

## The Influence of Learning Style, Learning Independence, and Learning Creativity on Students' Physics Learning Outcomes in the Implementation of the Merdeka Curriculum



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**ABSTRACT:** This research is Ex Post Facto research which aims to determine the influence of learning style, learning independence and learning creativity on physics learning outcomes. The data source in this research is students in the implementation of the Independent Curriculum. The population in this study was all 12 class X students of SMAN 1 North Toraja, while the sample was 220 people. The method used in data collection is a test method by administering non-test instruments to determine the influence of learning style, learning independence and learning creativity on students' physics learning outcomes. The data analysis techniques used are descriptive statistical analysis, inferential analysis and Path Analysis. The research results obtained show that there is an insignificant positive influence between learning style, learning independence and learning creativity on students physics learning outcomes in the Implementation of the Independent Curriculum.

**KEYWORDS:** learning styles, self-directed learning, learning creativity, learning outcomes, Merdeka Curriculum

### INTRODUCTION

The Merdeka Curriculum is a project-based curriculum that emphasizes helping students develop soft skills and characters in line with the Pancasila Student Profile. It is also inspired by the thinking of Ki Hajar Dewantara, which aligns with nature and the times. The Merdeka Curriculum method is well-organized and provides students with more freedom during learning activities. It also emphasizes new methods in presenting information or content, as well as various knowledge materials. The Merdeka Curriculum provides a clearer, more flexible curriculum and learning framework that emphasizes the development of students' knowledge and skills. It emphasizes the students' role and asks educators to take initiative and use creativity to help children reach their full potential. For students to successfully complete each learning activity and meet the required learning objectives, they must be able to learn independently, creatively, and critically.

Learning is the process of interaction between teachers and students in a learning environment. This interaction is supported by the attitudes of the students, where the attitude of the students is very important in the learning process. This is in line with Sari (2019:296), who stated, "To achieve a learning goal, the attitude of the students plays an important role in the learning process." Learning is used to provide knowledge and skills to students to achieve learning outcomes. According to Erviani (2016:53), "If educators give students the opportunity to collaborate in various learning activities so that students can actualize their abilities inside and outside the classroom, then the learning will be more meaningful." Thus, students will be more effective in learning to improve their learning outcomes.

Learning outcomes are everything that students achieve after going through the learning process, namely through the teaching and learning process. Students' learning outcomes are used to determine whether they have mastered the material taught by the teacher or not. Learning physics is not just about memorizing theories, but students should be able to think about how to solve problems related to theories.

All achievements made by students after going through the learning process, especially the teaching and learning process, are referred to as learning outcomes. To ensure whether a student has mastered the information taught by the teacher or not, students' learning outcomes are used. Concentration is needed in the learning process, where concentration is a very important aspect in supporting conducive learning. Learning styles can affect concentration in the learning process and ultimately can affect learning outcomes. Learning styles can make the learning process more effective and efficient. Ghufron and Risnawita (2012: 40) explained that learning styles are also a key factor for more effective learning.

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Students who know their learning styles will easily accept the information given to them to be processed internally. Learning styles influence the mastery of subject matter. The existence of learning styles can make a student aware of their characteristics in the learning process. Kolb (1981) in Ghufron and Risnawita (2012: 44) stated, "The difference in learning styles chosen by individuals shows the fastest and best way for each individual in the effort to absorb information from outside themselves." Students often do not know the learning style that suits them and the teaching style of the teacher that does not match the students' learning style. This is one of the factors that drive the less optimal learning outcomes of students. Each student has several unique traits and features that they use to respond to the learning they receive; these characteristics are called learning styles. Students' learning preferences in the form of preferred learning approaches facilitate the assimilation of thoroughly researched materials during the learning process. Activities that help students gather, organize, and process information and materials they acquire can be considered learning styles.

Students' learning outcomes are also influenced by the level of their learning independence. Because with good learning independence, the desired educational goals, including satisfactory learning outcomes, are achieved with excellent learning freedom. Independence refers to someone's attitude not relying on others to fulfill their obligations. Someone who wants to be independent in their learning process must be creative because creativity allows a person to develop their thinking, allowing students to contribute positively rather than just accepting what others say.

A child's ability to learn creatively will certainly be influenced by the education process used in schools, and a child's ability to learn creatively will play a very important role in their learning. One of the many elements that support a good learning process is the learning creativity of students as seen from their learning outcomes. To meet the challenges of the development of science, technology, and information, skilled resources are needed that involve critical, systematic, logical, creative thinking, and the ability to collaborate effectively. This highlights the importance of the education system in encouraging creativity. Because creativity is generated from creative thinking, the education system must be able to encourage it.

Creativity is the ability to understand, interpret, and express ideas and efforts that have the creativity to create new combinations of existing elements in order to improve the quality of students in self-development (Tirtiana, 2013). Because creativity allows someone to find fresh solutions to problems or challenges in learning. Modifying how people behave in a particular context is creativity. Social, cultural, and technical systems shape the learning environment at school. Students are socially connected to teachers and other students to solve problems and grow as individuals. Students' personalities are shaped by many life values they internalize during the learning process.

To conclude, creativity affects how students learn. Particularly in physics learning, the learning styles, independence, and creativity of students in their learning are very important. Students who learn physics in high school still have levels of learning styles, learning independence, and learning creativity that are not good enough. According to Athariq's research (2016: 2), some high school students have low levels of learning independence. The independence of students in doing exams is one sign. However, some students still doubt their ability to complete exams. The low learning outcomes of students in physics learning indicate that the level of students' learning freedom is decreasing. Some students find it difficult to learn independently because they consider physics to be less important in daily life. The low learning outcomes of students in physics can be caused by several factors including factors from the students themselves, teachers, learning methods, and the environment. One of the factors from students that causes low learning outcomes is the lack of creativity in absorbing, organizing, and processing information in the learning provided by teachers.

According to initial interviews and observations conducted with some students of SMAN 1 North Toraja, they said that physics is challenging but sometimes less enjoyable to learn because it only focuses on theory without understanding concepts, making them bored with the subject, but sometimes it's also enjoyable. In physics lessons, some students still lack confidence in their own answers, so they choose to copy their classmates' work rather than their own. Then some students who don't want to learn physics and just want to repeat their classmates' answers, then their learning outcomes are low because of their low level of learning independence. With the curriculum reform implemented in an educational unit, it may be possible to change the learning styles, learning independence, and learning creativity of students, especially in physics learning. Researchers are interested in conducting research at SMAN 1 North Toraja. Researchers also want to see if there is an influence between learning styles, learning independence, and learning creativity on the learning outcomes of students, especially in physics learning in the implementation of the Merdeka curriculum. Therefore, this research is titled "The Influence of Learning Style, Learning Independence, and Learning Creativity on Students' Physics Learning Outcomes in

### **METHOD**

The type of research conducted is Ex Post Facto, which was processed using Path Analysis. This research was carried out during the Odd Semester of the Academic Year 2023/2024. The research location was at SMAN 1 North Toraja. The population of this

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study consisted of 431 tenth-grade students at SMAN 1 North Toraja. Based on the Slovin formula, the minimum sample size obtained was 208. However, the researcher took a sample of 220, exceeding the minimum sample value according to Slovin's opinion to ensure the quality of the data obtained. The sampling technique used was proportional random sampling. Data collection in this research was conducted through surveys using non-test instruments in the form of physics learning style questionnaires, physics learning independence questionnaires, and physics learning creativity questionnaires. Each day, the same type of questionnaire was given to all tenth-grade students at SMAN 1 North Toraja. Data collection was carried out for consecutive days with different questionnaires each day. The physics learning outcomes test instrument was in the form of a physics learning outcomes test that was carried out during the odd semester of the academic year 2023/2024.

This research used Path Analysis, which consists of several data analysis procedures, including descriptive statistics used to provide an overview of the research subjects on each measured variable, classical assumption tests to test the accuracy and goodness of fit of the regression model to be formed. Classical assumption tests consist of normality tests, multicollinearity tests, linearity tests, and heteroscedasticity tests. The path analysis itself was conducted by forming two regression models with equations as follows:

### Model 1 (X<sub>1</sub> and X<sub>2</sub> on X<sub>3</sub>)

$$\hat{Y} = b + b_1 X_1 + b_2 X_2$$

Keterangan:

$\hat{Y}$  = Criterion/Estimated price Y (learning creativity)  $b_1$  = The coefficient of the regression direction for learning style.

$b_2$  = The coefficient of the regression direction for learning independence.

$b$  = The regression coefficient  $X_1$  = Learning style score

$X_2$  = Learning independence score

### Model 2 (X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub> on Y)

$$\hat{Y} = b + b_1 X_1 + b_2 X_2 + b_3 X_3$$

Keterangan:

$\hat{Y}$  = Criterion / Estimated price Y (learning outcome)

$b_1$  = The coefficient of learning style  $b_2$  = The coefficient of learning independence  $b_3$  = The coefficient of learning creativity

$b$  = The regression coefficient  $X_1$  = Learning style score

$X_2$  = Learning independence score

$X_3$  = Learning creativity score

The models above will then undergo t-tests to measure whether each independent variable has a significant effect on the dependent variable while assuming the other variables to be constant.

## RESULTS AND DISCUSSION

The data presented in this study includes the learning outcome (Y) as the dependent variable, learning style (X<sub>1</sub>) and learning independence (X<sub>2</sub>) as independent variables, and learning creativity as an intervening variable (X<sub>3</sub>). The learning style of tenth-grade students at SMAN 1 North Toraja is categorized as moderate, learning independence is categorized as high, learning creativity is categorized as high, and the learning outcomes of tenth-grade students at SMAN 1 North Toraja are categorized as high and very high. The research model used is multiple linear regression analysis consisting of two models forming the path analysis. Thus, this model needs to be tested to produce a good model with classical assumption tests. After being tested, all regression models have been able to meet the required classical assumption tests.

To obtain the path coefficients of all relationships in this research model, multiple regression analysis will be conducted with 2 regression models as follows:

### The regression equation for Model 1 is:

$$X_3 = 0,011 X_1 - 0.114 X_2$$

Thus, it is found that the direct effect value of Learning Style (X<sub>1</sub>) on learning creativity (X<sub>3</sub>) is 0.011, indicating a positive influence, and the direct effect value of Learning Independence (X<sub>2</sub>) on learning creativity (X<sub>3</sub>) is -0.114, indicating a negative influence.

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**Table 1. The Correlation Coefficient and Determination Coefficient of Regression Model 1**

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	0,113 <sup>a</sup>	0,013	0,004	8,825

Based on the table above, it is found that the multiple correlation coefficient is 0.113 and the coefficient of determination is 0.013. This indicates that the model accuracy is only 1.3%, and both independent variables, namely learning style and learning independence, do not have a significant relationship with the dependent variable of this study, which is learning creativity.

**Regression equation for Model 2:**

$$Y = -0.015 X_1 + 0.122 X_2 - 0.023 X_3$$

Thus, it is found that the direct effect value of Learning Style (X1) on learning outcome (Y) is 0.001, indicating a positive influence, the direct effect value of Learning Independence (X2) on learning outcome (Y) is 0.120, indicating a positive influence, and the direct effect value of Learning Creativity (X3) on learning outcome (Y) is -0.021, indicating a negative influence.

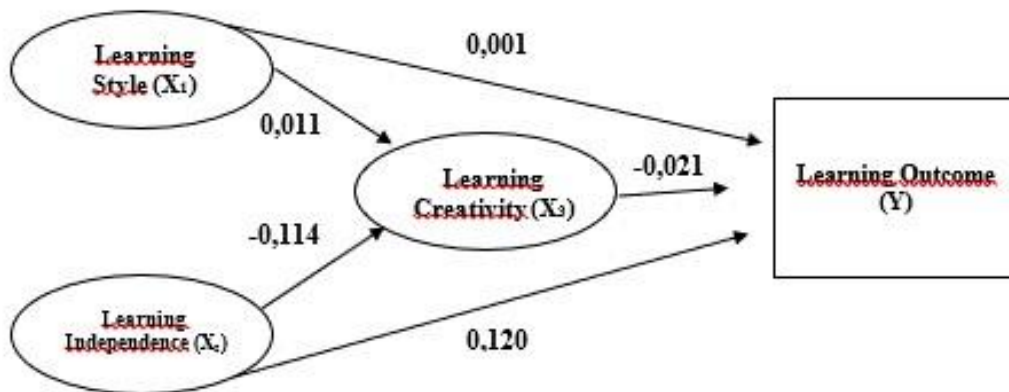
**Table 2. Coefficient of Correlation and Determination of Regression Model 2**

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	0,126 <sup>a</sup>	0,016	0,002	1.511

Based on the table above, it is found that the multiple correlation coefficient is 0.126 and the coefficient of determination is 0.016. This indicates that the model accuracy is only 1.6%, and the three independent variables, namely learning style, learning independence, and learning creativity, do not have a significant relationship with the dependent variable of this study, which is learning outcome.

**Path Diagram**

Based on the results above, a diagram model can be formed as shown in Figure 1, which illustrates the path analysis model of this study as follows:



**Picture 1. Path Diagram**

The indirect effects can be calculated as follows:

Indirect Effect X1 - X3 - Y

$$0.011 \times -0.021 = -0.000231 = -0.001 \text{ (rounded)}$$

Indirect Effect X2 - X3 - Y

$$0.114 \times -0.021 = 0.002394 = 0.002 \text{ (rounded)}$$

**Hypothesis testing (t-test)**

Based on the significance values obtained from the regression model equations 1 and 2, the significance values of the variables' effects can be tabulated as follows:

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**Table 3. Hypothesis Testing Results (t-test)**

No.	Variable Relationships	T	Sig.	R <sup>2</sup>	Description
<b>Model Equation 1 (X1 and X2 on X3)</b>					
1	$X_1 - X_3$	0,165	0,869		Not significant
0,013					
2	$X_2 - X_3$	-1,681	0,094		Not significant
<b>Model Equation 2 (X1, X2, X3 on Y)</b>					
3	$X_1 - Y$	-0,022	0,962		Not significant
4	$X_2 - Y$	1,762	0,079	0,015	Not significant
5	$X_3 - Y$	-0,307	0,759		Not significant

Based on the table above, the hypothesis testing results can be summarized as follows:

- The influence of Learning Style (X1) on Learning Creativity (X3)  
It is found that the significance value is  $0.869 > 0.05$ , thus H0 is accepted and Ha is rejected. Therefore, it can be concluded that Learning Style (X1) does not have a significant influence on Learning Creativity (X3) of the students in class X at SMAN 1 Toraja.
- The influence of Learning Independence (X2) on Learning Creativity (X3)  
The significance value is found to be  $0.094 > 0.05$ , thus H0 is accepted and Ha is rejected. Consequently, it can be concluded that Learning Independence (X2) does not have a significant influence on Learning Creativity (X3) of the students in class X at SMAN 1 Toraja.
- The influence of Learning Style (X1) on Learning Outcomes (Y)  
The significance value is found to be  $0.982 > 0.05$ , thus H0 is accepted and Ha is rejected. Therefore, it can be concluded that Learning Style (X1) does not have a significant influence on Learning Outcomes (Y) of the students in class X at SMAN 1 Toraja.
- The influence of Learning Independence (X2) on Learning Outcomes (Y)  
The significance value is found to be  $0.079 > 0.05$ , thus H0 is accepted and Ha is rejected. Therefore, it can be concluded that Learning Independence (X2) does not have a significant influence on Learning Outcomes (Y) of the students in class X at SMAN 1 Toraja.
- The influence of Learning Creativity (X3) on Learning Outcomes (Y)  
The significance value is found to be  $0.759 > 0.05$ , thus H0 is accepted and Ha is rejected. Consequently, it can be concluded that Learning Creativity (X3) does not have a significant influence on Learning Outcomes (Y) of the students in class X at SMAN 1 Toraja.

**Mediation Test (Indirect Effect)**

Based on the significance values obtained from regression model equations 1 and 2, the significance values of the indirect effects of variables can be tabulated as follows:

**Table 4. Results of Direct and Indirect Effects Testing**

No.	Variable	Direct	Indirect	Kriteria	Conclusion
1	$X_1 - X_3 - Y$	0,0015	-0,001	direct effect > indirect effect	Unable to mediate
2	$X_2 - X_3 - Y$	0,120	0,002	direct effect > indirect effect	Unable to mediate

Based on the table above, the hypothesis testing results can be summarized as follows:

- The effect of Learning Style (X1) on Learning Outcome (Y) through Learning Creativity (X3) It is found that the direct effect is 0.0015, which is greater than the indirect effect  $|-0.001|$ , indicating that Learning Creativity (X3) is not able to mediate the relationship between Learning Style (X1) and Learning Outcome (Y) of students at SMAN 1 North Toraja.
- The effect of Self-directed Learning (X2) on Learning Outcome (Y) through Learning Creativity (X3)  
The direct effect is 0.120, which is greater than the indirect effect 0.002, suggesting that Learning Creativity (X3) is not able to mediate the relationship between Self-directed Learning (X2) and Learning Outcome (Y) of students at SMAN 1 North Toraja.

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### CONCLUSION

Based on the findings and discussions presented in the preceding chapters, several conclusions can be drawn from this study. Firstly, it was observed that there exists a positive yet statistically nonsignificant correlation between learning style and physics learning creativity among 10th-grade students at SMAN 1 North Toraja. Similarly, there is a positive yet non-significant influence of learning style on physics learning creativity within the same cohort. Furthermore, the study found a nonsignificant positive impact of learning style on physics learning outcomes among these students. Additionally, the research indicates a non-significant positive association between self-directed learning and physics learning outcomes among the 10th-grade students at SMAN 1 North Toraja. Similarly, there is a non-significant positive relationship between physics learning creativity and physics learning outcomes in the same group. Moreover, no indirect effect was observed between learning style and physics learning outcomes through physics learning creativity, nor between self-directed learning and physics learning outcomes through physics learning creativity among the students.

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