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Correlation of Interpersonal Intelligence with Biology Learning Outcomes of Students in Senior High School

Tia Listiana[1*], Devie Novallyan[2], Muhsin Chatib[3], Salahuddin[4], Defita Permata Sari[5]
[1,2,3,4,5] Biology Education, Education and Teaching, UIN Sulthan Thaha Saifuddin, Jambi, Indonesia
tialistiana485@gmail.com*, devienovallyan@uinjambi.ac.id, muhsinchatib@uinjambi.ac.id, salahuddin@uinjambi.ac.id, defitapermata02@uinjambi.ac.id

Abstract

In learning biology, many topics require group work, such as laboratory practicums, field observations, or discussions of more complex concepts. In this process, Interpersonal Intelligence becomes one of the important factors in supporting the biology learning process. This study aims to prove whether or not there is a correlation between Interpersonal Intelligence and students' biology learning outcomes in high school. This research is a quantitative study with a correlational research design. The research was conducted at Ar-Riyadl High School with a total research sample of 30 students. The instrument used was a questionnaire for the independent variable (interpersonal intelligence) and documentation of the Final Semester Assessment (PAS) of the 2023/2024 school year for the dependent variable (biology learning outcomes). Data analysis to test the research hypothesis using Pearson Product Moment correlation analysis. The results showed a correlation between Interpersonal Intelligence and students' biology learning outcomes in senior high school. This can be seen in the value of r count (0.662) > r table (0.361) and the significance value (0.662) > 0.05, which means Ho is rejected and Ha is accepted. It can, therefore, be concluded that the formulated research hypothesis is accepted, namely that there is a correlation between Interpersonal Intelligence and students' biology learning outcomes in senior high school.

Keywords: biology, interpersonal intelligence, learning outcomes

INTRODUCTION

Education is the primary key to shaping the quality of human resources, particularly in developing the potential of students across various fields of science. One of the subjects that is the main focus in senior high school (SMA) is Biology, which provides an understanding of living things and how they interact with each other and the factors that influence them (Kurniawan, M. R. 2017). Biology learning outcomes are a crucial indicator in the educational process, illustrating the extent to which students have successfully grasped the material taught (Bernadus, 2017). However, students' learning outcomes in biology subjects often vary among students. The latest data from the Ministry of Education and Culture shows that the 2019 National Exam (UN) results were the second lowest at the national level, with an average score of 50.61 for high school (Kemendikbudristek, 2019). This suggests that non-cognitive factors, such as interpersonal intelligence, can significantly contribute to students' achievement in biology learning outcomes (Jaenudin, U., & Sahroni, D., 2021).

Biology learning requires not only high cognitive skills but also strong social skills, especially in the context of collaboration-based learning. In biology learning, many topics require group work, such as practicums in the laboratory, field observations, or discussions of more complex concepts (Pratiwi, W. N. W., Virgana, V., & Soenarno, S. M., 2023). In this process, interpersonal intelligence becomes one of the key factors in supporting the learning process in biology. As

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explained by Howard Gardner (1983) in his Multiple Intelligences theory, interpersonal intelligence refers to the ability to interact, understand, and cooperate with others. This ability plays an important role in supporting the biology learning process, which often involves cooperation in practicum, group discussions, and interaction between students and students with educators to understand complex biological concepts (Jaenudin, U., & Sahroni, D. 2021).

In the learning process, interpersonal intelligence enables learners to build, establish, and maintain positive social relationships with friends and educators (Winarti, A. 2021). This intelligence is crucial for learners to understand how to interact, cooperate, and empathize with others (Harfiani, R., 2021). Learners with high interpersonal intelligence tend to cooperate more easily in completing group tasks, actively participate in discussions, and have the confidence to ask questions and seek help when they feel they have not understood the material being studied (Tartila, M. F., & Aulia, L. A., 2021).

Research conducted by Alfy, Z. R., A'ini, Z. F., & Baihaqie, A. D. (2023) reveals a positive correlation and a very close relationship between interpersonal intelligence and students' biology learning outcomes. The results of this study reveal that students with high interpersonal intelligence are more able to cooperate with their classmates and solve problems together, which in turn has a positive impact on their understanding of the biology subject matter. In addition, research by Wajdi, M., Aziz, A. A., & Ngitung, R. (2018) also showed that good interpersonal intelligence can increase learners' participation in group-based learning, which contributes to the understanding of biological material.

Although numerous studies have demonstrated a correlation between interpersonal intelligence and learning outcomes, they often focus on other subjects, such as mathematics and social studies. As conducted by Janna (2024), Natsir, I., & Munfarikhatin, A. (2020), and Eranda, A., et al. (2023), very few studies specifically examine the correlation between interpersonal intelligence and biology learning outcomes at the high school level. In addition, previous studies have mainly been conducted at other levels of education, such as primary education, as seen in Dewi, L. S., Hidayat, S., & Sukmayadi, D. (2022) and Eranda, A., Purba, N., & Theresia, S. (2023). Given the limitations of previous research, this study focuses on the correlation of interpersonal intelligence with biology learning outcomes at the high school level.

Therefore, research on the correlation between interpersonal intelligence and students' biology learning outcomes in high school is crucial. This is not only to enrich the educational literature but also to provide new insights into the importance of interpersonal intelligence in learning biology, as well as recommendations for educators in designing effective learning strategies. Educators need to understand that interpersonal intelligence can be leveraged to enhance student learning outcomes, particularly in subjects that require significant interaction and collaboration, such as biology.

By considering these various explanations, researchers aim to conduct a study titled “Correlation of Interpersonal Intelligence with Biology Learning Outcomes among Senior High School Students” based on the background problem that has been explained. This research problem is formulated as follows: “Is there a correlation between interpersonal intelligence and students' biology learning outcomes in high school?” The research objectives are based on the problems that have been formulated, namely, to determine whether there is a correlation between interpersonal intelligence and students' biology learning outcomes in high school.

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RESEARCH METHOD

This study uses a quantitative approach. This research employs the ex post facto non-experimental method, a common approach used by researchers to address research problems (Ibrahim, A., et al., 2018). This research design uses correlational research. The research was conducted at Ar-Riyadl High School, located on Jalan Palembang-Jambi KM. 117, Desa Mekar Jadi (B2), Kecamatan Sungai Lilin, Kabupaten Musi Banyuasin, Provinsi Sumatera Selatan. The research was conducted in the odd July semester of the 2024/2025 academic year.

The data obtained by researchers is the result of distributing questionnaires regarding interpersonal intelligence. With this questionnaire, researchers can find out the interpersonal intelligence of students. The lattice of students' interpersonal intelligence instruments is as follows:

Table 1. Grids of Student Interpersonal Intelligence Questionnaire Instruments

	No	Indicator	Statement Item Number		Total Items
			Positive	Negative	
Variable Interpersonal Intelligence	1.	Able to interact well	1,2,3,11	25	5
	2.	Able to cooperate	4,5	6	3
	3.	Likes to socialize	7,8,17,23	9,14	6
	4.	Happy with group activities	10	12	2
	5.	Able to be a leader	16,19	18	3
	6.	Happy to act as a mediator in conflicts between friends	13,15	-	2
	7.	Able to empathize	20,21,24	22	4
Total Statement			18	7	25

(Source: Developed from Harfiani, R. (2021), Jaenudin, U., & Sahroni, D. (2021) and Winarti, A. (2021)).

The lattice of students' biology learning outcomes instrument is as follows:

Table 2. Lattice of Biology Learning Outcomes Instrument for Students

Variable	Indicator
Biology Learning Outcomes (Y)	Documentation of PAS (End of Semester Assessment) score data for Biology subjects of students at Ar-Riyadl High School even semester of the 2023/2024 school year.

(Source: Personal Documentation)

The population in this study were all students in grades XI and XII of Ar-Riyadl High School, totaling 55 students who had taken the Final Semester Assessment (FAS) in Biology. The sampling technique used by researchers is Propionate Stratified Random Sampling (Sugiyono, 2019). The study included 30 samples, comprising 30 students (Fauzy, A., 2019). In this study, the hypothesis test used, namely the Pearson Product Moment Correlation analysis and the interpretation of the price r to be able to provide an interpretation of the strength of the correlation, can use the table as follows:

Table 3. Correlation Coefficient Interpretation

Coefficient Interval	Correlation Level
0,00-0,199	Very Low
0,20-0,399	Low
0,40-0,599	Medium

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0,60-0,799	Strong
0,80-1,000	Very Strong

(Source: Sugiyono, 2019)

The criteria for testing statistical hypotheses in this study are:
Ho is accepted if r count < r table, meaning that there is no correlation between interpersonal intelligence and students' biology learning outcomes in senior high school.
Ha is accepted if the value of r count > r table, meaning that there is a correlation between interpersonal intelligence and students' biology learning outcomes in senior high school.

RESULT AND DISCUSSION

The data obtained by researchers is the result of distributing questionnaires regarding interpersonal intelligence. In this study, 30 students were used as samples. Based on research conducted on students regarding interpersonal intelligence, using a questionnaire based on a Likert scale with alternative answers presented in the questionnaire, namely always (S), often (SR), sometimes (KD), and never (TP) with a score interval of 1-4 on 25 statement items. Before testing the hypothesis, a prerequisite analysis is carried out to determine the type of statistics to be used. In this study, the prerequisite tests employed were the normality test, homogeneity test, and linearity test (Ananda, R., & Fadhli, M., 2018).

Table 4. Shapiro-Wilk Normality Test

Tests of Normality

	Shapiro-Wilk		
	Statistic	Df	Sig.
Interpersonal Intelligence	.943	30	.107
Biology Learning Outcomes	.971	30	.566

a. Lilliefors Significance Correction

(Source: *SPSS for Windows 25 version*)

From the calculation results in table 4 which shows the results of the Shapiro-Wilk normality test above, it is known that the significance value obtained by the interpersonal intelligence variable and the odd and even semester learning outcomes variable is greater than the significance level, namely, (0.107> 0.05) and (0.566> 0.05). So, it can be synthesized that the data is typically distributed.

Table 5. Homogeneity *Levene Test Statistic*

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Interpersonal Intelligence and Biology Learning Outcomes	Based on Mean	.142	2	87	.868
	Based on Median	.111	2	87	.895
	Based on Median and with adjusted df	.111	2	85.686	.895
	Based on trimmed mean	.116	2	87	.890

(Source: *SPSS for Windows 25 version*)

From the calculation results in Table 5 of the Levene Test Statistic homogeneity test above, in the "Based on Mean" column, it is evident that the significance value obtained is greater than the significance level, namely, (0.868 > 0.05). So, it can be concluded that the data for all variables have the same variant or are homogeneous.

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Table 6. Linearity Test

ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Biology Learning Outcomes * Interpersonal Intelligence	Between Groups	(Combined)	1020.783	18	56.710	1.421	.280
		Linearity	640.401	1	640.401	16.043	.002
		Deviation from Linearity	380.382	17	22.375	.561	.863
	Within Groups		439.083	11	39.917		
	Total		1459.867	29			

(Source: *SPSS for Windows 25 version*)

From the calculation results in Table 6 of the ANOVA Test for linearity, it is evident that the Deviation from Linearity value for biology learning outcomes and interpersonal intelligence is greater than the significance level, namely, (0.863 > 0.05). Therefore, the relationship between the independent variable (interpersonal intelligence) and the dependent variable (biology learning outcomes) is significantly linear.

After the prerequisite test is carried out, proceed with correlation testing to determine whether there is a correlation between interpersonal intelligence and students' biology learning outcomes in senior high school. The research hypothesis was tested using correlational analysis with the product moment formula, which was analyzed using the SPSS program for Windows version 25. Referring to Sugiyono (2019), the provisions are Ho accepted and Ha rejected if r count < r table. However, on the contrary, Ha is accepted and Ho is rejected if r count> from r table. The following are the results of the Pearson Product Moment correlation hypothesis test:

Table 7. Pearson Product Moment Correlation Hypothesis Test

Correlations

		Interpersonal Intelligence	Biology Learning Outcomes
Interpersonal Intelligence	Pearson Correlation	1	.662**
	Sig. (2-tailed)		.000
	N	30	30
Biology Learning Outcomes	Pearson Correlation	.662**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

(Source: *SPSS for Windows 25 version*)

The calculation results shown in table 7, Pearson product moment correlation hypothesis test results above, show that the value of r count (0.662) > r table (0.361). Thus, the correlation coefficient between interpersonal intelligence and biology learning outcomes of 0.662 is significant. Thus, it can be concluded that Ho is rejected and Ha is accepted, which proves that there is a correlation between interpersonal intelligence and students' biology learning outcomes in senior high school. The calculation results indicate a correlation of 0.662 between interpersonal intelligence and biology learning outcomes. The correlation coefficient found is then interpreted in terms of the strength of the relationship, using guidelines from Sugiyono (2019). The correlation coefficient value of 0.662 falls within the strong category, as it lies in the range of 0.60-0.799. Thus, it can be concluded that there is a strong correlation between interpersonal intelligence and students' biology learning outcomes.

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Based on the statements presented, the following are the results of the analysis of statements that reflect the interpersonal intelligence of students at Ar-Riyadl High School:

50% of learners often greet and smile when meeting teachers and friends. This behavior reflects the ability to interact by building positive relationships with others. This is one of the important aspects of interpersonal intelligence. In the biology learning process, this ability can create a conducive learning environment, allowing learners to be more comfortable interacting, discussing, and working together to understand biological material.

50% of learners often give greetings as a sign of respect when meeting the teacher. This behavior reflects the ability to interact, where learners understand and practice accepted social behaviors. This demonstrates interpersonal intelligence, as learners recognize the importance of fostering polite and respectful relationships. In biology learning, good relationships between teachers and learners are crucial because they facilitate more intimate communication with the teacher, which in turn can enhance understanding of biological material and lead to better biology learning outcomes.

40% of learners always say thank you when receiving help from friends or others. This behavior reflects the ability to interact by maintaining good relationships and showing appreciation for others. In biology learning, which often requires group work or discussion, the ability to interact by appreciating friends' contributions will promote effective collaboration. This can help learners understand the material more deeply and achieve better learning outcomes.

56.7% of learners always clean the school environment together with their friends. This behavior reflects the ability to work together. In learning biology, this behavior can foster the development of positive scientific attitudes, such as taking responsibility for biology practicum tasks.

63.3% of students always cooperate with friends in completing group assignments. In biology learning, effective group work enables learners to understand complex biological concepts by exchanging knowledge and helping one another.

46.7% of learners often interfere with friends when completing group tasks. Although most learners demonstrate good cooperative skills, there are still learners who often disrupt their friends when completing group tasks. This indicates that they may lack effective interpersonal intelligence. If not addressed, this behavior can hinder the effectiveness of collaborative learning in biology, such as practicum activities.

40% of learners often feel happy in a crowd and enjoy being in a new social environment. Interpersonal intelligence is reflected in learners' comfort with being in groups, which is relevant in learning biology, especially in collaborative activities such as group discussions, lab work, or project presentations. Learners who enjoy being in a social environment interact more easily, exchange ideas, and understand biological concepts from other people's perspectives, which can support the understanding of biological material.

50% of learners always quietly pay attention to their friends when they are completing group tasks. However, most learners show the ability to enjoy socializing. Still, some learners demonstrate a lack of socialization ability. This can hinder the biology learning process because learners are unable to participate in completing group tasks.

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50% of learners always prefer to do activities with friends rather than alone. For example, doing assignments with friends. Biology materials are often taught through group activities, such as discussions, lab work, and biology projects. Learners who prefer group work are more likely to be actively engaged in the learning process, exchanging information and sharing their understanding of biology with their peers. This enhances learners' ability to comprehend complex biological concepts.

50% of learners always prefer to do activities with friends rather than alone. In learning biology, group activities such as discussions, lab work and field observations require good interaction between learners. Learners who prefer working in groups tend to understand biology concepts better through discussion and sharing their understanding with friends.

43.3% of learners always like to pay attention to every word that others say. In learning biology, the ability to pay attention well helps learners receive and understand the teacher's explanation as well as input from friends during learning. This enhances understanding of biological concepts, particularly in discussion-based activities or group presentations.

50% of learners often feel discouraged when studying alone. This reflects that learners prefer group activities. This behavior is relevant to biology learning, which often involves working together in groups to understand complex biological material.

60% of learners always act as leaders or are asked by their friends to be leaders. The ability to lead a biological learning group helps learners guide discussions, organize tasks, and ensure that all group members understand the material. This shows that learners with high interpersonal intelligence can also significantly impact the overall success of group learning.

60% of learners were always able to manage and organize group activities. This behavior shows good interpersonal intelligence. In biology learning, effective organization helps maximize time and resources when working in groups or doing labs, thus supporting a better understanding of biology materials.

50% of learners often break up with their friends when they are arguing. This behavior shows learners' ability to act as mediators in resolving conflicts. In biology learning, this helps create a harmonious group work environment, making the learning process more efficient and productive.

36.7% of learners always feel reluctant to be in a new social environment. This behaviour shows limitations in socializing skills. This can hinder interaction and collaboration in biology learning, especially when working with new groups or participating in class discussions.

43.3% of students are often visited by friends to talk about something. This reflects good socialization skills, which can facilitate cooperation in learning biology, such as when sharing information or working together to solve problems.

56.7% of learners often give support to friends who are involved in arguments. This behavior reveals the learners' inability to act as mediators in conflicts between friends, thereby hindering the creation of peace. In learning biology, this will hinder the creation of disharmonious group work, thus reducing the effectiveness of the learning process.

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53.3% of learners often become advisors or problem solvers among friends. This behavior reflects learners' ability to mediate by understanding the situation and providing solutions. In biology learning, this ability can support group discussions, help friends understand the material, and resolve conflicts that may arise during cooperative work.

53.3% of learners are always willing to take the time to help friends who are having difficulties, such as those with learning difficulties. Learners' willingness to help friends with learning difficulties is a concrete form of empathy. In learning biology, this attitude is very relevant because the learning process often requires peer assistance in understanding complex concepts. Learners who take the time to help friends can also strengthen their own understanding.

53.3% of learners often think about problems that occur around them, such as their friends' problems and what can be done to help them. This thinking demonstrates a high ability to empathize, as it is characterized by social awareness and a desire to help. In biology learning, this ability can create good relationships among group members, thus improving cooperation and learning outcomes.

40% of learners always ignored a friend who was in despair. Although this statement is included as an indication of the ability to empathize, the results show that learners tend to care less about friends who are in despair. In biology learning, low empathy can hinder collaboration, as learners may not adequately support their peers in group discussions or when working together to solve problems.

46.7% of learners often make friends with everyone genuinely without prejudice. This ability shows good interpersonal intelligence. In the context of biology learning, openness to make friends and work together without prejudice will support the success of collaborative learning, such as discussions, group work, and lab work.

46.7% of learners often comfort sad friends. This behavior reflects empathy and social care. In biology learning, this ability can create a positive learning environment where learners feel emotionally supported, thereby increasing their motivation to learn and actively participate in the learning process.

50% of learners often find it difficult to interact with others. Although this falls into the 'able to interact' category, the results reveal barriers to interaction. Difficulties in interacting can be a barrier to effective collaboration in biology learning activities, such as group work or discussions, which require effective communication.

The results of the study can be accepted and are in accordance with the hypothesis formulated that there is a correlation between interpersonal intelligence and students' biology learning outcomes in high school. The results of the study were strengthened by the results of field notes taken during the study. Learners have been able to cooperate in completing group assignments by helping one another and actively participating in the process. Then, when educators provide opportunities to ask questions, students are confident enough to ask questions about biological material that they do not understand. Additionally, when educators explain the material, most students listen and pay attention well. In addition, learners have concern for the needs of friends, such as lending stationery. This finding is consistent with the research of Alfy, Z. R., A'ini, Z. F., & Baihaqie, A. D. (2023),

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which suggests that individuals with good interpersonal intelligence tend to exhibit behaviors such as a greater ability to work together in groups.

In learning biology, many concepts are more easily understood through group discussions or cooperative learning, such as in a biology practicum. Learners who possess the ability to communicate and listen effectively will be better able to understand the material more deeply (Mareta, M., 2020). It is also supported by previous research by Kurniawan, M. R. (2017), which suggests that there is a relationship between interpersonal intelligence and learning outcomes. Students who can communicate effectively with educators and among friends are more likely to create a positive learning environment. In addition, Wajdi, M., Aziz, A. A., & Ngitung, R. (2018) also stated in their research that learners with high interpersonal intelligence are more confident in asking questions or seeking help from educators or friends when they encounter difficulty understanding the subject matter. They are more active in participating in group work or class discussions, which allows them to gain a better understanding of the material being studied. This ability can help learners better understand the material, which in turn improves their learning outcomes. Conversely, learners with low interpersonal intelligence tend to be reluctant to ask questions and engage in discussions, which can result in them missing opportunities to fully understand the material.

The results of this study are also relevant to Howard Gardner's (1983) theory of Multiple Intelligences, which posits that interpersonal intelligence encompasses the ability to understand the feelings of others and interact effectively with them (Goleman, D., 2024). Interpersonal intelligence is the ability to build relationships with others, a skill that politicians and teachers excel in (Sarani, A., & Malmir, A., 2020). In the context of biology learning, this includes the ability of learners to work together in groups, communicate with friends and teachers and understand other people's perspectives. Based on the discussion of the results of this study, it can be concluded that there is a correlation between interpersonal intelligence and students' biology learning outcomes in senior high school.

CONCLUSION

Based on the results of data analysis and the discussion of this study, it can be concluded that the learners who have high interpersonal intelligence are also more confident to ask questions or ask for help from educators or friends when they have difficulties in understanding the subject matter. They are more active in participating in group work or class discussions, which allows them to gain a better understanding of the material they are learning. Learners have been able to cooperate in completing group tasks by helping each other and actively participating in completing group tasks. This ability can support learners to better understand the material, which has an effect on improving their learning outcomes. Conversely, learners with low interpersonal intelligence tend to be reluctant to ask questions and engage in discussions, which can result in them missing opportunities to fully understand the material.

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