ICMSE 11 (2024): 1-15
International Conference on Mathematics, Science, and Education
QRCBN 62-6861-0508-697
https://proceeding.unnes.ac.id/icmse

How Sensory Preference Learning Styles Affect Statistical Literacy ?

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Abstract. Statistical Literacy is described as the ability to read and write, often associated with arithmetic. The indicators of statistical literacy used are understanding statistical concepts, analyzing, interpreting, drawing conclusions. There are many factors that cause low statistical literacy, one of the factors that needs to be considered to improve learning outcomes is learning style. This study aims to describe and analyze students' statistical literacy based on learning styles (auditory, visual, and kinesthetic). This study uses a mixed method approach with a sequential explanatory design and involves 66 students. The quantitative part of this study uses multiple linear regression tests. To test the effect of visual, auditory, kinesthetic learning styles on statistical literacy. Furthermore, qualitative research was conducted to thoroughly test its influence through in-depth interviews. The results of this study indicate that visual, auditory, kinesthetic learning styles have an effect on statistical literacy ($R = 0.658$; $p = 0.00$) and contribute 43.3% based on the R-Square value. In addition, this study found differences in the performance of subjects with visual, auditory and kinesthetic learning styles. And the subject of visual and auditory learning styles is more influential than kinesthetic learning styles. Auditory learning style tend not to complete statistical literacy questions to completion. Students only fulfill the stage of understanding the concept of all statistical literacy indicators, while at the stage of analyzing, interpreting questions, making decisions, students have not been able to fulfill the domain of statistical literacy indicator. Visual learning style tend to complete statistical literacy questions to completion. Students at the stage of understanding the concept of all domain indicators fulfill the domain of statistical literacy, analyzing, interpreting questions, making decisions.
Keyword: statistical literacy, learning style visual, learning style auditori, learning style kinesthetic, mixed method

Introduction

Literacy is described as the ability to read and write, often associated with numeracy (Unesco, 2006). Statistical literacy according to (Gal, 2002) involves knowledge components (consisting of five cognitive elements:literacy skill, statistical knowledge, mathematical knowledge, context knowledge, critical question and disposition components (consisting of two elements: beliefs and attitudes and critical stance). Statistical literacy involves two reading skills, namely comprehension and interpretation. Statistical illiteracy involves the inability to understand what is being read. According to Garfield & Ben-Zvi (2008). In addition to the ability to interpret data-based information, evaluate critically, and communicate, statistical literacy can also be understood as the ability to understand the basic concepts of descriptive statistics which include how to collect data, organize or organize data, and present data. In short, a person is said to have statistical literacy if he is able to read and interpret data in both tabular and graphical forms (Schield, 2011). Statistical literacy is not only reading data but also evaluating and communicating with statistical messages (Schield, 2011). Statistical Literacy is the ability to create, evaluate and communicate messages involving words, numbers, and graphs together (Forbes et al. 2011). Wallman suggests that statistical literacy includes understanding and critically evaluating statistical messages that are necessary for individuals' everyday lives and for their decision-making, as he highlights for personal and societal needs (Wallman, 2012). Statistical literacy as stated by Schield (2013) focuses on making decisions using statistics as evidence, just as reading literacy focuses on using

words as evidence. Statistical literacy is a competency such as reading, writing or speaking. Statistical literacy involves the ability to read and interpret data in tables and graphs published by government statistical associations (Gal, 2014). Statistical literacy can also be understood as a person's ability to read (understand), analyze; interpret, and represent data either in the form of tables or graphs (Hafiyusholeh, 2015; Hafiyusholeh, Budayasa & Siswono, 2017; 2018). The construct of statistical literacy according to (Apino et al., 2024) includes the application of statistical concepts, interpretation of statistical data and information, communication skills, critical evaluation.

Based on the results of the PISA assessment, Indonesian students' reading, mathematics and science abilities are still below average. PISA wrote that Indonesian students' reading abilities achieved an average of 371, from an average PISA score of 487. In the initial test, students will be given statistical literacy questions that refer to indicators according to Hidayati (Hidayati et al., 2021). Meanwhile, the statistical literacy indicators used are understanding statistical concepts, analyzing, interpreting, drawing conclusions. Based on the initial test, students who have statistical literacy skills must also have strong numeracy skills. Statistics are also important to master because with statistical knowledge, a person will be able to read the data in the research. Without an understanding of statistics, the information contained will be meaningless. This is in line with the thinking of (Finch & Gordon, 2011) explaining that to be able to think statistically literate requires statistical reasoning, statistical skills, and critical thinking. The results of this initial study are also in line with the findings of (Setiani et al., 2021) stating that what is meant by "statistical literacy" is a person's ability to formulate, apply and interpret mathematics in various contexts, including the ability to make statistical reasoning and use concepts, procedures, and facts to describe, explain, or predict an event. (Yusuf et al., 2020) explained that students understand statistical literacy well in order to obtain information from existing data, criticize and make decisions based on that information and aim to develop skills. (Makridakis et al., 2018) revealed that students have difficulty when working on questions based on statistical literacy because students have not been able to formulate, interpret, and use the statistical concepts they understand to solve problems. Walker in 1951 introduced the definition of statistical literacy as the ability to communicate statistical information (Ziegler & Garfield, 2018). According to Mansur (2018), the main cause of low statistical literacy in Indonesia is the lack of training of students in solving statistical problems according to the context of literacy. There are many factors that cause low statistical literacy, one of the factors that need to be considered to improve learning outcomes is learning style (Bire, 2014, Priyatna, 2013). According to (Nikiforidou et al., 2010) explains learning style, age, personality, mood, diverse environments, tools and teaching, cognitive and social skills among other factors determine learning and construction of statistical knowledge. Learning style studies have been developed with various models. However, the main axis is from Rita Dunn and Kennenth Dunn (R. S. Dunn et al., 1981), these sensory preferences are divided into three: visual (V), auditory (A), and Kinesthetic (K). Visual preference is a stronger tendency towards awareness of the surrounding environment and its location in terms of space (R. Dunn et al., 2009). Visual preferences include depictions of information in the form of charts, graphs, flowcharts, arrows, circles, hierarchies and other forms that can represent the content of words. Layout, pattern, design, and color are important to build the meaning of learning style is a learning habit that makes someone easy to receive, process information, and interact with their learning environment. Learning style is one of the factors that influences the achievement of mathematical literacy (Syawahid & Putrawangsa, 2017). This study (Rorong & Asih, 2023) aims to describe and analyze students' statistical literacy based on learning styles (auditory, visual, and kinesthetic). This study will have an impact on mathematics education in Indonesia, especially in efforts to improve students' mathematical literacy skills in terms of students' learning styles. Based on previous studies and also based on the results of initial research observations. So this study will connect statistical literacy with the affective aspects of learning styles in students. In addition, this study is also based on the relevance of sensory preference learning styles and statistical literacy in students. This study aims to 1) determine the effect of learning styles (Visual, Auditory and Kinesthetic) on statistical literacy and 2) explore students' statistical literacy based on learning styles (Visual, Auditory and Kinesthetic).

Methods

This study uses two sequential methods, namely survey research with a quantitative approach combined with a qualitative approach to explore the data needed. According to (Creswell et al., 2013) collecting and analyzing quantitative data based on the results obtained is the first step in sequential design, then followed by data collection and data analysis, and findings achieved qualitatively. This study was conducted using two stages. The first stage, quantitative data collection to determine the learning style of sensory preferences for statistical literacy. Then a

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multiple regression test was carried out, before the regression test was carried out, a classical assumption test was carried out first. The second stage, semi-structured interviews were used to obtain qualitative mixed data to explain statistical literacy. For the statistical literacy test for quantitative data, there are two questions, namely a frequency diagram table, a hypothesis test. To analyze the qualitative method, one question was chosen. This study uses a random sampling approach, the sample is 60 students. The students used in this study are students who have taken statistics courses. Subjects were selected based on the research categories of high and low visual learning styles, high and low auditory learning styles, high and low kinesthetic learning styles. Then the subjects were interviewed to see how they completed the statistical literacy test. The statistical literacy test given in the interview consisted of one statistical literacy question. The question is as follows: In a village area A there is data on the age of 40 heads of families expressed in years, namely as follows:

44	49	28	37	52	40	40	29
39	37	35	34	40	33	31	36
40	31	40	34	41	37	51	41
44	42	35	52	48	42	31	60
53	38	31	28	32	45	49	56

a) Present the data above in the form of a frequency distribution table with the first 7 class intervals 28 – 32!
b) From the table provided, create a relative frequency distribution table.
c) Find the average, mean, median!

In this study, the data collection techniques used were questionnaires and documentation. The questionnaire used was designed using a Likert scale, to collect data on visual learning styles, auditory learning styles, and kinesthetic learning styles which are independent variables in this study. Documentation was used to collect data on students' statistical literacy which is the dependent variable in this study. This study used a sequential method, with quantitative analysis first and continued with qualitative analysis. The effect of visual, auditory, and kinesthetic learning styles on statistical literacy was analyzed based on the significance value of the statistical test, namely multiple regression. Where the response variable is the statistical literacy value. Qualitative data, namely reviewing theories from several literatures and relevant research results, preparing research instruments including: assignment sheets and interview guidelines, statistical literacy results and interview test results, then analyzed according to the analytical model.

Results

The research approach of 66 students filled out the visual learning style questionnaire, auditory learning style, kinesthetic learning style then answered the statistical literacy test. The test results are shown in table 1.

Table 1. Descriptive statistics of statistical literacy, visual learning style, auditory style, kinesthetic learning style

Descriptive Statistics

	Mean	Std. Deviation	N
Lit_Stat (Y)	76.42	4.046	66
G_Visual (X1)	97.39	7.382	66
G_Auditori (X2)	93.85	6.862	66
G_Kinestetik (X3)	105.82	9.173	66

Based on table 1, the average visual learning style is 97.39, the average auditory learning style is 93.85, the average kinesthetic learning style is 105.82. The results are that students have more kinesthetic learning styles in solving statistical literacy problems. Based on the average Visual, auditory, kinesthetic learning styles, this has an

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impact on statistical literacy, the average obtained is 76.42. To determine the impact of visual learning styles, auditory learning styles, kinesthetic learning styles on statistical literacy, a multiple regression test was carried out. Statistical tests use SPSS software.

The requirements before using multiple regression tests must first be met, including the classical assumption test, normality, linearity, homoscedasticity, and no cases of multicollinearity. Based on figure 1 which describes the normal prediction probability plot. Explains that the regression residual must have a normal distribution, which can be met by using a normal distribution and a predictable probability plot. Figure 1 shows that the dots move along the diagonal line, this shows that the plot of statistical literacy values is normally distributed.

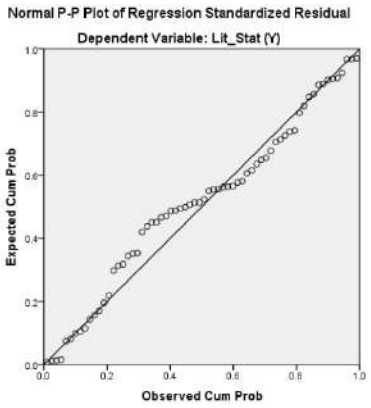
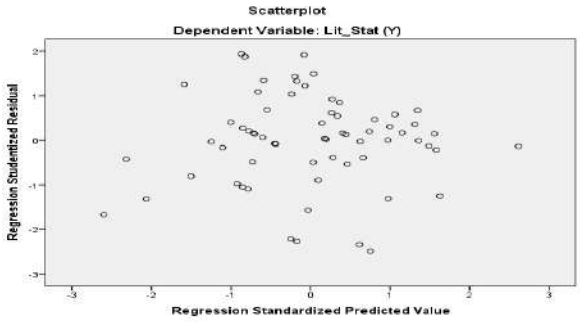


Figure 1. Normal prediction probability plot

To see whether there is a case of homoscedasticity or not, it can be seen in Figure 2. The scatter plot of the residuals. Homoscedasticity is based on evenly distributed points with no clear pattern and the residual scatter plot spreads above and below the number 0 on the Y axis. As a result, the homoscedasticity criteria are met. Because the residuals are homoscedastic and regularly distributed, it shows that the predictor variable has a linear relationship with the outcome variable in the regression.



Gambar 2. Plot sebar dari residu

Multicollinearity is done to see whether each independent variable (visual learning style, auditory learning style, kinesthetic learning style) has a relationship. Multicollinearity conditions occur if the independent variables are significantly related to each other. Multicollinearity conditions occur based on the tolerance value must be greater than 0.1. For VIF (Variance Inflation Factor) values less than 10.

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Table 2. Collinearity statistics Statistical Literacy

Gaya Belajar Visual 0.625	Gaya Belajar Auditor 0.702	Gaya Belajar Kinestetik 0.862	
VIF	1.599	1.425	1.160

Based on table 2. the tolerance value of visual learning style is 0.625, auditory learning style is 0.702, kinesthetic learning style is 0.862. Based on the VIF value, the VIF value of visual learning style is 1.599, the VIF of auditory learning style is 1.425, and the VIF of kinesthetic learning style is 1.160. Based on the VIF value, the VIF value is > 10, so we can conclude that there is no multicollinearity. Thus, the regression assumption test is met, so it can be continued with multiple regression tests. The partial t-test (multiple regression) is conducted to see how the independent variable partially influences the dependent variable. In this study, it can be seen how visual learning style, auditory learning style, and kinesthetic learning style have a partial effect on statistical literacy. This can be seen in table 3

Table 3 Multiple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42.981	6.589		6.523	.000
	G_Visual (X1)	.147	.066	.269	2.220	.030
	G_Auditori (X2)	.294	.067	.499	4.373	.000
	G_Kinestetik (X3)	-.081	.045	-.183	-1.774	.081

a. Dependent Variable: Lit_Stat (Y)

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Table 3 shows the sig value of visual learning style of 0.030, the sig value of auditory learning style of 0.000 and the kinesthetic learning style of 0.081. Based on the formula if the sig value <0.05 then it can be said that the independent variable (X) has a partial effect on the dependent variable (Y). Based on table 3 above, the visual and auditory learning style variables have a significant positive effect on statistical literacy. While the kinesthetic learning style does not have a significant positive effect on statistical literacy. After seeing how each independent variable (visual learning style, auditory learning style, kinesthetic learning style partially affects the completion of statistical literacy, it can be stated how the three independent variables simultaneously affect statistical literacy by conducting an F test. If the sig value is <0.05 then the independent variable (X) simultaneously affects the dependent variable (Y). This can be seen in table 4 below.

Table 4 Anova Test

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	460.366	3	153.455	15.758	.000[b]
Residual	603.755	62	9.738		
Total	1064.121	65			

a. Dependent Variable: Lit_Stat (Y)

b. Predictors: (Constant), G_Kinestetik (X3), G_Auditori (X2), G_Visual (X1)

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If the Fhit value > F table then it can be concluded that the independent variable (X) simultaneously affects the dependent variable (Y) or the sig value < 0.05. As seen in table 4 that the Fhit value = 15.758 while the F table value = F (3; 66) = 2.74. Because the Fcount value > Ftable then simultaneously visual, auditory, kinesthetic learning styles affect statistical literacy by 0.00. From table 3 the regression equation is obtained.

$$y = 42.981 + o.\ 147\ x_1 + 0.294\ x_2 - 0.081 x_3$$

Where,
x_1= visual learning style
x_2= auditory learning style
x_3= kinesthetic learning style
y = Statistical Literacy

Based on the results of table 3, visual learning styles and auditory learning styles significantly influence statistical literacy results.

Table 5 Summary of visual learning style models, auditory learning styles, kinesthetic learning styles and statistical literacy

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.658[a]	.433	.405	3.121	2.029

a. Predictors: (Constant), G_Kinestetik (X3), G_Auditori (X2), G_Visual (X1)

b. Dependent Variable: Lit_Stat (Y)

Based on table 5, the influence of visual learning style, auditory learning style, and kinesthetic learning style on students' statistical literacy is 43.3% based on the R Square value. Qualitative research was conducted by giving statistical literacy questions to 6 students to determine the factors in statistical literacy. Students were selected based on the criteria of high and low visual learning styles, auditory learning styles, while kinesthetic learning style subjects were not interviewed, because based on the results of the regression test, kinesthetic learning style did not have a significant effect on the completion of statistical literacy.

Statistical Literacy Ability Test

On Monday, January 5, 2024, researchers conducted a test on students majoring in informatics, logistics engineering, and digital business at the Insan Cendekia Mandiri Institute of Technology. Researchers conducted initial observations on students' statistical abilities. Researchers took data from all students who had received Statistics and Probability lectures. The questions used to explore students' statistical literacy profiles consisted of two questions, each of which was used to determine the role of the student. After the questions were declared valid through the instrument validation test, researchers also conducted a reliability test on the statistical literacy questions to see the consistency and level of reliability of the instrument. Interviews conducted with research subjects aimed to deepen the answers or facts that researchers found in the written answers by the subjects or literacy components that were not yet apparent in the written answers. Interviews were attempted to explore the data presentation process and the steps taken by the subjects. At the beginning of the interview, researchers gave subjects the opportunity to read and understand the questions given. Based on the results of the regression processing, only visual and auditory learning styles were found to have an effect. So the selected subjects were low and high category visual learning styles and low and high auditory styles.

Table 6
Interview excerpts related to Visual learning styles

interview results	Code
Apa rencana anda untuk menyelesaikan soal nomer 1?	Subjek
Untuk soal yang nomer satu, lebih tepatnya saya membuat tabel distribusi frekuensi, yang terdiri atas umur dan disampingnya ada frekuensi	V1.a.b
Apakah ada alternatif lain ?	Subjek
Ada bu…….saya akan membuat menambah satu kolom tally pada tabel sebelum tabel frekuensi	V1.a.b Subjek V1.a.b
Dapatkah kamu menguraikan secara runtut bagaimana kamu dapat membuat tabel distribusi frekuensi?	
Berhubung pada soal sudah diberikan informasi bahwa pada 7 interval kelas pertamanya 28 – 32. Maka saya tidak perlu mencari interval dan Panjang kelas	
Apakah kamu dapat menjelaskan langkah langkah menemukan interval kelas pertama?	Subjek
Dapat lah bu….. Langkah pertama kita menentukan rentang	V1.a.b
Bagaimana kamu menemukan nilai rentang?	Subjek
Nilai rentang diperoleh dari nilai data terbesar dikurangi nilai data terkecil	V1.a.b
Langkah kedua bagaimana?	Subjek
Menentukan banyak kelas interval kita beri symbol k, kemudian langkah ketiga menentukan p atau disebut Panjang kelas	V1.a.b
Dapatkah kamu jelaskan cara mencari Panjang kelas	
Subjek Panjang kelas diperoleh dari pembagian hasil dari rentang (R) dibagi dengan banyak kelas (k)	V1.a.b

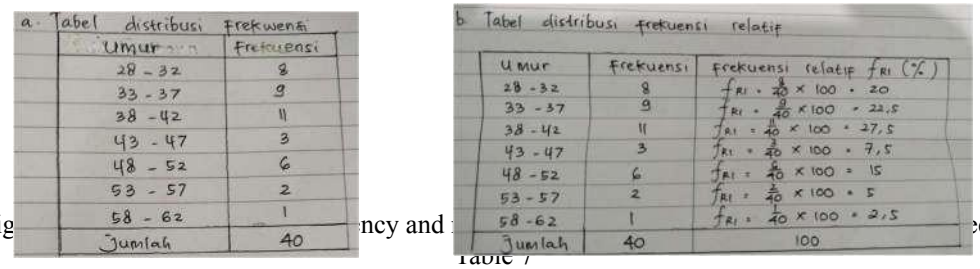

Fig ncy and cts

Table 7
Interview excerpts related to Visual learning styles

interview results	Kode
Pemikiran apa cara menyelesaikan nilai rata-rata pada soal c?	S
40 data dijumlahkan mulai data 44+ 49+ 28 + 37+52+40 ….. 38+31+28+32 +45+49+56 = 1605	V 1.c
Langkah selanjutnya setelah dijumlahkan bagaimana ?	S
Kemudian setelah data dijumlahkan, maka data dibagi dengan banyaknya data	

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V.1.c

Apa yang dimaksud dengan median?		S
Nilai data yang terletak ditengah setelah data itu disusun menurut urutan nilainya sehingga membagi dua sama besar	V. 1.c	
Bagaimana menyelesaikan soal median pada nomer 1c?		S

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Kita tentukan terlebih dahulu letak median, setelah itu data diurutkan	V. 1.c

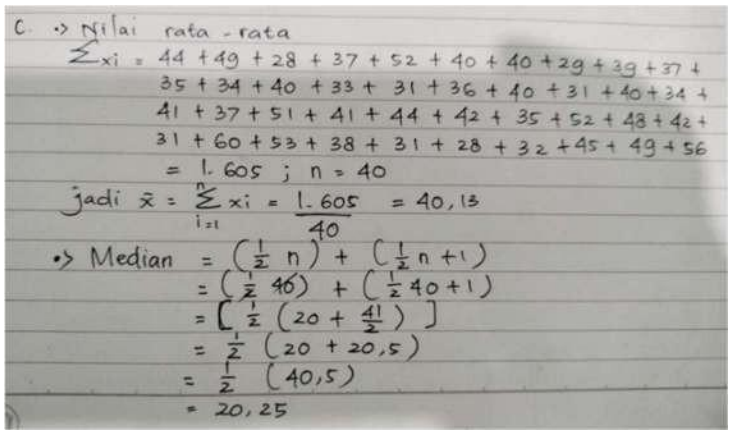

Figure 4. Answers to find the average and median values for the Visual learning style subject.

When completing statistical literacy questions for the Visual learning style subject, each step is carried out very systematically. The thinking process is sequential and neat, but the student tends to actively work on and complete the table by calculating it first. This shows that students are able to create frequency distribution tables properly and correctly. This is in line with research (Kolb & Kolb, 2005) which states that students who have a visual learning style will use tables and graphs as their reasoning domain. This is not in line with research (Riener & Willingham, 2010) which states that there is no evidence that a visual learning style exists. In the steps of completing mathematical literacy questions, students are able to describe and sort data, students are also able to complete the median value by finding the location of the median data first, before finding the median value. In addition, students are also able to use statistical symbols. This shows that students are able to use statistical terms, notations and symbols related to statistical literacy objects or relationships correctly.

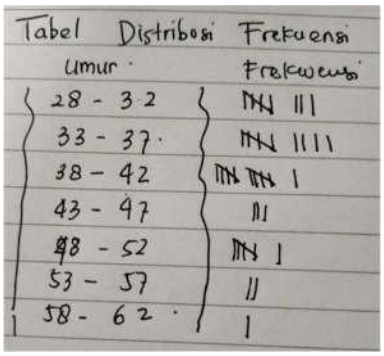

Figure 5 Answers to find the frequency and relative distribution of auditory learning style subjects

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Table 8
Interview excerpts related to Auditory learning style

Hasil wawancara	Kode
Pemikiran apa cara menyelesaikan distribusi frekwensi pada soal 1.a.b?	S
Berupa tabel yang berisi data berupa array yang mulai dari data terkecil hingga terbesar kemudian kita tabelkan Bagaimana cara mengelompokkan, apakah ada rumus atau langkah langkah membuat tabel distribusi frekwensi> Setelah dikelompokkan menurut kategori masing masing, kemudian kita hitung dengan tally masing-masing data	A.1.a S A.1.a
Bagaimana menemukan panjaang kelas?	S
Yaaa … kita bagi rata saja	A.1.a
Untuk banyak kelas apakah ada rumus?	S
Tidak ada sih…	A.1. a

Tabel 9
Interview excerpts relating to the Auditory learning style

Hasil wawancara	Kode
Pemikiran 9p acara menyelesaikan nilai rata-rata pada soal c?	S
Dijumlahkan bu..	A 1.c
Maksudnya…????	S
Semua di total	A 1.c
Langkah selanjutnya, setelah menemukan total jumlahnya?	S
Dibagi bu..	A 1.c
Dibagi berapa?	S
Yaaa di bagi…	A 1.c
Dapat kah dijelaskan cara menghitungnya?	S
Dapat bu …sebentar saya hitungnya….	A 1.c
Mana yang dijumlahkan?	S
Semua data dijumlahkan bu….. Hasilnya 1605 kemudian saya bagi 40 itulah rata ratanya	A 1.c
Bagaimana hitung median	S
Ya dihitung bu…	A. 1.c
Caranya????	S
Diurutkan dulu	A. 1.c
Bgm dengan data yang besar dan berkelompok	S
Yaaa diurutkan	A. 1.c
Untuk hasilnya berapa nilai mediannya?	S
Saya masih bingung bu mengurutkan, datanya banyak dan belum menemukan nilainya	A. 1.c

At this stage, students with an auditory learning style have difficulty understanding statistical literacy, starting from understanding the concept of statistical literacy questions to the stage of solving median questions, students have not been able to complete them properly. So they cannot draw the right conclusions. Students are less active in trying to solve the questions. Students are less adept at calculating the questions because they do

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not understand the concept correctly. Students stop at the concepts they know and are less able to explore their thinking process, so as not to be fixated on the concepts they have learned. This is in line with research (Tangen, 2018)

which states that students who have an auditory learning style tend to have difficulty solving questions in the form of graphs, tables, and symbols.

DISCUSSION

Based on the research results, it is known that visual learning styles, auditory learning styles, and kinesthetic learning styles based on the F test or simultaneous test have an influence on statistical literacy of 43.3% based on the R Square value. According to (Rorong & Asih, 2023) there are three types of learning styles based on sensory preferences, namely visual learning styles, auditory learning styles, and kinesthetic learning styles. Based on the partial regression test, only visual learning styles and auditory learning styles have an influence on statistical literacy.

Based on the research results, visual learning styles have the most influence on solving statistical literacy problems. This is in accordance with the results of the study (Hauptman & Cohen, 2011) which states that visual learning styles are learning styles where students learn by seeing real information presented such as depictions in maps, diagrams, graphs, and other devices used by teachers to represent information presented in words. Meanwhile, according to (Geisert & Dunn, 1991) visual learning styles are learning styles where visual learners process information most effectively when the information is seen. The information seen by visual learners includes charts, graphs, diagrams, writing. The triangulation process carried out in this study is time triangulation, namely by comparing the data from the first interview with the data from the second interview. If the interview data is consistent, then the interview can be stopped and can be said to be valid. If the data from the first interview and the data from the second interview are inconsistent, then a third interview is conducted and the interview data is compared with the data from the first or second interview. In addition to interview data, the data collected in this study are written data from the subject's answers related to statistical literacy questions. The data is used to support various findings or data analysis carried out during the interview session. (Hafiyusholeh et al., 2018). Based on interviews and triangulation, it was found that students who have a visual learning style tend to be neater, more systematic, in solving statistical literacy questions. Meanwhile, students who have an auditory learning style tend not to be able to describe the meaning of the table and have not been able to complete the questions completely. This is in line with the opinion of (Their & Dunn, 1998) who stated that auditory learning style is a learning style where someone learns best when hearing what is being learned, students with auditory learning style respond well to lectures and discussions and are very good listeners. While students who learn visually tend to think through pictures and writing, and have a clear imagination.

Conclusion

Based on data analysis and discussion, the following conclusions were obtained:

1. Based on the simultaneous regression test of the three independent variables, namely visual learning style, auditory learning style, and kinesthetic learning style, it has a significant influence on statistical literacy,
2. Based on the partial regression test or individual test on each independent variable, it was found that only visual learning style and auditory learning style have a significant influence, while kinesthetic learning style does not have a significant influence.
3. Based on the results of the written test on the influential variables, namely visual and auditory, it was found that students who have a visual learning style tend to complete statistical literacy questions to completion. Students at the stage of understanding the concept of all domain indicators fulfill the domain of statistical literacy, analyzing, interpreting questions, making decisions.
4. Based on the results of the written test on the influential variables, namely visual and auditory, it was found that students who have an auditory learning style tend not to complete statistical literacy questions to completion. Students only fulfill the stage of understanding the concept of all statistical literacy indicators, while at the stage of analyzing, interpreting questions, making decisions, students have not been able to fulfill the domain of statistical literacy indicators.

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