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The Correlation Between Biology Learning Outcomes and Senior High School Students' Self Concept

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Abstract

This study aimed to understand the correlation between academic self-concept and biology learning outcomes on high school students at virus material. The design used in this study was correlational. This study used descriptive quantitative as its method. The subjects of this study were tenth-grade students of senior high school in Tangerang Regency. The subjects of this study consisted of 135 respondents men and women, there were 102 respondents were taken as the sample through a simple random sampling technique. The data were obtained using the instrument of academic self-concept and students' learning outcomes on virus material. The learning outcomes were based on the multiple-choice test. After that, the obtained data were analyzed using Pearson Product Moment (PPM) of the SPSS 16 version. The results show that there is a positive and significant correlation between academic self-concept and biology learning outcomes of students with the coefficiency (r_{x1y}) of 0.553.

Keywords: Academic Self-Concept, and Learning Outcomes
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INTRODUCTION

Learning is one of human efforst to improve their abilities, both intellectually and emotionally can be interpreted as a complex process to change behavior through exercises, observation, and other learning processes. According to Biggs & Tang (2011) in Lenk *et al.,* (2018) learning outcomes are students' skills, knowledge or attitudes that should develop as a result of their learning. Learning outcomes can be observed and measured in form of change either cognitively, affective, or psychomotor. Learning process is influenced by internal and external factor (Lindholm, 2010). Internal factors consist of physiological factors (physical health) and psychological factors (self desire, motivation and self concept). External factors consist of environmental factors, such as family, friends and facilities and infrastructure at school. Learning environment at school influences students' attitudes towards learning so that it impacts their academic achievement (Blackmore et al., 2011; Cleveland & Fisher, 2014; Painter et al., 2013; Tanner, 2008 in Byers: 2018). According to Jensen *et al.,* (2015) the main factor which influences a learning process and outcome of science subject is academic self-concept. Some large-scale studies such as PISA have examined students' self-concepts in general science, while other researchers have developed different steps in the science subdomain and the results show students with good self-concepts can distinguish their academic self-concepts in biology, physics or chemistry (Jansen, *et al*., 2019).

Self concept is a person's persepective or attitude towards himself. According to Cokley in Khalaila (2014) self-concept covers a set of students' attitude, belief, and perception based on their intellectual or performance and skill. Students who have good academic self-concept will easily to understand their abilities and potential within themselves. Through self concept , students more easily recognize their abilities and desire, so that student will be motivated to reach the goals they are aiming for. In general academic self concept is defined as a psychological construction used to describe students beliefs about their abilities in certain academic fields (Flowers, *et al*., 2013). In the formation of academic self-concept, age is deemed to have a major contribution, with the period until middle adolescence being particularly vulnerable to declines (Marsh & Hocevar, 1985; Wigfield *et al.,* 1991). Two major influencing factors during this period are the transition from elementary to secondary schools and

shifts in educational contexts (Wigfield & Eccles, 2002); Wigfield *et al.,* 2015). Between middle and late adolescence, academic self-concept then becomes more stable and less prone to changes (Marsh, 1989) in Kulakow (2020).

Students who have good academic self-concept have a positive relationship with learning motivation which leads them to have a satisfactory achievement, so students are able to recognize their academic abilities that will help in achieving learning outcomes. Students who have high academic self-concept will also have high motivation in completing tasks from the schools (Baran *et al.,* 2011). Academic self-concept will become more stable as students grow older (Guay *et al.,* 2010). On the contrary, students who have low academic self-concepts tend to have low self-esteem. Thus, their learning motivation is not formed which leads to unsatisfactory learning outcomes. Students with negative self-concepts do not have confidence in their abilities, subjective, and cannot accept criticism (Rady *et al.,* 2016). Students who have low academic self-concepts have no control over their successes and failures in learning and in adjusting learning environment. This proves that there is a correlation between academic self-concept, learning outcomes and students learning motivation. Self-concept can be related to self-regulated learning and independent learning (Mynott, 2018).

Learning outcomes are the level of students' knowledge, skill and abilities which have been achieved as a result of a commitment to cooperation in the academic field (Lindholm, 2010). Bloom classifies learning outcomes into three categories namely cognitive, affective and psychomotor. The result of learning activities seen by a change in behavior that is more positive. Learning outcomes are references for standard and quality as well as for the development of curriculum in terms of teaching and learning. While, learning objectives describe the intended purposes and expected results of teaching activities and establish the foundation for assessment (Aziz *et al.,* 2012).

Academic learning is a type of learning that has superior quality features such as autonomy, intrinsic motivation, self-control, self-direction and self-regulation of the activity of students (Neacşu :2006 in Magdalena: 2015).

Previous research has found many positive effects of academic self-concepts on student achievement in the academic field, such as research conducted by Craven & Marsh, 2008; Marsh & Craven, 2005, 2006; Marsh, & O'Mara, 2008 (Arens *et al.,* 2014). As expressed by Villegas *et al.,* (2013) self-

concept has a significant influence on cognitive function. Thus, self-concept is important and necessary in education. Liu (2010) suggests that academic self-concept acts as a predictor of learning that significantly and strongly influences one's motivation. According to pahlivan (2010) in Baran *et al.,* (2011) explain that there is a relationship between academic self concept with internal and external factors with students' academic or learning outcomes. Academic self-concept plays a critical role in identity formation (Marsh & Hau, 2003) and is considered to be important for academic success in school (Mendaglio, 2013) in Townend *et al.,* (2016).

In fact, not all students are able to understand their own academic self-concept. However, this academic self-concept will be reflected in motivation so that it will affect the learning outcomes. Students who understand academic self concept have control over successes and failures in engaging in academic work , adjusting to friends and teachers, and tend to have a more positive perception of themselves. Students who are less able to understand the material generally get an unsatisfactory test score or below the Minimum Mastery Criteria. Therefore, it is necessary to investigate the correlation between academic self-concept of students and their biology learning outcomes, especially in virus material.

METHOD

The objective of this study is to understand the correlation between academic self-concept and biology learning outcomes of students. This study was conducted at SMAN 19 Tangerang. The method used was a quantitative method with the correlational study. Academic self-concept was set as a free variable while the learning outcomes were set as a bounded variable. The sample of tenth-grade students majoring Mathematics and Science were chosen by using cluster random sampling technique. From the total of 135 respondents men and women, there were 102 respondents were taken as the sample through simple random sampling technique.

Meanwhile, the students' academic self-concept was measured through self-perception profile for the adolescent instrument developed by Harter (2012). Meanwhile, students' learning outcomes were measured using cognitive learning test results and refers to six levels of Bloom's taxonomy and three indicators on virus material. Each question represents each indicator and cognitive domain C1- C6.

RESULTS AND DISCUSSION

The obtained data regarding students' academic self-concept in SMAN 19 Tangerang identified that the highest score was 77 while the lowest was 42. The standard deviation was 7.674 while the average score of academic self-concept was 57.60. The range of 56.5 - 61.5 identified the highest number of frequencies with an absolute frequency of 27 and a relative frequency of 26.5%. Meanwhile, the range of 76.5 - 81.5 identified the lowest number of frequencies with an absolute frequency of 1 and a relative frequency of 1.0%. The frequency distribution of students' academic self-concept scores was presented in Figure 1.

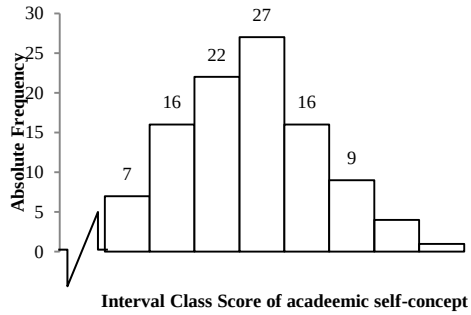

Figure1. The Frequency Scores Distribution of Academic Self-Concept Distribution

The scores of student's academic self-concept were presented based on six indicators. The scores of every indicator are 41.9% learning competence, 62.5% social competence, 49.7% job competency, 59.5% attractiveness, 54.5% behavior, and 57.8% friendship (Figure 2).

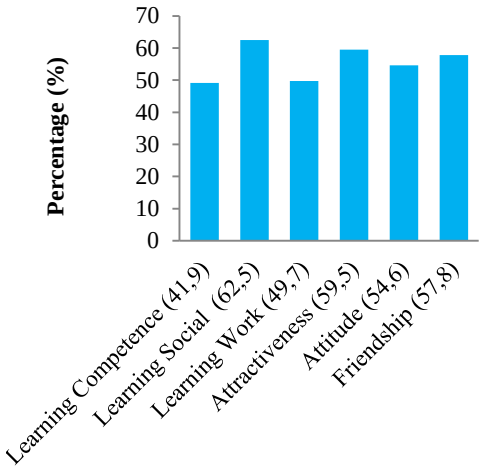

Figure 2. Scores Distribution of Academic Self Concept Based on Six Indicators

The learning outcomes of the biology subject of SMAN 19 Tangerang students identified that the highest score was 86 and the lowest score was 46. The standard deviation was 9.006. The average score of students' learning outcome was 66.08. The score range of 63.5-69.5 identified the highest number of frequencies with an absolute frequency of 28 and a relative frequency of 27.5%. The score range of 81.5-87.5 identified the lowest number of frequencies with an absolute frequency of 6 and a relative frequency of 5.9%. The frequency distribution of the learning outcomes was presented in figure 3.

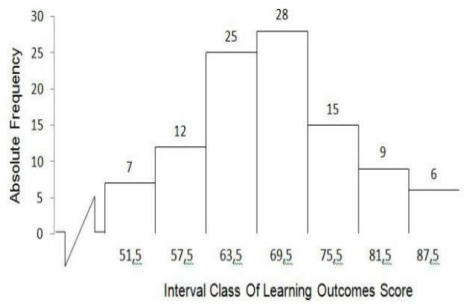

Figure3. Frequency Score Distribution of Biology Learning Outcomes

Based on the analysis of the pretest results, it can be inferred that the data in the study came from the population and were normally distributed and homogeneous. The regression and linear test obtained a regression model that was $\hat{Y} = 28{,}730 + 0{,}648X_1$. Based on that formula, it can be interpreted that if there is an increase of 1 score in academic self-concept (X1), it will be followed by an increase in learning outcomes of 0.648 in the constant 28.730 through a regression model $\hat{Y}$. Thus, it can be concluded that the correlational model between academic self-concept and learning outcomes in linear.

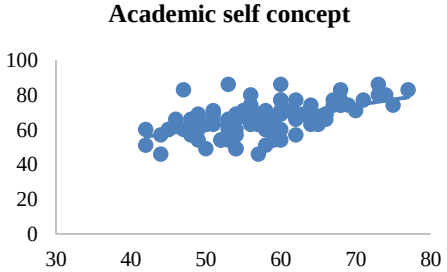

Figure 4. Simple linear regression model between academic self-concept and biology learning outcomes.

The data on Figure 1 presents the most score frequency was in the range of 56.5-61.5 of 26.5%. The distribution of academic self-concept in Figure 2 identified that each indicator had a similar proportion of spread. It can be concluded that the six indicators of academic self-concept that exist within students play a role in determining the tendency of students' self-reflection. Students who often reflects on themselves tend to be more aware of the advantages and disadvantages of self-owned learning.

The results of hypothesis testing identified the positive correlation between academic self-concept and biology learning outcomes of senior high school students in virus material with the correlation of 0.648. That number was considered as strong through Simple Correlation Coefficiency Test. This positive correlation identified academic self-concept which had a contribution to high school students' learning outcomes of biology subject as much as 30.5%. Academic self-concept will support students in learning biology in order to improve their learning outcomes in that subject.

Academic self-concept contributes to biology learning outcomes because there are internal factors inside the students who are able to determine

students' tendency to act and to face any event happens during the learning process of biology subject. For example, during the learning process inside the classroom, the students who have high academic self-concept will be able to understand and to evaluate themselves. Thus, the learning outcomes will be linear. There is a correlation between professional values and students' self-concepts, so that positive representations are formed in the future (Sagone, et al., 2014).

The findings in this study are in line with the findings of Dramanu *et al.*,(2013) because there was a significant correlation between academic self-concept and students' academic performance. This study is in accordance with the study conducted by Jansen *et al.*(2015) which found a significant positive correlation between academic self-concept and science learning outcomes. Sikhwari (2014) also supports this study by stating that academic self-concept has a significant impact on students' lives, especially their academic achievement based on motivation and gender. In addition to learning outcomes, a student's high self-concept is the result of the desired education (Schutte, et.al., 2016).

This study proves that academic self-concept is important in the context of good academic achievement because students are able to acknowledge their weakness and strength. Students who have good academic self-concept will have control over their success and failure in academic, socialize with their friends and teachers, and tend to have a positive perception of themselves (Matovu, 2012).This is in accordance with the achievement of every indicator in this study where the scores of social competence are spread compared to others as much as 62.5 % (figure 3). Among the most important influences on students' academic self-concept are performance feedback and social comparison processes (e.g., Huguet et al., 2009; Seaton, Marsh, & Craven, 2010)

Vidals (2005) *in* Villages *et al.*, (2013) suggested that there is a direct relationship between students' learning process, academic self-concept, and academic achievement. Mars *et al.*, in Green (2016) stated that academic self-concept is a very important educational supporting factor related to learning outcomes and student achievement in various studies from 1990 to 2003. Another study conducted by Coetzee (2011) found that academic self-concept contributed significantly to academic achievement as well as the presence of other influencing factors such as motivation. Thus, academic self-concept is closely intertwined with academic

achievement and develops through temporal comparison (individual performance at an earlier point in time), dimensional comparison (performance across different subjects), and social comparison (standing within a class) (Sewasew *et al.*, 2019).

CONCLUSION

Academic self-concept has a positive correlation with students' biology learning outcomes. It means that if academic self-concept is improved, students biology learning outcomes will also improve.

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