

[Research Article]

THE RELATIONSHIP BETWEEN BIMODAL LEARNING STYLES AND STUDENT'S LEARNING OUTCOMES IN WORK AND ENERGY TOPICS

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ABSTRACT

This study aims to obtain information about the relationship between bimodal learning styles and students' cognitive learning outcomes in work and energy. The bimodal learning style in this research focuses on the visual-auditory and visual-kinesthetic learning styles. The research method used is the correlational method. This research was conducted in one of the schools in Kuningan district, West Java, with a research sample of 65 students. Data were collected through questionnaires and instruments about work and energy topics. The results of the study found that there was no significant relationship between learning styles and learning outcomes. This is proven by calculating the learning style correlation test with learning outcomes obtained $p\text{-value} > 0.05$. The implication of this research is to provide information about student learning style (V-A) and (V-K) profiles and student learning outcomes profiles, and the absence of a relationship between learning styles and student learning outcomes. This research also provides information to students about their learning styles and educators so that they can apply teaching styles and methods that can accommodate students' learning styles so that students can be more active in following the learning process.

Keywords: Learning Style, Learning Outcome, Work and Energy

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1. INTRODUCTION

Learning style is the easiest or fastest way that someone likes to use their abilities and knowledge to process information in the learning process, with an optimal level of acceptance compared to other ways. Santrock in Jeanete (2016) argues that learning style is how people use their abilities. With the right learning style, learning will be more effective.

Each student has a different learning style, but there is one that is dominant and has a tendency to one particular learning style. In this case, not all teachers know the characteristics of each student's learning style. The appropriate learning style is the key to student success in learning. By realizing this, students can absorb and process information and make learning more accessible with their learning styles (Soleh, 2019). Regard the learning style of each student is different, then the teacher should know the learning style of his students so that teachers can choose and use learning methods that are suitable and liked by their students (Rostina, 2016).

Musrofi in Ahisya (2020) said that only 30% of students managed to participate in classroom learning, and the remaining 70% had difficulty participating in classroom learning. Successful students have a learning style per the teacher's teaching style in the classroom. Meanwhile, students with difficulty participating in class learning are caused by other learning styles, not the teacher's teaching style applied in the classroom. The teacher's teaching style does not accommodate 70% of student learning styles.

Research conducted by Dunn & Dunn in Gordon (2004) says that there are very few students when learning to use their modalities. Therefore, students need to know how they tend to learn. By understanding learning styles, learning success will be achieved. It is also helpful to increase students' awareness about learning activities that are suitable or not suitable for their learning style tendencies. Finally, students can plan their learning goals, leading to an effective and efficient learning process. Research conducted by Young in Heni (2016) concluded that learning following the

preferred learning style could improve learning achievement and self-performance. Thus, it can be concluded that the learning style is one of the essential factors in the teaching and learning process.

Thobroni (2015) states that learning styles determine a child's learning achievement. Children can develop better if given a strategy that follows their learning style. Many students have difficulty in determining an effective and appropriate learning style. The discrepancy in students' learning styles can potentially reduce student achievement. Thus, it can be concluded that there are not only learning styles that affect learning outcomes. Other factors influence it, including the internal factors of the students themselves and the factors of the teacher teaching them in class because it could be that the teacher who teaches ignores the child's learning style. So the teacher does not provide strategies appropriate to their learning styles, which will impact children's learning outcomes.

Learning styles are divided into two, namely unimodal learning styles and multimodal learning styles. Unimodal learning style is a single learning style that consists of only one type of learning style. In contrast, the multimodal learning style is a learning style that is a combination of more than one type of learning style (Tuti, 2017). In addition, multimodal learning styles are divided into three, namely, bimodal (having two learning style tendencies), trimodal (having three learning style tendencies), and quad model (having four learning style tendencies). Students will learn well if they use and optimize their modality tendencies.

Previously, several studies have been conducted on the relationship between learning styles and learning outcomes. Angrasari (2018) found that there was a significant positive relationship between learning styles and physics learning outcomes. Furthermore, Kadir (2020) proves a positive and significant influence between visual learning styles and physics learning outcomes.

Researchers are interested in researching a similar thing in a school in the Kuningan district

because, based on the initial observations made by researchers, students in the Mathematics and Natural Sciences major in one school in Kuningan district, West Java, on average, do not understand and know their respective learning styles, so students cannot yet understand their learning styles. Maximize it in the learning process. It was also found that students' learning styles were diverse. Therefore, it is necessary to examine in depth the learning styles of each student and how the relationship between learning styles and student learning outcomes in the matter of work and energy. Based on the problems above, researchers are interested in conducting research under the title "The Relationship of Bimodal Learning Style (V-A), (V-K) with Student Learning Outcomes on Work and Energy Topics". The objectives of this research are formulated into two, namely:

1. Knowing the profile of student learning styles and profiles of student learning outcomes
2. Knowing the relationship between the bimodal learning style (V-A) (V-K) with student learning outcomes on the topic of work and energy

The difference between this study and previous research is that the author examines the relationship between student learning styles and student learning outcomes on the work and energy topics that focus on bimodal learning styles (having two tendencies of learning styles). The bimodal learning styles studied were learning styles (Visual-Auditory) and learning styles (Visual-Kinesthetic).

2. METHOD

The research method used is the correlation method to determine the relationship between learning styles and student learning outcomes regarding work and energy. According to Sugiyono (2017), correlational research is a type of research with problem characteristics in the form of a correlational relationship between two or more variables. This research was conducted in one of the schools in Kuningan district, West Java. The research population was students of class XI MIPA, with a research sample of 65 students. The research

instruments used were questionnaires and test questions. Data collection in this study started with interviews to determine the knowledge of teachers and students about their learning styles.

Data were collected through a questionnaire based on the learning style according to Fleming (VARK), which can be accessed at the link. The scale used to measure student learning styles is the Likert scale with four alternative answers agree, strongly agree, disagree, and strongly disagree. Each alternative answer on a positive item is given a weighted score: 4 for strongly agree, 3 for agree; 2 for disagree; and 1 for strongly disagree. The instrument used in this study consisted of a questionnaire totalling 16 items, with each sub-variable amounting to 4 items. The instrument for work and energy material is 15 items that have been validated and tested first.

The data obtained through the questionnaire were analyzed using descriptive statistical analysis to determine which group had the highest number. Descriptive statistics are statistics used to analyze data by describing or describing the data collected without intending to make conclusions that apply to the public or generalizations (Sugiyono, 2017). Data analysis was carried out in two ways: univariate analysis and bivariate analysis. In univariate analysis, each variable is analyzed without being associated with other variables. Bivariate analysis is used to determine whether there is a correlation between two variables. Normality test, homogeneity test, One-way ANOVA test and correlation test were performed.

Three ways can be used as a guideline or basis for decision making in this bivariate correlation analysis, namely first by looking at the value of Sig. (2-tailed). The second is to compare the calculated r-value (Pearson correlation) with the r-value of the product moment table. The third is to look at the star (*) contained in the program output. After obtaining the correlation coefficient, conclusions are drawn as to the purpose of this study. In this study, two data are needed: student learning style profile data, which was revealed using a questionnaire, and learning outcomes profile data was revealed

using work and energy material test questions that had been tested for validity and reliability and tested first.

3. RESULT AND DISCUSSION

Based on the research results conducted in one of the schools in the Kuningan district, West Java, class XI totalled 65 people divided into two classes. So researchers can collect data through questionnaires filled out by students and then given a score on each statement item so that the data can be analyzed descriptively. After the data has been analyzed, calculate the number of scores obtained from each learning style. Next, look at the highest score among the student's learning styles. Based on the highest scores, each student is classified into which learning style tendency. The results of the classification of students based on the tendency of learning styles, from 65 students obtained, 25 students have multimodal learning styles, namely a combination of more than one type of learning style, can be seen in Table 1.

Table 1. Frequency Distribution of Students' V-A and V-K Multimodal Learning Styles

No.	Learning Style	N	%
1	V-A	6	60
2	V-K	4	40

This study only focuses on bimodal learning styles (visual-auditory and visual-kinesthetic) by looking for correlations between visual-auditory learning styles and student learning

outcomes and the correlation between visual-kinesthetic learning styles and student learning outcomes. The results of the correlation between learning styles and learning outcomes provide in Table 1.

Table 2 The Student Learning Outcomes of Work and Energy Topics.

Respondents	Score	Learning Style
R 002	27,5	V-A
R 004	28	V-K
R 007	26	V-K
R 011	23,5	V-A
R 013	28,5	V-K
R 016	16	V-K
R 017	53,5	V-A
R 018	25,5	V-A
R 020	10,5	V-A
R 023	22,5	V-A

3.1 Correlation Test of Visual-Auditory Learning Styles With Learning Outcomes

The sig value of the V-A learning style correlation with learning outcomes is 0.135. Because the sig correlation value is > 0.05, it can be said that there is no relationship between visual-auditory learning styles and learning outcomes. The Pearson correlation value of 0.683 indicates that auditory learning style is not positively related to learning outcomes. Following the decision-making above, the conclusion is that the independent variable (X) does not affect the dependent variable (Y). Alternatively, in other words, students' learning style (V-A) does not affect their learning outcomes.

Table 3 Correlation of Visual-Auditor Learning Style (LS) With Learning Outcomes (LO)

		V-A	LO
Spearman's rho	Learning Style V-A	Correlation Coefficient	1
		Sig. (2-tailed)	0.683
		N	6
	Learning Outcomes	Correlation Coefficient	0.683
		Sig. (2-tailed)	0.135
		N	6

3.2 Correlation Test of Visual-Kinesthetic Learning Styles With Learning Outcomes

The sig value of the correlation between V-K learning styles and learning outcomes is 0.895.

Because the sig correlation value is > 0.05, it can be said that there is no relationship between visual-kinesthetic learning styles and learning outcomes. The Pearson correlation value is - 0.105, so it can be said that the V-K learning

style is not negatively related to learning outcomes. Following the decision-making above, the conclusion is that the independent variable (X) does not affect the dependent

variable (Y). Alternatively, in other words, students' learning style (V-K) does not affect their learning outcomes.

Table 4 Correlation of Auditory Learning Style with Learning Outcomes

		LS (V-K)	LO
Spearman's rho	Learning Style V-K	Correlation Coefficient	1
		Sig. (2-tailed)	.0895
		N	4
	Learning Outcomes	Correlation Coefficient	-0.105
		Sig. (2-tailed)	.0895
		N	4

The results showed no significant relationship between learning styles and learning outcomes. Correlation of 0.683, which is included in the category of low correlation, and the results of the calculation of the correlation test for Visual-Kinesthetic learning styles with learning outcomes obtained $p\text{-value} > 0.05$, namely $0.895 > 0.05$ with a correlation value of 0.105 which is included in the category of low correlation. So, it can be concluded that there is no relationship between learning styles and student learning outcomes regarding work and energy.

The analysis of the relationship between the two variables (learning styles and learning outcomes) did not show a linear relationship. The cause of the absence of a correlation between student learning styles and student learning outcomes in the matter of work and energy can be seen from several sides, namely: teachers, students, and errors in research. In the teacher aspect, the teacher does not use a strategy that suits all the characteristics of the students in the class. This is because the teacher does not accommodate the student's learning style, and based on the interview results, the teacher has never done a learning style test for students, so the teacher does not know the characteristics of the learning style used. Dominant in each student. In the student aspect, students do not apply and optimize their respective learning styles, and this is because students do not know their learning styles.

Meanwhile, when viewed from the aspect of errors in the study, several errors in this study

caused no relationship between learning styles and student learning outcomes, namely the researchers only analyzed the results of the questionnaire used in this study and did not directly analyze the learning process in the classroom, including how to teach teachers and student learning in schools. In addition, the learning outcomes measured in this study are only in the cognitive aspect. Of course, each child has different intelligence in various aspects.

In several previous studies, the results showed that there was a relationship between student learning styles and student learning outcomes in physics subjects. However, it is different from the results of this study, which shows no relationship between student learning styles and student learning outcomes in the matter of work and energy. In the research by Ikhfa Indira, 2022 in a journal entitled *The Effect of Learning Style on Student Physics Learning Outcomes*, he found that student learning styles did not affect their learning outcomes. Ikea also said that this difference is not a problem because the research only proves an existing theory. Although, in general, based on many studies, learning styles affect learning outcomes, it does not rule out the possibility of exceptions (Indira, 2022).

4. CONCLUSION

Based on the problems disclosed and data analysis, this study obtained profiles of student learning styles and profiles of student learning outcomes, as well as the relationship between

student learning styles and student learning outcomes which revealed that there was no significant relationship between learning styles and learning outcomes. After knowing the learning style, it is expected that students can maximize their learning style by determining effective ways so that learning outcomes can be achieved as expected. In addition, it is also necessary to pay attention to several other factors that can affect learning styles, such as health, psychological, family, and school environment factors.

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