



Analysis of Student Learning Difficulties in the Material of Inheritance of Traits

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Abstract: This study aims to describe student learning difficulties in inheritance material in class XII SMA Negeri 1 Tapa. This type of research is descriptive quantitative. Data collection techniques used teacher activity sheets, student activity sheets, learning outcomes tests, questionnaires and interviews. The results of the study found: The results of learning implementation at meetings 1 and 2 with a value of 82, 81%, with a good category, at meetings 3 and 4 with a value of 78, 78 with a sufficient category. The results of student activity at meetings 1 to meeting 4 with a value of 54, 17, 51.17, 51.69, 53.39% with a less category. The results of student responses with aspects of physiology and psychology with a value of 69.58, 60.24% with a sufficient category and aspects of sociology with a value of 55.47% with a very sufficient percentage. The results of the analysis of learning outcomes tests with a value of 96% incomplete. In conclusion, there are many students who experience learning difficulties in terms of physiological, psychological, and sociological aspects.

Keywords: Analysis; Inheritance of Traits; Learning Difficulties

Introduction

In education there is a learning activity where the learning activity has a goal to be achieved. Learning activities will lead to changes, and these changes occur due to effort and achievement. This is in accordance with the opinion of Kosilah & Septian (2020) who argue that education can be achieved by learning, both at the formal and non-formal levels. Formal education is carried out in a theoretical learning system. Learning is a system that aims to assist the learning process of students, which contains a series of events that are designed, arranged in such a way as to influence and support the internal student learning process (Ginting, 2013; Puswanti, 2016; Santoso, 2020).

Learning is a change in disposition or ability that a person achieves through activities that are obtained directly from a person's natural growth process. Learning as a concept of gaining knowledge in practice is widely practiced. The teacher acts as a teacher who tries to provide as much knowledge as possible and

students are active in collecting and receiving it (Embun, 2015; Bagja Sulfemi & Supriyadi, 2018; Husen, 2020).

The formal learning process is obtained by students through education at school. However, education is pursued through learning activities at school, teachers are faced with a variety of student characteristics. Judging from their ability to participate in learning activities, there are students who do not experience learning difficulties, but there are also students who experience learning difficulties. Learning difficulties are a condition where students cannot learn normally, due to threats, obstacles or disruptions in learning. (Pautina, 2018; Muhammad, 2018; Harefa, 2022).

Learning difficulties can be defined as a condition in the learning process that is characterized by certain obstacles to achieving learning outcomes (Jonassen, D. H., 1997; Kormos, 2016; Kusmaryono, I., 2021). These obstacles may be realized and may not be realized by those experiencing them, and can be psychological, sociological, or physiological in the entire learning process. People who experience learning difficulties will experience obstacles in the process of achieving their

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learning outcomes so that their achievements are below the specified criteria. (Andayani, 2014; Muhammad, 2018; Kaharuddin, 2020)

Learning outcomes are changes in behavior as a result of learning in a broader sense that includes cognitive, effective, and psychomotor fields (Keshavarz, M., 2011; Lamb, R. L., et al., 2018; Rao, 2020). In simple terms, what is meant by student learning outcomes is the ability obtained by children after going through learning activities. More practically, learning outcomes are also intended to express student abilities in the form of numbers (Marzano, et al., 1993; Greaney, V., & Kellaghan, T., 1996; Wigfield, A., & Cambria, J., 2010; Schunk, D. H., 2023). Learning outcomes are the results of an assessment of students' abilities which are determined in the form of numbers after undergoing the learning process. The use of numbers in certain test results is intended to determine the absorption of students after receiving subject matter (Alfitri, 2020; Ai Muflihah, 2021).

The learning process at school, one of the difficult subjects is biology. Learning difficulties affect student achievement. In addition, difficulties make students less motivated to study biology. As a result, it is difficult for them to achieve good results from their studies (Insyasiska, 2017; Sani, 2019; Sundari 2022). This is in accordance with the opinion of Mardin et al, (2017) stated in the results of their research that genetics material is a difficult topic for students to learn. This is due to the language and terms in genetics, the mathematical content in it, the general attitude of students, the symbols in genetics, domain-specific terminology and vocabulary, cytological processes, the abstract nature of the subject and the complex nature of genetics. These concepts must be understood before students can solve trait inheritance problems. However, many sets of concepts are ignored and problem-solving exercises are only prioritized on the end result (Schmiemann, et al., 2017; Stern, F., 2017; Nusantari et al., 2018).

Biology subjects are often considered as subjects that are difficult to understand and boring by students (Cimer, et al., 2012; Islamia, 2019; García, M., et al., 2019; Byukusenge, C., et al., 2023). This is due to the material is very abstract and also a rote subject so that students become bored in receiving lessons which in the end students experience difficulties in understanding concepts such as genetics, especially in inheritance material. Inheritance of traits is one of the materials in biology lessons taught in class XII in the odd semester. As a result of an interview with a class XII biology teacher at SMA Negeri 1 Tapa, the teacher said that many students had difficulty learning the material on inheritance. This problem occurs in the learning process,

namely student participation in the learning process, resulting in a lack of student understanding in receiving lesson material. So there are still many students who do not meet the minimum completeness criteria. Where this incompleteness becomes a benchmark for assessing how well students are able to understand the material on the inheritance of traits. Based on the problems above, it is necessary to carry out research related to the analysis of students' learning difficulties in the material on the inheritance of traits in class XII IPA SMA Negeri 1 Tapa.

Method

The research method used is quantitative descriptive method. Data collected in a quantitative descriptive manner is used to provide an overview of the actual situation, as well as to answer questions related to the status of the subject of the study (Isnawati et al., 2020).

Diagnostic Test Analysis

To convert scores into values using the formula below (Muhammad, 2018)

$$\text{value} = \frac{\text{gain score}}{\text{maximum score}} \times 100 \tag{1}$$

Calculate the percentage of students who are not complete with the formula (Muhammad, 2018)

$$ST \frac{TT}{N} \times 100\% \tag{2}$$

The calculation of the percentage of difficulty is done by comparing the number of students who answered incorrectly, the formula used is as follows (Muhammad, 2018)

$$P = \frac{S}{N} \times 100\% \tag{3}$$

Recapitulate the percentage of student difficulties based on criteria in answering diagnostic test questions per learning objective.(Muhammad, 2018)

Table. 1. Percentage and Criteria of Student Difficulties

Percentage Range (%)	Criteria
0-20	Very Low
21-40	Low
41-60	Quite High
61-80	High
81-100	Very High

Student Response Questionnaire

Student response questionnaires are given at the end of all material discussion to students

$$P = \frac{\text{Student answer score value}}{\text{Maximum number of scores}} \times 100\% \quad (4)$$

The results of the calculation of the questionnaire response of the participants are interpreted in the criteria in the following table 1

Table 2. Student Response Questionnaire Criteria (Hamdi dan Bahrudin, 2014)

Criteria	Student response percentage %
Very good	81-100
Good	71-80
Fair	56-70
Very fair	41-55
Not quite	≤40

Implementation of Learning Activities

$$P = \frac{\text{score of each aspect achieved}}{\text{total score of each aspect}} \times 100\% \quad (5)$$

(Purwanto,2010)

Criteria for Implementation of Learning Activities the data analyzed must pay attention to the criteria for the implementation of learning activities.

Table 3. Criteria for Implementation of Learning Activities

Percentage range (%)	Criteria
P ≥ 90	Very good
80 ≤ P < 90	Good
70 ≤ P < 80	Fair
60 ≤ P < 70	Deficient
P ≤ 60	Very poor

(Yazid, 2016)

Student Activity

$$P = \frac{\text{score for each aspect achieved}}{\text{score for each aspect achieved}} \times 100\% \quad (6)$$

(Purwanto,2010)

The data analyzed must pay attention to the criteria for the implementation of student activities

Table 4. Student Activity Criteria

Activity (%)	Criteria
86 - 100	Very good
71 - 85	Good
56- 70	Fair
41 - 55	Poor
0- 40	Not good

(Yazid, 2016)

Result and Discussion

Based on the research conducted, the following results were obtained:

Teacher Interview Results

The results of the interview obtained by the teacher said that for class XII, they were still using the 2013 Curriculum, and the teacher's teaching hours during the week were 4 hours of lessons with 4 hours of lessons the teacher did not feel burdened, biology teachers at SMA Negeri 1 Tapa were 3 people. The teacher of class XII IPA said that the material for inheritance of traits was considered a little easy to understand. Teachers do not experience difficulties in the learning process because with the discussion the teacher is easy to explain to students what difficulties they face. For the minimum completeness criteria for inheritance material, 76 is actually 77, but the inheritance material is a little difficult, so only 76 is taken. And for each year many students experience incompleteness in the inheritance of traits material, for students who do not experience completeness, remedial will be carried out and the source of the questions used in the inheritance of traits material exam is taken from the internet and taken from the latest published books, during the learning process the inheritance of traits material is done a lot of practice doing questions and finally an evaluation will be carried out. And for assessment techniques tailored to the level of depth of the questions given.

Student Interview Results

The results of interviews obtained from students regarding the material of inheritance of traits in their opinion that the material of inheritance of traits is very important to learn at this time because they have to know that inheritance of traits is the process when genetic information is passed down from parents to children, and they say that the material of inheritance of traits is difficult, because in it there are many terms that we must know and understand to face difficulties students will look for all sources both from books and from the internet by transferring all the material of inheritance of traits. information about the inheritance of these traits. And related to the value of the minimum completeness criteria given in their opinion, it is very good because they will know where their abilities are in learning the inheritance of traits material and the value given is in accordance with the abilities of each student. Every time before entering the inheritance of traits material, the teacher always conveys indicators and learning objectives, when the teacher teaches the material, he always gives a good explanation and provides an overview of the material being explained.

Learning Activity Implementation

To support the successful implementation of learning, one of them is by seeing the maximum implementation of learning in the classroom.

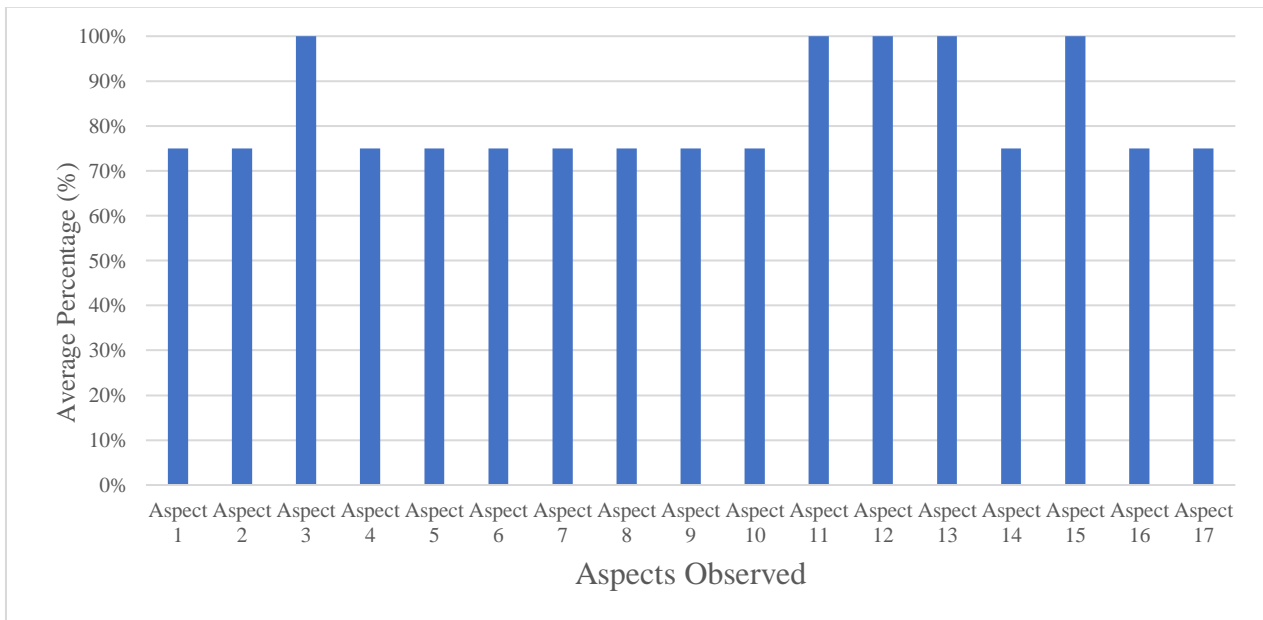


Figure 1. Learning Percentage of Meeting I

Informations:

- 1). Greeting and praying together
- 2). Take attendance and condition the class (as an implementation of the value of discipline)
- 3). Giving a quiz
- 4). Provide apperception and motivate students
- 5). Delivering learning objectives
- 6). Showing a picture/video
- 7). Guiding students in formulating questions about the image displayed
- 8). Organizing students in several groups to conduct discussions
- 9). Guiding students in group discussions
- 10). Monitoring and guiding students who are doing presentations and class discussions
- 11). Correcting concepts that are still unclear and different to students and explaining things that are still unclear to students
- 12). Summarizing the material
- 13). Rewarding discussion groups that perform well.
- 14). Provide reflection and follow-up on the material that has been delivered
- 15). Provide evaluation
- 16). Giving assignments to students
- 17). Closing the lesson with prayer and greetings.

The implementation of learning activities obtained a score of 100% with very good criteria, namely in aspects 3, 11, 12, 13, 15 and a score of 75% with good criteria, namely in aspects 1, 2, 4, 5, 6, 7, 8, 9, 10, 14, 16, 17. Thus, all aspects of learning implementation activities observed at meeting I were well implemented.

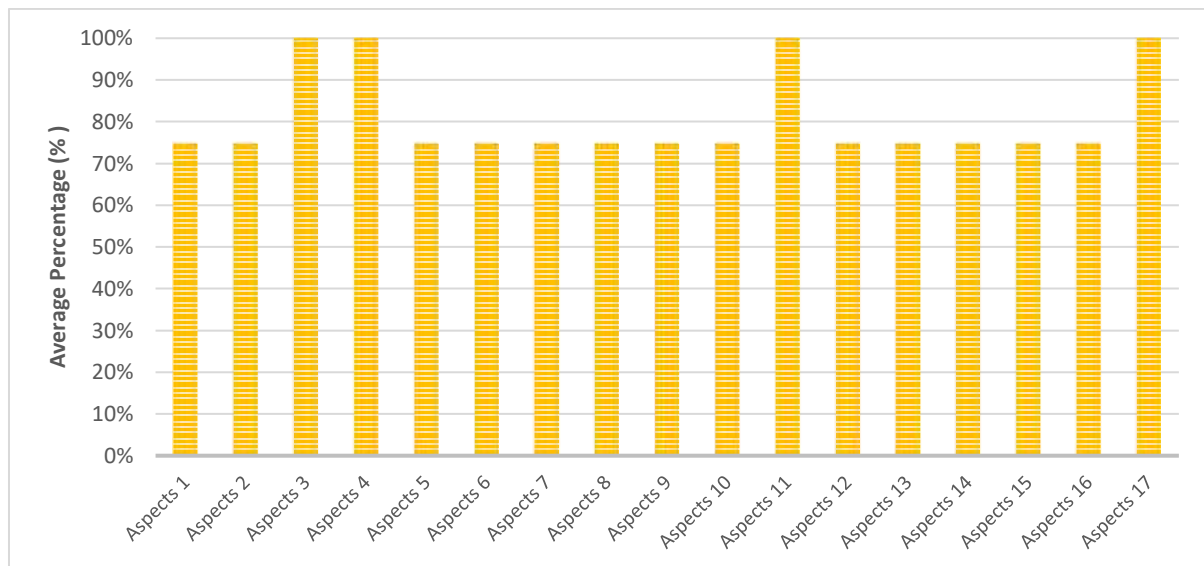


Figure 2. Learning Percentage of Meeting II

The implementation of learning activities in the observation of meeting II obtained a score of 100% with very good criteria, namely in aspects 3, 4, 11, and 17 and a score of 75% with good criteria, namely in aspects 1, 2, 3, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16 using the attached

rating scale. Thus, all aspects of learning implementation activities observed at meeting II were well implemented.

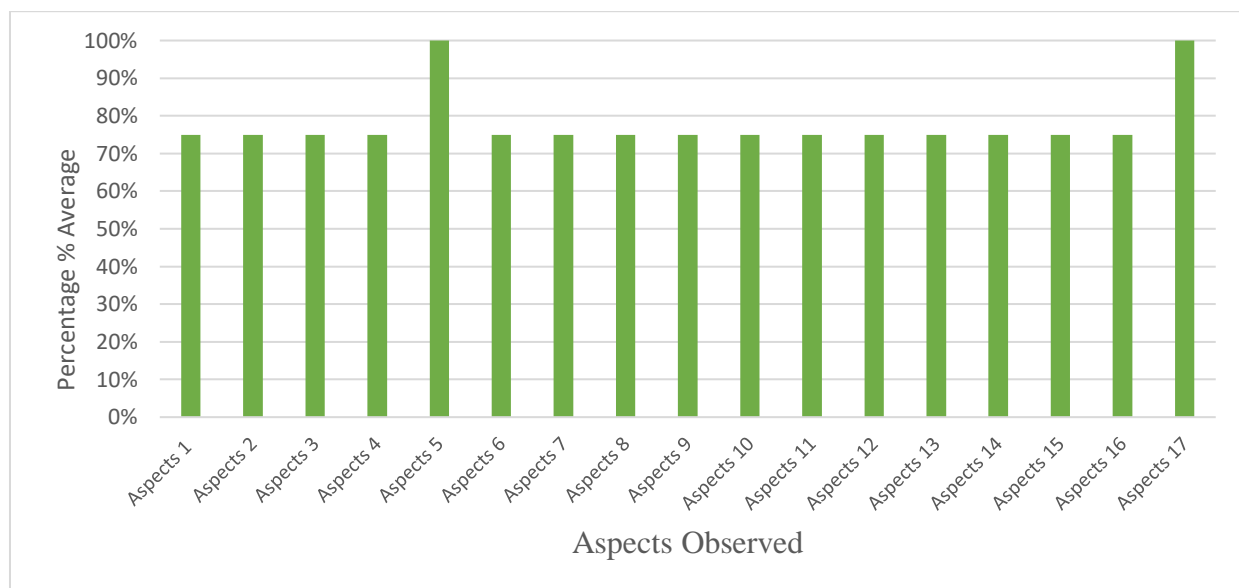


Figure 3. Learning Percentage of Meeting III

Based on the results of the observation of meeting III shown in Figure 4.3 using the attached rating scale, it was found that all aspects of the implementation of learning activities observed at meeting III were well implemented. The implementation of learning activities obtained a score of 100% with very good criteria, namely

in 5.7 and a score of 75% with good criteria, namely in aspects 1, 2, 3, 4, 6, 8, 9, 10, 12, 13, 14, 15, 16. Thus, all aspects of learning implementation activities observed at meeting III were well implemented.

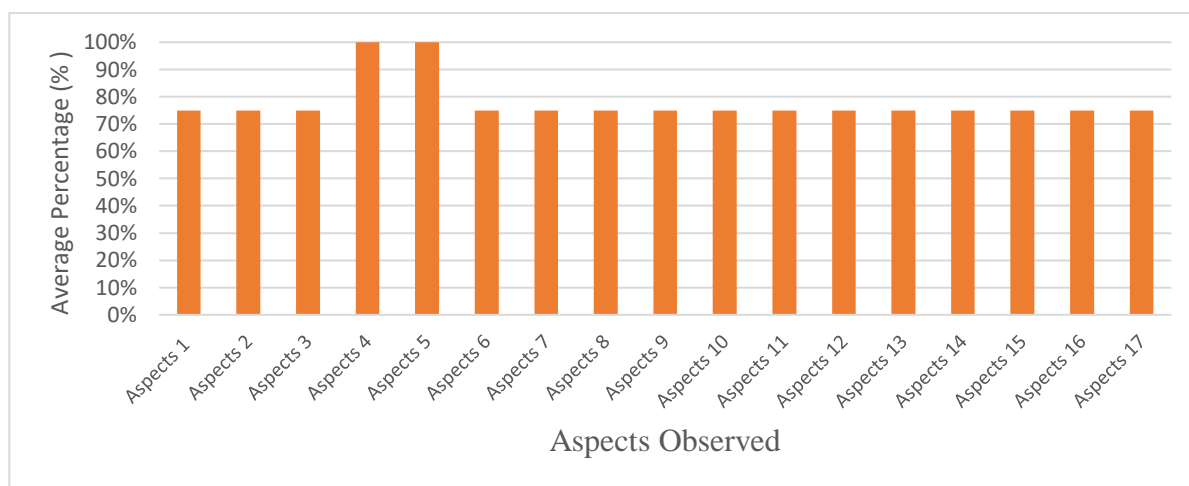


Figure 4. Learning Percentage of Meeting IV

The implementation of learning activities at meeting IV obtained a score of 100% with very good criteria, namely in aspects 4,5 and a score of 75% with good criteria, namely in aspects 1, 2, 3, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17. Thus, all aspects of learning implementation activities observed at meeting IV were well implemented.

Based on the results of data analysis regarding the implementation of learning activities, meeting I to meeting IV obtained a percentage of very good and good. For aspect I of meetings I, II, III, IV with a percentage of 75% with good criteria. Based on this data, it can be said that aspect 1, which is the provision of greetings and prayers together, the teacher can do well.

Aspects 2 and 7, namely taking attendance, conditioning the class and doing habituation (as an implementation of the value of discipline) and organizing students to write questions about the observed pictures, obtained good criteria, both from the beginning to the end of the meeting. This is because teachers still need time to learn to adjust to new student characters and have to make students dare to express what they want to ask and organize students to write questions about the pictures. increase student creativity in the images displayed so that students are interested and can write or ask directly what they do not understand about the object. According to (Indriastuti et al., 2017) Learning readiness needs to be considered in the learning process, because the learning process accompanied by readiness will make it easier for students to accept and understand the material delivered by the teacher and can encourage students to give a positive response where this situation will affect the learning outcomes obtained.

Aspect 3, at meetings I and II obtained a percentage of 100% while at meetings III and IV 75% this is because the teacher needs to learn in guiding students in doing quizzes with completion at the right time. Furthermore,

in the aspect of providing apperception and motivating students, the percentage has changed, namely at meetings I and III 75% and meetings II and IV 100%. This shows that the teacher's success in making apperception is good but needs to be improved again so that it is related to students' habits in their daily lives so that they can quickly understand what the teacher means. For providing motivation, the teacher is very good at providing motivation that can arouse students' enthusiasm for learning. According to (Rahmat, 2018) Teachers as educators have the responsibility to create high learning motivation. Teachers must be able to create interesting learning activities because the teacher not only acts as a transfer of knowledge but is also responsible for directing and guiding students. In addition, according to (Mardin et al., 2022) Motivation provides encouragement for students to continue learning which has an impact on the achievement that students want to achieve. Motivation is very important for student behavior, it can be said that student success is influenced by their motivation so that teachers must be aware of factors that can increase or decrease student motivation (Syamsul et al., 2021).

The aspect of conveying the teacher's learning objectives was very good at meetings II and IV, but at meetings I and III it was in the good criteria. This is because it needs to be improved by providing stimulus to students so that they understand the goals that must be achieved in learning. The next aspect, namely organizing students into groups from meetings I to IV, obtained a percentage of 75%, this is already included in the good criteria, one of the teacher's weaknesses in group distribution is controlling students to remain calm in organizing groups, besides that the teacher must also organize students who disagree when grouped with several students who have problems with them. And the teacher must also be able to guide students' attitudes towards friends. group. The successful achievement of

learning objectives is determined by student activeness. According to (Putri Pangestu & Rohinah, 2019) Teachers make various efforts to arouse their activeness. The efforts made include increasing interest, generating motivation, applying the principle of student individuality.

The next aspect, namely displaying pictures from meetings I to IV, the percentage is 75% with good criteria. This is because at each meeting the teacher never displays pictures that can make students express things that are not understood in the picture. The teacher should be able to display pictures that can make students express things that are not understood in the picture. And for the aspect of monitoring and guiding students who are presenting and class discussions from meetings I to IV with a percentage of 75%, this shows that teachers need to improve methods and assertiveness to guide students in discussions, both in the process of giving assignments, understanding the questions and the discussion process for the results that have been obtained. According to (Zulfanidar et al., 2016). During small group discussion activities, the teacher must always try to focus the attention and learning activities of the students on the topic or problem being discussed. Thus, if there is talk that deviates from the target of the discussion, then at that time the small group discussion leader must immediately straighten out and remind the discussion

participants about the topic and target of the discussion being carried out. Problems that arise during group discussions can be overcome by focusing students' attention.

The next aspect, namely correcting concepts that are still unclear and different to students and explaining things that are still unclear to students at meetings I and II with a percentage of 100% with very good criteria and at meetings III and IV with a percentage of 75% with good criteria. This is because there are several things that are outside the indicators that are not fully explained by the teacher in mastering the material or improving concepts that are not clear to students. Furthermore, the aspect of summarizing the material has decreased, at meeting I with a percentage of 100% with very good criteria. Whereas in meetings II, III and IV with a percentage of 75% in the good category. This is because teachers sometimes do not provide conclusions at the end of the lesson. Teachers always provide opportunities for students to be able to summarize the material for students who raise their hands, the teacher should also provide opportunities for other students, so that they are brave as well as see the extent to which all students understand the learning material carried out that day.

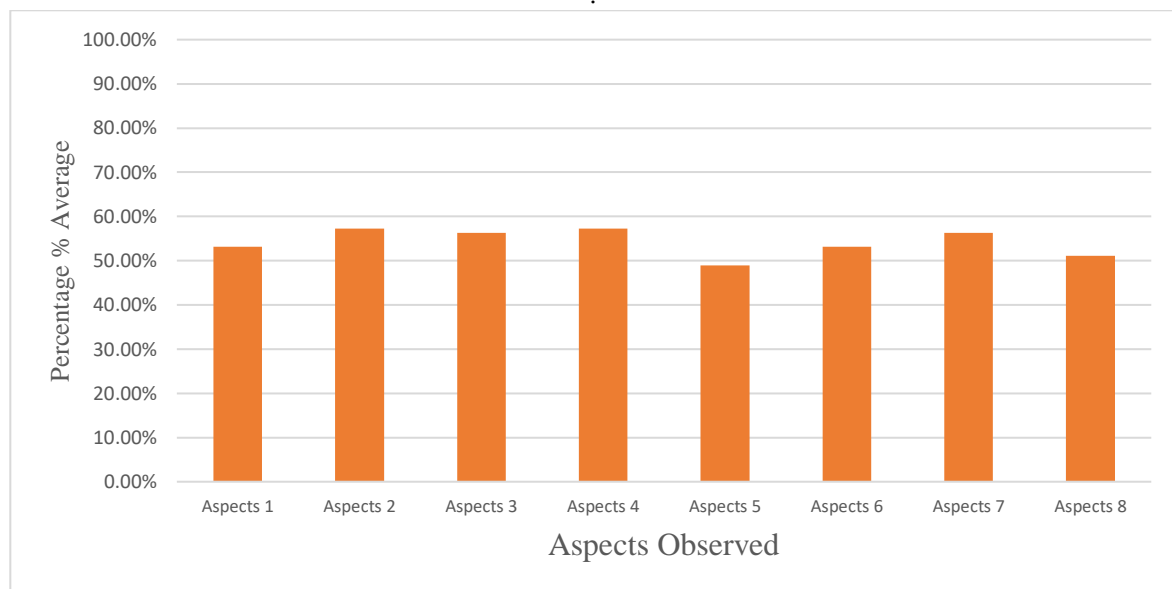


Figure 5. Percentage of Student Activity I

Based on the percentage of student activity at meeting I shown in Figure 4.5, it shows that aspects with sufficient criteria are aspects 2, 3, 4 and 7 with a percentage range of (56-70)% and aspects with

insufficient criteria are aspects 1, 5, 6 and 8 with a range of (41-55)%.

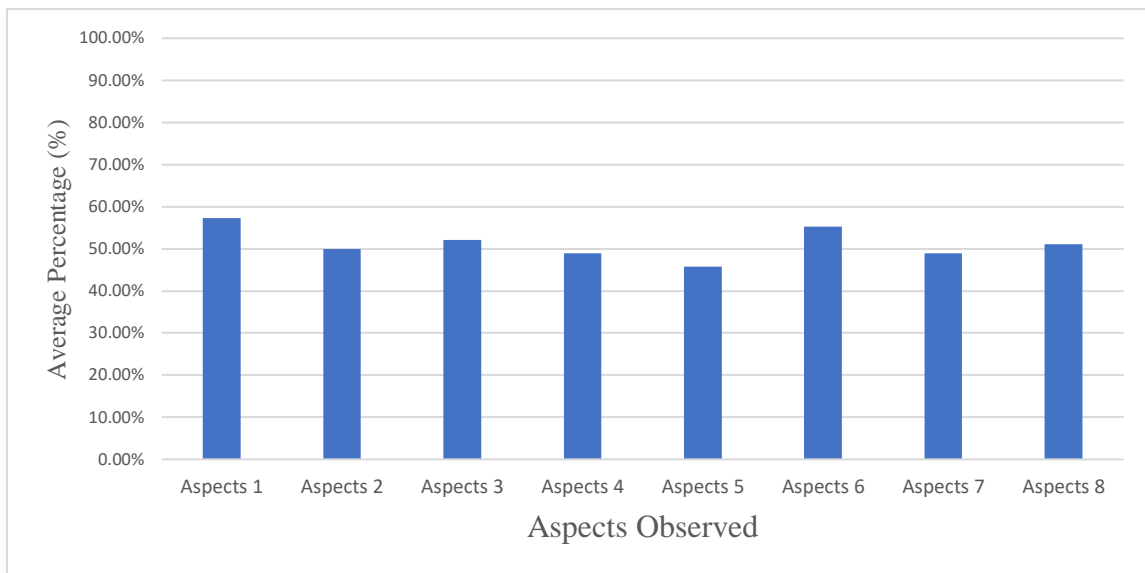


Figure 6. Percentage of Student Activity II

The percentage of student activity at meeting II shown in Figure 6 shows that the percentage is sufficient in aspect 1 with a percentage of 56-70% and the

percentage is less in aspects 2, 3, 4, 5, 6, 7 and 8 with a percentage range of 41%-55%.

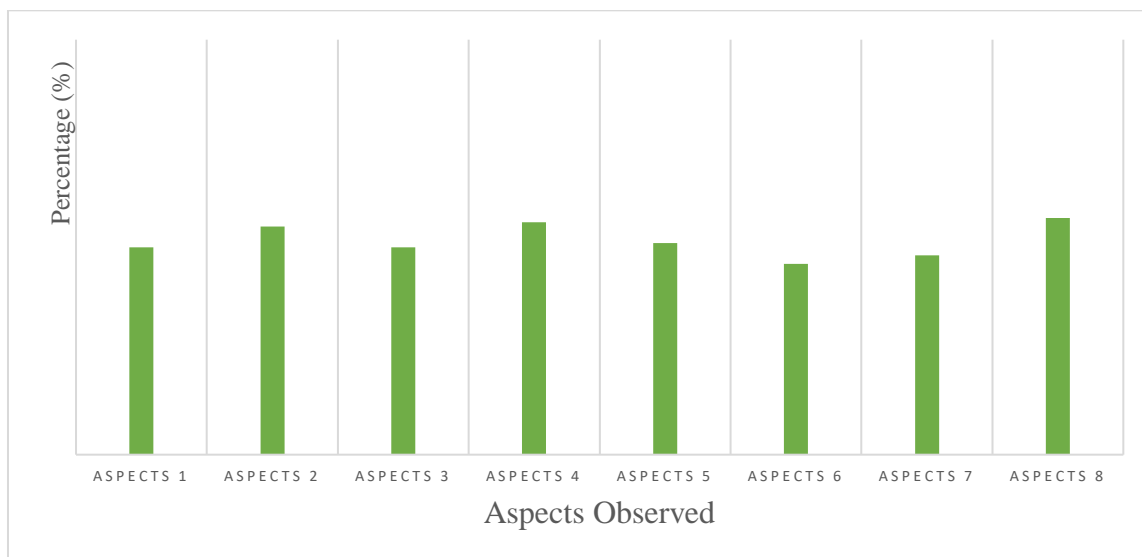


Figure 7. Percentage of Student Activity III

Based on the percentage of student activity at meeting III which is shown in figure 4.7 shows that aspects with sufficient criteria are on aspek 4 dan 8 with a percentage range of 56-70% and aspects with less criteria are in aspects 1, 2, 3, 5, 6 and 7 with a percentage of 41%-55%.

51-75%. While the less in aspects 1, 2, 3, 6, 7, and 8 with a percentage range of 41%-55%.

Based on the percentage of student activity at meeting IV shown in Figure 4.8, the percentage is obtained in aspects 4 and 5 with a percentage range of

Based on the results of data analysis of student activities from meeting I to meeting IV, the percentage results of two criteria are sufficient and lacking. At meeting I can be seen in the analysis of student activity data can be seen in appendix 9 and the percentage graph of student activity in (Figure 8).

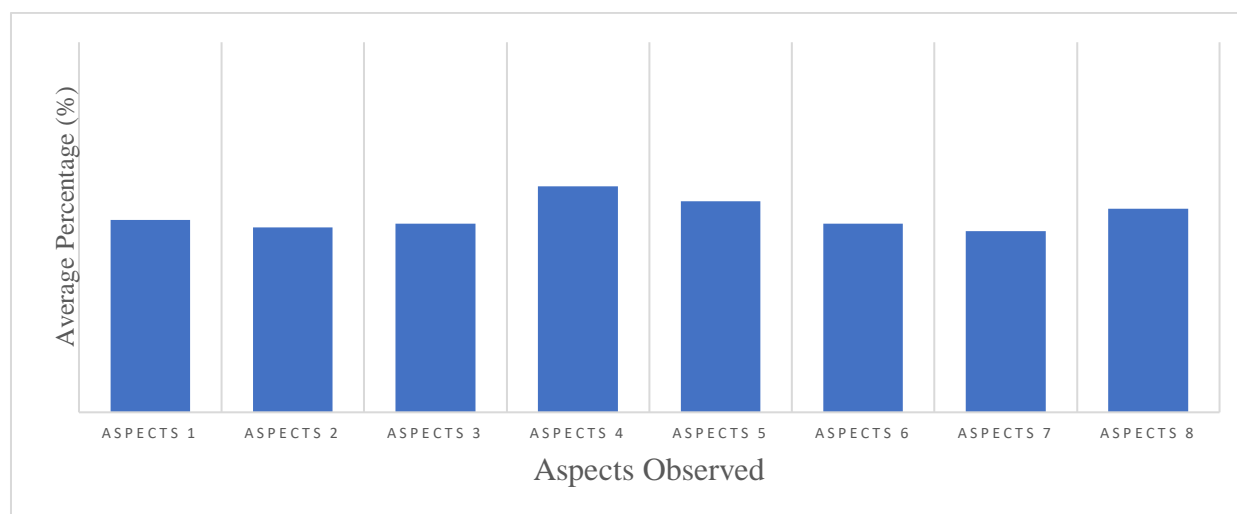


Figure 8. Percentage of Student Activity IV

Based on the results of data analysis of student activities from meeting I to meeting IV, the percentage results of two criteria are sufficient and lacking. At meeting I can be seen in the analysis of student activity data can be seen in appendix 9 and the percentage graph of student activity in (Figure 4.5) which fluctuates in aspects 2, 3, 4 and 7 with a percentage range of 56% - 70% in the sufficient category, this shows that there are still many students who cannot receive lessons properly so that there is no feedback given by the teacher when observing the images/video displayed. For the enthusiasm of students working on worksheet, it is classified as a sufficient category because during the learning process the teacher does not distribute student worksheets but the teacher only distributes package books to work on the questions discussed in the material being taught. and to express opinions students are still less active. And for aspects 1,5,6 and 8 with a percentage value of 41%-55% with a sufficient category, the aspect of responding to the apperception conveyed by the teacher. Most students who are less captured in responding to the apperception given by the teacher. This is because students are still afraid to give responses. What is meant is vocabulary that is rarely heard so there are some students who cannot capture the intended apperception. This apperception is very important to increase students' interest in learning material, and connect the material with habits in everyday life so that students get fun things at the beginning of learning. According to (Satria & Kusumah, 2019) The provision of apperception at the beginning of each lesson is very significant for student learning readiness. Apperception can helps students to become steady in absorbing the lessons that have been given. Based on the opinions and descriptions above, it can be related that this apperception is a form of motivation to arouse students' interest in learning.

The aspect of conducting discussions with group friends and presenting the results of group discussions is classified as a less category because students are not very active in group discussions, this is due to the lack of packet books distributed in each group when conducting group discussions. In each group, there are students who do not get the distribution of packet books, for example, in 1 group they only get 2 packet books, so only those who get the packet books will hold discussions. Meanwhile, students who do not get a packet book will be busy with their own affairs so that there is no group discussion with group mates.

Meeting II, as in meeting I, obtained percentage results with sufficient and insufficient criteria. In aspect 1, giving responses to the apperceptions conveyed by the teacher in the sufficient category with a percentage of 56%-70%, this is because students have not been able to express opinions and give responses to the apperceptions conveyed by the teacher. This can be due to students still lacking courage in expressing opinions for fear of being wrong. and for aspects 2-8 in the insufficient category with a percentage of (41-55)%. For the aspect of observing the images/video displayed by the teacher and paying attention to the teacher's explanation and being able to formulate questions based on the observed images/video is in the sufficient category because the teacher does not display the images discussed in the material that is temporarily taught by the method applied in the classroom still using the lecture method. Furthermore, for the aspect of students enthusiastically working on LKPD and conducting discussions with group mates in the sufficient category, the same as in the first meeting where the teacher does not distribute student worksheets, only distributes packet books in which there are sub-topics that are temporarily discussed. Students are only ordered to do the questions contained in the package book so that

discussions with group friends are not well implemented. Furthermore, for the aspect of students being able to express opinions and students being able to summarize the material in the sufficient category. The low activity of students in expressing opinions, students feel shy and afraid to express their opinions and students are not fluent in using good language. Then to conclude this material can also be a measure of student understanding of learning material. Based on this, it can be said that the factors of courage and trust self greatly affects student activeness in the learning process.

Meeting III, the results of the analysis of student activity obtained 2 criteria the same as in meetings I and II, namely sufficient and insufficient. In aspects 4 with 8, it is classified as a sufficient category because just like in meetings I and II the teacher does not distribute student worksheets during the learning process, and for the aspect of students being able to conclude the material is also not well implemented because almost most students do not have the courage to be able to conclude the material in every lesson. From meeting I, this aspect has always been an obstacle for students, some of the factors that cause this are that some people do not know and do not dare to guess apperception. In addition, aspects 2, 3, 5, 6, and 7 are categorized as lacking with a percentage of 41%-55%. For the aspect of observing the images/video displayed and students paying attention to the teacher's explanation and being able to formulate questions based on the images/video displayed, the problem factor is that when the teacher explains the same as in meetings I to III the teacher does not display images/video when learning is taking place where the method used is still using the lecture method so that students do not pay too much attention to what is

conveyed during learning, many students are only busy telling stories with a group of friends. Then for aspect 5, conducting discussions with friends in 1 group, there are some students who do not carry out discussions optimally, some even do not participate in discussions, do not want to express their opinions, only expect friends to discuss and maybe don't want to be in the group. For aspect 7, students are able to express their opinions which are classified as insufficient because the factors that influence students not to express their opinions are fear of being wrong and also not having the courage to express their opinions.

Meeting IV obtained percentage results with sufficient and insufficient criteria as well as meetings I to III. In the aspect of students enthusiastically working on student work sheet and conducting discussions with group mates is categorized as sufficient with a percentage of 56%-70%. It is the same as in meetings I to III where students are not distributed student worksheets during the learning process. this shows that there is a decrease in activeness in the learning process. Furthermore, for the aspect of conducting discussions with group friends, it is classified as a sufficient category because of the tendency of students to complete the tasks distributed by the teacher to rely only on group friends, some students only wait for the results obtained from their friends' work. This is a factor that causes students not to discuss with group friends.

The results of the student response questionnaire analysis obtained the total score for physiology 69.58% Psychology 60.24% and Sociology 55.47% of the three aspects obtained sufficient criteria, namely with a percentage of 56-70%.

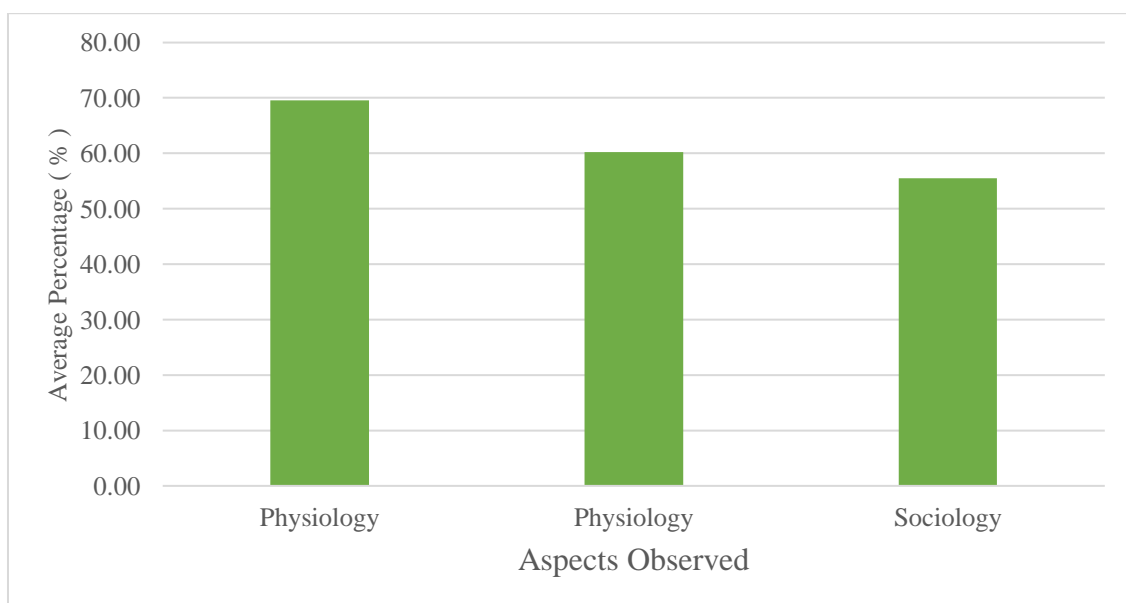


Figure 9. Results of Student Response Analysis

Based on the results of the analysis of student response questionnaires for physiological aspects with a percentage of 69.58% in the sufficient category. Physical conditions generally greatly affect a person's learning activities. A healthy and fit physical condition will have a positive influence on individual learning activities. Conversely, weak or sick physical conditions such as headaches, stomachaches, toothaches will hinder the achievement of maximum learning outcomes. Therefore, physical condition greatly affects the learning process and there needs to be an effort to maintain physical health.

The psychological aspect with a percentage of 60.24% with a sufficient category. This is because the success of the learning process will certainly be influenced by various factors both from the school environment, family or from the students themselves. Students as a person who is learning and developing have their own uniqueness and character in the learning process.

The sociological aspect with a percentage of 55.47% with a sufficient category is due to the relationship between parents, school environment and peers is very influential because the continuity of student education is more or less influenced by parental attention and responsibility. Parents' attention to their children's education is sometimes influenced by factors, such as parents' busy work and level of education.

Evaluation results on inheritance material based on the values that have been analyzed on question number 10 can be categorized as very high with a percentage of 81% to 100% using the attached rating scale. And for the high category in question numbers 2, 3, 4, 5, 7, 8, 9, 12 and 13 with a percentage of 61% to 80% with a fairly high category in question numbers 1 and 6 with a percentage of 41% to 60% and for the very low category in question numbers 11,13 and 15 with a percentage of 0% to 20%.

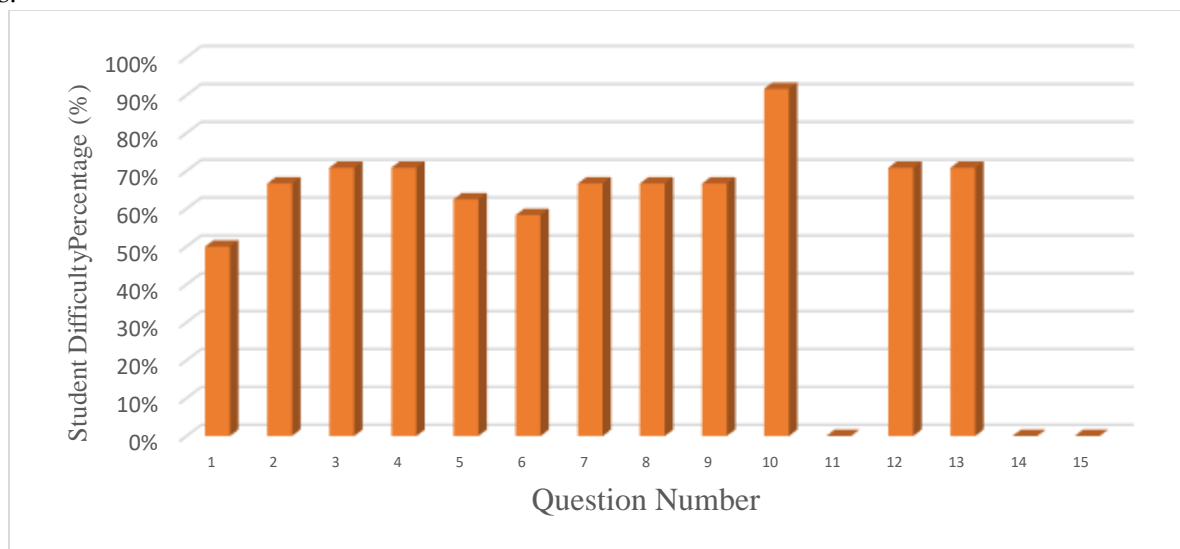


Figure 10. Student Test Analysis

Based on the results of the analysis, many students who could not answer question no. 10 with a very high category of learning difficulties with a percentage of 81% to 100% with the cognitive domain C4 (Analyzing). This shows that students' learning ability is still low in understanding the material conveyed by the teacher, resulting in student scores still below the average. From these data it can be seen that students tend to experience learning difficulties with the character of analysis questions and students tend not to experience difficulties in answering comprehension questions. According to (Tamba et al., 2020) Low learning outcomes and learning difficulties experienced by students are not only caused by low intelligence, but can also be caused by non-intelligence factors. These factors can come from within the student (internal) or from

outside the student (external). Internal factors include health, intelligence, interest, and student motivation. While external factors such as family, teachers and school environment. Furthermore, for the high category of learning difficulties in question numbers 2, 3, 4, 5, 7, 8, 9, 12 and 13 with a percentage of 61% to 80%. This is because students find it difficult to work on problems according to them, the material of inheritance of traits is difficult because there are too many formulas and calculations, and they only study when they are going to face an exam. In accordance with the opinion (Tambunan, 2018) which states that Interest has a great influence on processes and the achievement of learning outcomes. If the subject matter studied is not in accordance with the interests of students, then students will not be interested in learning as well as possible.

There is no attraction for students resulting in reluctance to learn, so if there is less interest in learning, it will result in learning difficulties because it has no attraction. Furthermore, the category is quite high for the causes of learning difficulties in questions number 1 and 6 with a percentage of 41% to 60%. This is because students are embarrassed and hesitant to ask the teacher if there is material that is not clear and if it is at home students will not repeat the lesson material. This is in line with the opinion (Ramadhan et al., 2022) which states that motivation in students needs to be turned on so that in the process of learning activities they are doing. One of the main factors that influence the increase in learning motivation possessed by students in participating in learning activities. Furthermore, the category of learning difficulties is very low in questions no. 11, 13 and 15 with a percentage of 0% to 20%. This is due to the lack of difficulty level in the question. Many students can answer questions on these question numbers because students are more interested in understanding than analyzing and questions 11, 13 and 15 are classified as low so that many students can answer these questions. (Hanifah, 2014) says that the level of difficulty of the item is the proportion between the number of test takers who answer the item correctly and the number of test takers. This means that the more test takers who answer the item correctly, the greater the difficulty index, which means the easier the item. Conversely, the fewer test takers who answer the item correctly, the more difficult the item.

Conclusion

There are many students who experience learning in terms of physiological, psychological and sociological aspects. Physiological aspects are related to the physical condition of students. Psychological aspects are related to various factors both from the school environment, family or students. While the sociological aspect is related to the relationship between parents, school environment and peers. this can affect student learning difficulties so that it will have an impact on student learning outcomes on the material of inheritance of traits.

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Author Contribution

All authors contributed to this research. Starting from the initial stages of research preparation, preparation of research instruments, instrument validation, research implementation, data collection, data analysis, to the preparation of research

articles. Guidance is provided throughout the research process from initial preparation to the preparation of research articles.

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Conflicts of Interests

There are learning difficulties experienced by students in the inheritance material in class XII Science at SMA Negeri 1 Tapa. This problem occurs in the learning process, namely student participation in the learning process, resulting in a lack of student understanding in receiving lesson material. So there are still many students who do not meet the minimum completeness criteria. Where this incompleteness becomes a benchmark for assessing how well students are able to understand the material on the inheritance of traits. Based on the problems above, it is necessary to carry out research related to the analysis of students' learning difficulties in the material on the inheritance of traits in class XII IPA SMA Negeri 1 Tapa

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