to the research objectives to ensure the findings accurately reflect the phenomenon under investigation.

The sample was determined using proportional random sampling, which gives every member of the population an equal chance of selection while maintaining proportional representation from each class. This sampling technique was considered appropriate because the population consisted of several intact classes with relatively homogeneous academic

characteristics. Using the Slovin formula, 120 students were selected as research respondents. Probability sampling techniques, particularly proportional random sampling, are recommended in quantitative educational research because they reduce sampling bias and improve sample representativeness (Creswell & Creswell, 2017).

The selected respondents were students who met the established inclusion criteria: being officially enrolled in Grade XI Social Sciences, having completed the economics learning process during the semester of data collection, having documented intellectual intelligence (IQ) scores, and participating in the administration of the empowering school environment questionnaire. These criteria ensured that all participants provided complete, comparable data for statistical analysis. A representative sample is essential for

producing valid estimates and enhancing the generalizability of quantitative research findings(Taherdoost, 2016).

Variables and Measurement

This study involved three research variables: two independent variables and one dependent variable. The independent variables were intellectual intelligence (X₁) and empowering school environment (X₂), while the dependent variable was students’ economics learning outcomes (Y). These variables were selected on the assumption that students’ academic achievement is influenced by both internal factors, represented by intellectual intelligence, and external factors, represented by the school learning environment. The operational definitions and measurement of each variable are presented in Table 2.

Table 2. Operational definition of research variables

Variable	Operational Definition	Indicators
Intellectual Intelligence (X ₁)	Students’ cognitive ability reflected in their Intelligence Quotient (IQ) score.	IQ score
Empowering School Environment (X ₂)	Students’ perceptions of how much the school environment supports participation and learning.	1. School Building 2. Optimization of learning media/tools 3. Class quantity and quality 4. Library functionality
Economics Learning Outcomes (Y)	Students’ achievement in economics as reflected in their midterm test (PTS) score.	Economics achievement score

The intellectual intelligence variable was measured through students’ IQ scores obtained from official school records maintained by the Guidance and Counseling (BK) unit. Therefore, no additional questionnaire was administered for this variable. The empowering school environment variable was measured using a structured questionnaire developed from indicators of a supportive learning environment. In contrast, economics learning outcomes were measured using students’ mid-semester assessment scores

in economics obtained from school academic records.

The questionnaire for the empowering school environment variable employed a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated stronger perceptions of an empowering school environment. The use of multiple measurement techniques, including documentation and questionnaires, enabled the study to obtain objective data on students’ intellectual intelligence

and learning outcomes while simultaneously capturing students' perceptions of their school learning environment (Creswell & Creswell, 2017)

Data Collection Techniques

Data were collected using two complementary techniques: documentation and questionnaire administration. Documentation was used to obtain students' IQ scores and economics learning outcomes from official school records. IQ scores were obtained from the Guidance and Counseling (BK) unit, while students' economics learning outcomes were obtained from mid-semester assessment records obtained from subject teachers. Documentation was chosen because it provides objective and authentic data that has been formally recorded by the school, thus minimizing measurement bias (Fraenkel & Wallen, 1990).

The empowering school environment variable was measured using a structured questionnaire developed based on school learning environment indicators. The questionnaire consisted of statements designed to capture students' perceptions of the Empowering School Environment based on four indicators: school building, optimization of learning media and tools, class quantity and quality, and library functionality. These indicators represent the physical and learning-resource conditions available to support students' learning activities. All questionnaire items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), allowing respondents to indicate their level of agreement with each statement (Creswell & Creswell, 2017; Sullivan et al., 2013).

Before data collection, the researcher obtained permission from the school to access students' academic records and administer the questionnaires. The questionnaires were distributed directly to selected respondents during school hours under the researcher's supervision. Integrating documentation and questionnaire

techniques enabled the researcher to obtain comprehensive and reliable data to examine the relationship between intellectual intelligence, an empowering school environment, and students' economic learning outcomes (Artino et al., 2014). Research participants voluntarily participated in the study, and all collected data were used solely for academic purposes.

Instrument Validity and Reliability

Before the main data collection, the questionnaire measuring the empowering school environment was tested for validity and reliability to ensure the instrument accurately represented the intended construct and yielded consistent responses. In quantitative research, validity refers to the degree to which an instrument measures what it is intended to measure, whereas reliability refers to the consistency of the scores produced by the instrument across respondents and measurement occasions (Boateng et al., 2018; Sürücü & Maslakçi, 2020).

The validity of the questionnaire items was assessed using item-total correlation based on the Pearson Product-Moment coefficient. Items with correlation coefficients above the critical value at the 0.05 significance level were retained because they contributed adequately to measuring the construct. This procedure is widely used in scale validation to identify items that align with the underlying dimension being measured and to ensure each item functions meaningfully within the overall instrument (Sürücü & Maslakçi, 2020).

Reliability was evaluated using Cronbach's alpha to assess the questionnaire's internal consistency. A Cronbach's alpha value of 0.70 or higher is generally considered acceptable for research instruments, although reliability should also be interpreted in relation to item quality and construct coherence (Hayes & Coutts, 2020).

The results showed that the empowering school environment questionnaire had a Cronbach's alpha of 0.877, indicating good internal consistency. Therefore, the instrument

was considered reliable and suitable for data collection. Based on the preliminary instrument testing, all items met the required validity and reliability criteria and were therefore deemed appropriate for use in the main study.

Data Analysis

The collected data were analyzed using IBM SPSS Statistics. Descriptive statistics were first used to summarize the data characteristics, followed by inferential analysis to examine relationships among intellectual intelligence, empowering school environment, and students' economics learning outcomes. Using descriptive and inferential statistics in educational research allows researchers to describe data patterns and test hypotheses systematically (Mishra et al., 2019).

The data obtained were then analyzed in accordance with the aims and objectives of the research, while the Respondent Achievement Rate (RAR) was used to determine the respondent's achievement using the following formula:

$$RAR = \frac{\text{Average Score}}{n} \times 100\%$$

RAR : respondent achievement level

N : maximum score

Meanwhile, the descriptive data explanation is carried out using the RAR benchmark as follows:

Table 3. Criteria for respondents' achievement rate

No	Percentage Range	RAR
1	0%-54%	Poor
2	55%-64%	Less Good
3	65%-80%	Moderate
4	81%-90%	Good
5	91%-100%	Very Good

Source: (Sugiyono, 2021)

Before hypothesis testing, classical assumption tests were conducted to verify that the multiple linear regression model met the required statistical assumptions. These tests included checks for normality, multicollinearity, heteroscedasticity, and linearity. Normality tests assessed whether the residuals were approximately normally distributed. Multicollinearity was examined using tolerance and Variance Inflation Factor (VIF) values to ensure the independent variables were not excessively correlated. Multicollinearity can distort regression estimates and weaken model interpretability, so diagnostic checking is essential before interpreting regression coefficients (Kim, 2019). Heteroscedasticity and linearity tests were also conducted to confirm that residual variance was constant and that the relationship between variables was linear, supporting the appropriateness of the regression model (Mishra et al., 2019).

Hypothesis testing was carried out using multiple linear regression analysis. The partial effect of each independent variable on students' economics learning outcomes was examined using the t-test. In contrast, the simultaneous effect of all independent variables was tested using the F-test. The coefficient of determination (R^2) was calculated to determine the proportion of variance in economics learning outcomes explained by intellectual intelligence and an empowering school environment. Statistical significance was evaluated at the 5% level ($\alpha=0.05$), which remains a conventional threshold in educational and social science research (Mishra et al., 2019).

■ RESULT AND DISCUSSION

The following diagram describes the intellectual intelligence (IQ) scores of Hang Tuah 2 Sidoarjo high school students.

Figure 1 shows that the distribution of students' intellectual intelligence was predominantly concentrated within the average and above-average ranges. The largest

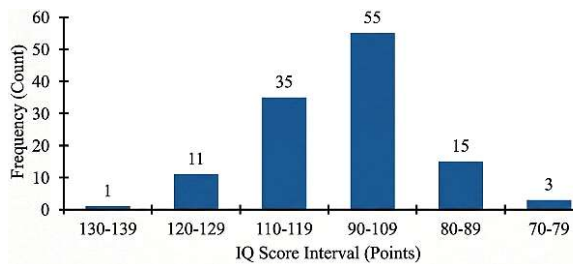


Figure 1. Distribution of students' intellectual intelligence (IQ) scores

concentration was observed in the average category, while a substantial proportion of students were also classified as above average and superior. In contrast, only a relatively small proportion of students fell into the borderline and below-average categories, and very few students were classified in the very intelligent range. Overall, the distribution indicates that most students had intellectual intelligence within the average to superior range. This distribution provides an important descriptive overview for examining the subsequent relationship between intellectual intelligence and students' economics learning outcomes.

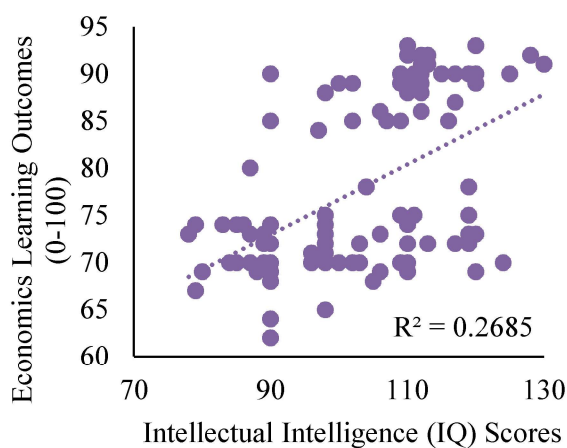


Figure 2. Relationship between intellectual intelligence (IQ) and economics learning outcomes

As illustrated in Figure 2, the horizontal axis represents students' IQ scores ranging from 70

to 130, while the vertical axis represents their economics learning outcomes, ranging from 60 to 100. Each purple dot represents an individual student ($N = 120$). Visual evaluation of the scatter plot reveals a distinct pattern of data points extending from the lower-left to the upper-right corner of the graph. This upward trajectory visually demonstrates a strong positive linear relationship ($R \approx 0.91$) between intelligence and academic achievement in economics. Students with lower IQ scores (concentrated between 70 and 85) generally cluster around lower economics test scores (65–75), whereas students displaying higher IQ scores (110 to 130) consistently achieve higher economics learning outcomes (85–95). The linear regression trend line further supports the conclusion that higher cognitive capacity is systematically associated with superior academic performance in economics.

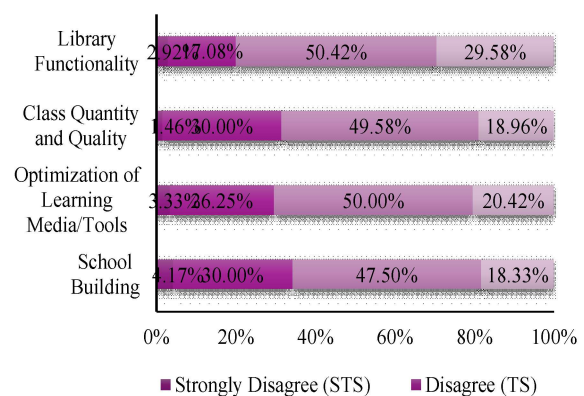


Figure 3. Distribution of empowering school environment responses

The 100% stacked bar chart in Figure 3 provides a nuanced visualization of student perceptions across the four main indicators of an empowering school environment, replacing aggregate percentages with item-level response distributions. Across all indicators, response patterns lean heavily toward positive evaluation, confirming a strong baseline environment. Specifically, the School Building indicator shows

that 72% of students hold a favorable view (32% Agree, 40% Strongly Agree), reflecting a highly conducive physical learning infrastructure. Similarly, the Optimization of Learning Media/Tools records a 63% combined agreement (23% Agree, 40% Strongly Agree), indicating that instructional resources are effectively integrated into daily learning. Notably, Class Quantity and Quality shows the highest level of enthusiasm, with 69% of respondents marking 'Strongly Agree' and 25% 'Agree' (94% total positivity), highlighting exceptionally strong social support and active classroom dynamics. Finally, Library Functionality achieves a 67% cumulative positive perception (27% Agree, 40% Strongly Agree), further supporting that educational resource centers are actively used to support and empower students to achieve better economics learning outcomes.

Table 4. Results of respondent achievement rate (RAR) of empowering school environment variables

No	Indicator	%	Category
1	School Building	81.40	Good
2	Optimization of learning media/tools	76.90	Moderate
3	Class quantity and quality	77.70	Moderate
4	Library functionality	76.00	Moderate
	Average	78.00	Moderate

The average score for the empowering school environment variable was 3.89 on a five-point Likert scale, indicating that students generally agreed that the empowering school environment supported their learning. The overall Respondent Achievement Rate (RAR) was 78.00%, which falls within the moderate category according to the criteria presented in Table 4. In addition, the Respondent Achievement Rate (RAR) of 78.00 percent falls within the sufficient category. The results of the data analysis on the

influence of intellectual intelligence (IQ) and school environment on student learning outcomes are explained in Table 5

Table 5. Descriptive statistics of main variables

Variable	Minimum	Maximum	Mean
IQ Score	70.00	130.00	98.50
Empowering School Environment Score	32.00	58.00	46.80
Economics Learning Outcomes	62.00	93.00	78.45

Based on the descriptive statistical analysis in Table 5, the IQ score ranges from 70.00 to 130.00, with a mean of 98.50 and a standard deviation of 12.30, indicating that students' overall intellectual level falls in the average category with moderate variation. Meanwhile, the School Environment score ranges from 32.00 to 58.00, with a mean of 46.80 and a relatively small standard deviation of 5.42, indicating that students' perceptions of their school environment are fairly homogeneous. Lastly, the Economics Learning Outcomes show scores ranging from 62.00 to 93.00, with a high average of 78.45 and a standard deviation of 8.65, reflecting overall good mastery of the Economics subject material among the students.

Table 6. Normality test

Normality Test			
Kolmogrov-Smirnov	Sig	Criteria	Description
	0.200	0.05	Normally Distributed

From the results described in Table 6 with the Kolmogorov-Smirnov test, it can be concluded that the significance value (Sig.) is 0.200. Since this value is greater than 0.05, the residuals are normally distributed.

Table 7. Multicollinearity test

Variable	Tolerance	VIF	Description
IQ	0.773	1.293	Multicollinearity did not occur
Empowering School Environment	0.877	1.141	Multicollinearity did not occur

Based on the results in Table 7, the VIF value is <10, or the Tolerance Value is >0.1. Based on these results, there is no multicollinearity problem.

Table 8. Heteroscedasticity test

Variable	Sig.	Description
IQ	0.938	Heteroscedasticity did not occur
Empowering School Environment	0.537	Heteroscedasticity did not occur

Based on Table 8, the Sig. value from the heteroscedasticity test using the Spearman-Rank test shows that the significance value (Sig.) > $\alpha = 0.05$. This means the research model does not exhibit heteroscedasticity.

Table 9. Linearity test

Variable	Sig.	Description
Learning Outcomes*IQ	0.461	Linear
Learning Outcomes*Empowering School Environment	0.945	Linear

Based on the results in Table 9, the significance value of the Deviation From Linearity for each variable is greater than 0.05. Therefore, the variables have a linear relationship.

Table 10. Statistical analysis results: model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.640 ^a	.409	.399	6.912

a. Predictors: (Constant), Empowering School Environment, Intellectual Intelligence (IQ)

Based on the multiple regression results in Table 10, intellectual intelligence and empowering school environment were simultaneously and significantly associated with students' economics learning outcomes. The statistical analysis showed that the regression model was significant, indicating that both variables collectively contributed to improved students' academic achievement in economics learning. The model explained 40.9% of the variance in students' economics learning outcomes, while the remaining 59.1% was not explained by the variables included in the model. These findings suggest that students' cognitive capacities and supportive learning environments play important roles in strengthening learning achievement.

Table 11. Hypothesis testing

Variable	Coefficient β	Standard Error	t	Sig.
(Constant)	-53.852	11.104	-4.850	
IQ	0.156	0.049	3.171	.002
Empowering School Environment	0.013	0.003	5.041	.000

The partial regression analysis shows that both intellectual intelligence and school environment significantly and positively affect students' economics learning outcomes (Table 11). Intellectual intelligence has a positive regression coefficient of 0.156 ($t = 3.171$, $p = .002$), indicating that higher intellectual intelligence is associated with better economics learning outcomes. Since the t -value exceeds the critical value of 1.980 and $p < .05$, H1 is accepted. Similarly, school environment has a positive regression coefficient of 0.013 ($t = 5.041$, $p < .001$), indicating a significant positive relationship with economics learning outcomes. Thus, H2 is also accepted. findings suggest that students' cognitive capacity and the school's learning environment are both important factors associated with their achievement in economics learning.

The Influence of Intellectual Intelligence (IQ) on Students' Learning Outcomes

The results showed that intellectual intelligence had a significant positive effect on

students' economics learning outcomes. This finding indicates that students with higher intellectual intelligence tend to achieve better academic performance in economics subjects. Intellectual intelligence plays an important role in supporting students' abilities to think logically, analyze information critically, solve problems, and understand economic concepts comprehensively. In economics learning, students must not only memorize theories but also interpret economic phenomena, evaluate information, and make rational decisions based on analytical reasoning. Therefore, students with stronger intellectual abilities are more likely to demonstrate better conceptual understanding and learning achievement.

These findings also indicate that intellectual intelligence contributes to students' cognitive empowerment by strengthening their analytical capacity, reasoning skills, and active engagement during the learning process. Students who possess higher intellectual abilities tend to process information more effectively and adapt more easily to academic challenges in economics learning. In addition, intellectual intelligence supports students in developing independent learning abilities and critical thinking skills, which are essential components in empowerment-based economics education.

The findings of this study can be better understood through the perspective of Social Cognitive Theory (SCT), which posits that learning outcomes are shaped by the dynamic interaction among personal factors, environmental influences, and behavioral processes rather than by a single factor operating independently (Bandura et al., 1999). In the present study, intellectual intelligence represents the personal cognitive factor that enables students to comprehend economic concepts, analyze problems, and make logical decisions. However, these cognitive abilities are more likely to translate into higher academic achievement when students

learn in an empowering school environment that provides adequate educational resources and supportive learning conditions.

The empowering school environment examined in this study encompasses the physical and learning-resource conditions represented by school building, optimization of learning media and tools, class quantity and quality, and library functionality. These environmental conditions give students access to appropriate learning spaces, instructional media, classroom facilities, and learning resources that support their engagement in economics learning. According to Social Cognitive Theory, environmental resources not only provide physical support but also strengthen students' motivation to learn, self-regulation, and confidence in using their cognitive abilities effectively (Bandura et al., 1999). Consequently, students with higher intellectual intelligence are more likely to maximize their cognitive potential when they are supported by a conducive learning environment.

This interaction explains why intellectual intelligence and the empowering school environment jointly contribute to economics learning outcomes. Students with strong cognitive abilities can process information efficiently; however, adequate school facilities, accessible libraries, and supportive instructional resources enable them to apply their analytical and problem-solving skills more effectively in learning economics. Previous studies have similarly shown that positive school environments promote student engagement, academic motivation, and achievement by providing meaningful learning opportunities and reducing barriers to learning (Kutsyuruba et al., 2015; Wang & Degol, 2015). Therefore, this study's findings extend Social Cognitive Theory by providing empirical evidence that students' academic achievement is strengthened through the reciprocal interaction between individual cognitive capacities and empowering educational environments.

The findings are consistent with previous international research showing that cognitive ability is a significant predictor of academic achievement. Students with stronger intellectual capacities tend to achieve better learning outcomes because they are more capable of processing information, applying analytical reasoning, and adapting to complex learning tasks. Furthermore, higher cognitive abilities enable students to understand learning materials more effectively and transfer knowledge across different learning situations, thereby supporting improved academic performance (Liu & Nesbit, 2024; Meyer et al., 2024). These findings reinforce the argument that intellectual intelligence remains an important factor in determining students' success in educational settings. Recent international studies have highlighted that cognitive abilities and analytical thinking are essential determinants of academic success because they facilitate knowledge construction, problem-solving, and active engagement in learning activities. These competencies are particularly important in economics education, where students are expected to analyze economic phenomena, evaluate evidence, and make informed decisions based on logical reasoning (Liu & Nesbit, 2024; Reeve et al., 2025). These findings reinforce the argument that intellectual intelligence is closely associated with students' success in learning processes.

However, some studies have reported that cognitive ability alone does not necessarily lead to higher academic achievement. The relationship between intellectual capacity and learning outcomes may depend on the presence of other supporting factors, such as learning motivation, self-regulated learning, instructional quality, and learning environment characteristics. Consequently, students with strong cognitive abilities may not always achieve superior academic performance when these supporting factors are insufficient (Credé & Kuncel, 2008;

Richardson et al., 2012). These differences may be influenced by variations in research, student characteristics, learning environments, and instructional approaches used during the learning process. In economics education, learning activities that encourage active participation and analytical discussion may strengthen the role of intellectual intelligence in improving students' learning outcomes.

Recent evidence suggests that cognitive abilities contribute not only to academic achievement but also to students' capacity for self-regulated learning and adaptive problem-solving. Students with stronger intellectual capacities are generally better able to organize learning activities, monitor their own understanding, and apply knowledge to unfamiliar situations. Such competencies are increasingly important in economics education, where students are expected to evaluate information critically and make evidence-based decisions in complex socio-economic contexts (Duckworth et al., 2019; von Stumm, 2018). In economics education, intellectual intelligence is particularly important because students must analyze economic issues, evaluate alternative solutions, interpret data, and make reasoned decisions. Therefore, strengthening students' cognitive capacities may support the development of economic reasoning and problem-solving skills essential to contemporary economic learning (Walstad et al., 2013).

The findings of this study imply that economics education should not merely focus on transferring theoretical knowledge but also emphasize developing students' cognitive capacities and analytical reasoning skills. Teachers are expected to implement more student-centered, empowering learning strategies that encourage active participation, critical thinking, and problem-solving during economics learning activities. Through supportive and empowering instructional practices, students are expected to

develop stronger intellectual capacities and achieve more optimal learning outcomes.

The Influence of Empowering School Environment on Students' Learning Outcomes

The results of this study demonstrated that the empowering school environment had a significant positive effect on students' economics learning outcomes. This finding indicates that supportive, conducive learning environments contribute to improved academic achievement in economics. An empowering school environment plays an important role in encouraging students' active participation, learning motivation, confidence, and engagement during the learning process. In economics education, students require learning environments that support discussion, collaboration, and interactive learning activities to strengthen their understanding of economic concepts and real-life economic issues.

In this study, the empowering school environment was operationalized through four indicators: school buildings, optimized learning media and tools, class quantity and quality, and library functionality. These dimensions reflect how well the school's physical infrastructure and learning resources support students' learning activities. Adequate school buildings provide a conducive learning environment, while optimized learning media and tools improve students' access to instructional materials and support learning. Class size and quality reflect the availability and adequacy of classroom facilities, while library functionality gives students additional access to learning resources. Together, these conditions can create an environment that enables students to engage more effectively in economics learning. These conditions help students feel more comfortable, motivated, and confident expressing opinions, asking questions, and engaging in analytical discussions during economics learning. As a result, students become more actively involved in the learning process, which may positively influence their learning achievement.

The findings also indicate that empowering learning environments contribute to student empowerment by strengthening learning autonomy, participation, and academic engagement. Students who learn in supportive educational environments tend to demonstrate higher motivation and more positive learning behaviors. In economics learning, empowering classroom conditions can encourage students to develop analytical reasoning, critical thinking, and problem-solving abilities needed to understand economic phenomena.

These findings support Social Cognitive Theory proposed by Bandura et al. (1999), which explains that environmental factors significantly influence students' learning behaviors and academic outcomes. A positive educational environment may strengthen students' confidence, motivation, and participation during the learning process, which ultimately contributes to better learning outcomes. In economics education, supportive school environments can support more meaningful, student-centered learning experiences.

This study's findings align with previous research by Peterria & Suryani (2016) and Siahaan & Pramusinto (2018), which reported that the school environment significantly influences students' learning outcomes. Supportive educational environments give students opportunities to participate actively and maximize their learning potential. Furthermore, recent international studies also highlighted that empowering learning environments positively influence students' engagement, motivation, and academic achievement by fostering supportive interactions and learner autonomy (Lee & Kim, 2024; Pan, 2023). These findings reinforce the importance of creating empowering educational environments to support students' academic success.

Empowering educational environments are increasingly recognized as essential for promoting meaningful learning experiences. Supportive

school environments can provide students with appropriate learning spaces, accessible learning resources, and adequate instructional facilities, which may encourage engagement and facilitate effective learning. Research shows that positive classroom climates and supportive teacher-student relationships are among the strongest predictors of students' academic success and psychological well-being (Choi et al., 2025; Quin, 2017; Wang & Degol, 2015).

However, this study differs from Kibriya & Jones (2021), who reported that school environment factors did not significantly affect students' learning outcomes. These differences may reflect variations in educational settings, school culture, learning systems, and students' characteristics across studies. In this study, the empowering school environment was specifically examined within the context of economics education, where active participation and collaborative learning play important roles in supporting students' understanding and achievement. From an empowerment-based economics education perspective, learning environments should not merely facilitate knowledge acquisition but also encourage students to become active learners who can critically understand economic realities and make informed decisions. Empowering educational settings therefore play an important role in developing students' economic agency and lifelong learning capacities (Maschi et al., 2000).

The findings of this study imply that schools and teachers should create more supportive, participatory, and empowering learning environments to optimize students' economics learning outcomes. Economics learning should be designed not only to improve academic achievement but also to encourage student empowerment, active engagement, and independent learning capacities. Therefore, teachers are expected to implement more student-centered learning strategies and create classroom

environments that support interaction, collaboration, and analytical discussion during economics learning activities.

The Influence of Intellectual Intelligence (IQ) and Empowering School Environment on Students' Learning Outcomes

The results showed that intellectual intelligence and an empowering school environment had a significant positive effect on students' economics learning outcomes. These findings indicate that students' academic achievement in economics is influenced not only by internal cognitive factors but also by supportive learning environments. Intellectual intelligence and empowering school environments complement each other in supporting students' understanding, participation, and achievement in economics education.

Intellectual intelligence helps students think logically, analyze economic problems, and understand learning materials effectively. Meanwhile, an empowering school environment provides students with adequate physical facilities, optimized learning media and tools, appropriate classroom conditions, and functional learning resources. With these conditions in place, students have more opportunities to access learning materials, engage in instructional activities, and apply analytical skills in economics learning. When these factors are integrated, students tend to demonstrate better engagement, stronger analytical reasoning, and higher motivation in economics learning activities. As a result, students are better able to achieve optimal learning outcomes.

The findings also suggest that the interaction between cognitive abilities and supportive learning environments contributes to students' cognitive and educational empowerment. Students with strong intellectual capacities may develop more effectively when they are supported by conducive and empowering educational

environments. In economics education, empowering classroom conditions encourage students to participate actively in discussions, solve contextual economic problems, and apply economic concepts critically in real-life situations. Therefore, combining intellectual intelligence with an empowering school environment is important for strengthening students' learning achievement and academic development.

These findings support Social Cognitive Theory, which proposes that learning outcomes are influenced by reciprocal interactions between personal factors and environmental conditions. Students' cognitive abilities may influence how they process information and respond to learning tasks, while supportive educational environments may strengthen students' motivation, confidence, and engagement during the learning process (Bandura et al., 1999). This interaction ultimately contributes to improved academic achievement.

The findings align with previous studies showing that academic achievement is influenced by the interaction between students' cognitive capacities and the quality of their learning environment. Students are more likely to achieve optimal learning outcomes when strong intellectual abilities are supported by positive educational experiences and conducive learning conditions (Xu et al., 2023). These findings align with previous studies showing that academic achievement is shaped by both individual cognitive factors and environmental support. Students with stronger cognitive competencies tend to perform better academically when they learn in environments that promote engagement, motivation, and active participation (van der Zanden et al., 2018). Similarly, supportive school environments contribute significantly to students' academic achievement by encouraging active participation and effective learning experiences (Peterria & Suryani, 2016). Recent international studies also emphasized that cognitive abilities, student engagement, and

empowering learning environments play important roles in improving students' learning outcomes and higher-order thinking skills (Pan, 2023). These findings reinforce the argument that academic achievement is influenced by the interaction between students' internal capacities and external educational environments.

The coefficient of determination in this study indicated that intellectual intelligence and an empowering school environment contributed 40.9% to students' economics learning outcomes. The remaining percentage was influenced by factors outside the scope of this study. This finding suggests that learning outcomes are multidimensional and may also be influenced by motivation, learning strategies, family background, emotional intelligence, and other educational factors that were not examined in this study.

The combined influence of intellectual intelligence and empowering school environments supports contemporary educational perspectives that view academic achievement as the result of interactions between individual characteristics and contextual factors. Students' cognitive capacities may facilitate learning, but learning environments that provide autonomy support, constructive feedback, and opportunities for active participation often strengthen their development and application of knowledge. Consequently, educational success is best understood through an integrated perspective that considers both personal and environmental determinants of learning (Reeve et al., 2025; Ryan & Deci, 2020).

The findings of this study imply that economics education should integrate cognitive development and empowering learning environments to optimize students' academic achievement. Teachers should implement more student-centered, participatory learning strategies that encourage analytical thinking, collaboration, and active engagement during economics learning

activities. In addition, schools should create supportive educational environments that facilitate students' cognitive development and empowerment-oriented learning experiences. Through these efforts, students are expected not only to achieve better academic performance but also to develop critical thinking, independent learning capacities, and economic reasoning skills needed in contemporary society.

■ CONCLUSION

The findings showed that intellectual intelligence and an empowering school environment significantly influenced students' economics learning outcomes, both partially and simultaneously. Intellectual intelligence contributed to students' analytical reasoning, problem-solving abilities, and conceptual understanding in economics learning, while empowering school environments supported students' motivation, participation, and engagement during the learning process. Furthermore, the simultaneous influence of these variables indicates that students' academic achievement is shaped by the interaction between cognitive capacities and supportive educational environments.

This study highlights the importance of integrating an empowering school environment into economics education to strengthen students' cognitive development and learning participation. Adequate school buildings, optimized learning media and tools, appropriate class size and quality, and functional library resources can provide supportive conditions for students to engage in economics learning and develop their analytical abilities. Therefore, economics teachers and school administrators are encouraged to optimize available learning facilities and resources to support students' academic achievement.

The findings also contribute to the development of empowerment-based economics education by providing empirical evidence on the role of intellectual intelligence and empowering

school environments in improving students' learning outcomes. Practically, these findings suggest that economics teachers should adopt student-centered learning strategies that strengthen students' analytical thinking, problem-solving skills, and active participation in class. School administrators are also encouraged to improve learning facilities, optimize the use of libraries and other educational resources, and create a supportive school environment that enables students to maximize their intellectual potential. In addition, educational policymakers should support programs and policies that integrate cognitive development with conducive learning environments to enhance students' academic achievement. However, this study was limited to intellectual intelligence and empowering school environment variables. Therefore, future studies are recommended to examine other factors influencing economics learning outcomes, such as learning motivation, emotional intelligence, digital learning environments, and self-regulated learning.

■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the writing of this manuscript, the author(s) used ChatGPT by OpenAI to help improve English grammar, sentence structure, and the manuscript's overall clarity. After using this tool, the author(s) reviewed and edited the content as needed and took full responsibility for the publication.

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