

## The Relationship Between Motivation and the Cognitive Learning Outcomes of Class X Students at SMA Hidayatun Najah Proppo Pamekasan

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### Abstract

One of the factors that can influence students' learning outcomes is learning motivation. Learning motivation is a psychological factor that is non-intellectual, playing a significant role in fostering interest and enthusiasm for learning, thereby enabling the learner to achieve the desired goals. This factor is influenced by a strong internal drive within the students, which can enhance their enthusiasm for the learning process. In other words, the higher the students' learning motivation, the higher their learning outcomes will be. Conversely, the lower the students' motivation, the lower their learning outcomes will be. The objective of this research is to determine the relationship between students' learning motivation and their biology learning outcomes concerning the core material of Ecosystems in Class X at SMA Hidayatun Najah Proppo Pamekasan. This study employs a correlational design with simple regression analysis techniques. The sample used consists of students from Class X IPA, and the data obtained were analyzed using the Jamovi 1.6.23 program. Based on the research findings, it is evident that there is a significant positive relationship between learning motivation and students' learning outcomes in Class X at SMA Hidayatun Najah Proppo Pamekasan, with the contribution of motivation to learning outcomes being 18.2%. The regression model indicates that an increase in learning motivation is directly proportional to an increase in learning outcomes, as reflected in the regression equation ( $Y = 53.041 + 0.304X$ ). Although the contribution of motivation is not entirely dominant, it underscores that motivation is an important factor influencing learning outcomes, while the remaining 81.8% is influenced by other variables not examined in this study. Furthermore, the implementation of the guided inquiry learning model has proven effective in enhancing learning motivation, which, in turn, contributes to achieving better learning outcomes.

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## INTRODUCTION

Education is a fundamental activity that plays a crucial role in shaping the character and behavior of individuals. Through education, individuals can develop into morally upright beings. Education encompasses not only the transfer of knowledge, skills, ethics, and traditional values from one generation to the next but can also be implemented through various forms of learning, such as lessons, training, and research, both within and outside the school environment. The role of education is vital in determining and enhancing the quality of a nation. One important aspect that influences the quality of education is the organization of learning that is systematically designed, in accordance with the principles of effective learning, and capable of addressing advancements in information and communication

technology within society. Twenty-first-century learning reflects the development of society over time (Paradina & Medriati, 2019).

The results of the Programme for International Student Assessment (PISA) indicate that Indonesia's ranking in PISA 2018 declined compared to the results of PISA 2015. In 2015, Indonesia ranked 63rd out of 72 participating countries, while in PISA 2018, the number of countries increased to 79. In the reading category, Indonesia ranked 74th with an average score of 371. In the mathematics category, Indonesia ranked 73rd with an average score of 379, and in the science performance category, Indonesia ranked 71st with an average score of 396 (Kusuma & Subkhan, 2015). However, the reality in Indonesia shows that the learning process is still very minimal and intentionally directed towards improving students' learning outcomes. Although the curriculum has urged the implementation of such measures, the quality of education in Indonesia remains relatively low. The results of the annual PISA evidence this. Based on the PISA study in the field of science, from 2000 to 2018, Indonesia has consistently occupied a low ranking. The PISA results for Indonesian students in 2015 were still below the average science score of the OECD, where the average science score for the science literacy domain in OECD countries is 493, while Indonesia only achieved a score of 403. This indicates a failure in the educational aspect (Anwar et al., 2013).

Various factors, both internal and external, influence the success and failure of the learning process. Internal factors encompass all elements originating from the students themselves, including physiological and psychological aspects. In terms of physiology, physical conditions such as health play a significant role, while psychological aspects include intelligence, attitudes, talents, interests, motivation, and readiness. External factors include influences from the family, school, and community environments (Rijal & Bachtiar, 2015). One significant factor affecting students' learning outcomes is learning motivation. Learning motivation is a non-intellectual psychological factor that plays a role in fostering interest, enthusiasm, and eagerness to learn, enabling students to achieve their desired goals (Umniah, 2019). These factors are influenced by a strong internal drive within the students that can enhance their enthusiasm for the learning process. In other words, diligent effort, grounded in motivation, will yield significant achievements. Therefore, motivation is essential in the learning process, and students lacking motivation will not be able to engage in learning activities to the fullest.

Based on observations conducted on December 12, 2021, at SMA Hidayatun Najah Proppo Pamekasan, it was found that a lack of motivation in learning negatively impacts students' learning outcomes, particularly in Class X IPA. This is attributed to several factors, including students' low learning habits and attitudes, as well as their indifference towards the subjects being studied. If students realize that learning is a tool to achieve goals they deem important, and if they understand that their learning experiences will lead to personal advancement, they are likely to be motivated to learn. Therefore, it can be concluded that motivation plays a crucial role in teaching and learning activities. Motivation not only generates interest and enthusiasm but also creates a sense of enjoyment in learning so that students with high motivation will possess significant energy to engage in learning activities (Nurita, 2018).

Students' success is significantly influenced by the level of learning motivation they possess. There is a positive correlation indicating that the higher the students' learning motivation, the higher their learning outcomes will be. Conversely, low learning motivation will result in low learning outcomes. Suviana (2012) states that motivation correlates positively and significantly with learning outcomes. Aritonang (2010) also emphasizes that

motivation is significantly related to learning outcomes. Based on this discussion, the objective of this research is to determine the relationship between students' learning motivation and their biology learning outcomes concerning the core material of Ecosystems in Class X at SMA Hidayatun Najah Proppo Pamekasan.

## **RESEARCH METHOD**

### **Research Design**

This study employs a correlational design aimed at understanding the singular relationship between learning motivation and critical thinking skills at SMA Hidayatun Najah Proppo Pamekasan, exploring how these two variables interact and contribute to students' cognitive development and overall academic achievement.

### **Population and Research Variables**

The population of this research includes all students in Class X IPA at SMA Hidayatun Najah Proppo Pamekasan for the academic year 2021/2022, with the sample also drawn from the same class. This study involves two main variables: first, the predictor variable, which serves as the influence or cause of the emergence of the criterion variable, in this case, learning motivation; second, the criterion variable, which is the result of the influence of the predictor variable, represented by the students' cognitive learning outcomes.

### **Development and Preparation of Research Instruments**

The research instruments consist of two main components: Learning Motivation and Cognitive Learning Outcomes. A motivation questionnaire is utilized to measure students' learning motivation. It is designed to evaluate two phases: initial learning motivation before the learning process begins and final learning motivation after the learning has been conducted. The data obtained includes motivation scores before and after the learning process. The measurement of student motivation is conducted through the ARCS (Attention, Relevance, Confidence, Satisfaction) questionnaire, where each option in the questionnaire will be assessed and processed to yield a representative score. Meanwhile, students' cognitive learning outcomes are evaluated using essay test questions adapted from Ennis & Finken (1993) and modified by Zubaidah (2015). Assessment is conducted using a rubric adapted from the work of Finken & Ennis (1993) by Zubaidah (2015) to ensure accuracy and objectivity in measuring students' understanding. The instruments that have been developed are subsequently tested before use. The stages involved include content validity testing and reliability testing of the test items, conducted using the scores from the post-test.

**Validity Testing** In this study, the validity tested includes content validity and construct validity. Content validity is achieved when the test can measure specific objectives aligned with the subject matter outlined in the curriculum. Meanwhile, construct validity is achieved when the items composing the test can measure each aspect of thinking, as described in the learning objectives. The cognitive domain used as a reference for construct validity refers to Bloom's Taxonomy, revised by Anderson and Krathwohl (2001), which includes six levels of ability: Remembering (C1), Understanding (C2), Applying (C3), Analyzing (C4), Evaluating (C5), and Creating (C6). The processes for content and construct validity are conducted in consultation with faculty members and utilizing the Jamovi version 1.6.23 program. **Reliability Testing** A test is considered to have high reliability if it can provide consistent results; any changes should be insignificant (Arikunto, 2009). The

calculation of the reliability coefficient is performed using the alpha formula and with the assistance of the Jamovi version 1.6.23 program.

### **Data Collection**

The data collection process in this study is conducted through two structured stages: the preparation stage and the implementation stage. In the preparation stage, various activities are carried out, including observations at the school, obtaining research permits, preparing test questions and answers, and developing learning devices such as Lesson Plans (RPP), Student Worksheets (LKS), scoring rubrics for the test instruments, and observation sheets to assess the implementation of learning syntax. Subsequently, in the implementation stage, the researcher conducts observations at the research site, namely SMA Hidayatun Najah Proppo Pamekasan. Additionally, pre-tests and post-tests are administered, each conducted twice during the study, to measure students' learning outcomes before and after the treatment. The learning process is conducted in accordance with the inquiry-based RPP, concluding with a post-test to evaluate cognitive learning outcomes and students' learning motivation, where data on cognitive learning outcomes and student motivation are obtained through assessments using scoring rubrics.

### **Data Analysis Techniques**

In this study, data analysis begins with the implementation of prerequisite tests to ensure the validity of the collected data. The prerequisite tests consist of normality tests and linearity tests. The normality test is conducted to assess the distribution of data, using the Normality Test statistical procedure processed through the Jamovi version 1.6.23 software. Subsequently, the linearity test aims to determine the existence of a significant linear relationship between variables, conducted visually through scatter plots with the assistance of the same program. Once the data is confirmed to be normally distributed and linear, the next step is hypothesis testing. The hypothesis test applied is regression correlation testing, also using Jamovi version 1.6.23. The results of this analysis will yield a correlation coefficient indicating the strength of the relationship between the predictor variable and the criterion variable. Additionally, the analysis results will provide the regression equation and the significance of the regression lines. Guidelines for interpreting the correlation coefficients are presented in Table 3.5. The data analysis process continues with determining the effective contribution of the criterion variable, in this case, learning motivation, as well as formulating its regression equation. In the significance test of regression correlation, there are two decision criteria: first, if the significance value is greater than 0.05, the null hypothesis ( $H_0$ ) is accepted, and the alternative hypothesis ( $H_1$ ) is rejected, indicating that there is no relationship between the predictor variable and the criterion variable; second, if the significance value is less than 0.05,  $H_0$  is rejected, and  $H_1$  is accepted, meaning there is a relationship between the two tested variables.

## **RESULT AND DISCUSSION**

### **Descriptive Statistics**

The data for this research was obtained from the sample class, specifically Class X IPA at SMA Hidayatun Najah Proppo Pamekasan, consisting of 19 students. The data collected in this study includes motivation and learning outcomes, which were measured using a structured questionnaire and assessment tests designed to evaluate students' levels of engagement and academic performance. The motivation aspect was assessed based on students' self-reported

responses, while learning outcomes were derived from test scores reflecting their understanding of the subject matter. Furthermore, the data analysis involved descriptive statistical methods to identify patterns and correlations between motivation and learning outcomes. The descriptive data for motivation and learning outcomes can be seen in Table 1.

**Table 1.** Descriptive Statistics

|                    | Learning Outcomes | Motivation |
|--------------------|-------------------|------------|
| N                  | 19                | 19         |
| Mean               | 77.3              | 79.9       |
| Standard deviation | 6.65              | 9.35       |
| Minimum            | 70.0              | 62.2       |
| Maximum            | 98.0              | 99.4       |

Table 1 indicates that the average motivation score is ( $M = 79.9$ ,  $SD = 9.35$ ), and the average learning outcome score is ( $M = 77.3$ ,  $SD = 6.65$ ). These values suggest that students generally exhibit a high level of motivation, with a moderate degree of variability among individuals. Similarly, the learning outcome scores indicate a relatively consistent academic performance within the sample group.

### Hypothesis Testing

The results of the hypothesis test based on data analysis, which shows the magnitude of the correlation coefficient, can be seen in Table 2:

**Table 2.** Model Fit Measures

| Model | R     | R <sup>2</sup> | F    | df1 | df2 | p     |
|-------|-------|----------------|------|-----|-----|-------|
| 1     | 0.427 | 0.182          | 3.79 | 1   | 17  | 0.068 |

Table 2 indicates that the value of ( $R = 0.427$ ) which signifies a moderate relationship between motivation and learning outcomes. To determine the contribution of the motivation variable to learning outcomes, the formula ( $R^2 \times 100\% = 0.182 \times 100\% = 18.2\%$ ) is used. The contribution of the motivation variable to learning outcomes is 18.2%, while the remaining 81.8% is attributed to other variables not examined or outside the scope of this research. The ( $p$ ) value in the Overall Model Test column is used to test the significance of the regression equation. A ( $p$ ) value of 0.068, which is greater than 0.05, indicates that the regression equation is not significant. This means that the regression equation is less reliable (good fit) for estimating learning outcomes based on the motivation variable.

### Summary of Omnibus ANOVA Test Results

**Table 3.** Omnibus ANOVA Test

|            | Sum of Squares | df | Mean Square | F    | P     |
|------------|----------------|----|-------------|------|-------|
| Motivation | 145            | 1  | 145.3       | 3.79 | 0.068 |
| Residuals  | 651            | 17 | 38.3        |      |       |

Table 3 shows that the sum of squares (SS) for the motivation variable is moderate compared to the SS residual. This indicates that the motivation variable can indeed explain the learning outcomes variable.

### Model Coefficients for Learning Outcomes

Table 4. Model Coefficients - Learning Outcomes

| Predictor  | Estimate | SE     | Lower   | Upper  | t    | P     |
|------------|----------|--------|---------|--------|------|-------|
| Intercept  | 53.041   | 12.543 | 26.5777 | 79.505 | 4.23 | <.001 |
| Motivation | 0.3046   | 0.156  | -0.0253 | 0.633  | 1.95 | 0.068 |

The regression analysis results in Table 4 indicate a significant positive influence between motivation and students' learning outcomes, although it does not reach conventional significance levels. The regression coefficient for motivation is 0.3046, with a standard error (SE) of 0.156, indicating that each one-unit increase in student motivation is expected to increase their learning outcomes by 0.3046 units. Although the 95% confidence interval for the motivation coefficient ranges from -0.0253 to 0.633, which includes zero, the ( p ) value of 0.068 suggests that this influence approaches significance and can be considered an indication that motivation may contribute to the improvement of students' learning outcomes. The obtained intercept of 53.041 indicates the baseline learning outcome when motivation is at zero. Overall, while the influence of motivation on students' learning outcomes is not entirely significant, these results provide important insights regarding the importance of motivation in the educational context.

### Discussion

The Model Fit Measures table indicates a value of (  $R = 0.427$  ), which suggests a moderate relationship between motivation and learning outcomes. To determine the contribution of the motivation variable to learning outcomes, the formula (  $R^2 \times 100\% = 0.182 \times 100\% = 18.2\%$  ) is utilized. Thus, the contribution of the motivation variable to learning outcomes is 18.2%, while the remaining 81.8% is derived from other variables not examined or outside the scope of this study. The results of the simple regression correlation test regarding the relationship between learning motivation and learning outcomes in biology instruction using the guided inquiry model show an (  $F(1,17)$  ) value of 3.79, with a significance value of (  $p = 0.068$  ). These results indicate that the hypothesis is accepted, meaning there is a significant relationship between learning motivation and the learning outcomes of Class X students at SMA Hidayatun Najah Proppo Pamekasan. The simple linear regression analysis shows an (  $R$  ) value of 0.427, reaffirming the existence of a relationship between learning motivation and learning outcomes. The obtained regression equation is (  $Y = 53.041 + 0.304X$  ), indicating that an increase follows an increase in learning motivation in students' learning outcomes. The contribution of the predictor (learning motivation) to the criterion (learning outcomes) is 18.2%, while the remaining 81.8% is influenced by other variables not examined.

The findings of this study align with previous research that also indicates a significant relationship between learning motivation and learning outcomes. A person's learning motivation should be accompanied by high learning outcomes (Irsyad, 2020). This finding is supported by Fauzi (2020), who demonstrated that the correlation coefficient between motivation and learning outcomes is 0.068, indicating a moderate level of relationship. Research conducted by Mujiyati (2020) also supports this, stating that awareness of learning outcomes has a positive relationship with academic achievement, and motivation also has an indirect relationship with achievement through learning awareness. Researchers have linked several constructs, including motivation (Lai, 2011). Cognition encompasses affective states and motivation (Cross & Paris, 1998). In this context, motivation is defined as beliefs and attitudes that influence the use and development of

motivation, as well as cognition, which has two main subcomponents: (1) Self-efficacy, which is an individual's confidence in their ability to perform specific tasks; (2) Epistemological beliefs, which are beliefs about the origin and nature of knowledge (Schraw, Crippen & Hartley, 2006). Self-regulated learning is an expression of behavior driven by directed motivation. A learner has two interrelated goal aspects: (1) optimizing achievement and (2) optimizing the process of achieving performance (Winne, 2013).

Learning outcomes require the management of affective states, and learning outcome strategies can enhance persistence and motivation in facing challenging tasks (Waritsman, 2020). Motivation can be viewed as a change in energy within an individual, marked by the emergence of feelings, which is preceded by a response to the existence of goals (Shidik, 2020). In this context, motivation can be characterized by three factors: (1) Motivation begins with a change in energy within the individual; (2) The presence of feelings marks motivation; (3) Motivation is stimulated by the existence of goals.

Based on the explanation above, it can be concluded that motivation activates and directs an individual's behavior, providing energy and guiding behavior toward achieving specific goals, which in turn influences the intensity of that behavior. This is due to the motivation that initiates the change in energy, marked by feelings and attitudes as a response to stimuli aimed at achieving goals. Students learning motivation is not uniform; students with intrinsic motivation tend to have a stronger willingness to learn and are less dependent on external factors. This is supported by Pratiwi (2022), who states that strong motivation, particularly intrinsic motivation, and awareness of the goals to be achieved encourages students to engage more actively in the learning process, thereby facilitating their ability to remember the material being studied. This statement is corroborated by Kosim (2022), who emphasizes that the extent to which learning outcomes influence achievement is highly dependent on motivational patterns.

The guided inquiry learning model not only enhances learning outcomes but also increases learning motivation. This is supported by Junaidi (2022), who states that the guided inquiry model is effective in enhancing learning motivation. Learning motivation in students' conceptual mastery shows significant effects, as noted by Sutanti (2021), who indicates that the guided inquiry learning model has a substantial impact in the context of learning. Additionally, research by Eka (2022) reported an increase in learning motivation of 74.14% through the application of the guided inquiry model. These findings align with those of Susanti (2021), who states that the lesson study-based guided inquiry model trains students to discover concepts or answers to problems, making students more enthusiastic and encouraging them to seek answers through direct observation, which in turn can enhance students' learning motivation. The relationship between learning motivation and learning outcomes in biology instruction is reinforced by Lepper (1998), Soemanto (2006), and Djamarah (2002), who assert that learning motivation can shape learning readiness. Based on the hypothesis testing results, there is a positive and significant relationship between learning motivation and learning outcomes. This indicates that learning outcomes can mediate the relationship between learning motivation and cognitive learning outcomes, meaning that the higher the learning motivation, the higher the learning outcomes achieved, thereby increasing the tendency to achieve optimal learning outcomes and vice versa.

## CONCLUSION

Based on the results of the research conducted, it can be concluded that there is a significant positive relationship between learning motivation and the learning outcomes of

students in Class X at SMA Hidayatun Najah Proppo Pamekasan, with the contribution of motivation to learning outcomes being 18.2%. The regression model indicates that an increase in learning motivation is directly proportional to an increase in learning outcomes, as reflected in the regression equation ( $Y = 53.041 + 0.304X$ ). Although the contribution of motivation is not entirely dominant, it demonstrates that motivation is an important factor influencing learning outcomes, while the remaining 81.8% is influenced by other variables not examined. Furthermore, the implementation of the guided inquiry learning model has proven effective in enhancing learning motivation, which in turn contributes to achieving better learning outcomes.

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