The Relationship of Emotional Intelligence, Learning Independence and Learning Motivation with Learning Outcomes

Hasnidah Mulyadi[1*], Firdaus Daud[1], Hartono[1], Yusminah Hala[1]

[1] Masters Study Program of Biology Education, Makassar State University, Makassar, Indonesia

Abstract: One of the common issues in the learning process is the low learning outcomes of students, which can be caused by various factors, including low emotional intelligence, learning independence, and learning motivation. This study aims to determine the relationship between emotional intelligence, learning independence, and learning motivation with the science learning outcomes of eighth-grade students at public junior high schools in Panca Rijang Subdistrict, Sidrap Regency. This is a quantitative study using a correlational approach. The study population consists of all eighth-grade students from four public junior high schools, with a sample size of 153 participants selected using simple random sampling. The research instruments include a Likert scale questionnaire to measure emotional intelligence, learning independence, and learning motivation, as well as a multiple-choice test to assess science learning outcomes. The data analysis technique used was path analysis with the assistance of SPSS 25.0. The results of the study showed a significant direct relationship between emotional intelligence, learning independence, and learning motivation with science learning outcomes. Additionally, learning motivation was found to act as an intervening variable that partially mediated the relationship between emotional intelligence and learning independence on science learning outcomes. In conclusion, strengthening emotional intelligence, enhancing learning independence, and developing learning motivation simultaneously can positively contribute to improving students' science learning outcomes. Therefore, a holistic and character-development-oriented learning approach is needed.

Keywords: Emotional Intelligence; Junior High School Students.; Learning Independence; Learning Motivation; Learning Outcomes; Science.

Introduction

Education is a complex and systematic process designed to help learners achieve national education goals. Education is an effort to create an environment and learning methods that allow learners to maximize their potential. Education in Indonesia currently focuses on developing learners' characters, not only in academic abilities, but also in social and emotional aspects (Rahman, et al. 2022). Sujana (2019) asserts that education should equip learners with emotional intelligence that can benefit themselves and society. However, one of the challenges faced by Indonesian education is the high number of bullying cases in schools. KPAI recorded an increase in bullying cases among students in 2022 which the importance of the role of emotional intelligence in dealing with bullying behavior. Previous research also shows that emotional intelligence affects students' learning achievement (Handayani, et al. 2021).

Emotional intelligence is often associated with the ability to regulate and control oneself, motivate oneself, and have empathy for others (Chang, et al. 2020). The results of a survey conducted on adolescents aged 11-13 years showed that their emotional intelligence was still relatively low, with 26.9% in the low group, 46% in the medium group, and only 26.9% in the high group (Basaria, 2019). This shows that many children are still

lacking in emotional intelligence, which can affect their behavior and achievement in learning.

In addition to emotional intelligence, learning independence is a key factor in the educational process (Damayanti & Sumadi. 2016). Independent learners will show the ability to learn actively, determine their own learning goals, and be responsible for their learning outcomes (Fitriana, et al. 2015). Some studies state that the level of learning independence is directly proportional to the academic achievement of students, especially in science subjects such as science. To foster learning independence, strong learning motivation is needed. Learning motivation is an internal and external drive for students to change their behavior (Ratna, et al. 2022).

Learning motivation affects student learning outcomes, and the higher the motivation of students to learn, the better their learning outcomes (Menrissal & Utari. 2017). Motivated learners will be more focused, consistent, and have the drive to overcome learning difficulties, so they tend to get optimal results (Yulianti, et al. 2022). Good learning outcomes are closely related to learning motivation, which underlies the desire of learners to develop. Without learning motivation, learners will not achieve maximum learning outcomes. Intellectual intelligence contributes only 20% to success, while the other 80% comes from other factors, including emotional intelligence. In a modern era, full of challenges, emotional intelligence and personal motivation of learners are key in achieving good learning outcomes (Mariana, et al. 2024).

However, initial observations made by the author at SMP Negeri Panca Rijang District showed that most students still experience obstacles in terms of emotional management, learning motivation, and learning independence. This phenomenon has an impact on the achievement of science learning outcomes that are less than optimal. Therefore, this study aims to empirically analyze the relationship between emotional intelligence, learning independence, and learning motivation on science learning outcomes in class VIII students of SMP Negeri in Panca Rijang District, Sidrap Regency. The results of this study are expected to make theoretical and practical contributions in the development of holistic and learner-centered learning strategies.

Method

Types of research

This type of research is quantitative correlation with a *path* analysis approach. The following research design can be seen in the picture below.
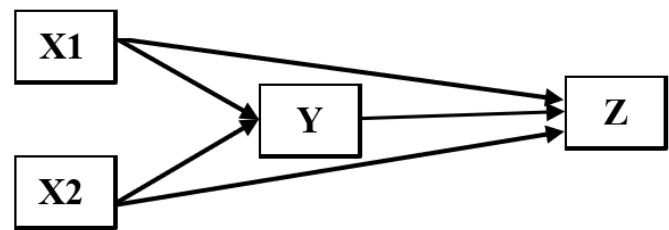

Figure 1. Research design

Description:
X1 : Emotional Intelligence
X2 : Learning Independence
Y: Learning Motivation
Z : Science Learning Outcomes
(Sugiyono, 2015)

Time and place of research

This research was conducted from November 11 to December 11, 2024, in Panca Rijang Subdistrict, Sidrap Regency, South Sulawesi Province.

Research Population

The population consisted of 349 students in class VIII of SMP Negeri in Panca Rijang District. The sample was determined by as many as 153 students using simple random sampling technique and proportional allocation.

Research Instrument

The instruments used to obtain data in this study are tests and non-tests. The test was conducted to measure the achievement of cognitive learning outcomes of IPA class VIII students while the non-test was in the form of a questionnaire in the form of a Likert scale which was carried out to obtain information about emotional intelligence, learning independence and learning motivation.

The questionnaire used is a closed questionnaire with a Likert scale whose answers have been provided by the researcher consisting of 4 answer options, namely strongly agree (SS), agree (S), disagree (ST), and strongly disagree (STS) in the form of favorable (positive) and unfavorable (negative) statements, so that respondents only have to choose the appropriate or suitable statement by checking the available answers. The questionnaire rating scale of emotional intelligence, learning independence and learning motivation can be seen in Table 1

Table 1. Likert Scale Alternative answer scores

Alternative Answer	Score for question	
	Positive	Negative
Strongly agree	4	1
Agree	3	2
Disagree	2	3
Strongly disagree	1	4

Source: Sugiyono (2016)

Research Stages

1) Preparation Stage

Some preparations made by researchers as initial steps in the research include discussing with science teachers at public junior high schools, searching for references related to research variables, and preparing proposals and consulting with supervising lecturers.

2) Implementation Stage

The stage of collecting information from the research sample regarding the variables to be studied begins with validating the instruments, distributing questionnaires, and taking research documentation.

3) Completion Stage

The stage of analyzing the data collected from the sample to determine the conclusions of the research results, which are then compiled into a research report.

Data Analysis

Data analysis conducted in this study is descriptive analysis and inferential analysis. Before hypothesis testing, prerequisite tests and classical assumption tests are used. The prerequisite test consists of normality test and linearity test. While the classic assumption test consists of multicollinearity test, and heteroscedasticity test.

Result and Discussion

Descriptive Analysis

Based on the formulation of the problems that have been stated previously, the results obtained are related to emotional intelligence, learning independence and learning motivation with the science learning outcomes of VIII grade students of SMP Negeri in Panca Rijang District.

Table 2. Description of Emotional Intelligence, Learning Independence, Learning Motivation and Science Learning Outcomes

Statitics	Emotional intelligence	Learning independence	Learning motivation	Learning motivation
Sample Quantity				153
Minimum	48	50	51	50
Maximum	80	78	79	86
Mean	65,29	64,46	66,59	66,04
Standard Deviation	7.123	5.689	6.403	6.701

Source: Primary data obtained with Microsoft Excel 2016

Based on Table 2. it is obtained that the average value of emotional intelligence of students in class VIII of SMP Negeri in Panca Rijang District is 65.29, which means it is in the moderate category. The ability of learning independence of students in grade VIII of SMP Negeri in Panca Rijang District is 64.45 which means it is in the medium category. The ability of learning motivation of VIII grade students of SMP Negeri in Panca Rijang District is 67.58 which means it is in the medium category. While the science learning outcomes of VIII grade students of SMP Negeri in Panca Rijang District is 66.04 which means it is in the moderate category.

Inferential Statistical Techniques

Inferential statistical techniques were used to test the research hypothesis. Before testing the hypothesis inferentially, prerequisite tests were first conducted, namely basic assumption tests and classical assumption tests. Basic assumption tests consisted of normality tests and linearity tests.

Normality Test

Based on table 3 shows the value of Sig. The four variables> 0.005 so that the analysis is normally distributed.

Table 3. Normality Test Results

Variables	Sig. (2 tailed)	Description
Emotional Intelligence	0,077	Normal
Learning Independence	0,098	Normal
Learning motivation	0,200	Normal
Emotional Intelligence	0,089	Normal

Linearity Test

Table 4. Linearity Test Results

Variables	*Sig. Linearity*	Description
Emotional Intelligence* Learning Outcomes	0,648	Linear
Learning Independence* Learning Outcomes	0,858	Linear
Learning Motivation* Learning Outcomes	0,501	Linear

The basis for decision making for the linearity test is if the *Sig* value. Linearity> 0.05 then there is a linear relationship between the independent variable and the dependent variable. Based on Table 4 it is known that the *Sig* value. *Linearity> 0.05* so that there is a linear relationship between the independent variable and the dependent variable.

Heterocedacity Test

Table 5. Heterocedacity Test Results

Variables	*Sig.*	Description
Emotional Intelligence	0,715	No Heteroscedasticity Occurs
Learning Independence	0,547	No Heteroscedasticity Occurs
Learning Motivation	0,270	No Heteroscedasticity Occurs

Based on the output table above, it is known that the *sig.* value for the emotional intelligence variable is 0.715. Meanwhile, the *Sig.* value for the learning independence variable is 0.547 and the *Sig.* value of the learning motivation variable is 0.270. Because the significant value of the three variables above is greater than 0.05, according to the dasr of decision making in the heterocedacity test, it can be concluded that there are no symptoms of heterocedacity.

Multicollinear Test

Table 6. Multicollinearity Test Results

Variables	Colinearity Statistic		Description
	Tolerance	VIF	
Emotional Intelligence	0,.862	1.160	No Multicollinearity
Learning independence	0.851	1.170	No Multicollinearity
Learning Motivation	0.882	1.134	No Multicollinearity

Based on Table 6 it is known that the *Tolerance* value for the emotional intelligence variable is 0.862> 0.100, the learning independence variable is 0.851> 0.100, the learning motivation variable is 0.882> 0.100. Meanwhile, the VIF value for the emotional intelligence variable is 1.160 > 10.00, the learning independence variable is 1.170 > 10.00, the learning motivation variable is 1.134 > 10.00. So, referring to the basis for decision making in the multicollinearity test, it can be concluded that there are no symptoms of multicollinearity.

Hypothesis Test

Table 7. Regression Analysis Results of the Relationship between Emotional Intelligence, Learning Independence with Motivation to Learn Regression I

Model	Non-standardized coefficient		Standardized coefficient beta	t	Sig.
	B	Std. Error			
(Constant)	1.484	2.339		0.634	0.527
Emotional Intelligence	0.183	0.060	0.200	3.061	0.003
Learning independence	0.821	0.073	0.739	11.289	0.000

Table 7 shows that the beta coefficient of the emotional intelligence variable (X_1)of 0.200 shows that emotional intelligence provides a relationship with learning motivation by 20%. The beta coefficient of the learning independence variable of 0.739 proves that learning independence provides a relationship with learning motivation by 73.9%. In addition, the Sig value. emotional intelligence <0.05 or 0.003 and the Sig value. Learning independence <0.05 or 0.000 then H_0 is rejected which means there is a significant relationship.

Table 8. Coefficient of Determination of Regression I

Regression Model	R	R Square
1	0.918	0.843

Based on Table 8, shows the R Square value states the magnitude of the relationship between the independent variables (emotional intelligence and learning independence) on the learning motivation variable which is 0.843 or 84.3% while the rest is another uncontrolled relationship in this study, by looking at the correlation coefficient of the variable relationship in the "Very strong" category.

Table 9. Regression Analysis Results of the Relationship between Emotional Intelligence, Learning Independence, Learning Motivation with Science Learning Outcomes

Model	Non-standardized coefficient		Coefficient standard beta	t	Sig.
	B	Std. Error			
(Constant)	5.103	3.119		1.636	0.104
Emotional Intelligence	0.306	0.082	0.324	3.722	0.000
Learning independence	0.299	0.132	0.261	2.272	0.024
Learning Motivation	0.322	0.109	0.313	2.964	0.004

Table 9 shows the beta coefficient of the emotional intelligence variable (X_1) of 0.324 indicates that emotional intelligence provides a relationship with science learning outcomes of 32.4%. The beta coefficient of the learning independence variable of 0.261 proves that learning independence provides a relationship with science learning outcomes by 26.1%. The beta coefficient of the learning motivation variable of 0.313 proves that learning motivation provides a relationship with learning outcomes by 31.3%. In addition, the Sig value. emotional intelligence <0.05 or 0.000 and the Sig value. Learning independence <0.05 or 0.024 and Sig value. learning motivation <0.05 or 0.004 then H_0 is rejected which means there is a significant relationship.

Table 10. Coefficient of Determination of Regression II

Regression Model	R	R Square
2	0.860	0.739

Shows the value of R Square states the magnitude of the relationship of independent variables (emotional intelligence, independence of learning and learning motivation) to the variable learning outcomes of science which is 0.739 or 73.9% while the rest is another relationship that is not controlled in this study. If R Square is connected to the correlation coefficient interpretation guidelines, it is in the "Strong" category.

Direct Relationship between Emotional Intelligence and Learning Motivation of Class VIII Students of State Junior High School in Panca Rijang District

The results of the analysis of the relationship between emotional intelligence and learning motivation of Class VIII students of State Junior High School in Panca Rijang District can be seen in Table 11

Table 11. Direct relationship between emotional intelligence (X_1) and Motivation to Learn (Y) of Class VIII Students of State Junior High School in Panca Rijang Subdistrict

Beta Coefficient Value	Sig.(α) Level	Sig.
0,200	0,05	0,003

Based on Table 11, it can be seen that the coefficient value ρyx_1= 0.200 with a sig value. 0.003 is smaller than the probability value of 0.05 or the value of 0.05> 0.003, then H_0 is rejected and H_a is accepted, meaning that the path analysis coefficient is significant. This means that emotional intelligence is directly and significantly related to learning motivation.

Direct Relationship between Emotional Intelligence and Science Learning Outcomes of Class VIII State Junior High School Students in Panca Rijang District

The results of the analysis of the relationship between emotional intelligence and science learning outcomes of VIII grade students of SMP Negeri in Panca Rijang District can be seen in Table 12.

Table 12. Relationship between Emotional Intelligence (X_1) and Learning Outcomes (Z) of Class VIII Students of State Junior High School in Panca Rijang Subdistrict

Coefficient Value	Sig.(α) Level	Sig.
0.324	0,05	0,000

Based on Table 12, it can be seen that the path coefficient value ρzx_1= 0.324 with a sig value. 0.000 is smaller than the probability value of 0.05 or the value of 0.05> 0.000, then H_0 is rejected and H_a is accepted, meaning that the path analysis coefficient is significant. This means that emotional intelligence is directly and significantly related to science learning outcomes.

Direct Relationship between Learning Independence and Learning Motivation of Class VIII State Junior High School Students in Panca Rijang District

The results of the analysis of the relationship between learning independence and learning motivation of students in class VIII of SMP Negeri in Panca Rijang District can be seen in Table 13.

Table 13. Relationship between Learning Independence (X_2) and Learning Motivation (Y) of Class VIII Students of State Junior High School in Panca Rijang Subdistrict

Path Coefficient Value	Sig.(α) Level	Sig.
0.739	0,05	0,000

Based on Table 13, it can be seen that the path coefficient value ρyx_2= 0.739 with a sig value. 0.000 is smaller than the probability value of 0.05 or the value of 0.05> 0.000, then H_0 is rejected and H_a is accepted, meaning that the path analysis coefficient is significant. This means that learning independence is directly and significantly related to learning motivation.

Direct Relationship between Learning Independence and Science Learning Outcomes of Class VIII State Junior High School Students in Panca Rijang District

The results of the analysis of the relationship between learning independence and science learning outcomes of VIII grade students of SMP Negeri in Panca Rijang District can be seen in Table 14.

Table 14. Relationship between Learning Independence (X_2) and Learning Outcomes (Z) of Class VIII Students of State Junior High School in Panca Rijang Subdistrict

Path Coefficient Value	Sig.(α) Level	Sig.
0.261	0,05	0,024

Based on Table 14, it can be seen that the path coefficient value ρzx_2= 0.261 with a sig value. 0.024 is smaller than the probability value of 0.05 or the value of 0.05> 0.024, then H_0 is rejected and H_a is accepted, meaning that the path analysis coefficient is significant. This means that learning independence is directly and significantly related to learning outcomes.

Direct Relationship between Learning Motivation and Science Learning Outcomes of Class VIII State Junior High School Students in Panca Rijang District

The results of the analysis of the relationship between learning motivation and the learning outcomes of ipa students in class viii public smp in panca rijang sub-district can be seen in Table 15.

Table 15. Relationship between Learning Motivation (Y) and Learning Outcomes (Z) of Class VIII Students of State Junior High School in Panca Rijang Subdistrict.

Path Coefficient Value	Sig.(α) Level	Sig.
0,313	0,05	0,004

Based on Table 15, it can be seen that the path coefficient value ρyz = 0.313 with a sig value. 0.004 is smaller than the probability value of 0.05 or the value of 0.05> 0.004, then H_0 is rejected and H_a is accepted, meaning that the path analysis coefficient is significant. This means that learning motivation is directly and significantly related to learning outcomes.

The Indirect Relationship between Emotional Intelligence and Science Learning Outcomes through Learning Motivation of Class VIII State Junior High School Students in Panca Rijang District

Based on the results of the analysis and calculation using the *Sobel test*, a *p-value* of 0.0000001 <0.05 was obtained. This means that emotional intelligence is indirectly related to science learning outcomes through learning motivation or emotional intelligence through learning motivation is related to science learning outcomes.

The Indirect Relationship between Learning Independence and Science Learning Outcomes through Learning Motivation of Class VIII State Junior High School Students in Panca Rijang District

Based on the results of analysis and calculation using the *Sobel test*, the *p-value* of 0.00015 <0.05 was obtained. This means that learning independence is indirectly related to science learning outcomes through learning motivation or learning independence through learning motivation is related to science learning outcomes.

Discussion
Direct Relationship between Emotional Intelligence and Learning Motivation

The analysis results show a path coefficient of 0.200 (sig 0.003), indicating that there is a positive and significant direct relationship between emotional intelligence and students' learning motivation in Panca Rijang District. This positive correlation means that the higher the students' emotional intelligence, the higher their learning motivation. Emotional intelligence includes the ability to understand and manage emotions, and motivate oneself and others (Qudsiyah & Faturahman, 2024). Both variables show stable data and support each other. Emotional intelligence helps students manage stress and anxiety, which has an impact on increasing self-confidence and readiness to learn. Yulika's research (2022) states that students with high emotional intelligence have high learning motivation. Tam et al (2021) emphasized that motivation alone is not enough without emotional intelligence. Rosa et al (2024) mentioned that the intelligence possessed by students will be realized if learning motivation is also high.

Direct Relationship between Emotional Intelligence and Science Learning Outcomes

The analysis showed a path coefficient of 0.324 (sig 0.000) indicating a positive and significant relationship between emotional intelligence and students' science learning outcomes. This suggests that emotional intelligence plays an important role in academic success, including in science subjects (Ganesan, 2023). Although descriptive analysis placed both variables in the moderate category, students with sufficient emotional intelligence are able to manage emotions and maximize the learning process. This is in line with research by Riandini et al (2020) and Supriyanto & Harryoga (2019), which states that emotional intelligence affects up to 80% of a person's success.

Direct Relationship between Learning Independence and Learning Motivation

The analysis results show a path coefficient of 0.739 (sig 0.000), meaning that learning independence is directly and significantly related to learning motivation. The higher the learning independence, the higher the students' motivation to learn. Rijal & Bachtiar (2015) mentioned that learning independence is also related to science learning outcomes. Ratna (2022) and Eriyanto et al (2021) stated that motivation makes a major contribution to learning independence. Fauziah (2021) added that high motivation fosters encouragement in students to learn independently. Researchers' observations also found that some students have not

shown optimal learning independence, as seen from the lack of active participation and initiative in learning.

Direct Relationship between Learning Independence and Science Learning Outcomes

The analysis results show a path coefficient of 0.261 (sig 0.024) indicating a direct and significant relationship between learning independence and science learning outcomes. Independent learners tend to have a sense of responsibility, confidence, and high discipline (Suprihatin & Rosita, 2020). Damayanty & Sumadi's (2016) research shows that learning independence is an important factor in achieving academic achievement. Independence encourages students to be more ready to face challenges and increase learning success.

Direct Relationship between Learning Motivation and Science Learning Outcomes

The analysis results showed a path coefficient of 0.313 (sig 0.004) indicating that learning motivation has a direct and significant relationship to science learning outcomes. Motivation is an important driver that affects academic achievement (Uno, 2015; Djamarah, 2015). Research by Rochmamh & Kurniawan (2022) and Sahita (2018) reinforces that high learning motivation has a direct impact on the quality of student learning outcomes. With high motivation, students will study harder, have learning goals, and be able to create a conducive learning atmosphere.

The Indirect Relationship Between Emotional Intelligence and Science Learning Outcomes Through Learning Motivation

The results of the analysis using the Sobel test showed a significant indirect relationship between emotional intelligence and science learning outcomes through learning motivation. Amanda, et al (2024) and Sayed (2024) emphasize the importance of emotional intelligence in shaping learning motivation. Salvador-Ferrer's (2021) study in Spain stated emotional intelligence as a mediator in the relationship between learning motivation and life goals. MacCann et al (2019), Quílez-Robres (2023), and Nieto et al (2024) also concluded emotional intelligence contributes to academic achievement through motivation and learning strategies. Research by Tang & He (2023), Liu et al (2024), and Mahdavi et al (2023) supports this mediating role, showing that emotional intelligence is related to self-efficacy, resilience, and learning outcomes.

Indirect Relationship between Learning Independence and Science Learning Outcomes through Learning Motivation

The results of the Sobel test analysis showed a significant indirect relationship between learning independence and science learning outcomes through learning motivation. Learning independence provides an intrinsic drive that strengthens motivation and has an impact on learning outcomes (Novalia et al, 2025; Yurdal et al, 2024; Wahyudi et al, 2024). In science learning that requires critical thinking skills, learning independence is crucial (Samsudin, 2019). Learning motivation is an important link because motivated students will be more diligent and understand the material better (Bandhu et al., 2024). Zainuddin & Halili (2016), Mahdavi et al (2023), and Dogan (2015) also showed that motivation acts as a mediator between independence and learning outcomes.

Teachers are expected to create learning that encourages student autonomy and fosters motivation, so that science learning outcomes can improve optimally.

Conclusion

Based on the results and discussion of this study, it can be concluded that there is a direct and significant relationship between emotional intelligence and learning motivation among Grade VIII students in State Junior High Schools in Panca Rijang District, Sidrap Regency. Emotional intelligence also shows a direct and significant relationship with students' science learning outcomes. Furthermore, learning independence has a direct and significant relationship with science learning outcomes. In addition, learning motivation is directly and significantly related to science learning outcomes. The study also reveals an indirect relationship between emotional intelligence and science learning outcomes through learning motivation, partially. Similarly, there is an indirect relationship between learning independence and science learning outcomes through learning motivation, partially. These findings highlight the importance of emotional intelligence, learning independence, and learning motivation in enhancing students' science learning outcomes.

Author Contributions
Conceptualization, H.M ; Methodology,H.M; Normal analysis, H.M and F.D; Supervision, F.D and H; All authors have read and approved the published version of the manuscript.

Conflicts of Interest
The authors declare no conflict of interest.

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