

ANALYSIS OF STUDENTS DIFFICULTIES IN LEARNING HEREDITY OF XII GRADE STUDENTS IN SMA SWASTA HARAPAN 1 MEDAN ACADEMIC YEAR 2015/2016

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ABSTRACT

This study aims to detect the students difficulties in learning heredity topic and the factors that influence on it. A descriptive research design was used in this study to describe the level of students difficulties based on cognitive and learning indicator aspect and also the causing factors. The population are taken from whole of XII Grade Students in SMA Swasta Harapan 1 Medan. There were 3 classes chosen as the sample by applying cluster random sampling technique. The instruments used to obtain data were multiple choice test, essay test, concept map and questionnaire. The result of data analyzed showed : (1) On cognitive aspect, the difficulties are categorized into very high difficulties from C1 until C6 level of cognitive which the highest percentage is on C6 category as 80,21%, (2) On learning indicator aspect, the students have very high difficulties in explaining the causing of pseudo deviation of Mendelian Law as 72,32%, (3) Society is the factors that categorized as influential in causing students learning difficulties which is 76,77%.

Keywords : *learning difficulties, cognitive aspect, learning indicator, heredity*

INTRODUCTION

Science education researchers have presented the argument in which the students have difficulty in learning some science concepts. In this perspective, identifying students' difficulties in science learning has received a big attention in science education research (Top Çu, 2009).

In conducting the learning activity, one thing that have to be concerned by the teacher is that not every students capable in relating the old and new knowledge that they gained, and it will cause misunderstanding on a topic. This misunderstanding will further cause a problem to the student and make them difficult to learn (Ameruddin, 2013).

Students' difficulties in learning biology have been studied by various researchers among the world. Many concepts in biology is aimed as difficult to be learnt by the students. Tekkaya et al (2001) found that hormones, genes and chromosomes, mitosis and meiosis, the nervous system, and mendelian genetic were considered difficult concept by the students. Heredity is one of a concept that perceived as difficult to learn. The students have difficulties in the invisibility and

inaccessibility of heredity concept and heredity included complicated structure. In addition to difficulty in learning of these heredity concepts, many students did not construct necessary relationships among these heredity concepts, and had the problems about the process and the mechanism of inheritance. Another problem mostly determined in the literature was mathematical expressions in learning heredity because these expressions caused problems and the heredity symbols (e.g., XX, XY) were not used consistently by teachers and textbook writers.

The learning difficulties that faced by the students are caused by various factors. According to Djamarah (2011), factors affecting learning difficulty classified into internal and external factors.

Therefore, the purpose of this study were to examine students difficulties in learning heredity based on cognitive and learning indicator aspect and also the factors that influence in causing learning difficulties.

RESEARCH METHOD

Location and Time. This research is conducted in SMA Swasta Harapan 1 Medan. This research is

planned for range February-June 2016, which include proposal preparation, research instrument preparation, research instrument standarization, collecting data, and taking conclusion.

Population and Sample. Population of this research was taken from whole students in grade XII SMA Swasta Harapan 1 Medan on academic year 2015/2016 that consist of 122 students. By using cluster random sampling technique, the sample of this research are 68 students.

Kind of Research. Researcher use descriptive research methodology.

Research Procedure. The explanation of research procedure are: the research conducted in SMA Swasta Harapan 1 Medan. Using multiple choice test, and essay test to find out the percentage of students difficulties in learning heredity and the questionnaire to find out the factors that influence in students difficulties. The knowledge test and questionnaire must be validated first by validator for construct and content by the expert. After that the sample were given the Heredity knowledge test and questionnaire. After that, researcher

collect the data and then, the researcher does data analysis and finally make some conclusion.

Research Instrument. The researcher formulated 20 number of questions in multiple choice test, 8 questions in essay test, and 45 items in questionnaire.

RESULT

A. Result of Multiple Choice

The multiple choice test is consist of 20 questions with 5 answers that can be chosen by the samples. The result shows that the students have difficulties in learning heredity in all level of cognitive.

B. Result of Essay Test

The essay test consists of 8 questions that represent each learning indicators. The questions in essay were arranged by the high order thinking level of cognitive.

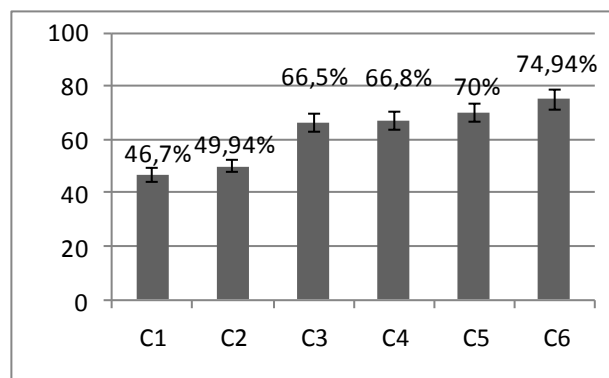


Figure 1. Percentage of students difficulties in multiple choice test based on cognitive aspect

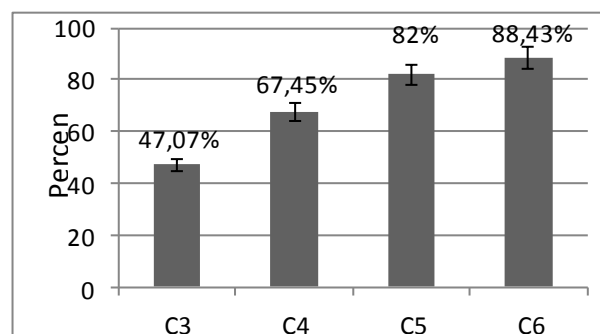


Figure 2. Percentage of students difficulties in essay test based on cognitive aspect

C. Analysis of Test Result on Cognitive Aspect

Based on the result, known that the highest percentage of learning difficulties present in C6 (Creation) Category which is 80,21%, while

the lowest percentage of learning difficulties present in C1 (Remember) category which is 46,7%.

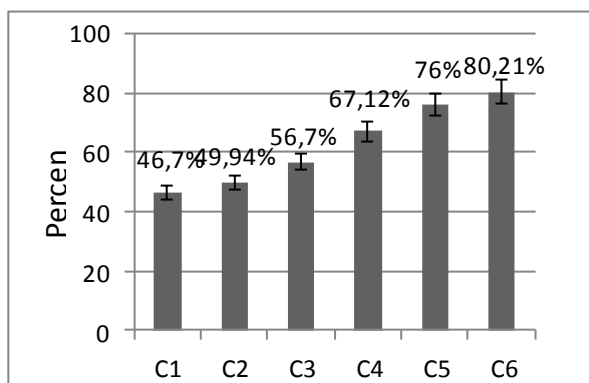


Figure 3. Percentage of students difficulties based on cognitive aspect

D. Analysis of Learning Difficulties Factors

After obtained the data about level of students difficulties on cognitive and learning indicator aspect, then the questionnaire will be analyzed to know the factors that influence the students difficulties in learning heredity. Based on

the result of students' questionnaire, known that society is the most influential factor that causing the students' difficulties in learning heredity, which is 76,67% and the lowest is motive with 45,43%. When the data of questionnaire be averaged, will obtain :

No.	Factor	Average
1.	Internal Factors	59%
2.	External Factors	68,35%

DISCUSSION

The Bloom's Taxonomy is a scheme for classifying educational goals, objectives, and, most recently, standards. It provides an organizational structure that gives a commonly understood meaning to objectives classified in one of its categories, thereby enhancing communication.

The Bloom's Taxonomy consisted of six categories, nearly all with subcategories. They were arranged in a cumulative hierarchical framework; achievement of the next more complex skill or ability required achievement of the prior one.

Cognitive aspect is the measurement of students' intellectual capability from the lowest to highest level. The cognitive aspect can be divided into two, namely, Low Order Thinking that consist of C1 – C3 level and High Order Thinking that

consist of C4 – C6 level. Theoretically, the higher level of cognitive, the more students have difficulties in learning. It because the higher level of question, the more analyzing capability of students is required. The data of this research shows that the order of learning difficulties based on cognitive aspects that faced by the XII grade students in SMA Swasta Harapan 1 Medan are highest in C6 (creation) then followed by C5(evaluation); C4(analyze); C3(application); C2(understanding); and last is C1(remember).

Based on the result, it can be seen that the students have learning difficulties in all level of cognitive. It means that they are faced the difficulties to build their capability in intellectual thinking from the lowest to the highest level. Certain prerequisite concepts are necessary for a learner to develop an understanding of a certain

concept. If these do not exist, it would be difficult for the learner to understand the concept. Teachers generally assume that the students have already mastered the concept or ideas. On the contrary, they may not have assimilated the ideas into their cognitive structure, which are necessary for a meaningful understanding new topic (Tekkaya, 2001).

There are two factors that influence in learning difficulties, internal and external factor. The internal is the one that come from the inner side of students, while the external is the factors that supports the learning process.

Based on the result of questionnaire, the most influencing factors to the learning difficulties is Society with 76,67% and followed by Schools' Building (75,2%); Health (73,77%); Quality of Teachers (70,73%); Family (69,97%); and Psychist (61,83%). While the factors that quite influential in learning difficulties are Talent (60,63%); Teaching Method (60,53%); Intelligence (58,67%); Motivation (58,3%); School's Infrastructure (56,9%); Interest (54,93%) and Motive (45,43%). Health, Psychist, Intelligence, Motivation, Interest and Motive are including into Internal Factors, while Society, School's Building, Quality of Teacher, Family, Teaching Method, and School's Infrastructure can be classified into External Factors.

The high percentage that shown in society factor means that the society is influence in development of students' behaviour, and also influence their learning behaviour (Syadiah, 2009). In society, the children are taught about local values and culture that make them have a different pattern of behavioural development. Students' activities in community, social media, friends and social life take an important role in students' learning behaviour development. Good interaction between the students and their society will made a positive impact for their learning behaviour. The society can support the learning process if the students associated their self and time into a positive society.

CONCLUSION

Based on cognitive aspect, the XII Grade Students in SMA Swasta Harapan 1 Medan are

have difficulties in all level of cognitive which all be classified into very high category. The highest percentage of learning difficulties is present on C6 (Creation) level and followed by C5 (Evaluation); C4 (Analyze); C2 (Understanding); C1 (Remember) and last is C3 (Application). The factors that categorized into influential in causing learning difficulties of XII Grade Students in SMA Swasta Harapan 1 Medan from the higher to the lower are Society, Schools' Building, Health, Quality of Teachers, Family and Psychist. While the factors that categorized into quite influential from the higher to the lower are Talent, Teaching Method, Intelligence, Motivation, School's Infrastructure, Interest and Motive.

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