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Correlation Between Collaboration Skills & Environmental Literacy in Class XI Students at SMA Negeri 6 Malang

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ABSTRACT
The aim of this research is to analyze the level of student collaboration skills, namely indicators of productive work, showing respect, compromise and responsibility and to analyze the level of environmental literacy, namely indicators of environmental knowledge, cognitive skills, environmental care attitudes and environmental behavior in students at SMA Negeri 6 Malang and knowing the relationship between collaboration skills and students' environmental literacy. The sample in this research was 33 class XI students. This research is quantitative research using test data collection techniques, observations, interviews and documentation. The sampling technique used was purposive sampling. The data obtained will be tested using the Pearson Correlation statistical test. The research results show that the level of collaboration skills of students got a score of 201.65 which is in the medium category (Proficient) while environmental literacy got a score of 179 which is in the medium category. Collaboration skills can help improve students' environmental literacy, especially in working together and contributing to one another. Both variables show a positive relationship between collaboration skills and environmental literacy of class XI students at SMA Negeri 6 Malang, which means that the higher the collaboration skills carried out, the higher the students' environmental literacy will be.

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1. INTRODUCTION

Collaboration skills are important skills that a person must have to interact and appreciate differences in a team, as well as hone their decision-making abilities to reach mutual agreements (Mashudi, 2021). For students, this skill is designed to build synergy in biology learning, which will later be used as a basis for facing competition. Effective collaboration will increase student competitiveness. This skill will develop optimally if many students are actively involved in group activities (Redhana, 2019). According to Afdillah et al., (2024) collaboration skills are a person's ability to work together effectively in a group which involves coordinating tasks, sharing information, and producing creative solutions through team feedback. This skill is important in solving problems that involve collaboration because it allows for a more efficient division of labor, incorporation of diverse perspectives, as well as improving the quality of results (Ruiz-Rojas et al., 2024). Collaboration skills also include cognitive domains related to task regulation and application of knowledge to solve problems (Greasser et al., 2018). This is important in learning contexts, especially in science, technology, engineering, and mathematics (STEM) education, where collaboration improves scientific understanding and investigative abilities.

Environmental literacy is a conscious attitude towards protecting the environment so that it maintains balance. This conscious attitude is defined as an environmentally literate attitude, not only having knowledge of the environment but also having a responsive attitude and being able to provide solutions to environmental issues (Nadtochiy & Timoshkina, 2024). Students as part of society who are prepared as the next generation and agents of change in society need to be equipped with environmental literacy skills. Measuring environmental literacy abilities consists of four components, namely environmental knowledge, cognitive skills, attitudes towards the environment and behavior towards the environment (Santoso & Siswanto, 2021).

Increasingly complex global environmental problems, such as climate change and ecosystem damage, require the younger generation, especially high school students, to have the awareness and ability to protect the environment (Mahler, 2020). Environmental problems are often complex and require a multidisciplinary approach. Through collaboration, students can combine knowledge and skills from various fields to find innovative solutions (Tariq, 2024). Environmental literacy gives students a deep understanding of environmental issues, so they can contribute actively to the problem-solving process. Environmental literacy is able to create healthy habits, awareness and care for the environment. Increasing environmental literacy aims to prepare people who understand the situation, care about and overcome environmental problems so that future generations can be well prepared. Therefore, to face increasingly complex global problems, collaboration skills are needed in mastering and overcoming environmental problems (environmental literacy) in order to be ready to face the changes that occur, especially environmental changes that continue to develop.

The preliminary study at SMA Negeri 6 Malang shows that students' collaboration skills and environmental literacy are still relatively low. Many students have not yet optimized their ability to work effectively in groups and lack a deep understanding of environmental issues. This affects their ability to contribute to solutions for existing environmental problems. Therefore, efforts are needed to improve collaboration skills and environmental literacy so that students can be more actively involved in preserving the environment. This research aims to determine the relationship between collaboration skills and environmental literacy of class XI students at SMA Negeri 6 Malang.

2. RESEARCH METHOD

This research is a quantitative research using a survey method of students at SMA Negeri 6 Malang which was conducted from May to June 2024 at SMA Negeri 6 Malang. The population in this study were class XI students with a sample size of 33 students. The sampling technique used was purposive sampling provided that students had taken Biology subjects, namely biodiversity. The collaboration skills data collection instrument is a collaboration skills questionnaire adapted from Greenstein, (2012), including: working productively, showing respect, compromise, and shared responsibility.

Table 1. Collaboration Skills Indicators

Indicators	Examplary	Proficient	Basic	Novice
Work Productively	We used all our time efficiently to stay focused on the task and produce the required work. Everyone did their assigned duties and sometimes more.	We worked together. Well and for the most part stayed on task until we completed our work. Each person performed nearly all their duties.	We worked together sometimes, but not everyone contributed or did their job, making it hard finish our work	We really didn't work together very well. Everyone wanted to do their own thing and tell others what to do rather than focus on the task.
Demonstrates Respect	All team members respectfully listen and discuss existing ideas together	Most of the team members listen to each other and interact respectfully with most of the time	Some team members have difficulty showing respect to others	Each member does not want to listen to other members' opinions and argue with fellow members
Compromise	All team members are flexible within work together to achieving goals with the group	Compromise to advance and resolve work groups more quickly	Requires other team members with more depth compromise to make work faster	There are many disagreement and some team members agree if their opinion is used
Shared responsibility : all group members contribute	All team members do their best work and follow the tasks given	Most of the team members carry out the tasks given	Difficult to keeps team members involved in the work group	Really can't rely on all team members to do their jobs

References: Greenstein (2012)

Environmental literacy data collection instruments in the form of environmental literacy tests and environmental literacy questionnaires were adapted from the Middle School Environmental Survey (MSELS) which consists of four environmental literacy indicators, namely environmental knowledge, cognitive skills, environmental care attitudes and environmental behavior.

Table 2. Environmental Literacy Indicators

Environmental Literacy Aspects	Test Form	Number of Questions	Range of Scores to be Obtained Learners Per Indicator
Environmental Knowledge	Multiple choice	20 Questions	0-100
Cognitive Skills	Multiple choice	10 Questions	0-100
Attitude towards the environment	Statement	20 Questions	0-150
Environmental Behavior	Statement	10 Questions	0-50

References: Nastoulas et al., (2017)

Data on collaboration skills and environmental literacy of class XI students at SMA Negeri 6 Malang will be analyzed through two stages of analysis. The first analysis uses descriptive statistics by calculating the average student score for each indicator of collaboration skills. This descriptive statistical analysis stage aims to describe the categories of collaboration skills and environmental literacy of class XI students at SMA Negeri 6 Malang. Students' collaboration skills are categorized into four categories, namely low (novice), medium (basic), high (Proficient) and very high (exemplary). Students' environmental literacy is categorized into three categories, namely high, medium and low categories. The second stage uses inferential statistical analysis using statistical tests Pearson Correlation.

3. RESULT AND DISCUSSION

Collaboration Skills of Class XI Students at SMA Negeri 6 Malang

Indicators of collaboration skills include: working productively, showing respect, compromise, and shared responsibility. Data on collaboration skills was collected using a questionnaire that included four indicators to measure the collaboration skills of class XI students at SMA Negeri 6 Malang. Based on the results of descriptive statistical analysis of collaboration skills, the total score obtained was 201.64, which is included in the medium (Proficient) category. Details of students' collaboration skills scores are explained in table 3.

Table 3. Descriptive Statistics for Measuring Collaboration Skills

Descriptive Statistics

	N	Minimum	Maximum	Average	Mean	Std. Deviation	Category
Work Productively	33	31	80	51.66	51.52	11.102	Proficient
Demonstrates respect	33	20	100	47.87	47.88	13.695	Proficient
Compromise	33	36	76	51.31	51.00	10.069	Proficient
Responsibility	33	33	83	50.80	50.42	12.005	Proficient
Valid N (listwise)	33						
Totaly				201,64			Proficient

Based on table 3, there are four indicators of collaboration skills: working productively, showing respect, compromise, and responsibility. Based on the data obtained, it is known that the total score of 201.64 is included in the moderate (proficient) category, meaning that students are able to work productively, show mutual respect, compromise and be responsible. Students' abilities in *"work productively"* got a score of 56.66 which is included in the (proficient) category. It is known that students work productively to complete the tasks given to students, in general the students in the group have shown quite good abilities and manage time effectively, divide tasks quite well and are actively involved in the task completion process. According to Huggins & Izushi, (2020). work productivity in student study groups is influenced by various factors, both originating from the individual students themselves, the group as a whole, and the learning environment. According to Riaz & Din, (2023) Interaction between group members, the existence of conflict or alignment of goals, and the way the group overcomes differences of opinion will influence productivity so it can be concluded that working productively is influenced by group cooperation and the effectiveness of each individual.

The second indicator of collaboration skills is *"show respect"* Class XI students of SMA Negeri 6 Malang obtained a score of 47.87, including in the (proficient) category. This shows that in the group learning process,

students show respect for each other and respect the opinions of other students. Students are able to show a fairly good attitude of respect in the process of doing group assignments. This means that students have tried to respect the opinions, ideas and contributions of other group members. They tend to listen actively, provide constructive feedback, and avoid condescending or judgmental behavior. According to Pujiati, (2023), students' ability to show feelings for each other Respect in a study group is influenced by various factors, both originating from the individual students themselves, the group as a whole, and the learning environment.

The third indicator of collaboration skills is *"compromise"* Class XI students of SMA Negeri 6 Malang obtained a score of 51.31, including in the (proficient) category. This shows that in the learning process when students work on group assignments there is mutual compromise between one student and another. Students' ability to compromise with each other in study groups is influenced by various factors, both from within the students themselves, group dynamics, and the comprehensive learning environment. According to Gurba (2021), mutual compromise can increase emotional intelligence, that is, students are able to recognize and manage their own emotions and understand the emotions of others, which will help students to compromise more easily when working on assigned group assignments. Another thing that has an influence when students compromise with each other is that character education such as the values of tolerance, empathy and cooperation are instilled in students.

The fourth indicator of collaboration skills is *"responsibility"*. On this indicator, a score of 50.80 was obtained, including in the (proficient) category. Students' collaboration skills on the responsibility indicator are quite good in carrying out their respective roles in the group. Being responsible in a group is a person's attitudes and actions in a group that show awareness of their role and obligations as a group member (Laal et al., 2012). This means that the individual is committed to actively contributing to achieving group goals, whether in completing tasks, solving problems, or maintaining good relations between members.

The factor that most influences students' collaboration skills is the teacher's role as a facilitator. Teachers who act as facilitators can create a learning environment that is conducive to collaboration by accompanying and directing students without taking over their main role in the learning process (Saenab et al., 2019). Teachers can provide challenges or problems that require joint solutions, so that students are stimulated to work together. In addition, teachers who encourage open communication and provide effective direction and feedback will make students more confident to express their opinions, listen to other people's ideas, and reach solutions together.

Learning models and methods are also a crucial aspect in improving collaboration skills. Use of cooperative learning models, such as *Group Investigation, Jigsaw, or Think-Pair-Share,* allows students to exchange information and discuss material in depth in an interactive learning atmosphere (Abdullah et al., 2024). For example, in the Group Investigation model, students are divided into small groups to research a particular topic so that they naturally develop the ability to work together to complete assignments and convey discussion results. These learning models are specifically designed to build positive interactions between members groups and reduce the dominance of one or two people in the group. According to Sunbanu et al., (2019) collaborative learning methods also help students develop social skills such as empathy, active listening, and making decisions that prioritize the interests of the group.

Students' characteristics also play a significant role in their ability to work together. Each student has a different personality, social background, and learning style, which can influence group dynamics (Afelia et al., 2024). Students who have high self-confidence are usually more open in expressing opinions, while students who tend to be introverted need additional support to be active in groups. It is important for teachers to understand the characteristics of each student and complement each other in one group (Wahyudi, 2024). Apart from that, students' ability to accept differences of opinion is also an important factor, because in the collaboration process different ideas often emerge that must be discussed constructively. Therefore, developing collaboration skills requires a flexible approach, where each student is encouraged to appreciate and learn from the differences that exist within the group.

A supportive learning environment also has a big influence on students' collaboration skills. A safe and comfortable environment physically and emotionally will make it easier for students to communicate and interact openly (Nurhayati et al., 2024). Study spaces designed for group learning, such as desks that can be arranged in a circular or semicircular formation, allow for more effective interaction compared to traditional classroom models (Prayogi et al., 2024). Apart from the physical environment, emotional support also plays an important role, students feel heard and appreciated in expressing their opinions. When students feel that their opinions are accepted, they will be more motivated to engage in discussions and provide their best contributions. Conversely, if the learning environment seems competitive or too formal, students will feel intimidated and reluctant to participate actively in collaborative activities.

Environmental Literacy of Class XI Students at SMA Negeri 6 Malang

The environmental literacy instrument was prepared by adapting the Middle School Environmental Survey (MSEL) which includes four indicators of environmental literacy: ecological knowledge, cognitive skills, attitudes towards the environment and behavior towards the environment. Students' environmental literacy levels

are measured through tests cognitive and questionnaire. These two instruments were used to measure the environmental literacy of students in SMA Negeri 6 Malang class XI who had received biodiversity material. Based on the results of the analysis that has been carried out, namely descriptive statistics, the total environmental literacy score obtained is 179 which is included in the medium category.

Table 4. Descriptive statistics for measuring environmental literacy

	Descriptive Statistics						
	N	**Minimum**	**Maximum**	**Average**	**Mean**	**Std. Deviation**	**Category**
Environmental Knowledge	33	5	75	43	43.24	12.302	Medium
Cognitive Skills	33	0	90	45	45.29	22.728	Medium
Attitude Towards the Environment	33	40	97	70	70.10	16.804	High
Environmental behavior	33	0	50	21	20.74	13.491	Medium
Valid N (listwise)	33			179			Medium

Environmental literacy is a person's ability, especially students, to understand, care about, and take action related to the surrounding environment. Table 4. Describes four indicators of environmental literacy, namely environmental knowledge, cognitive skills, attitudes towards the environment and behavior towards the environment. The total score obtained was 179 which is included in the medium category, meaning that students' environmental literacy at SMA Negeri 6 Malang is quite good and students are able to understand, respond and behave well towards the environment. On the first indicator about *"environmental knowledge"* The average score obtained was 43, including the medium category, this shows that students' understanding of environmental concepts is still at an intermediate stage. In this category, students tend to have basic abilities in recognizing and understanding environmental aspects related to the material being taught, but this understanding is not yet deep enough to reach the high or very good category. A score in the medium category indicates that students already know some basic information about the environment, such as basic understanding of ecosystems, factors that influence environmental quality, as well as global environmental issues such as pollution, deforestation and climate change (Maknun et al., 2016).

The second indicator of environmental literacy is *"cognitive skills"* obtained with a score of 45 which is included in the moderate category, meaning, students have the ability to think and analyze environmental issues at a level elementary to intermediate. This means that students begin to understand how to process environmental information, however their ability to conduct more in-depth analysis or to apply critical thinking needs to be improved. Cognitive skills in the context of environmental literacy refer to students' abilities to understand problems, develop critical thinking, analyze data or information, and form conclusions based on existing environmental knowledge (Meilinda et al., 2017). With a score of 45, you can. It is said that students already have basic knowledge, but are not skilled enough in processing it and using information to produce concrete solutions to environmental problems.

The third indicator of environmental literacy is *"attitude towards the environment"* obtained a score of 70 which is included in the high category means Students have a strong concern for environmental issues and show a positive attitude in efforts to protect and preserve the environment. An environmentally caring attitude includes emotional and moral awareness of the importance of environmental sustainability, as well as a desire and commitment to take real action to maintain the balance of the ecosystem (Sunarto, 2023). This score indicates that students understand the importance of protecting the environment and generally have high motivation to engage in actions that support nature conservation.

Students with high environmental care attitude scores demonstrate awareness of the impact of human actions on the environment and are more responsive to environmental issues that occur around them. For example, they may be aware of the dangers of pollution, the effects of wasting resources, as well as threats to biodiversity. Students with an attitude that cares about the environment tend to have high attention to efforts to maintain cleanliness, reduce plastic waste, and save water and electricity use (Anggraini et al., 2021).

The fourth indicator of environmental literacy, namely *"environmental behavior"* The score obtained was 21, which is in the medium category, meaning that even though students have a basic understanding of the importance of protecting the environment, the real actions they take in their daily lives to support environmental sustainability are still limited. Behavior towards the environment reflects the extent to which individuals apply knowledge and caring attitudes participating in environmental conservation activities (Ardoin et al., 2015).

Scores in the medium category indicate that although students have a basic awareness of the importance of protecting the environment, they may not consistently implement environmentally friendly behavior. For example, students may realize the importance of reducing plastic use, but still rarely bring their own shopping

bags or choose environmentally friendly items. They also understand the importance of saving water and electricity, but have not yet made it a habit to turn off the lights when not in use or reduce the time they use water. According to Erts et al., (2016), this low level of environmentally friendly behavior can be caused by several factors, such as limited facilities, lack of support from the surrounding environment, or lack of motivation to take more concrete actions.

Increasing students' environmental literacy on various indicators of environmental knowledge, cognitive skills, attitudes towards the environment and behavior towards the environment involves the role of many parties, including schools, teachers, families and communities. Each party has an important contribution to shape students' understanding, skills and attitudes so that they not only understand, but are also actively involved in protecting the environment (Shutaleva, 2023). Teachers, as educators, play a role in conveying relevant information about the environment in an interesting and easy to understand manner (Nusche et al., 2024). In the environmental knowledge indicator, the teacher is tasked with introducing basic concepts such as ecosystems, climate change and biodiversity. In terms of cognitive skills, teachers also play an important role in encouraging students' analytical abilities. Through discussions, problem solving, and case studies, students are trained to think critically about environmental issues. Teachers can direct students to analyze data, for example regarding the level of air or water pollution around them, and develop creative solutions to environmental problems (Boca & Saraçlı, 2019). Teachers can also be role models in environmentally friendly behavior, such as by saving electricity and water in the classroom. Students who see real examples from teachers and the school environment will find it easier to develop an environmentally caring attitude within themselves.

Correlation Between Collaboration Skills And Environmental Literacy

Collaboration skills and environmental literacy have a close relationship in forming students who are able to understand environmental issues and take action that has a positive impact on environmental sustainability (Svensson *et al.,* 2022). Collaboration skills, which include the ability to work productively, show respect, compromise and responsibility, are essential in the environmental learning process. Through collaboration, students can learn from different perspectives, combine ideas, and develop more creative and effective solutions to overcome environmental problems.

To find out the relationship between collaboration skills and students' environmental literacy, a data analysis test was carried out *Pearson Correlation.* Analysis *Pearson Correlation* was conducted to determine the relationship between collaboration skills and environmental literacy of class XI students at SMA Negeri 6 Malang. Based on statistical calculations *Pearson Correlation* A value of 0.417 was obtained which indicates a correlation between collaboration skills and students' environmental literacy. Correlation analysis results *Pearson* shown in Table 5 below.

Table 5. Pearson Correlation Data Analysis Test Results

Correlations			
		Collaboration Skills	**Environmental Literacy**
Collaboration Skills	Pearson Correlation	1	.417***
	Sig. (2-tailed)		.001
	N	33	33
Environmental Literacy	Pearson Correlation	.417***	1
	Sig. (2-tailed)	.001	
	N	33	33

** Correlation significance at level 0,01 (2-tailed)

Based on Table 5, the Pearson correlation results obtained a significance value = 0.001, a significance value of 0.001 < 0.05 indicating a correlation between collaboration skills and environmental literacy of students at SMA Negeri 6 Malang. The Pearson Correlation value obtained is 0.417 when compared with r. The table shows the results of $r_{count} > r_{table} = 0.417 > 0.915$, this shows that there is a relationship between collaboration skills and environmental literacy in class XI students at SMA Negeri 6 Malang. The Pearson correlation value in table 5 is positive, which shows that the type of relationship between the independent variable (collaboration skills) and the dependent variable (environmental literacy) is positive, meaning that the higher the student's collaboration skills score, the higher the student's environmental literacy score. Based on the Pearson correlation degree table, if matched with the calculation results obtained, the score of 0.417 is categorized as moderate, meaning that the relationship between the independent variable (collaboration skills) and the dependent variable (environmental literacy) has a moderate relationship.

The high collaboration skills of students at SMA Negeri 6 Malang increasingly make students collaborate to solve environmental problems, meaning that by working productively, showing respect, compromise and being responsible, students' environmental literacy will also increase even though the strength of the relationship

between the two variables is not that strong. By working together, students can solve environmental problems so they can increase their understanding of ecosystems and find more effective solutions to environmental problems. In the collaborative process, individuals are often involved in group discussions that broaden their horizons about environmental issues. It can provide opportunities to learn different perspectives, deepen their knowledge, and develop better environmental literacy.

Good collaboration often contributes to strengthening environmental awareness. Through activities that focus on solving environmental problems, students will be more aware of the impact of their behavior on the environment and more motivated to take sustainable action (Hairida *et al.,* 2021). So, collaboration skills and environmental literacy will increase if each student or individual tends to be more actively involved in environmental-based activities that require cooperation.

Based on research conducted by Al-Muhdhar *et al.,* (2021) Collaboration skills include students' ability to work together effectively, communicate, share ideas, and solve problems together. On the other hand, environmental literacy is students' understanding of environmental issues, the attitudes and skills they need to play an active role in protecting the environment. In its implementation, collaboration skills can enrich students' environmental literacy, namely collaboration allows students to exchange information and perspectives on environmental issues. When students work in groups, they have the opportunity to discuss environmental issues from multiple points of view, share knowledge, and create a more holistic understanding.

Collaboration also allows students to see various environmental impacts at different scales, such as local, national, or global, which deepens their understanding and improves their ability to analyze environmental problems holistically (Muhdhar *et al.,* 2021). Collaboration skills help students to engage in complex problem-solving processes, as often occurs in environmental issues. Through working together in groups, students learn how to formulate innovative and practical solutions to environmental problems, such as pollution, deforestation, or climate change. For example, they might design projects together that focus on reducing waste in schools, environmental awareness campaigns, or natural resource conservation efforts. This process requires the contribution of ideas from all members, constructive discussions, and compromise, all of which are at the core of collaboration skills.

4. CONCLUSION

The collaboration skills of grade XI students at SMA Negeri 6 Malang are included in the medium (proficient) category, meaning that students are able to work productively, show respect for each other, compromise, and be responsible while students' environmental literacy is included in the category of being at a medium level so environmental literacy is necessary. there was an increase, especially in indicators of environmental knowledge, cognitive skills and environmental behavior. However, the caring attitude towards the environment of students at SMA Negeri 6 Malang is still relatively moderate so there needs to be maximum improvement and they have a high intention to protect the environment. Collaboration skills can be a reference so that students' environmental literacy increases, especially in working together in depth and contributing between students with one another. These two variables show a positive relationship between collaboration skills and environmental literacy of grade XI students at SMA Negeri 6 Malang, which means that the higher the collaboration skills carried out, the higher the students' environmental literacy.

This study reveals that students' collaboration skills are categorized as moderate, indicating potential for improvement. Future research should expand the sample size and involve more variables that may influence collaboration skills and environmental literacy, such as motivational factors or support from the school. Additionally, the use of learning models could also impact students' collaboration skills and environmental literacy, providing a more comprehensive understanding and improved outcomes.

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