**ORBITA: Jurnal Pendidikan dan Ilmu Fisika**
ISSN : 2460-9587 (print) | ISSN : 2614-7017 (elektronik)
Volume 10, No. 1, May 2024, pp. 43-51

# Analysis of the relationship between learning styles and creativity with high school physics learning outcomes

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Received: 09 November 2024 | Revised: 30 April 2024 | Accepted: 01 May 2024 | Published Online: 04 May 2024


## Abstract

Difficulties experienced by students in learning Physics include both students and teachers not being able to recognize their learning styles and students' lack of creativity in learning which will have an impact on learning outcomes. The aim of this research is to analyze whether there is a relationship between learning style and creativity with high school physics learning outcomes. This type of research is descriptive research with a correlational quantitative approach. The research population is State High Schools in Payakumbuh. Sample selection applies Purposive Cluster Sampling by selecting 1 from each school ranking, high, medium and low. The instruments used are the learning style questionnaire consisting of 26 items and the creativity questionnaire consisting of 27 items. The data analysis technique uses prerequisite analysis tests, namely the normality test; homogeneity test and hypothesis test using linearity test, multiple linear regression test and correlation test. The results obtained are as follows: (1) there is a positive relationship between learning style and learning outcomes. (2) there is a positive relationship between creativity and learning outcomes at a significance level of 5% or 0.05.

**Keywords:** learning style; creativeness; learning outcomes.

**How to Cite**: Junita, N., Desnita, Asrizal, & Gusnedi. (2024). Analysis of the relationship between learning styles and creativity with high school Physics learning outcomes. *ORBITA: Jurnal Pendidikan dan Ilmu Fisika, 10*(1), 43-51. https://doi.org/10.31764/orbita.v10i1.20063

## INTRODUCTION

The existence of a nation is largely determined by the resources it possesses, both natural resources and human resources. Quality human resources are human resources that are able to compete with any country. To create quality human resources, a country must be able to optimize every supporting element, one of which is by meeting educational needs. Education is a benchmark in determining the quality of a country's human resources. Quality human resources will be formed if educational goals can be achieved. Education is a conscious effort. Conscious effort means that the educational activities carried out must be preceded by careful, systematic and directed planning activities using certain procedures, mechanisms and tools to support smooth implementation (Suriansyah, 2011). Education is synonymous with the learning process. The learning process produces a change in the individual which involves changes in several aspects, namely cognitive,

affective and psychomotor aspects. So someone is said to be experiencing a learning process if there is a change in behavior in these three aspects (Sari et al., 2018)

Learning is a process of change within an individual that results in changes in behavior due to interactions with others and the environment based on certain practices and experiences. In the learning process at school, Physics is one of the subjects that must be studied. Physics is studied through a series of activities designed to support students' internal learning process (Suparwoto, 2007). Physics is a subject that requires understanding, but conceptual understanding is focused on the process of forming knowledge through discovery, presenting data mathematically and according to certain rules, so that in studying it you need certain rules (Wardhany, 2014). Physics can be defined as the science that studies natural events that are physical in nature and can be studied by observation, experiment and theory. The Physics learning process carried out by students as a learning subject is of course influenced by several factors, both internal and external factors (Sari et al., 2018). All of these factors will influence student learning outcomes. Learning outcomes are a measure of how far someone has mastered the material that has been taught. Learning outcomes are the realization of achieving educational goals. Learning outcomes are related to changes in students, the form of change is in the form of knowledge, understanding, attitudes and behavior, and skills (Lestari, 2015). Learning outcomes are defined as level of student success in learning at school which is expressed by the scores obtained from test results on certain subject matter (Setyowati & Widana, 2016). Learning outcomes are the limitations that students have in understanding the material (Suyonoo, 2018).

UNESCO stated that the learning outcomes to be achieved consist of four pillars, namely *learning to know*, *learning to do*, *learning to be* and *learning to live together*. According to Benjamin S. Bloom, with *the Taxonomy of Educational Objectives,* learning outcome indicators consist of three domains, namely cognitive level, affective domain and psychomotor domain. Getting good learning results is not easy, this depends on the abilities of the student. Basically, students' abilities to absorb information in learning vary, these differences are influenced by various factors, both internal and external. Internal factors, namely those that originate from the student, include learning style and creativity. Meanwhile, external factors influence learning outcomes such as the environment, school and so on. Learning style is very important and very determining for anyone who carries out their learning tasks, anyone can learn easily, when they find a learning style that suits them (Nurlia et al., 2017). Learning style is a method that individuals have to obtain information (Adawiyah et al., 2020). Learning style is the ability an individual has to absorb, organize and process the information received. Learning styles depend on learning activities or situations and conditions that students are facing. There are three types of learning styles, namely visual, auditory and kinesthetic (Arylien et al., 2019). The visual learning style is dominant in sight when learning, the auditory learning style is dominant in sense of hearing and the kinestatic learning style is dominant in the sense of touch, by feeling something (hands) when learning (Unaifah & Suprapto, 2014).

Basically students have these three types of learning styles, but there is one that is dominantly used in the learning process. Of these three types of learning styles, students are not yet able to recognize which type of learning style is more dominant, so they have not implemented it optimally as a result in the learning process students experience difficulties. Therefore, in the learning process students must be assisted and directed to recognize the learning style that suits them so that the learning process can run as expected and the learning objectives can be achieved optimally. However, many teachers do not pay attention to students' learning styles, so the delivery of learning material is still monotonous. This causes students to experience difficulty in understanding each material taught. If

this problem can be overcome, the learning process will be better so that learning outcomes will be even better. Apart from learning style, another factor that influences learning outcomes is student creativity in the learning process. Creativity is a person's ability to create something new, in the form of idea or real work that is relatively different from the previous one, whether in the fields of science, literature or other arts. Creativity is the ability possessed by individuals to actualize ideas to create something new or a combination of previously existing elements, into a new work. This is in accordance with the objectives of the 2013 Curriculum, namely producing Indonesian people who are innovative, creative, affective and productive through integrated skills, attitudes and knowledge.

Learning creativity is an indicator of success in learning and plays an important role in achieving learning success. Students who have creativity in learning will be known by showing their level of creativity in various activities. They always want to solve problems or problems, dare to take even difficult risks, prefer to work alone or independently, are always curious or have a high sense of curiosity, enjoy seeking new experiences, and believe in themselves (Amin, 2019). Creative thinking is closely related to new things or new ideas. A person's creativity can influence and be influenced by both the student's personality and the surrounding environment, thus both the student's personality and the environment can support or hinder creative efforts (Mandasari & Nadjamuddin, 2015). Basically, every student has a creative soul, but it's just not sharpened and developed enough. Thinking creatively when learning can help students develop their attitudes, motivate discovery and exploration, and support cognitive development.

The cause of low creativity in learning is that students are still passive in learning, students only accept what is taught without having the desire to increase knowledge and references in learning. Apart from being passive in learning, self-confidence is also still low. Students feel unsure about the knowledge they have as a result they feel afraid to express their creative ideas. Another cause of low student creativity is that the situation or atmosphere in learning does not stimulate students to express their ideas or opinions, apart from that the learning process still focuses on the teacher, students are only recipients of information as a result of which students' thinking is convergent, meaning students can only do something like what is taught so that no variations or new ideas emerge. For example, when solving problems, students will understand the example questions discussed by the teacher in front of the class, but if they are given the same problem again with a different presentation, students will have difficulty solving it.

Based on the results of observations at SMA Negeri 2 Payakumbuh, SMA Negeri 4 Payakumbuh and SMA Negeri 5 Payakumbuh, students still experience difficulties or are slow in understanding Physics learning (Data Badan Akreditasi Nasional Sekolah/Madrasah). The slowness of students in understanding the lessons delivered by the teacher indicates that the characteristics or learning styles of each student are different. In the learning process, students experience difficulties both in understanding theory and solving problems related to Physics. This is because neither students nor teachers can recognize their learning styles. Apart from learning style, another problem is the lack of student creativity in solving Physics problems. Students' passivity in the learning process, as well as lack of confidence in their abilities, result in students' creativity not being well honed and creative ideas not emerging. Apart from that, the students' learning character is still convergent, meaning they only accept what is available without wanting to look for alternatives or other references to increase the knowledge gained. As in solving Physics questions, students can only answer the questions as they are presented on the blackboard, if they are presented in a different form students experience difficulty in

solving the questions. This proves that students only focus on what is explained, without trying to find other ways of solving it.

There are several studies that support this research, namely research conducted by (Triumiana & Sumadi, 2016). The results of this research are that there is a very strong and positive relationship between teacher teaching style, learning motivation, student learning creativity and student learning achievement. Further research conducted by (Nurlia et al., 2017). The results of this research are that learning style has a strong relationship with Biology learning outcomes, learning independence has a fairly strong relationship with Biology learning outcomes, learning interest has a strong relationship with learning outcomes. Biology, learning style, learning independence and interest in learning have a very strong relationship with Biology learning outcomes for students at SMA Negeri 1 Tonra, Bone Regency.

Therefore, research needs to be carried out to see whether there is a positive relationship between student learning styles and creativity and physics learning outcomes. Therefore, correlational research will be carried out with the title "Analysis of the Relationship between Learning Styles and Student Creativity with High School Physics Learning Outcomes".

## METHODS

Type study This is Wrong One from type study descriptive with approach quantitative With design study that is to study quantitative correlational.

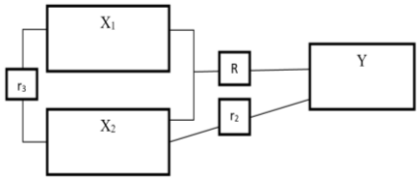


**Figure 1.** Eksperiment Desain

Description :

$X_1$ : Learning Style
$X_2$ : Creativity Study
Y : Results Study
$r_1$ : Learning style relate with results Study participant educate
$r_2$ : Creativity Study relate with results Study participant educate
$r_3$ : Learning style relate with creativity Study
R : Learning style And creativity relate with results Study

Variable bound in study This is results Study student (Y) meanwhile variable free is style learn ($X_1$) and creativity students ($X_2$). In this research, the research instrument used was a closed questionnaire using a Likert Scale. The questionnaire contains written statements that will be given to respondents to provide responses to the statements submitted regarding learning styles and creativity. The learning styles measured are visual, auditory and kinesthetic learning styles. The learning style instrument consists of 26 statement items. The creativity measured consists of four dimensions, namely fluency, flexibility, originality and detail. The creativity instrument consists of 27 statement items. The learning outcomes used in this instrument are the scores from the final semester exam results. Population of study This is all over student class XI SMAN year 2022/2023 teaching in Payakumbuh

City. Furthermore, taking sample schools use Technique *Purposive Cluster Sampling.* Sample selection was based on school ranking, namely high, medium and low. Whereas taking sample classes use Technique *Simple Random Sampling.* Simple Random Sampling is taking sample members from a population randomly without paying attention to the strata in the population (Sugiyono, 2017). Sample in this study, namely class XI of SMA 2 Payakumbuh, SMA 4 Payakumbuh and SMA 5 Payakumbuh. Samples were taken based on school accreditation scores taken based on BANSM data, namely high, medium and low scores (Table 1).

**Table 1.** Accreditation data based on BANSM

| School name | Mark |
|---|---|
| SMA 1 Payakumbuh | 91 |
| SMA 2 Payakumbuh | 94 |
| SMA 3 Payakumbuh | 93 |
| SMA 4 Payakumbuh | 86 |
| SMA 5 Payakumbuh | 84 |

There are three stages in the research procedure, namely the preparation stage, implementation stage and data processing stage. The data analysis technique uses analysis prerequisite tests and hypothesis testing with a significance level of 0.05. Hypothesis testing in this research was calculated using a multiple correlation *test*. Correlation is a statistical term that states the degree of linear relationship between two or more variables (Purba, D & Purba M. 2022). Level of correlation value is presented in the Table 2 (Wijayanto, 2008).

Table 2. Integration of r Values

| coefficient interval | relationship level |
|---|---|
| 0,80 – 1,000 | Very Strong |
| 0,60 – 0,799 | Strong |
| 0,40 – 0,599 | Strong Enough |
| 0,20 – 0,399 | Weak |
| 0,00 – 0,199 | Very Weak |

## RESULTS AND DISCUSSION

The research results were obtained by conducting prerequisite tests and hypothesis testing. Prerequisite tests are tested using the normality test and homogeneity test. The normality test in this study used the *Kmolgrov-Smirnov test* and the homogeneity test used the *Barltlet test*. After testing the prerequisite analysis, the next step is to carry out a linearity test. Test the linearity of the test on learning style variables ($X_1$) and creativity ($X_2$) with learning outcomes (Y) after carrying out calculations and obtain the following results (Table 3):

**Table 3.** Linearity Test

| School name | $X_1$ with Y | $X_2$ with Y |
|---|---|---|
| SMA 2 Payakumbuh | 1,467 | 1,594 |
| SMA 4 Payakumbuh | 1,918 | 1,638 |
| SMA 5 Payakumbuh | 1,875 | 2,425 |

Data is said to be linear if $F_{count} < F_{table}$ . For $X_1$ dengan Y Furthermore, at SMA Negeri 4 Payakumbuh, it was found that $F_{count} < F_{table}$ , namely 1.918 < 2.08, meaning that learning styles and learning outcomes at SMA Negeri 4 had linear data. The final test, namely at SMA Negeri 5 Payakumbuh, found that $F_{count} < F_{table}$ was 1.875 < 3.676, meaning that learning styles and learning outcomes at SMA Negeri 5 Payakumbuh had linear data. For variable $X_1$ dengan Y, At SMA Negeri 4 Payakumbuh, it was found that $F_{count} < F_{table}$ with a value of 1.638 < 2.103, meaning that creativity and learning outcomes at SMA Negeri 4 Payakumbuh had linear data. Furthermore, at SMA Negeri 5 Payakumbuh, the data obtained was 2.425 < 3.676, meaning that creativity and learning outcomes at SMA Negeri 5 Payakumbuh had linear data.

The next test is the correlation test. The correlation tests used are the partial correlation test *and* the multiple correlation *test* . The partial correlation test obtained the following results (Table 4):

**Table 4.** Partial Correlation Test

| School name | $X_1$ with Y | $X_2$ with Y | $X_1$ with $X_2$ |
|---|---|---|---|
| SMA 2 Payakumbuh | 0.137 | 0.54 | 0.17 |
| SMA 4 Payakumbuh | 0.06 | 0.55 | -0.01 |
| SMA 5 Payakumbuh | 0,02 | -0.03 | 0.49 |

The first partial correlation test is between learning styles and learning outcome, at SMA Negeri 2 Payakumbuh, a value of 0.137 was obtained in the very low category. The significance level obtained is $t_{count} < t_{table}$ with a value of 0.665 < 1.655, meaning that there is no significant relationship between learning style and learning outcomes. SMA Negeri 4 Payakumbuh, it was found to be 0.06 in the very low category, with the significance obtained being $t_{count} < t_{table}$ with a value of 0.6 < 1.682, This means that there is no significant relationship between learning styles and learning outcomes. SMA Negeri 5 Payakumbuh, it was found to be 0.02 in the very low category, learning style influences learning outcomes with a very weak relationship, namely 0.02. The level of significance obtained by $t_{count} < t_{table}$ with a value of 0.152 < 1.753 means that there is no significant relationship between learning style and learning outcomes.

The next partial correlation test is the correlation between creativity and learning outcomes. At SMA Negeri 2 Payakumbuh it was obtained 0.54 with a fairly strong category, if creativity increases then student learning outcomes at SMA 2 Payakumbuh will also get better with a significance level of $t_{count} < t_{table}$ with a value of 7.545 > 1.655 meaning there is a significant relationship between creativity and learning outcomes. At SMA Negeri 4 Payakumbuh it was found to be 0.55 with a fairly strong category, if creativity increases then student learning outcomes at SMA 4 Payakumbuh will also get better. The significance level of $t_{count} < t_{table}$ with a value of 4.351 > 1.682 means that there is a significant relationship between creativity and learning outcomes. Furthermore, at SMA Negeri 5, it was

found to be -0.03 in the very low category and with a negative value, meaning that the higher the student's creativity, the lower the learning outcomes with a close relationship of 0.03. The level of significance is obtained $t_{count} < t_{table}$ with a value of -0.193 < 1.753, meaning there is no significant relationship between creativity and learning outcomes.

The final partial correlation test is between learning style and creativity. At SMA Negeri 2 Payakumbuh, it was found to be 0.17 in the very weak category, with a significance level of $t_{count} < t_{table}$ with a value of 1.40 < 1.655, meaning that there is no significant relationship between learning style and creativity. At SMA Negeri 4 Payakumbuh it was found to be -0.01 in the very weak category and with a negative value, with a significant level obtained, $t_{count} < t_{table}$ with a value of -0.413 < 1.682, meaning there is no significant relationship between learning style and creativity. and the relationship is negative. The last school, namely SMA Negeri 5, obtained 0.49 with a fairly strong category with a significance level, $t_{count} < t_{table}$ with a value of 2.238 > 1.753, meaning there is a significant relationship between learning style and creativity.

The final test is the multiple correlation test and the following results are obtained (Table 5):

**Table 5.** test Multiple Corellation

| School name | Results |
|---|---|
| SMA 2 Payakumbuh | 0.542 |
| SMA 4 Payakumbuh | 0.556 |
| SMA 5 Payakumbuh | 0.055 |

The last test is the multiple correlation test. SMA Negeri 2 Payakumbuh and SMA Negeri 4 Payakumbuh the relationship between learning style and creativity and learning style is categorized as quite strong. SMA Negeri 2 Payakumbuh the correlation value obtained was 0.542 and SMA Negeri 4 Payakumbuh the correlation value was 0.556, meaning that if students know their learning styles and increase their creativity, the learning outcomes obtained will be better. SMA Negeri 5 Payakumbuh the relationship between learning style and creativity and learning outcomes is very weak. The correlation results show 0.055, meaning that learning style and creativity do not have much influence on learning outcomes.

## CONCLUSION

Based on the objectives and results of research conducted regarding the relationship between learning styles and creativity with Physics learning outcomes carried out at SMA Negeri 2 Payakumbuh, SMA Negeri 4 Payakumbuh and SMA Negeri 5 Payakumbuh, it was concluded that there is a positive relationship between learning styles and learning outcomes, there is there is a positive relationship between creativity and learning outcomes and there is a positive relationship between learning styles and creativity and high school physics learning outcomes..

The suggestion of this research is that both teachers and students can recognize learning styles and hone creativity in learning so that the learning outcomes obtained can be better. This research is still limited to learning styles and creativity, suggestions for other research to develop other variables.

## Acknowledgments

The author would like to express his thanks to all parties who have helped the author in completing this article. especially to the thesis supervisor and to ORBITA who have agreed and permitted the author to publish this article

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