



## Relationship Between Procedural Knowledge with Cognitive Learning Outcomes in fungi Topics on First Grade SMA Negeri 6 Medan

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### ABSTRACT

This study was conducted to see a significant relationship between students' procedural knowledge and biology learning outcomes on grade ten (class X MIA) students in SMA Negeri 6 Medan. In this study, the sample was taken by total sampling techniques, which were all students of class X MIA SMA Negeri 6 Medan, consisting of 4 classes with 128 students in total. This research was a descriptive-correlative research. The results showed there was a significant correlation between procedural knowledge and learning outcomes. The results of this study indicate that there was a significant relationship between procedural knowledge to cognitive learning outcomes. As the value of value oftcountwas higher than ttab ( $t_{count} 2.620 > t_{tab} 1,657$ ) on the significance of  $0.010 < 0.05$ , means there was a significant relationship between procedural knowledge to learning outcomes. The value of correlation coefficient was  $R_{2 \times 2} = 0,052$ , with regression line equation was  $\hat{Y} = 58,038 + 0,227X$ .

**Keywords:** *procedural knowledge, cognitive learning outcomes, fungi*

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### INTRODUCTION

Gradation of cognitive aspect knowledge is very visible where in high school (SMA/MA) level includes factual, conceptual, procedural and metacognitive knowledge [1]. This research will discussed about students' procedural knowledge on fungitopics. Teachers can develop students' procedural knowledge through practicum activities. In practicum activities students are taught to perform scientific methods to generate/find a concept.

Teachers more often do the learning process by lecture, question and answer and discussion. Lessons conducted in the classroom were generally still teacher-centered, so the students tend to only listen, record and then memorize the material presented by the teacher. In fact practicum activities were rarely held in school (interview with biology teacher at SMA Negeri 6 Medan). Therefore, the students' procedural knowledge is poorly developed. Students' procedural knowledge is still poor could be seen from incapability of students to answered correctly questions concerning procedural knowledge [2].

In procedural knowledge will be studied various techniques, methods, strategies as a whole known as procedures, for example research methods that include: (1) Formulate questions, (2) formulate hypotheses, (3) conduct experiments, (4) results, (5) draw conclusions [1].

With students' procedural knowledge, students can do things according to the procedures. Students can solve problems with the correct stages. In biology learning, procedural knowledge is needed, where students not only understand the concept but also

understand the processes on a learning material. Inside the Curriculum 2013 is demanded for learning to use a scientific approach, scientific approach is also expected to be able to direct students in analyzing a problem based on the steps or procedure of problem solving, so that students are required to have good procedural knowledge [3].

## MATERIAL AND METHODS

This research was conducted in November 2016 until April 2017. This research was conducted in SMAN 6 Medan which was located at Jl. Ansari No. 34 Medan postal code 20214. The population of this study was all students of class X SMA Negeri 6 Medan in Academic Year 2016/2017 which was 128 students in total. This type of research was a descriptive-correlative research, which aimed to determine the relationship of procedural knowledge with student's learning class X SMA Negeri 6 Medan learning outcomes.

The data collection stage was done by giving the test instrument about fungi topics. The test instrument was given to measure procedural knowledge, it measured by using 8 questions essay test while cognitive learning outcomes by using 30 questions multiple choices test. Prior to data analysis, prerequisite test was done by normality test, homogeneity and data linearity. Data analysis technique used was regression technique.

## RESULTS AND DISCUSSION

Prior to data analysis, normality, homogeneity, and linearity tests were performed. The normality test used was Kolmogorov-smirnov test. Data is said to be normal when  $\text{sig} > 0.05$ . Based on data normality test results, the distribution of procedural knowledge data, and learning outcomes were normally distributed. On procedural knowledge, P value was equal to  $0.055 > 0.05$  means data was normally distributed. On learning outcomes, P value was equal to  $0,051 > 0,05$ , also means data was normally distributed.

**Table 1.** Normality test results

<b>Kolmogorov-Smirnova</b>			
	Statistic	Sig.	Notes
<b>P_Procedural</b>	0,078	0,055	Normally distributed
<b>Learning Outcomes</b>	0,078	0,051	Normally distributed

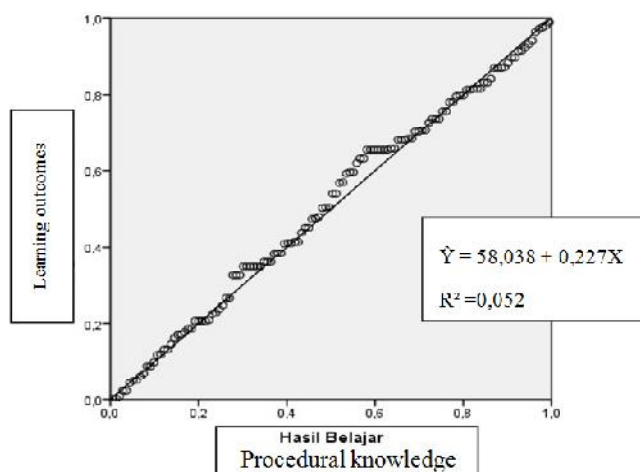
Homogeneity was tested using Levene's Test at a significant 0.05 level. Based on the results of homogeneity test data, it was known that the distribution of procedural knowledge data (X) obtained P value  $0.127 > 0.05$  which means the data had the same variance (homogeneous). Student learning outcomes data (Y) obtained P value  $0.071 > 0.05$  which means the data had the same variance (homogeneous).

**Table 2.** Homogeneity Test Results

	<b>Levene's Statistic</b>		<b>Notes</b>
	<u>statistic</u>	<u>Sig</u>	
<b>P_Procedural</b>	1,937	0,127	Homogeneous
<b>Learning Outcomes</b>	2,401	0,071	Homogeneous

Data linearity was tested by F test, if the value of r was smaller or equal to  $\alpha$  (sig <0.005) then the data was distributed in linear pattern. Based on the results of linearity test data using F test, it was known that the data of students' procedural knowledge on biology subject matter (X) with student learning outcomes (Y) obtained sig 0.180 > 0.05 which means the data has a linear pattern.

According to the results of correlation test on students in XMIA class, it was known that correlation value obtained was 0.227, which means the level of relationship between procedural knowledge with learning outcomes was in low categories. The R value shows the level of linear relationship or the correlation value of procedural knowledge with learning outcomes (0.227). The value of correlation coefficient was  $R^2 \times 1y = 0.052$ , means the magnitude of the relationship of procedural knowledge in the ups and downs of the learning outcomes of the class X MIA was 5.2%. The regression coefficient between procedural knowledge variable and learning outcomes is equal to 0,218, with constant (a) 58,038 so that regression line equation was  $\hat{Y} = 58,038 + 0,227X$ . With the value of  $t_{count}$  was 2.620 >  $t_{tab}$  1.657 on the significance level of 0.010 < 0.05, then the alternative hypothesis ( $H_{a1}$ ) was accepted. This means that there was a significant relationship between procedural knowledge with learning outcomes in the fungi topics. The relationship of procedural knowledge with learning outcomes can be seen in Figure 1.



**Figure 1.** Relation Between Procedural Knowledge With Learning Outcomes In Fungi Topics Of Class X MIA SMAN 6 Medan



According to the result of regression test in Figure 1., it was known that the regression equation line shows a positive relationship, meaning that the higher the value of procedural knowledge then the higher the value of student learning outcomes. Positive regression equation shows a positive relationship, meaning the higher the value of X1 the greater the value of  $\hat{Y}$ . From that equation could be understood that the increase of 1 unit of procedural knowledge value then the learning outcomes will rise by 58,038. Figure .1 shows the points follow and approached the diagonal line that states that the regression meets the assumption of normality.

Procedural knowledge is important to own by students where in biology subjects, students conduct experiments or practicum which involves procedural knowledge. Practical activities conducted directly by students lead to high understanding and memory because students are directly involved therefore could improve their learning outcomes. Based on the results of research obtained from 128 students, found that the average value of students' procedural knowledge on fungi topics was 61.6, means include in medium category. According Sahdra (2003) knowledge of biology is not only obtained from the theory alone, but through procedural knowledge where they do things that involve both motor skills and cognitive skills.

Regression analysis result showed that the level of students' procedural knowledge has a positive relationship with learning outcomes. This study found a significant relationship between procedural knowledge with learning outcomes with a significance of  $0.010 < 0.05$ . Contribution of procedural knowledge in influencing the ups and downs of student learning outcomes on fungi topics of class Mia Class X was 5.2%. The findings indicate that procedural knowledge had a positive and significant contribution to the high and low student learning outcomes in fungi topics. Cognitive aspects can be suppressed based on concepts one develops through experience and what is learned from the environment[5]. The experiences of the learner can develop if they can experience by themselves, practicum is one of the appropriate means to develop students' procedural knowledge.

Procedural knowledge is trained through laboratory activities, but in this study the level of students' procedural knowledge with students' learning outcomes on fungi topics is in the low category because the students are less empowering their procedural knowledge or less serious during the learning process/practicum[1]. Another indication that cause student's low procedural knowledge is the lack of concentration during practicum which can support the students' procedural knowledge[4]. knowledge of biology is not only through his theory but through procedural knowledge where they do things involving both motor skills and cognitive skills. If students have done well practicum activities then students not only train their cognitive skills but also procedural and motor skills.

## CONCLUSIONS

Based on research results and data testing analysis, it can be concluded that There was a significant relationship between procedural knowledge with the biology learning outcomes of class X MIA students by 5.2% ( $P = 0.010$ ).

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