JPF | Volume 10 | Number 3 | 2022 | 237 - 247

p - ISSN: 2302-8939
e - ISSN: 2527-4015

Jurnal Pendidikan Fisika

https://journal.unismuh.ac.id/index.php/jpf

DOI: 10.26618/jpf.v10i3.8987

Relationship Between Learning Styles and Physics Learning Outcomes of Class X Science Students

Fatmawati[1)*], Khaeruddin [2)], Abdul Haris [3)], Pariabti Palloan[4)], Usman[5)]

[1),2),3),4),5)]*Department of Physics Education, State University of Makassar, Makassar, 90222, Indonesia*

**Corresponding author: fatmawati.s001@gmail.com*

Received: May 31, 2022; Accepted: July 12, 2022; Published: August 31, 2022

Abstract *– This study aims to describe the learning styles and physics learning outcomes of class X science students at MAN 1 Polewali Mandar and the relationship between the two variables. This research is a quantitative descriptive research employing survey design. Data collection were carried out by distributing online learning style questionnaires using google forms and giving cognitive tests in the form of multiple choice to 124 students. To help determine the influence of learning styles toward learning outcomes of physics, inferential analysis in the form of Pearson product moment correlation analysis was used. The results showed that the most of the students in class X science at MAN 1 Polewali Mandar had visual learning styles, and only few of them had kinesthetic learning styles and auditory learning styles. Some students were not categorized in one specific learning style as they are not dominant in any of the three. In addition, majority of the female students had a visual learning style, while majority of the male students had kinesthetic learning style. Furthermore, the students' physics learning outcomes were in medium category. Finally, there was a weak relationship between learning styles and students' physics learning outcomes.*

Keywords *: learning style; learning outcomes; physics*

I. INTRODUCTION

Education is the most important part in improving human resources' quality by continuing to learn to acquire knowledge so that they can be useful for the nation future. According to Astuti et al. (2018), through education intelligent and creative human beings are created, and the demands for technology and scientific advances require them to keep learning.

Learning is an activity carried out by each individual to obtain behavioral changes that are manifested by the addition of knowledge, skills and attitudes in order to become a complete human being with a better personality. To find out a person's success in learning, it is necessary to conduct an evaluation with the aim of knowing the results gained by the students in the process of learning. According to Hasanah et al. (2018) one of the elements in the learning

process is the involvement of students in learning activities as learning process is crucial to students and enable them to experience changes in behavior through interaction during learning activities which shows that students must be able to interact in a way each in each learning process in the classroom.

According to Nur et al. (2015) learning that is an event intellectual development, especially increase one's ability in integrate and use new information, involving three a process that occurs in almost at the same time, namely obtaining information new, transformation, and evaluation.

In addition, Purwanto (2014) in (Khairiah et al., 2015) suggested that outcomes of learning are able to be explained by understanding the meaning of results and also learning. Understanding the result leads to an acquisition to become a result of having process which causes a change in functional kind of input, while learning can be claimed as a process that people interact with the environment in order to have changes to the behavior that they have, in the activities of teaching or learning and also after doing them, it can change the students' behavior to be better than before.

Winkel (1987) in (Ikhsan, 2022) states that learning outcomes are essential result of internal ability that has become a person's personal property. (Martiningsih, 2016) claimed that the physics learning outcome is a level of mastery in physics lesson materials after obtaining learning experience in certain period of time.

One of the factors which gives influence to the learning outcomes of the students is the student's learning style in understanding the concept of physics. According to Angrasari (2016) learning styles are supporting factors that make students easier to receive the lesson.

Learning theory refers to the acquisition of a meaningful understanding. Hernacki (2000) in (Halim, 2012) states that learning style can be defined as a combination of a person in absorbing information and also processing the information to be meaningful. In line with this, (Deporter & Hernacki, 2007) defines learning styles in the easiest way that each individual has in absorbing information (modalities), then organizing and managing the information he receives (brain dominance).

In general psychology, learning style is defined as learners' approach to do learning; it usually includes the way of collecting, receiving, processing, and also interpreting to make it knowledgeable (Chetty et al., 2019; Halim et al., 2021).

Not all students have the same learning style; thus, educators who understand the difference can adjust the situation. Michael Grinder in (Deporter & Hernacki, 2007) who authored Righting the Education Conveyor Belt, has taught learning styles and teaching methods to many instructors. He noted that in each group of thirty students, around twenty-

two people were able to learn effectively in visual, auditory and kinesthetic ways so they did not need special attention. From the remaining eight people, about six people chose one learning modality over the other two modalities. Thus, at all times they must strive to understand the commandments, unless special attention is paid to them by presenting them in the manner of their choice. For these people, knowing how to best study them can mean the difference between success and failure, while the other two students have learning difficulties due to internal reasons.

Therefore, based on the factors that have been described previously, learning style can influence the quality of students' outcome. In fact, not a few students have low learning outcomes because the teacher's teaching styles' do not match with the students' learning style. Hence, the students are less able to receive information properly.

In addition, one person may have more than one learning style. However, they have a dominant learning style that is in accordance with their ability to understand or accept the learning process. When it comes to teaching methods, Nasution (2015) in (Angrasari, 2016) explains that there is no teaching method that is suitable for all students. Some are more compatible with self-study, some prefer to listen to explanations and information from the teacher through the lecture method.

The research that was carried out by (Taqwa & Astalina, 2015; Kamal et al., 2021) reveals that there is a significant correlation of the audiotory, visual, and also kinesthetic learning styles with physics learning outcomes. It was proven by the results of the study that the most common learning style possessed by students is visual learning style. The difference between previous research and this research is in different places, times and students.

The results of observations conducted by the researchers indicate that most of the learning conducted by the teachers are still teacher-centered. The teacher seem not able to adjust the method or media used based on the different learning styles in the classroom. Students learned by reading notebooks and textbooks, some were talking to their friends, some were silent and some were active to ask questions and were active in asking when something was not understood. These conditions can make the students bored and not focused on the lesson. In the end, it may also affect their learning outcomes.

Given the importance of knowing the influence of learning styles and physics' outcomes of learning, the researchers have conducted research on the influence of learning styles on the students' physics learning outcomes at MAN 1 Polewali Mandar.

Based on the researcher's observations of class X science at MAN 1 Polewali Mandar, the problem formulated in the

research are: 1) what are the learning styles of the students? 2) What is the level of students' physics learning outcomes? and 3) is there any correlation between students' learning styles and physics learning outcomes?

From the formulation of the problem, the researcher aimed to describe the students' learning styles, the students' learning outcomes, as well as the correlation between the students' learning styles and their physics learning outcomes.

II. METHODS

The research is a quantitative descriptive. Quantitative descriptive research is an approach in research that produces descriptive data in the form of numbers or percentages. The method used was a survey method.

This research took place at MAN 1 Polewali Mandar, which is located in West Sulawesi Province. This study was done during the period of the odd semester of the 2020/2021 academic year. The research population were 160 students from 4 classes. The research sample was 124 students in total, consisting of 31 students taken randomly from each class.

The learning style research instrument was measured using a non-test instrument, namely the learning style questionnaire consisting of 57 statement items and the physics learning outcomes were measured using a test consisting of 38 questions. This research was done with the steps of planning, data collection, and also data processing.

The techniques of data collection were first using a questionnaire, carried out by means of a survey using a non-test instrument in the form of a learning style questionnaire through the google form application to research subjects and physics learning outcomes test, and secondly with a physics learning outcome test carried out by giving physics test questions to the research subject, then assigning a score to the test results that have been completed. In this case, the test given was in the form of multiple choice questions which are objective tests.

The technique of data analysis used is kind of descriptive statistical analysis and also inferential statistical analysis technique.

1. Descriptive statistical analysis techniques

This kind of analysis is done on purpose to give the answer to the research questions by describing the scores of respondents for each variable using the score of average, standard deviation, and also score of maximum as well as the score of minimum, variance, percentage, and frequency distribution.

2. Inferential statistical analysis techniques

Inferential statistics is to test the correlation between the variables in order to make test the proposed hypothesis namely the correlation coefficient (r) between learning styles (variable X) and learning outcomes of

physics (variable Y). Before conducting inferential statistical analysis, the basic statistical tests namely normality test and linearity test were conducted. To have test the hypothesis, the Pearson Product Moment correlation test statistic is used with a level of significance = 5% or = 0.05. This criteria of test are if $r_{count} < r_{table}$, then H_0 is claimed to be accepted and H_1 is claimed to be rejected, and if $r_{count} > r_{table}$, then H_1 is accepted and H_0 is rejected.

The Pearson product moment correlation formula according to Sugiyono (2019) is as follows:

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{\{n\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum Y)^2\}}} \quad (1)$$

III. RESULTS AND DISCUSSION

1. Research result

a. Descriptive Statistical Analysis Results

1. Results of Descriptive Analysis of Students' Learning Styles

Statistical results related to student learning styles can be presented as follows:

Table 1. Statistical Data on Student Learning Style Questionnaire Results

Statistics	Statistical Score
Respondent	124
Ideal Maximum Score	228
Ideal Minimum Score	57
Highest Score	201
Lowest Score	125
Average Score	162,48
Standard Deviation	18,56
Variance	344,64

Table 1 indicates that the score of average of learning styles from the results of a survey conducted on 124 students is 162.48, which means that on average students have a learning style that is relevant to their own. The highest score obtained by students is 201 which means that no student obtained the ideal maximum score of 228. The lowest score is also the same, from the data obtained the lowest score is 125 while the ideal minimum score is 57. The standard deviation is 18.56, while the variance value of the data is 344.64.

The percentage of each student's learning style based on gender is presented as follows:

Table 2. Percentage of Learning Styles of Female Students

Learning Style	Number of Student	Persentage(%)
Visual	45	43,7
Audiotorial	9	9,0
Kinesthetic	23	22,3
Cannot be distinguished	26	25,0
Total	103	100,0

Data on the percentage of learning styles of female students of the class X science is shown in the following figure:

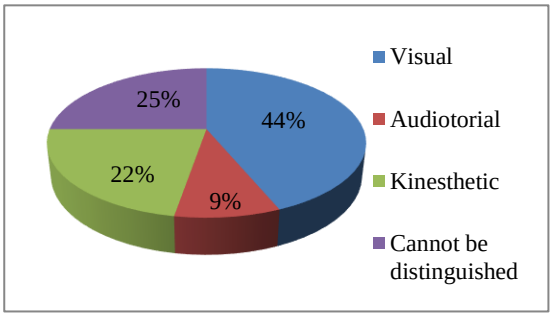

Figure 1. Diagram of Grouping Learning Styles of Female Students

Figure 1 shows that most of the female students (45 students) belong to the visual

learning style and at least 9 people have the auditory learning style.

Table 3. Percentage of Male Students' Learning Styles

Learning Style	Number of Students	Percentage(%)
Visual	5	24,0
Audiotorial	0	0,0
Kinesthetic	12	57,0
Cannot be distinguished	4	19,0
Total	21	100,0

Data of he percentage of male students in the class X science learning styles are presented in the form of a diagram as shown in the following figure:

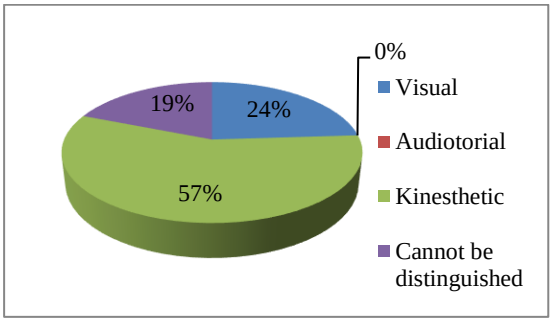

Figure 2. Diagram of the Grouping of Male Students' Learning Styles

Figure 2 indicates that most of male students (12 students) belong to the kinesthetic learning style and none of them has an auditory learning style.

2. Descriptive Analysis of Students' Physics Learning Outcomes

The results of the study of learning outcomes of physics for students which was carried out by giving test instruments through the multiple choice kind of questions are presented in the following table:

Table 4. Statistical Data on Physics Learning Outcomes

Statistics	Statistical Score
Respondent	124
Ideal Maximum Score	100
Ideal Minimum Score	0
Highest Score	76
Lowest Score	18
Average Score	44
Standard Deviation	14,51
Variance	210,561

Table 4 shows that the score of average carried out on 124 students is 44. The highest score obtained by students is 76, which means that no student has obtained the ideal maximum score of 100. The lowest score obtained by students is 18. The standard deviation of the data obtained is 14.51 while the variance of the data is 210.561.

The research data that have been obtained are grouped into 5 categories. The following is a diagram of the frequency distribution of students' physics learning outcomes.

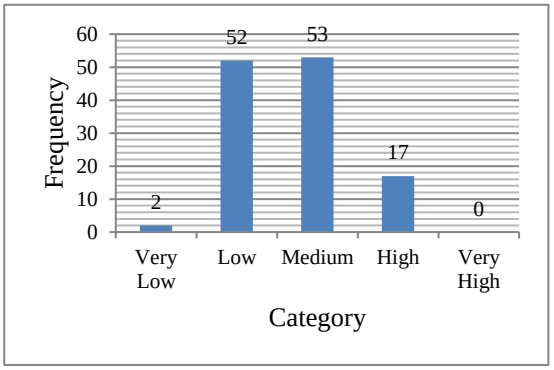

Figure 3. Frequency Diagram of Student Learning Outcomes

Figure 3 shows that the acquisition of learning outcomes scores for students in class X IPA is more likely to score in the moderate category as many as 53 people, while there are

no students who score in the very high category.

b. Inferential Statistical Analysis

1. Normality Test

The results of normality testing, respectively, obtained a significance value of 0.200 and 0.169. The values obtained from the two variables indicate that sig > 0.05, which is meant that the data obtained are distributed normally.

2. Linearity Test

The results of this analysis obtained a significance value 0.453. This value indicates that sig > 0.05. This means that the data from the variables have a linear pattern. Meanwhile, based on the obtained F_{value} of 1.026 < 1.59 (obtained from F_{table}) which means F_{count} is smaller than F_{table}, it can be stated that there is a linear correlation of learning style variables and also learning outcomes.

2. Hypothesis Test

This test in used the test Pearson product moment correlation, obtained of the correlation value of 0.131. To test the hypothesis we compare the value of r_{count} with rt_{able}. The value of rt_{able} for n = 124 and a significance of 5% or 0.05, then r_{table} = 0.176, while for r_{count} it is 0.131. From the results, it is known that $r_{count} < r_{table}$, then H_0 is accepted and H_1 is rejected.

2. Discussion

Learning style is claimed as the factors which tends to give influence toward learning process, namely internal factors.

The analysis of data is obtained by an average score of 162.48. Overall, there are 50 students who have a visual learning style. Furthermore, for students with audiotorial learning styles as many as 9 people. Then there are 35 students who use a kinesthetic style of learning. Meanwhile, as many as 30 students who cannot be distinguished from their learning styles because they are not dominant to one learning style.

According to Sundayana (2018) states that from several types of this styles of learning, namely visual, audiotory, and kinesthetic, there are individuals who tend to one learning style and others who tend to all learning styles. The results indicates that the students tended to be dominated by visual learning styles. However, based on gender, female students tend to use a more dominant visual learning style, while male students have a kinesthetic style of learning. This is consistent with the research results of (Sudria et al., 2018; Damayanti & Pratitis, 2012) which states that more female students use visual learning styles and also for male students more use the kinesthetic styles of learning.

In addition, this research was done to determine how the students' learning outcomes of physics. Referring to the research results, the level of physics outcomes of learning is in the medium category. These results state that students had not used their styles of learning well and it makes the learning outcomes are moderate.

In this study, the hypothesis proposed is "there is a positive and also significant influence of the learning styles and also learning outcomes in the students of class X science at MAN 1 Polewali Mandar". The results of hypothesis testing obtained $r_{count} < r_{table}$ then H_0 is accepted and H_1 is rejected. Where, the value of rcount is 0.131 and the value of rtable is 0.175. The correlation coefficient value is obtained and compares it with the coefficient interval to determine the level of relationship between variables, it is found that the correlation coefficient value is in the interval 0.00-0.199. This shows the level of relationship that exists between the two variables is included in the very low category because $r_{count} < r_{table}$.

These results are able to be seen that there is no found any significant influence of learning styles and also learning outcomes in students of class X science at MAN 1 Polewali Mandar. It is supported by the research of (Chania et al., 2016) in the influence of learning styles and also student learning outcomes which states that there is no significant influence of learning styles and also student learning outcomes, whether it is a separate relationship or an overall relationship.

The results can be revealed this way due to the fact that students have not applied their respective learning styles properly, whether it is visual, auditory, or kinesthetic learning styles as teachers have lack of knowledge and less focused on students' learning styles. In addition, considering the teaching and learning process carried out at MAN 1 Polewali Mandar, namely from online learning to offline learning, it makes it difficult for students to understand physics lessons so that it gives influence toward learning outcomes which are less than optimal. Another reason is that there is no correlation influence of learning styles and also learning outcomes of the student, which is able to be known from the teacher factor.

There are many factors that affect learning outcomes apart from students' learning styles which are internal factors. There are other internal factors, namely interests, talents, motivation, readiness, while external factors or factors originating from outside the individual are related to aspects of family, school and community (Slameto, 2010).

However, in addition to the influence of individual internal and external factors, other causes are the use of strategies or learning models applied by teachers that are not relevant to the learning styles of students and teachers do not know the abilities of students well. According to Wahyuni (2017) the use of learning models applied by educators needs to be considered, because if not, the educators are less able to explore students' abilities. According to S. J. Allcock and J. A. Hulme (2010) in (Arfandi & Lopa, 2018) teachers are claimed as the key to do the activities of learning. The capaability to adapt the kind of cognitive development can be claimed as the important reason. Adjustment of teacher to

the learners' characteristics are going to significantly help them to reach the mastery in learning. In line with this opinion according to Saiful (2019) that the teacher has an important role not only in delivering material, but also in planning, implementing, and managing learning that can develop students' abilities according to learning objectives with implementing learning that is suitable with students' character, as well as assessing process and students' learning outcomes.

According to Wahyuni (2017) recognizing one's own learning style will not help in making a person smarter, but it can help teachers determine a more effective way of learning.

Therefore, teachers can adjust the ways that can be used to facilitate the learning process of students so that students have good learning outcomes. For those with visual learning styles, the teacher can use visual materials such as pictures, maps, diagrams and colors so that students will not bored and interested in learning. For students with auditory learning styles, teachers can use discussion, lecture or teaching methods with the help of audio learning media, and for those with kinesthetic learning styles, teachers can invite students to learn while exploring their environment or learn outside the classroom not only in the classroom.

IV. CONCLUSION AND SUGGESTION

According the data and result of analysis, it is stated that the learning styles of the students in the class X science at MAN 1 Polewali Mandar are dominated by visual learning styles, followed by kinesthetic learning styles and auditory styles of learning. Some students cannot be identified clearly as they do not dominate one of three learning styles given. Interestingly, female students are more dominant to have a visual style of learning and male students mostly have a kinesthetic learning style. In addition, students' learning outcomes are in the medium category. It is also found that there is a insignificant relationship between learning styles and students' physics learning outcomes.

REFERENCES

Angrasari, F. (2016). Hubungan gaya belajar dengan hasil belajar fisika peserta didik kelas X MIA di SMA Negeri 2 Takalar. *Jurnal Pendidikan Fisika*, *6*(2), 225–234. https://doi.org/10.26618/jpf.v6i2.1310

Arfandi, A., & Lopa, A. (2018). Learning type, learning motivation, and grade performance achievement of students in vocational higher education. *Proceedings of the Internasional Conference on Indonesia Technical Vocational Education and Association*, 28–31. https://doi.org/10.2991/aptekindo-18.2018.6

Astuti, C. D., Sumantri, M. S., & Boeriswati, E. (2018). The relationship of achievement motivation and critical thinking with the ability to read

comprehension. *American Journal of Educational Research*, *6*(7), 1005–1008. https://doi.org/10.12691/education-6-7-17

Chania, Y., Haviz, M., & Sasmita, D. (2016). Hubungan gaya belajar dengan hasil belajar siswa pada pembelajaran biologi kelas X SMAN 2 Sungai Tarab Kabupaten Tanah Datar. *Sainstek : Jurnal Sains Dan Teknologi*, *8*(1), 77-84. https://doi.org/10.31958/js.v8i1.443

Chetty, N. D. S., Handayani, L., Sahabudin, N. A., Ali, Z., Hamzah, N., Rahman, N. S. A., & Kasim, S. (2019). Learning styles and teaching styles determine students' academic performances. *International Journal of Evaluation and Research in Education*, *8*(4), 610–615. https://doi.org/10.11591/ijere.v8i3.20345

Damayanti, A. K., & Pratitis, N. T. (2012). Gaya belajar ditinjau dari tipe kepribadian dan jenis kelamin. *Persona: Jurnal Psikologi Indonesia*, *1*(2), 88-98.

Deporter, B., & Hernacki, M. (2007). *Quantum learning: Membiasakan belajar nyaman dan menyenangkan*. Bandung: Kaifa.

Halim, A. (2012). Pengaruh strategi pembelajaran dan gaya belajar terhadap hasil belajar fisika siswa SMPN 2 Secanggang Kabupaten Langkat. *Jurnal Tabularasa PPS Unimed*, *9*(2), 141–158.

Halim, A., Wahyuni, A., Susanna., Elisa., Hamid, A., & Irwandi. (2021). Correlation between learning style and achievement in physics learning. *Journal of Physics: Conference Series, 1940*, 1-9. DOI: 10.1088/1742-6596/1940/1/012115

Hasanah, I., Kantun, S., & Djaja, S. (2018). Pengaruh gaya belajar terhadap hasil belajar siswa kelas XI jurusan akuntansi pada kompetensi dasar jurnal khusus di SMK Negeri 1 Jember semester genap tahun ajaran 2017/2018. *Jurnal Pendidikan Ekonomi: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi, dan Ilmu Sosial*, *12*(2), 277–282. https://doi.org/10.19184/jpe.v12i2.8572

Ikhsan, K. N. (2022). Sarana pembelajaran untuk meningkatkan hasil belajar. *Academia: Jurnal Inovasi Riset Akademik*, *2*(3), 119–127. https://doi.org/10.51878/academia.v2i3.1447

Kamal, I., Karim, M. K. A., Kechik, M. M. A., Ni, X., & Razak, H. R. A. (2021). Evaluation of healthcare science student learning styles based VARK analysis technique. *Internasional Journal of Evaluation and Research in Education*, *10*(1), 255-261. http://doi.org/10.11591/ijere.v10i1.20718

Khairiah, K., Wati, M., & Hartini, S. (2015). Hubungan kepercayaan diri dengan hasil belajar siswa kelas VIII MTsN Mulawarman Banjarmasin pada mata pelajaran IPA. *Berkala Ilmiah Pendidikan Fisika*, *3*(3), 200-210. https://doi.org/10.20527/bipf.v3i3.812

Martiningsih, M. (2016). Peranan strategi active learning terhadap hasil belajar fisika siswa kelas VIII SMP Negeri 6 Makassar. *Jurnal Pendidikan Fisika*, *4*(3), 357-364. https://doi.org/10.26618/jpf.v4i3.334

Nur, F., Yani, A., & Haris, A. (2015). Penerapan pendekatan inquiry based learning terhadap hasil belajar fisika di SMKN 1 Sulawesi Selatan. *Jurnal Pendidikan Fisika*, *3*(2), 158–165. https://doi.org/10.26618/jpf.v3i2.263

Saiful, M. (2019). Pengaruh model example non_example (ene) dan inside outside circle (ioc) dalam pembelajaran berbantuan media audiovisual. *Refleksi Edukatika: Jurnal Ilmiah Kependidikan*, *10*(1), 77-86. https://doi.org/10.24176/re.v10i1.3885

Slameto. (2010). *Belajar dan faktor-faktor yang mempengaruhinya*. Jakarta: Rineka Cipta.

Sudria, I. B. N., Redhana, I. W., Kirna, I, M., & Aini, D. (2018). Effect of Kolb's learning styles under inductive guided-inquiry learning on learning outcomes. *Internasional Journal of Instruction, 11*(1), 89-102. . https://doi.org/10.12973/iji.2018.1117a

Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.

Sundayana, R. (2018). Kaitan antara gaya belajar, kemandirian belajar, dan kemampuan pemecahan masalah siswa SMP dalam pelajaran matematika. *Mosharafa: Jurnal Pendidikan Matematika*, *5*(2), 75–84. https://doi.org/10.31980/mosharafa.v5i2.262

Taqwa, M. R. A., & Astalina, D. (2015). Hubungan gaya belajar visual, auditorial, dan kinestik dengan hasil belajar siswa pada materi dinamika rotasi dan kesetimbangan benda tegar kelas XI IPA SMAN SeKota Jambi. *Prosiding Seminar Nasional Sains dan Pendidikan Sains 5*, 220–227.

Wahyuni, A. (2017). Korelasi antara gaya belajar terhadap hasil belajar mahasiswa pada mata kuliah kalkulus dasar. *Jurnal Karya Pendidikan Matematika*, *4*(1), 1–5. https://doi.org/10.26714/jkpm.4.1.2017.%25p

Wahyuni, Y. (2017). Identifikasi gaya belajar (visual, auditorial,kinestetik) mahasiswa pendidikan matematika Universitas Bung Hatta. *Jurnal Penelitian dan Pembelajaran Matematika*, *10*(2), 128–132. https://doi.org/10.30870/jppm.v10i2.2037