



The Effect of Visual Learning Style and Problem Based Learning towards Mathematics Learning Outcomes Viewed from Emotional Intelligence

Sunyoto Hadi Prajitno* & Alyarah Fardatul Auliya

Department of Mathematics Education, Universitas PGRI Adi Buana Surabaya, Indonesia

Abstract: This study aims to determine whether there is an effect of visual learning style using the Problem Based Learning model on learning outcomes in terms of the emotional intelligence of class XI students of SMA Negeri 1 Menganti. The population used is class XI IPA and the selected sample is students of class XI IPA 2 and XI IPA 3 by applying the Problem Based Learning model. Data collection techniques used are questionnaires and student learning outcomes tests. From the results of the data analysis, the value of sig. (2-tailed) = 0.005 on the results of the visual learning style test with high emotional intelligence was obtained. Meanwhile, the visual style learning outcome test with moderate emotional intelligence obtained a value of sig. (2-tailed) = 0.000 and the visual learning style with emotional intelligence obtained a value of sig. (2-tailed) = 0.001. It can be said that there is an influence on visual learning style using Problem Based Learning on significant learning outcomes of the emotional intelligence of class XI students of SMA Negeri 1 Menganti in 2021/2022.

Keywords: problem based learning, visual learning style, emotional intelligence, mathematics learning outcomes.

Abstrak: Penelitian ini bertujuan untuk mengetahui ada tidaknya pengaruh gaya belajar visual menggunakan model Problem Based Learning terhadap hasil belajar ditinjau dari kecerdasan emosional siswa kelas XI SMA Negeri 1 Menganti. Populasi yang digunakan adalah kelas XI IPA dan Sampel yang terpilih adalah siswa kelas XI IPA 2 dan XI IPA 3 dengan menerapkan model Problem Based Learning. Teknik Pengumpulan data yang digunakan adalah kuesioner dan tes hasil belajar siswa. Dari hasil analisis data didapatkan nilai sig.(2-tailed) = 0,005 pada hasil tes gaya belajar visual dengan kecerdasan emosional tinggi. Sedangkan tes hasil belajar gaya belajar visual dengan kecerdasan emosional sedang didapat nilai sig.(2-tailed) = 0,000 serta pada gaya belajar visual dengan kecerdasan emosional rendah diperoleh nilai sig.(2-tailed) = 0,001. Dapat dikatakan bahwa terdapat pengaruh yang signifikan pada gaya belajar visual menggunakan Problem Based Learning terhadap hasil belajar ditinjau dari kecerdasan emosional siswa kelas XI SMA Negeri 1 Menganti tahun 2021/2022.

Kata kunci: pembelajaran berbasis masalah, gaya belajar visual, kecerdasan emosional, hasil belajar matematika.

▪ INTRODUCTION

Education has a very important role in efforts to improve and realize quality human resources. Education is a conscious and planned effort to create a learning atmosphere and learning process that is carried out by students actively with the aim of developing their potential who has religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, as well as the nation's community, and the State. (Law of the Republic of Indonesia No. 20 of 2003).

In the world of education, to realize quality education of course teaching and learning activities have an important role in order to make students more active and have high motivation in learning. However, this will not go well, because some students still

think that mathematics is a very scary subject. At the time of learning, many students try to avoid learning and even make excuses for not participating in learning.

In Indonesia, the development of mathematics learning is still very concerning. This can be seen in the ability of students whose learning outcomes are still below average. There are only a few students who can master mathematics well. Mathematics is a basic science whose learning can train students' ability to think critically, logically and improve students' analysis in seeing a problem. During the learning process, each child has differences in receiving and processing information, some are quick to receive information, some are slow to receive information. This difference is caused by the child's learning style in understanding the lesson, including in learning mathematics. According to Nasution in (Reinita & El Fitri, 2019) Learning style is a consistent way for a student to capture stimulus or information, how to remember, think and solve problems. By knowing the characteristics of students' learning styles, it is hoped that it will make it easier for teachers to carry out learning and be able to apply various learning models so that the learning outcomes obtained by students are optimal. According to a study conducted by Gregg in (Razzak et al., 2019) that by adjusting learning materials based on students' preferred learning styles, it can provide benefits for students, namely increasing their learning outcomes.

Students have different learning styles and will use their respective learning styles according to the level of difficulty of the material that has been given. According to Depoter in (Hasanah, et al (2018) there are three types of learning styles, namely visual, auditory, and kinesthetic. Students with visual learning styles are learning by seeing, observing, analyzing through reading materials such as diagrams, charts, graphs, and tables. Students the auditory learning style is learning by prioritizing the senses of the listener, students are easier to receive information through lectures, discussions, debates, and instructions. Then, the kinesthetic learning style in which students prefer to learn through physical activity and direct involvement which can be in the form of handling and moving.

learning process, learning activities are still teacher-centred, students follow lessons by listening to the explanations given by the teacher, so that not much experience is directly obtained by students during learning, especially learning mathematics. Learner-centered learning activities can be carried out in various ways. model selection n models can be adapted to the needs of students. The learning model that is expected to help students develop critical, logical and problem solving thinking is the Problem Based Learning model. The Problem Based Learning is learning that emphasizes students starting with proposing problems, then analyze the existing problems and trying to find solutions. This activity will make students actively construct learning outcomes (Prayitno, 2018). Problem based learning model is one way to further activate students during the learning process. In addition, PBL designs a learning atmosphere to solve problems both individually and in groups. By involving students in solving problems, students will think optimally and activate their potential so that the learning process is more lively and can make students active during the learning process. In this case, the educator acts as a guide and facilitator during the learning activities.

In addition to learning styles and learning models that are thought to affect student learning outcomes, emotional intelligence is also one of the factors that can improve student learning outcomes. In the learning process, students must face problems, of

course, cannot be separated from the way students respond to a problem which in this case is closely related to their emotional skills in dealing with a problem. In this case the emotional skills of students will be measured through their emotional intelligence. According to (Prayitno, 2020) emotional intelligence is the potential that a person has to adapt to his environment. If a person is able to manage, supervise, control, and regulate his emotions appropriately, whether that person is dealing with his personality, dealing with other people, parents, friends or society, dealing with work or having problems, then that person can be said to have emotional intelligence. Based on the discussion above, this article was created with the aim of knowing the learning styles and learning outcomes of students' mathematics using the *Problem Based Learning* in terms of high, medium, and low emotional intelligence.

▪ **METHOD**

This study used a quantitative approach. The method used is a quasi-experimental, a design using Pre-experimental Design using One Group Pretest-Posttest, which is a research design carried out by taking one measurement at the beginning (pretest) on an object under study, before being given treatment or treatment. Then the researcher will give certain treatment. After getting treatment, another measurement will be carried out in the form of a posttest. The research place is at SMA Negeri 1 Menganti Gresik for the odd semester 2020/2021 academic year. This research was conducted in class XI IPA by applying the Problem Based Learning. This study uses a population of all students in class XI IPA totaling 252 students. while the sample used was taken by purposive sampling technique, namely through the consideration of the mathematics teacher to facilitate the research, so that the students of class XI IPA 2 and XI IPA 3. and collect data to make the activity more systematic and easier. (Nasution 2016). In this study used instruments in the form of questionnaires and written tests. Questionnaires or questionnaires are used to determine the learning style and level of emotional intelligence of students. the learning outcomes test is used to determine the learning outcomes of mathematics after applying the Problem Based Learning in terms of students' emotional intelligence. The data analysis technique used is normality test, homogeneity test, t-test with a significant level of 0.05. Hypothesis testing is used to determine whether there is an influence of learning styles using the Problem Based Learning on mathematics learning outcomes in terms of high, medium, low emotional intelligence for students of class XII IPA SMA Negeri 1 Menganti for the academic year 2020/2021.

As for taking the assessment criteria on the statement of answers to the student learning style questionnaire, where the answer choices in the positive category are always 4, often 3, rarely 2 and never 1, while in the negative category it is always 1, often 2, rarely 3, and never 4. The criteria for assessing the statement of emotional intelligence questionnaire answers in the positive category are strongly agree 4, agree 3, disagree 2, strongly disagree 1, and the assessment criteria in the negative category are strongly agree 1, agree 2, disagree 3, and strongly disagree 4of

▪ **RESULT AND DISSCUSSION**

Descriptive Analysis

Based on the results of research obtained at SMA Negeri 1 Menganti, there were 37 students with visual learning styles. Meanwhile, emotional intelligence can be

categorized according to high, medium, and low groups with single data processing. After obtaining the average calculation value of $\bar{X} = 109.57$ and the value of the standard deviation or standard deviation of $(S) = 10.74$. Then the next step will be categorized based on the level of high, medium and low emotional intelligence. From the calculation of students' emotional intelligence categorization, it is found that students are categorized as having high emotional intelligence if they have a value of $X \geq 120.31$. Meanwhile, students with moderate emotional intelligence category have a value of $98.83 X < 120.31$ and students have low emotional intelligence if the value obtained is $X < 98.83$. (Prayitno et al., 2021). Based on the above categorization, the results are in table 1 below:

Table 1. Categorization of emotional intelligence assessment

Category	Interval
High	$X \geq 120.31$
Medium	$98.83 X < 120.31$
Low	$X < 98,83$

After distributing the questionnaire, the next step is to carry out the teaching and learning process using the Problem Based Learning model. As for knowing how much influence the Problem Based Learning has on mathematics learning outcomes, students are given a written test containing four essay questions which are conducted before and after the application of the Problem Based Learning model. The normality test was conducted to test whether the data that had been collected by the researcher had data that was normally distributed or not. If the data is normally distributed, the next step is to do a homogeneity test and the next stage of data analysis. Before analyzing the data, the researcher grouped the students according to the level of students' emotional intelligence. To make it easier to analyze the data, the researchers used the help of the SPSS version 20 program, by looking at the significant value on Kolmogorov Smirnov, which was more than 0.05 (Oktaviani & Notobroto, 2014) from the results of the normality test of students' mathematics learning outcomes seen from learning styles and intelligence can be obtained in table 3.

Table 2. Recapitulation of Categorization of Visual Learning Styles and Students' Emotional Intelligence

No.	Learning Style	Emotional Intelligence	Number of students
1.	Visual	High	7 Students
2.	Visual	Moderate	24 Students
3.	Visual	Low	6 Students

Table 3. Normality Test Tests for Mathematics Learning Outcomes Students

Category	Data Source	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Visual learning style viewed from high emotional intelligence	Pretest	.247	7	.200*	.901	7	.340
	Posttest	.258	7	.174	.818	7	.062
	Pretest	.173	24	.062	.937	24	.138

Visual learning style viewed from middle level of emotional intelligence	Postest	.147	24	.192	.926	24	.079
Visual learning style viewed from low emotional intelligence	Pretest	.216	6	.200*	.887	6	.302
	Postets	.293	6	.117	.766	6	.029

Based on Table 3 normality test data can be seen that the value of sig. obtained in each class in terms of high, medium and low emotional intelligence that has a significant value in the Kolmogorov Smirnov column has a sig value of more than 0.05, so it can be said that the data is normally distributed. After doing the normality test, the next step is to do the homogeneity test used to test whether the data is homogeneous or not, if homogeneity is met then research can be carried out at a later stage. To simplify data analysis, the researchers used the help of *SPSS version 20*. By looking at the significantly more value of 0.05 (Oktaviani and Notobroto, 2014). The results of the homogeneity test of students' mathematics learning outcomes can be seen in the following table:

Table 4. Homogeneity test of students' mathematics learning outcomes

Category	Levene Statistic	df1	df2	Sig.
Visual Learning Style in terms of Students' High Emotional Intelligence	.305	1	12	.591
Visual Learning Style in terms of Students' Medium Emotional Intelligence	1.652	1	46	.205
Visual Learning Style in terms of Students' Low Emotional Intelligence	1.689	1	10	.223

Based on the calculation results of *SPSS version 20*. through the homogeneity test in the t table by looking at the significant value of more than 0.05, it can be said that the data is homogeneous. After conducting the analysis prerequisite test, namely the normality test and homogeneity test, then the hypothesis test is carried out. Hypothesis testing was carried out from the data on students' mathematics learning outcomes using the t-test or Paired Samples t-Test. This test is used to make a decision whether the research hypothesis is accepted or rejected. The following is a table of results from hypothesis testing:

Table 5 . T-Test of Students' Mathematics Learning Outcomes

No.	Category	Sign Value. (2-tailed)	Average
1.	Visual Learning Style in terms of Students' High Emotional Intelligence	.005	Pretest = 81.29 Posttest = 89.29

2.	Visual Learning Style in terms of Student's Medium Emotional Intelligence	.000	Pretest = 72.63 Posttest = 83.46
3.	Visual Learning Style in terms of Students' Low Emotional Intelligence	.001	Pretest = 65.15 Posttest = 77.00

The result of analyzing SPSS version 20 results of the t-test can be seen from the significant value (2-tailed) In table 5 If the value of sig (2- tailed) < 0.05 then there is a significant effect on the data. Based on the results of the t-test calculation on students with visual learning styles in terms of students' high emotional intelligence, it can be seen that the value (2-tailed) is 0.005 <0.05 then $H_{0,1}$ rejected and $H_{1,1}$ accepted, so it can be concluded that "there is a significant influence between students' visual learning styles using the Problem Based Learning on students' mathematics learning outcomes in terms of students' high emotional intelligence".

Based on the results of the t-test calculation on students with visual learning styles in terms of moderate emotional intelligence, it can be seen that the value (2-tailed) is 0.000 <0.05 then $H_{0,2}$ rejected and $H_{1,2}$ accepted, so it can be concluded that "there is a significant effect between students' visual learning styles using the Problem Based Learning on students' mathematics learning outcomes in terms of students' moderate emotional intelligence". Based on the results of the t-test calculation on students with visual learning styles in terms of students' low emotional intelligence, it can be seen that the value (2-tailed) is 0.001 <0.05 then $H_{0,3}$ rejected and $H_{1,3}$ accepted, so it can be concluded that "there is a significant influence between students' visual learning styles using the Problem Based Learning on students' mathematics learning outcomes in terms of students' low emotional intelligence".

From the results of the data analysis, it can be concluded that there is a significant influence between visual learning styles using the Problem Based Learning on mathematics learning outcomes in terms of students' emotional intelligence. This research was conducted with the aim of knowing the effect of visual learning styles using the Problem Based Learning on students' mathematics learning outcomes in terms of students' emotional intelligence. From the three outputs of the results of the t-test data analysis using SPSS version 20 by paying attention to the significant value (2-tailed) it can be concluded that there is a significant effect on students with visual learning styles and high emotional intelligence because the sign value (2-tailed) is more than 0.05 and it can be seen from the average results of the test of learning outcomes before and after the implementation of the Problem Based Learning , there was an increase in both students with visual learning styles and high, medium, and low emotional intelligence.

This is in accordance with the opinion of Suyono and Hariyanto (Ulfa, 2015) which states that a child who understands his own learning modality will benefit in his learning because he will be accustomed to learning ways that are suitable for himself. Likewise, teachers who understand the learning modalities of each child will be able to choose varied learning methods so that it is hoped that the learning delivered will be more easily accepted by students and more meaningful. In addition to learning styles, emotional intelligence also has a close relationship with students' mathematics learning outcomes. Emotional intelligence is the ability to understand feelings and emotions, both in oneself and in others and use information to guide thoughts and actions. Students must be able to manage emotional intelligence well, in order to improve their learning outcomes. In this

study, there were 37 students who had visual learning styles, of which 37 students were divided according to high, medium, and low levels of emotional intelligence. Visual learning style is a learning style that plays an important role is the eye or the sense of sight. they tend to learn by what they see. Students who have a visual learning style must see the body language and expressions of the teacher in learning to be able to understand the subject matter. With this it can be used by a teacher to package a lesson and apply the right learning model so that students can be interested and motivated to take part in learning. By applying the Problem Based Learning , students with visual learning styles can motivate themselves to get maximum learning outcomes. In this case, the visual learning style and the students' emotional intelligence affect the students' mathematics learning outcomes.

▪ **CONCLUSION**

Based on the results of the data analysis described above, it can be concluded that according to the first data analysis, namely students with visual learning styles in terms of students' high emotional intelligence, there is a significant influence when the Problem Based Learning learning model is applied. While the second data analysis, namely students with visual learning styles in terms of emotional intelligence, while students have a significant influence when the Problem Based Learning learning model is applied. And according to the results of the third data analysis, namely students with visual learning styles in terms of students' low emotional intelligence there is a significant influence when the Problem Based Learning learning model is applied. From the results above, it can be concluded that there is an influence of visual learning styles using the Problem Based Learning on mathematics learning outcomes in terms of the emotional intelligence of students at SMA Negeri 1 Menganti Gresik for the 2021/2022 academic year.

Based on what has been concluded from the results of this study, the authors have several suggestions that might be implemented to develop learning styles so that students' mathematics learning outcomes can improve well. The suggestion from the researcher is that in the learning process it is hoped that the teacher can know and analyze the characteristics of student learning styles so that in the application of the Problem Based Learning it can run well and students can improve mathematics learning outcomes, while suggestions for the school are expected to increase cooperation with teachers. continuously in paying attention to student learning styles, so that students can study well and get optimal mathematics learning outcomes. Suggestions for researchers who want to do the same research, this article can be used as a reference, it is highly recommended to develop this research by preparing other material presentations and further optimizing research in order to improve future mathematics learning outcomes.

▪ **REFERENCES**

- 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>
- Oktaviani, M. A., & Notobroto, H. B. (2014). Perbandingan tingkat konsistensi normalitas distribusi metode Kolmogorov-Smirnov, Lilliefors, Shapiro-Wilk, dan

- Skewness-Kurtosis. *Jurnal Biometrika Dan Kependudukan*, 3(2), 127–135. <http://journal.unair.ac.id/downloadfullpapers-biometrikd8bc041810full.pdf>.
- Pendidikan, J., Sekolah, G., Pendidikan, F. I., & Semarang, U. N. (2015). *Jurusan pendidikan guru sekolah dasar fakultas ilmu pendidikan universitas negeri semarang 2015*.
- Prayitno, S. H. (2018). *Upaya Meningkatkan Hasil Belajar Matematika Siswa Kelas Viii-F Smp Negeri 22 Surabaya Melalui Penerapan Model Pembelajaran Problem Based Learning Tahun Pelajaran 2018-2019*. 4(2), 43–54.
- Prayitno, S. H. (2020). *Pengaruh Kecerdasan Emosional Dalam Pembelajaran Matematika Abad 21*. 171(November 2017), 8557.
- Razzak, F., Shaikh, S., & Siddiqui, A. (2019). Exploring Effects of Learning Styles on Learning Outcomes. *New Horizons (1992-4399)*, 13(1), 13–30. [http://10.2.36.54/NH.13.1\(19\).02%0Ahttps://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=138449750&site=ehost-live&scope=site](http://10.2.36.54/NH.13.1(19).02%0Ahttps://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=138449750&site=ehost-live&scope=site)
- Reinita, R., & El Fitri, A. (2019). *The Effect of Cooperative Two Stay Two Stray Model on Civics Learning Outcomes of Primary School Students*. 1(3), 212–216. <https://doi.org/10.2991/icet-19.2019.109>
- Prayitno, S. H., & Utami, H. P. D. (2021). Perbedaan hasil belajar matematika siswa dengan discovery learning dan problem based learning ditinjau dari kecerdasan emosional. *Math Didactic: Jurnal Pendidikan Matematika*, 7(2), 159-169.
- Nasution, H. F. (2016). Instrumen Penelitian Dan Urgensinya Dalam Penelitian Kuantitatif. *Jurnal IAIN Padangsidempuan*, 4(1), 64–75. <http://jurnal.iainpadangsidempuan.ac.id/index.php/Almasharif/article/download/721/633>.