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The Influence of Learning Style and Learning Facilities on Mathematics Learning Achievement in Grade VII Middle Schools in the City of Surabaya in the Pandemic Era

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ABSTRACT

This research explores the influence of learning styles and learning facilities on the mathematics learning achievement of class VII junior high school students in Surabaya during the pandemic. The research method used was causal associative quantitative, with a sample of 65 students from three junior high schools. Data was collected through questionnaires and written tests, then analyzed using descriptive analysis and multiple regression. The results show that the visual learning style has a positive effect on mathematics learning achievement, while the auditory and kinesthetic styles do not. Learning facilities also have a positive influence. The visual learning style is dominant with 46.14%, followed by auditory 32.30% and kinesthetic 21.53%. Overall, learning styles and learning facilities provide a total effective contribution of 5.5% to mathematics learning achievement.

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1. Introduction

The current modern era requires humans to have higher education. One of the government's efforts to face this modern era is through education. Education not only provides knowledge, but also moral values and shapes individual character. Apart from increasing knowledge, education is also expected to develop skills so that they can compete in the modern era. However, the quality of education in Indonesia is still relatively low or lagging compared to other countries. This is supported by the sresults of the 2015 PISA (Program for International Student

Assessment) study which shows that Indonesia is ranked 69th out of 76 countries and is still stagnant. The low quality of education requires the world of education to continue to change its mindset. This is related to a teacher's obligation to change his or her concept of thinking, namely by getting to know students, understanding appropriate learning styles, and determining the appropriate method of delivering material based on the students' conditions and circumstances(Shoffa et al., 2023). Recognizing student learning styles is not too difficult because it can be seen from the characteristics of each student. In other words, learning styles originate from an individual's personality and abilities.

Since April 2020, after the outbreak that hit Indonesia, many aspects of life, including activities and events, have experienced significant changes. In the world of education, the learning process stopped and then resumed with online learning policies. This policy is based on a circular issued by the Ministry of Education and Culture (Kemendikbud) Directorate of Higher Education No. 1 of 2020 concerning preventing the spread of the Covid-19 outbreak in the education sector. Education in the modern era supports students in carrying out learning during the pandemic by utilizing technology as an online learning tool. The use of technology such as cellphones, laptops and digital platforms becomes an intermediary for teachers and students in carrying out learning activities. Therefore, schools and parents need to meet the facilities needed by students during the online learning process. If previously learning was done face-to-face in class, now it is done online. This causes students not to be able to participate in direct learning. Online learning makes it difficult for teachers and students to understand each other, especially for teachers who must teach material according to their students' learning styles through appropriate learning methods, models or approaches. In online learning, teachers can only explain the material, give assignments, and conduct question and answer sessions, so it is difficult to know whether students really understand the material being taught. In fact, students' learning styles can influence their learning achievement. Research by Permatasari, (2015), shows that learning styles have an influence on student learning achievement in mathematics subjects at MTsN Makassar. Widyawati (2016), explains that learning style is the way humans manage, organize and absorb lesson information received during learning. Students' learning preferences in receiving, managing, and understanding new information vary from one student to another. These differences in learning styles show how students solve problems and how quickly they learn. Hamzah explained that there are several types of learning styles, namely visual learning style, audio learning style, and kinesthetic learning style (Wahyuni, 2017).

Apart from learning styles, learning facilities also influence student learning achievement. This is reinforced by the opinion of Yusuf (2006), who states that the use of learning facilities affects a person's academic achievement. Learning facilities include everything related to students to support smooth and successful learning, including learning media, learning tools, school supplies, and other supporting facilities (Puspitasari, 2020). Facilities and infrastructure are very important in supporting students' learning processes both at home and at school. Hasnadi explained that facilities and infrastructure are very important factors in determining the effectiveness of the learning process; for example, the learning process will not run effectively if the classroom is uncomfortable, unkempt, or unfit to live in

(Hasnadi, 2022). According to Widjaya, achieving good learning achievement requires a smooth teaching and learning process, which is also supported by learning facilities (Muhamad et al., 2019). Subari differentiates the role of learning facilities in the learning process into several parts, including learning tools, teaching aids, and teaching media. Learning media provides benefits by making it easier for teachers and students to understand the material, making learning more creative, interesting, varied, and motivating students to learn (Shoffa et al., 2021). During the pandemic era, several facilities provided by schools to support online learning and bring together students and teachers include LMS (Learning Management System), cellphones/laptops, internet networks, and books. This facility helps students feel comfortable, motivated and have their learning needs met even from home.

2. Method

This research is causal associative in nature with the aim of determining the influence of the independent variables (learning style and learning facilities) on the dependent variable (learning achievement). The research population included all students of class VII SMP in Surabaya City, while the sample consisted of 20 students of class VII of SMP Muhammadiyah 15 Surabaya, 22 students of class VII of SMP Subulussalam, and 23 students of class VII of SMP Taruna Jaya 1. The data collection technique used a questionnaire to obtain data. regarding learning styles and learning facilities, as well as written tests to collect data on learning outcomes in mathematics subjects. The analysis techniques used include (1) descriptive analysis where data obtained from questionnaires and written tests are analyzed descriptively to provide a general picture of students' learning styles, learning facilities and mathematics learning achievements. This descriptive analysis includes calculating the mean, median, and standard deviation for each variable. (2) prerequisite tests are carried out to ensure that the data meets the required assumptions. The normality test is used to check data distribution, the linearity test to ensure a linear relationship between the independent and dependent variables, and the multicollinearity test to check for high correlation between independent variables. The analytical method used is multiple regression analysis to determine the simultaneous influence of learning styles and learning facilities on learning achievement.

Statistical test results include (1) visual learning style: The t test results show that visual learning style has a significant positive influence on mathematics learning achievement with a t value of 3.911 ($p < 0.05$). This means that students with a visual learning style tend to have better mathematics learning achievements. (2) Auditory and Kinesthetic Learning Styles: The t values for auditory and kinesthetic learning styles are not significant, indicating that these two learning styles do not have a positive influence on mathematics learning achievement in this sample. (3) Learning Facilities: The t test results for learning facilities show a significant positive influence on learning achievement with a t value of 2.335 ($p < 0.05$). This indicates that adequate learning facilities contribute to increasing student learning achievement.

3. Results and Discussion

a. Learning Style

Learning styles in this research consist of three categories, namely visual learning style, auditory learning style and kinesthetic learning style. From this research data, it was obtained that students' learning styles were more dominant and influential. Based on table 1.

Table 1. Categorization of learning styles

No	School name	Learning Style		
		LSV	LSA	LSK
1.	SMP Muhammadiyah 15	15,38%	9,23%	6,15%
2.	SMP Subulussalam	16,92%	10,76%	7,69%
3.	SMP Taruna Jaya 1	13,84%	12,31%	7,69%
total		**46,14%**	**32,30%**	**21,53%**

The table above shows that students have a more dominant visual learning style as much as 46.14% of students, 32.30% of students have a dominant auditory learning style and 21.53% of students have a dominant kinesthetic learning style. Thus, the dominant learning style of junior high school students in grade VII in the city of Surabaya is the visual learning style. The results in the linearity test were known that the significance value in the Deviation from Linearity line for visual learning style was 0.727 > 0.05, while for the auditory learning style linearity test the significance value was 0.095 > 0.05 and for the kinesthetic learning style linearity test the significance value was 0.866 > 0.05. Therefore, it can be concluded that the significance value is greater than 0.05 between each variable of learning style (X1) and learning achievement (Y), so there is a relationship between learning style and learning achievement. Meanwhile, multiple regression analysis was found to be calculated for visual learning styles of 3,911, auditory learning styles of 1,652 and kinesthetic learning styles of -984. Because the value of the calculation on the visual learning style > the table, Ha is accepted. while for auditory learning style and kinesthetic learning style, the calculation is less than table, so Ha is rejected. It is also seen that the relative contribution is 97% and the relative contribution is 5.31%. Thus, it can be concluded that visual learning style has a positive effect on learning achievement.

The results of this research are different from those carried out by Widyawati (2016), in that the marginal mean value for visual learning style is 3.4710, auditory learning style is 3.4725 and kinesthetic learning style is 3.3338, so the results of the visual learning style value have good achievements. the same as the auditory learning style, while both have the same learning style compared to the kinesthetic learning style. This could happen for several reasons. It was explained by Chasanah et al., (2020) that the emergence of learning styles is influenced by several things, namely environmental, physical, emotional and sociological factors.

b. Learning Facilities

The variable data on learning facilities was obtained from a questionnaire filled out by 65 students from 3 different schools, namely 20 students from SMP

Taruna Jaya 1, 23 students from SMP Subulussalam and 22 from SMP Muhammadiyah 15 with a total of 11 question items.

Table 2. Distribution of Categorization of Learning Facility Variables

No	Criteria	Frequency	Percentage	Information
1	X ≥ 34	39	0.00%	High
2	22 ≤ X < 34	26	40.00%	Medium
3	X < 22	0	0.00%	Low
total		**65**	**100%**	

The results of the distribution of categorization of learning facility variables in table 2 show that the frequency of learning facility variables with high criteria is 60.00%, the frequency of learning facility variables with medium criteria is 40.00%. Meanwhile, the variable frequency of learning facilities in the low criteria is 0.00%. So, it can be concluded that the tendency for the learning facilities variable to be at the High criterion is 60.00%.

The results of the multiple regression analysis found that the critical value of the t distribution (t_{tabel}) was 1.998 and the results of the regression analysis calculations found that the value of $thitung$ for learning facilities was 2.335, because $t_{hitung} > t_{tabel}$ or Ha is accepted. In this way, it can be interpreted that learning facilities have a positive effect on learning achievement in mathematics in class VII of junior high schools in the city of Surabaya in the pandemic era. The opinion of Arikunto (2013) is further clarified that learning facilities are anything that can facilitate and expedite learning activities optimally. This is reinforced by the opinion of (Mudholifah et al., 2024) that the use of learning facilities affects a person's academic achievement. In this way, optimal use of learning facilities will result in higher mathematics learning achievements achieved by students.

The descriptive results of learning facilities found that the utilization of learning facilities was high at 60.00% of 65 students in 3 schools in the city of Surabaya. This is due to the influence of learning facilities on learning achievement. As is the opinion expressed by Shoffa et al., (2020) that the learning process that occurs between students and teachers will run smoothly and well if the supporting facilities for learning are adequate.

c. Learning achievement

Learning outcomes are obtained from written test scores which contain indicators from the PAT (End of Year Assessment) of class VII students in the city of Surabaya in mathematics subjects.

Table 3. Categories of Trends in Mathematics Learning Achievement

No	Category	Frequency	Percentage	Information
1	≥ 75	21	32,31%	complete
2	< 75	44	67,69%	incomplete
total		98	100%	

Based on the results of table 3, it is known that only 32.31% of class VII students at SMP Muhammadiyah 15, SMP Subulussalam and SMP Taruna Jaya 1 in Surabaya City have completed their studies. Meanwhile, the percentage of

67.69% of students has not completed their studies. So, it can be concluded that the mathematics learning achievement of class VII junior high schools in the city of Surabaya, namely Muhammadiyah 15 Middle School, Subulussalam Middle School and Taruna Jaya 1 Middle School, is still relatively low considering that there are still many students who get scores below the minimum completeness criteria, reaching 67.69%.

The results of simultaneous calculations obtained a value of f_{hitung} of 3.881, because the value of f_{tabel}= 3.14. It can be concluded that $f_{hitung} > f_{tabel}$, then Ha is accepted. So, learning styles and learning facilities together have a positive influence on learning achievement in mathematics in class VII of junior high schools in the city of Surabaya in the pandemic era. The results of multiple regression testing show that the coefficient of determination (R) has a large contribution of learning styles and learning facilities together to learning achievement of 5.5%, while the remaining 94.5% is influenced by other variables not examined in this research such as: motivation, peers., intelligence, learning atmosphere, talents, interests, and environment. As explained in the theoretical study, there are many more factors that influence student learning outcomes, both factors from themselves and factors from outside the student.

The results of calculating the relative contribution and effective contribution of each independent variable to the dependent variable show that the total effective contribution is 5.5%. The learning style variable is 5.31% and the learning facilities variable provides an effective contribution of 0.19%. Therefore, it can be concluded that the largest or dominant effective contribution comes from the learning style variable to the learning achievement variable.

The limitation of this research was that it only involved 65 students from three junior high schools in Surabaya. This relatively small sample size may not be able to represent the population of class VII students in Surabaya as a whole. For future research, it is recommended to use a larger and more diverse sample to increase the generalizability of the research results.

This research uses a quantitative approach with a causal associative type of research. Although this method is effective for identifying relationships between variables, this research cannot definitively determine cause and effect. Future research could consider using experimental research designs to gain a deeper understanding of causation.

4. Conclusions

Based on the results and discussion above, it can be concluded that the visual learning style has a positive influence on the mathematics learning achievement of class VII junior high school students in the city of Surabaya during the pandemic era. On the other hand, auditory and kinesthetic learning styles do not show a positive influence on the mathematics learning achievement of class VII junior high school students in the city of Surabaya. Most students find it easier to understand mathematics subjects through visual methods. Apart from that, learning facilities also have a positive influence on the mathematics learning achievement of class VII junior high school students in the city of Surabaya during the pandemic era. With optimal use of learning facilities, students' mathematics learning achievements will be higher. The most dominant learning style among junior high school students in

the city of Surabaya during the pandemic was the visual learning style at 46.14%, followed by the auditory learning style at 32.30%, and the kinesthetic learning style at 21.53%. Contribution of this research Simultaneously, learning styles and learning facilities provide a total effective contribution of 5.5% to mathematics learning achievement. This suggests that other factors outside this study may have a greater influence on learning achievement.

The practical implications include (1) Developing Learning Methods: Considering that visual learning styles have a significant influence on mathematics learning achievement, teachers can develop more visual learning methods, such as using diagrams, graphs and other visual media to help students understand mathematical concepts. (2) Improving Learning Facilities: Schools must focus on improving learning facilities, such as providing comfortable study spaces, adequate learning aids, and access to educational technology, to support student learning achievement. (3) Adjustment of Teaching Strategies: Considering the variations in students' learning styles, teachers need to adapt their teaching strategies to cover various learning styles, although the results of this study show that auditory and kinesthetic learning styles are not significant, they should still be considered in developing a holistic curriculum. By applying these findings, schools and teachers can be more effective in improving student achievement through a more focused and comprehensive approach.

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