



Study of the Relationship Between Students' Biology Learning Outcomes and Students' Family Environment

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ABSTRACT

Purpose of the study: The purpose of this study was to analyze the relationship between students' biology learning outcomes and their family environment. This study also aims to identify family environmental factors that contribute to students' biology learning achievement.

Methodology: This research is a quantitative research with descriptive method. The population in this is XI science at Public High School 2 Bengkulu, 40 students, and parents of each student is 40 people. The sample was taken using saturated sampling technique. The research instrument used family environment questionnaire, observation, and documentation and data analysis techniques used were descriptive statistics and inferential statistics.

Main Findings: The results of the analysis show that the family environment has a significant influence on the learning outcomes of class XI science students in the inferential statistical analysis with the F test showing that the calculated F value is greater than the F table, which means that the relationship between the family environment and student learning outcomes is significant. The average results of the family environment are the moderate category, while student learning outcomes are in the very high category.

Novelty/Originality of this study: This research focuses on class XI science students, offering a special understanding of how the family environment relationships learning outcomes in biology at a critical educational stage. This can provide in-depth insight into the factors that relationship academic performance at the upper secondary education level. Seeing the relationship of the family environment on biology learning outcomes.

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1. INTRODUCTION

Education is a carefully planned process, where each step is directed at creating a learning environment that facilitates students to be able to develop their potential to the maximum [1]–[3]. The main aim is to enable students to be actively involved in the learning process, which in turn will help them develop various aspects of life. This includes aspects of spirituality, self-control, formation of a strong personality, development of intelligence, enrichment of morals, as well as mastery of skills needed for personal, social success and contribution to society, state and nation. Education has a central role in directing humans to become individuals who not only have faith and devotion to Allah, but also become quality individuals [4], [5]. Therefore, every individual should feel the benefits of the educational process, both through formal channels in formal educational institutions and through non-formal educational processes.

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Formal educational institutions in general are the places that most enable a person to increase knowledge, and it is easiest to develop the younger generation which is carried out by the government and society [6], [7]. Discussing the issue of formal educational institutions certainly talks about schools as formal educational institutions because they are held in certain schools/places, and take place from kindergarten to university, based on official rules that have been established. Schools are institutions with a neatly structured organization and all activities are planned deliberately, which is called the curriculum [8], [9]. Basically, education at school is part of education in the family, which is also a continuation of education in the family. Apart from that, life at school is a bridge for children that connects life in the family with life in society in the future.

Learning outcomes are a reflection of achievements that involve in-depth understanding, mastery of material, skills and concepts obtained through the learning process [10]–[12]. More than just a numerical assessment or recording of test results, it encapsulates the transformation that occurs in the way a person thinks, understands, and responds to the material studied. The entire learning process forms the foundation for significant changes in a person's knowledge, his ability to apply these concepts in various real situations, and his capacity to continue to grow and develop his learning potential [13], [14]. These learning outcomes also cover broader dimensions, including cognitive aspects in understanding and applying information, affective dimensions related to changes in attitudes and values, as well as psychomotor dimensions related to mastery of skills and physical actions as a result of dedication and effort made in the process. learning.

The progress of education cannot be separated from the support of the government, schools, families and society. Therefore, cooperation between these four supporting factors is needed. To achieve these national education goals, parents as the first and main educators have a very important role [15], [16]. This is seen from the role of the family as the first and main educational institution, it is in the family that a child is born, grows and develops until he becomes an adult. The family is the first and main forum for children's growth and development. If the atmosphere in the family is good and fun, then the child will grow well too. If not, the child's growth will certainly be hampered. The role of parents in the family is very important. The form, content and pattern of education in the family will continuously relationship the growth and development of the character, manners and habits of the family members. The education obtained from parents as the main and first educators is what children will follow as a reference for attending school [17]–[19].

Biology, as a very broad science, opens the horizons of human knowledge to the essence of life in its various dimensions line with previous with [20], [21]. From the search for invisible microscopic organisms to the exploration of complex, intertwined ecosystem systems, biology is an intellectual bridge that takes us to explore the secrets behind the birth, growth, reproduction and interaction of living things with their environment. In understanding the essence of biology, we explore the structure and function of cells as the foundation of life, explore the genetic code that holds evolution, and map the ecological complexities that relationship the survival of the planet. Furthermore, by integrating these sciences, we gain a more comprehensive vision of the close relationships between living organisms, their interactions with each other, and the changes brought about by environmental shifts, becoming a deep and complex ocean of knowledge.

This study provides a new contribution by identifying and quantitatively measuring the influence of family environment on biology learning outcomes of grade XI science students at Public High School 2 Bengkulu. The findings indicate that family environment has a significant influence, while external factors such as community and school environment also play an important role. This study emphasizes the importance of family support in education and opens up opportunities for further exploration of the influence of other external factors, providing more comprehensive insights for efforts to improve students' academic achievement.

The family environment in education greatly relationships the improvement of learning outcomes, the formation of children's attitudes, character and personality [22], [23]. In general, all children definitely need attention in a family environment so that children can learn well so that their lives can be better than before. The students at Public High School 2 Bengkulu in particular, in the author's review, are very worrying in terms of aspects of the child's personality, where when the author was still studying at Public High School 2 Bengkulu, what the author saw and felt was very minimal in terms of the students' speech and behavior. The remarks that most students usually make are completely inconsistent with what the Islamic religion teaches, one of which is the dirty words that students usually say, whether they are making fun of each other and so on. In terms of behavior, it is not uncommon for students to commit physical violence against other students either during the lesson or after the lesson has finished.

2. RESEARCH METHOD

2.1 Research Type

The type of research used by the author in this research is quantitative research with descriptive methods, namely a research method that attempts to present real data and facts [24]–[26] about the role of the family in improving biology learning outcomes by distributing questionnaires to respondents at the place where

the research was conducted.. This method aims to present real data and facts about the role of families in improving biology learning outcomes.

2.2 Population and Sample

The population in this study were all students of class XI science at Public High School 2 Bengkulu totaling 80 people. The sampling technique used was the saturated sampling technique, where all class XI science were sampled with a total of 40 students, plus 40 parents of each student. Thus, the total sample in this study was 80 people.

2.3 Data Collection Technique

To obtain the data needed in this study, the author used various techniques and methods of appropriate data collection. These techniques include observation, questionnaires, and documentation. The instruments used included questionnaires, observation forms, and documents. The questionnaires were divided into two, namely for students and parents, with the aim of measuring indicators such as parental education, relationships between children and other family members, household atmosphere, parental attention, and family economic situation.

2.4 Data Analysis Technique

The data analysis techniques in this study include descriptive statistics and inferential statistics. Descriptive statistics are used to explain the characteristics of the sample and the variables observed, while inferential statistics are used to test hypotheses and relationships between the variables studied, such as the relationship between the family environment and students' biology learning outcomes.

To obtain the data needed in this research, the author used various appropriate data collection techniques and methods. The goal is to obtain objective data. The data collection methods used in this research are observation, questionnaires and documentation. The instruments in this research are questionnaires, observations and document forms. Data processing and analysis techniques in this research are descriptive statistics and inferential statistics. In this study, researchers used two questionnaires, namely the first questionnaire for students and the second questionnaire for parents. The indicators that will be measured in this research are:

Table 1. Family Environment Questionnaire Grid

Variable	Indicator	Number of Questions
Family environment	How parents educate	6
	Relationships between children and family members	6
	Home atmosphere (harmonious relationships/situations and conditions)	4
	Parents attention	6
	Family economic situation	6
Total		28

For the categorization of the family environment there are no standard categories, so the author uses the concept of statistical categorization as follows:

Table 2. Family Environment Categories

Range	Category
$x < 69.79$	Low
$69.79 \leq x < 99.21$	Currently
$99.21 \leq x$	Tall

To make it easier to find out the level of learning outcomes, a breakdown is made according to value categories. Details of student learning outcome categories using standard categorization techniques established by the Ministry of Education (2006) are as follows:

Table 3. Learning Outcome Categories

Mark	Category
0 – 20	Very low
21 – 40	Low
41 – 60	Currently
61 – 80	Tall
81 – 100	Very high

2.5 Research Procedure

The research procedure begins with data collection using prepared instruments, namely questionnaires, observations, and documents. After that, data was collected from the entire sample population using a saturated sampling technique. Furthermore, the collected data were analyzed using appropriate statistical techniques, both descriptively and inferentially, to explore the relationship between the variables studied and identify the contribution of the family environment to student learning outcomes.

3. RESULTS AND DISCUSSION

3.1. Results

Researchers collected data through questionnaires which were filled out by each parent of the students and students in class XI science 1.

Table 4. Descriptive Analysis

Variable	N	Mean	Std. Deviation	Variance	Range	Minimum	Maximum
Family environment	40	84.5000	14.71263	216.462	52.00	56.00	108.00
Learning outcomes	40	80.1000	3.60057	12.964	13.00	76.00	89.00

Based on research results, the level of the family environment can be determined by carrying out categorization which is then expressed as a reference or norm in grouping individual scores, where limits are first determined based on standard deviation units (σ) and theoretical mean (μ). Based on the results of the descriptive analysis, a standard deviation of 14.712 was obtained and the average value was 84.500. Environmental level categories are grouped into three categories using categorization, namely; high, medium and low categories. The family environment level categories can be seen in the following table:

Table 5. Category of Family Environment of Class XI Science Students at Public High School 2 Bengkulu

NO	Score Category	Frequency	Category	Percentage (%)
1	$x < 69.79$	8	Low	20
2	$69.79 \leq x < 99.21$	24	Currently	60
3	$99.21 \leq x$	8	Tall	20
Amount		40		100

Based on the data obtained in the table above, by looking at the 40 students as a sample it can be seen that 8 people (20%) are in the low category, 24 people (60%) are in the medium category, and 8 people (20%) are in the high category. Meanwhile, if you look at the average score obtained, 84.50 when included in the three categories above, it is in the medium category, so it can be concluded that class XI students at Public High School 2 Bengkulu have a family environment in the medium category.

Based on the table of learning outcomes according to the Ministry of National Education in 2006, it can make it easier for researchers to find out the learning outcomes obtained by students and it can be seen that the data is in the low, high or even very high categories.

Table 6. Categories of Biology Learning Outcomes for Class XI Students at Public High School 2 Bengkulu

NO	Mark	Category	Frequency	Percentage (%)
1	0 – 20	Very low	0	0
2	21 – 40	Low	0	0
3	41 – 60	Currently	0	0
4	61 – 80	Tall	28	70
5	81 – 100	Very high	12	30
Amount			40	100

Based on the data obtained in the table above by looking at 40 students as a sample, it can be seen that there are no students whose scores are in the low, very low and medium categories, there are 28 people (70%) in the high category, and 12 (30%) in the high category. % is in the very high category. Meanwhile, if you look at the average obtained, it is 80.10 when included in the five categories above, above, it is in the high category, so it can be concluded that class XI students at Public High School 2 Bengkulu have high learning outcomes.

And the following is a table that describes the relationship that the independent variable has on the dependent variable:

Table 7. Results of Regression Analysis

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.738	1	16.725	6.112	.001 ^b

Residual	265.371	39	15.584
Total	281.112	40	

Table 8. Results of Regression Analysis

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Family environment >< Learning outcomes	72.403	3.159	.372	22.918	.000

Based on the results of this analysis, it is known that the simple linear regression equation that describes the relationship between the independent variable and the dependent variable is: $Y' = 72.40 + 0.091X$. Furthermore, in the table of results of simple regression analysis using the SPSS application, an R^2 value of 0.139 or 13.9% is obtained, meaning that the independent variable (family environment) contributes 13.9% in influencing the dependent variable (learning outcomes) of students in class XI Science. The remaining 86.1% is relationship by other factors such as the community environment, school environment and other factors that can relationship learning outcomes which are not included as variables. After carrying out the calculations, the calculated $f_{\text{value}} = 6.112$. Because $f_{\text{calculated}} > f_{\text{table}}$ ($6.112 > 4.10$) then H_0 is rejected. Thus, the decision for this test is to reject H_0 and accept H_a , which means that there is an relationship between the family environment on the learning outcomes of class XI Science students at Public High School 2 Bengkulu.

A description of the family environment of students in class Meanwhile, if you look at the average value obtained, it is 84.50. If included in the three categories above, it is in the medium category so it can be concluded that class XI Science students at Public High School 2 Bengkulu have a family environment in the medium category. This is because the environment is an important learning factor. The environment is also the basis for teaching in conditional factors that relationship individual behavior and is an important learning factor. One of the most important learning environments is the family environment, because basically education takes place in the family environment. The family has a function that has a very strong relationship on the maturation of children. Parents have a big role in forming children's personality patterns. Based on the results of observations, researchers also assume that students who often experience conflict or problems in their family environment tend to be gloomy in class, always remain silent, are not actively involved in the learning process, do not pay attention to the teacher when teaching so that what the teacher conveys is unacceptable or students understand and the assignments given by the teacher cannot be completed well. Apart from that, students who have problems in their families also sometimes stay away from their friends and do not socialize with the school environment like other children, even to the point of not attending school.

Apart from that, there are many aspects that must be considered in assessing students' family environment, namely the way parents educate, relationships between family members, home atmosphere, family economic situation, understanding of parents, cultural background, emotional relationships between parents and how parents educate. [27]–[29]. And overall, researchers were unable to examine all of these aspects so that the results of assessing the students' family environment were also not optimal, so the results obtained only illustrate that the students' family environment is in the medium category. The existence of a weak emotional bond between children and parents will have an unfavorable relationship on various things on children, including learning. Apart from that, one of the causes is problems in the student's family environment, including: lack of family time to guide the child in learning, the family has not prepared adequate learning facilities, the family always assumes that learning activities at school are sufficient to fulfill their child's education. Based on the research results, it was concluded that the student's family environment is in the medium category, which means that students have a fairly good family environment so that it can be an asset for students in improving their learning outcomes.

An overview of the biology learning outcomes of students in class is in the very high category. Meanwhile, if you look at the average obtained, it is 80.10 when included in the five categories above, it is in the high category, so it can be concluded that class XI students at Public High School 2 Bengkulu have high learning outcomes. Based on the research results, it was concluded that the description of student learning outcomes was in the high category, indicating that students received quite good support from their family environment so that they were able to obtain high learning outcomes as well. However, you need to know that the family environment is not the only factor that relationships student learning outcomes. This also proves that even though the description of the family environment is in the medium category, student learning outcomes are in the high category as seen from the average value of the two variables. the. Although if you look at the learning outcomes of students, not all of them are in the high category because learning outcomes are the results achieved

after someone goes through the learning process. In a class, not all students have good learning outcomes. Differences in student learning outcomes are caused by personal background factors, students and students' talents and students' ability to capture lessons [30], [31].

The research results show that there is an relationship between the family environment on the biology learning outcomes of class XI Science students at Public High School 2 Bengkulu. Based on the correlation test that has been carried out, it is known that the family environment has an relationship of 0.139 or 13.9% on learning outcomes. Hypothesis testing shows that the F value obtained from the calculation results ($F_{\text{calculated}}$) is greater than the F value obtained from the F distribution table (F_{table}) with a significance level of 5% ($F_{\text{calculated}} > F_{\text{table}}$) namely $(6.112) > (4,10)$. This proves that there is a significant relationship between the family environment on the learning outcomes of class XI Science students at Public High School 2 Bengkulu. Based on the above, it can be concluded that the family environment has a fairly large positive relationship on student learning outcomes and this is proven by the large percentage of relationship of the family environment on learning outcomes and apart from that the rest is relationshipd by other factors such as the community environment and school environment. [32], [33]. A good and ideal family environment is a family environment that can help students improve their learning outcomes so that students can increase their understanding of the material being taught. A high understanding of the subject matter will certainly improve student learning outcomes.

The family is the first and foremost educational environment in developing the basic personality of children. Apart from that, family/parents, according to the results of psychological research, function as the main influencing factor for children's motivation and learning outcomes, which has a profound relationship on every step of the child's development so that they can survive until college. From this understanding it can be concluded that the involvement of parents and other family members has a very big relationship on their children's success in school. If we build positive relationships with parents, we can help them see the important role of supporting the school's educational goals by providing a place that supports improving a child's learning outcomes. The more clearly we communicate our expectations about their role in a child's learning, the more likely they will play that role. A good and ideal family environment is a family environment that can help students improve their learning outcomes so that students can improve their understanding of the material being taught. [34]–[36]. A high understanding of the subject matter will certainly improve student learning outcomes.

The main limitations of this study include the limitation in measuring family environment variables which are only conducted through questionnaires, which may affect the validity and accuracy of the data obtained. In addition, the use of saturated sampling techniques that take the entire sample population may result in limited generalization to the wider population. The implication of these limitations is the need for further research that expands the scope of variables measured and integrates more diverse data collection methods, such as in-depth interviews or case studies, to gain a deeper understanding of the complexity of the relationship between family environment and student learning outcomes. In addition, this study also highlights the importance of considering external factors such as school and community environments in understanding the broader context that influences student academic achievement.

4. CONCLUSION

Based on the results of the study and discussion, it can be concluded that the family environment has a significant influence on the learning outcomes of class XI science students at Public High School 2 Bengkulu, with the contribution of variability in learning outcomes influenced by other factors outside the family environment, such as the community and school environment. This study shows that the family environment plays an important role in students' academic achievement, highlighting the importance of better understanding how broader environmental factors can influence students' learning outcomes in the future.

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AUTHOR CONTRIBUTIONS

The sole author was responsible for all aspects of this research, including conceptualization, methodology, validation, formal analysis, investigation, data curation, writing – original draft preparation, writing – review & editing, visualization, project administration, and funding acquisition.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

Not applicable.

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