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An Analysis of Students' Learning Style, Mathematical Disposition, and Mathematical Anxiety toward Metacognitive Reconstruction in Mathematics Learning Process

Bambang Sri Anggoro[1], Safitri Agustina[2], Ramadhana Komala[3], Komarudin[4], Kittisak Jermsittiparsert[5], Widyastuti[6]

[1,4] Universitas Islam Negeri Raden Intan Lampung, Indonesia
[2]Sekolah Menengah Atas Negeri 8 Bandar Lampung, Indonesia
[3]Sekolah Tinggi Ilmu Kesehatan Pringsewu, Indonesia
[5]Social Research Institute, Chulalongkorn University, Bangkok, Thailand
[6]Universitas lampung, Indonesia
[1]Correspondence Address; bambangsrianggoro@gmail.com

Abstract

The purpose of this research is to find out whether there is an influence of learning styles, mathematical disposition, and mathematical anxiety on metacognitive reconstruction in mathematics learning and to know how learning styles, mathematical disposition, and Mathematical anxiety effect metacognitive reconstruction in mathematics learning. This research was conducted using the Mixed Method. The data processing in this research uses the Structural Equation Model (SEM) through the application of the Lisrel 8.80 program. Based on the data and research results, it can be concluded that: 1) there is an influence of learning style, mathematical disposition, and mathematical anxiety on metacognitive reconstruction in mathematics learning; 2) students with good metacognitive reconstruction prefer visual learning style and have a high mathematical disposition and low level of anxiety. Students with medium metacognitive reconstructions category prefer kinesthetic learning styles and have a moderate mathematical disposition and moderate levels of anxiety. Students with low metacognitive reconstruction categories prefer audio learning styles and have a low mathematical disposition and a high level of anxiety.

Keywords: Anxiety, Mathematical Disposition, Learning Style, Metacognitive Reconstruction

INTRODUCTION

The learning process is one of the important factors in achieving learning objectives. Learning can be said to be successful if the expected results can form a cognitively strong conceptual understanding. Cognitive understanding and the power of human thought, especially students, cannot be separated from how to can obtain knowledge. The process of gathering scientific evidence into human cognitive is more likely to be called a process of "thinking before thinking". This process can be called a metacognitive process. Metacognitive is an awareness of what is known (cognitive knowledge) and a way to organize knowledge (cognitive regulation) (Diandita, Johar, & Abidin, 2017; Fasha, Johar, & Ikhsan, 2018; Rahmawati, Rohaeti, & Yuliani, 2018; Wijayati & Darminto, 2018)

The metacognitive process in learning is important to determine the success in acquiring new understanding. Metacognitive processes are vital in learning that requires reasoning, logic, analogies, algorithms, and proof. Reasoning, logical analogies, algorithms, and proof is a part of mathematics learning so that it is needed to determine the results of learning. Proof of mathematics is one important component in learning mathematics. Reasoning, mathematical communication, mathematical connections, logical analogies, and algorithms fall into the mathematical proof section which is the most difficult part in mathematics (Suraji, Maimunah, & Saragih, 2018)

Mathematical learning is a learning process that requires a lot of high thinking skills. Many cases in the learning outcomes of mathematical proof courses are still very low. Some mathematical proof courses are real analysis courses 1, real analysis 2, and mathematical statistics. The low score and understanding are inseparable from the cognitive process. Students have not maximized the flow of thinking or the way how a solution is found. The real problems are how students replay, repeat, and explore their knowledge in the form of definitions, theorems, and axioms to be used in proving other theorems. This is what is better known as "reconstructing" knowledge in cognitive. The process of metacognitive reconstruction is also strongly influenced by external factors. External factors that play an important role in the reconstruction process are affective, especially student learning styles, mathematical disposition, and anxiety. For this reason, it is necessary to know and investigate how students reconstruct the metacognitive based on learning styles, dispositions, and anxiety.

Several previous studies have discussed metacognitive processes in learning (Diandita et al., 2017; Fasha et al., 2018; Rahmawati et al., 2018; Sukardi, Susilo, & Zubaidah, 2015; Wijayati & Darminto, 2018), research on students' learning styles (Iriani & Leni, 2013; Jagantara, Adnyana, & Widiyanti, 2014; Muhtaran & Abidin, 2018; Rijal & Bachtiar, 2015; Sundayana, 2016), as well as disposition and anxiety (Ariany & Dahlan, 2017; Izzati, 2017; Zaozah, Maulana, & Djuanda, 2017). However, there are no studies that analyze the process of metacognitive reconstruction in learning mathematics based on learning styles, mathematical disposition, and anxiety. Based on previous research, the novelty of this research is focused on the analysis of the influence of learning styles, mathematical disposition, and anxiety on students' metacognitive reconstruction. So, the purpose of this research is to find out whether there is an influence of learning styles, mathematical disposition, and mathematical anxiety toward metacognitive reconstruction in mathematics learning and to know how learning styles, mathematical dispositions, and mathematical anxiety can influence metacognitive reconstruction in mathematics learning.

THE RESEARCH METHODS

This research was conducted by employing the Mixed Method. The population of this research was all undergraduate students in the Mathematics Education Department of UIN Raden Intan Lampung. Samples from this research were taken from two classes in real analysis courses through the purposive sampling technique. This research aims to see the metacognitive reconstruction in the real analysis course which is more likely to use metacognitive processes. In this research, data collection was carried out through metacognitive reconstruction tests, questionnaires (learning styles, mathematical disposition, and mathematical anxiety) and documentation. The data obtained were processed using the Structural Equation Model (SEM) with the application of the Lisrel 8.80 program. The Structural Equation Model (SEM) has two parts including the measurement model carried out through confirmatory factor analysis and the structural model carried out using regression.

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THE RESULTS OF THE RESEARCH AND THE DISCUSSION

The results of the research were obtained by carrying out the testing stages. Before the research was conducted, first, the test instruments were tested. The instruments used in this research consisted of a test instrument to measure metacognitive reconstruction, a questionnaire or questionnaire instrument for learning styles, mathematical disposition, and anxiety. Since the path analysis was used, it is necessary to test the normality and homogeneity. The normality and homogeneity testing data are presented in Tables 1 and 2:

Table 1. The Normality Test of Research Variable

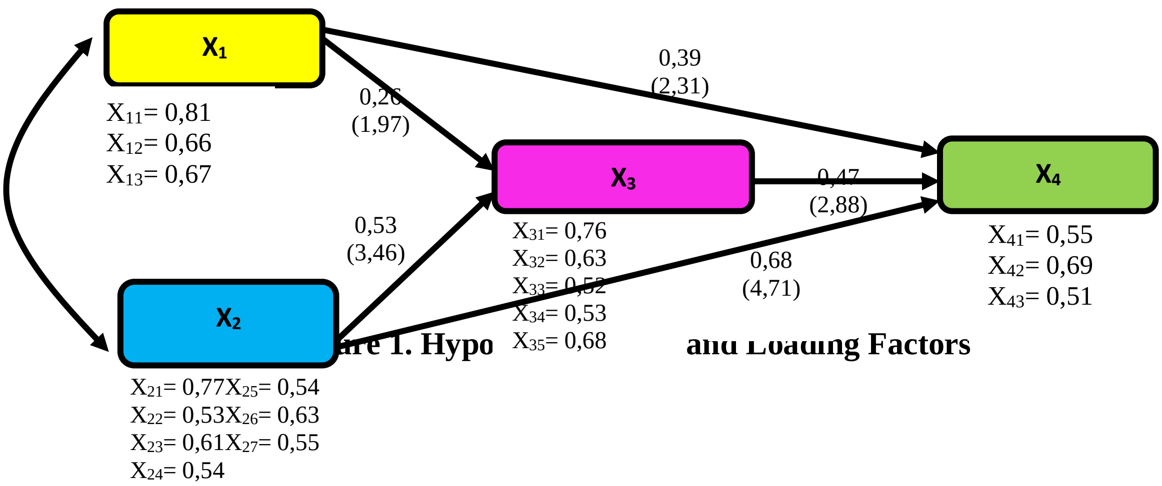
No.	Variable	$L_{observed}$	$L_{critical}$	Distribution
1	Learning Style (X_1)	0.0979	0.1144	Normal
2	Mathematical Disposition (X_2)	0.1021	0.1144	Normal
3	Anxiety (X_3)	0.0958	0.1144	Normal
4	Metacognitive Reconstruction (X_4)	0.0968	0.1144	Normal

Based on the normality test results, it can be seen that the data obtained for learning style, mathematical disposition, anxiety, and metacognitive reconstruction are normally distributed so that all data can be tested using parametric statistics, namely regression and path analysis.

Table 2. The Homogeneity Test of Research Variable

No.	Homogeneity test	$X^2_{observed}$	$X^2_{critical}$	Decisions
1	Learning Style(X1)	1.227	5.991	$H_0$is accepted
2	Disposition Mathematically (X2)			
3	Anxiety (X3)			
4	Reconstruction Metacognitive (X_4) The			

Table 2 shows that the data obtained from the learning style variable, mathematical disposition, anxiety, and metacognitive reconstruction are homogeneous. It is very important to see the condition of each variable whether it is in the same state. Further discussi on will be carried out related to the relationship of each research variable. To determine the strength of the correlation of each variable involved, the SEM method was employed. The following are the results of data processing from questionnaires and tests that have been filled out by students.



...re 1. Hypo ... and Loading Factors

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e-ISSN 2540-7562

Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

The significance of the relationship between variableas can be seen in Figure 1is based on the t-value that has been summarized as follows :

Table 3. t-value between Variable

Variable	t-value	t-table
X_1 to X_3	1.97	1.66
X_1 to X_4	2.31	1.66
X_2 to X_3	3.46	1.66
X_2 to X_4	4.71	1.66
X_3 to X_4	2.88	1.66

Based on table 3, the t-value of the learning style variable (X_1) to the anxiety variable (X_3) is 1.97. The t-value of the learning style variable (X_1) to the metacognitive reconstruction variable (X_4) is 2.31. Furthermore, the t-value of the mathematical disposition variable (X_2) to the anxiety variable (X_3) is 3.46. Then, the t-value of the mathematical disposition variable (X_2) to the metacognitive reconstruction variable (X_4) is 4.71. Lastly, the t-value of the anxiety variable (X_3) to the metacognitive reconstruction variable (X_4) is 2.88.

It can be seen that the highest significance among the variable is the mathematical disposition indicator (X_2) to the metacognitive reconstruction variable (X_4) which is 4.71. It is followed sequentially by mathematical disposition variable (X_2) to the anxiety variable (X_3) with a t-value of 3.46, then the learning style variable (X_1) to the metacognitive reconstruction variable (X_4) with a t-value of 2.31, after that the anxiety variable (X_3) to the metacognitive reconstruction variable (X_4) is equal to 2.88, and finally the lowest is the learning style variable (X_1) to the anxiety variable (X_3) with a t-value of 1.97. Based on the results of all t-value tests for all possible variables, the mathematical disposition variable (X_2) to the metacognitive reconstruction variable (X_4) is the most significant among others.

The next step is to review the relationships between variables, which are summarized in Table 4.

Table 4. Relationships betweenVariable

Variable	Relationship
X_1 to X_3	0.26
X_1 to X_4	0.39
X_2 to X_3	0.53
X_2 to X_4	0.68
X_3 to X_4	0.47

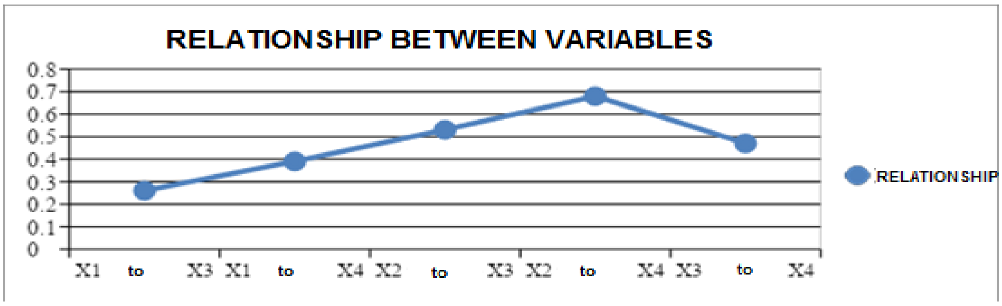

Figure 2. The Relationships between Variable

Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

aljabar : Jurnal Pendidikan Matematika
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Based on Table 4, the value of the relationship of learning style variable (X_1) to the anxiety variable (X_3) is 0.26. The relationship between learning style variable (X_1) and metacognitive reconstruction variable (X_4) is 0.39. Furthermore, the relationship between the mathematical disposition variable (X_2) to the anxiety variable(X_3) is 0.53. The value of the relationship between the mathematical disposition variable (X_2) to the metacognitive reconstruction variable (X_4) is 0.68. The last, the value of the relationship between anxiety variable(X_3) to the metacognitive reconstruction variable (X_4) is 0.47.

It can be seen that the relationship between a variable with the highest value is held by the mathematical disposition variable (X_2) to the metacognitive reconstruction variable (X_4) with a value of 0.68. Continued sequentially by the mathematical disposition variable (X_2) to the anxiety variable (X_3) with a relationship value of 0.53. Then, the relationship between anxiety variable (X_3) to the metacognitive reconstruction variable (X_4) is 0.47. Furthermore, the relationship between learning style variable (X_1) to the metacognitive reconstruction variable (X_4) is 0.39. Finally, the lowest is the relationship between learning style variable (X_1) andanxiety variable(X_3) with a value of 0.26. Furthermore, if the contribution of each indicator is reviewed from each variable, it can be illustrated as follows:

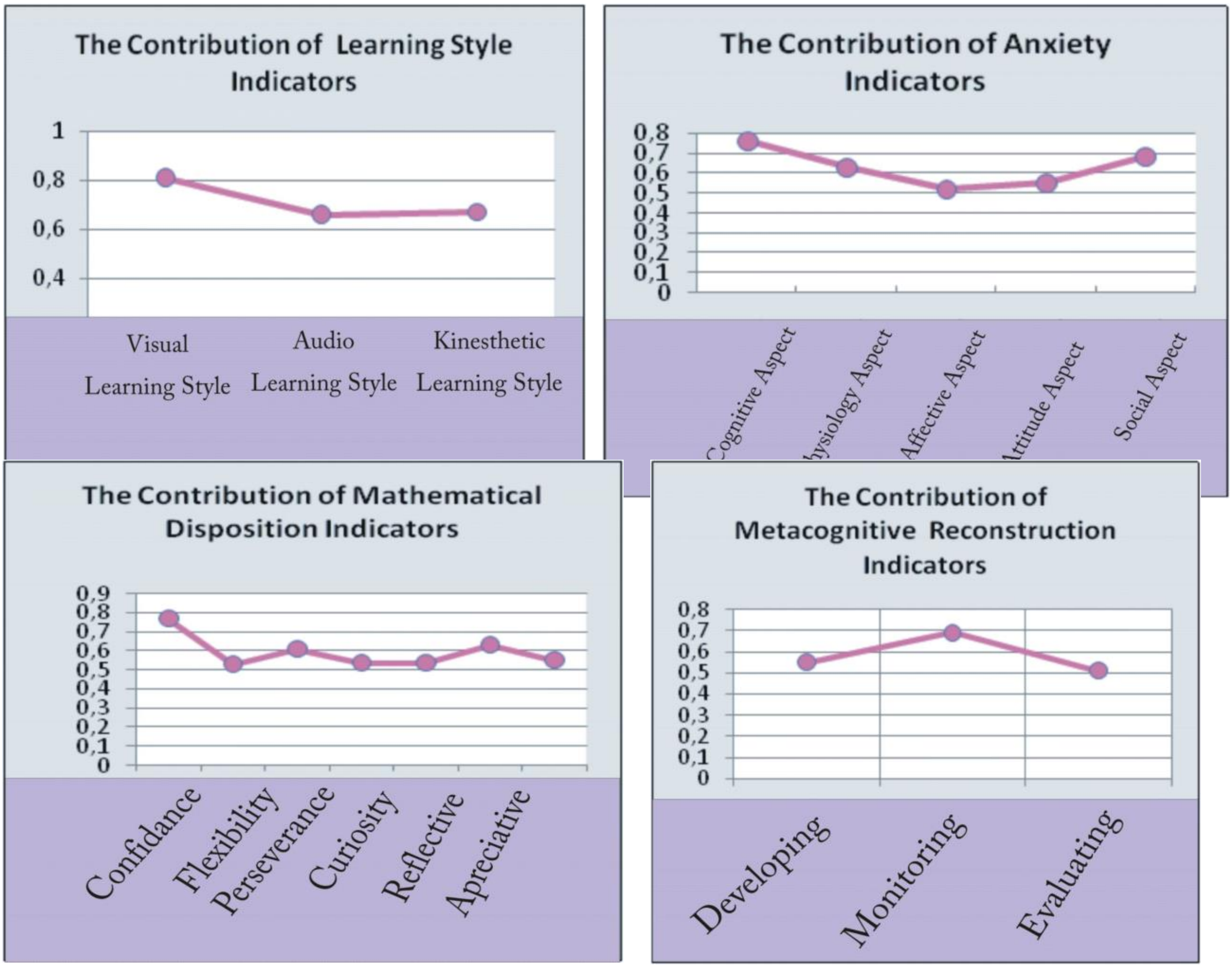

Figure 3. The Contribution of Indicators to Each Variable

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Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

Based on the results of calculations using the Lisrel tool, the obtained value of Goodness of Fit (GOF) is as follows:

Table 5. The Value of the Overall Models'Compatibility

Goodness of Fit	Value	Information
A. Absolute Fit Measures		
1. GFI	0.92	High
2. RMSEA	0.063	High
3. RMSR	0.04	High
B. Incremental Fit Measures		
1. AGFI	0.88	Medium
2. NFI	0.94	High
3. CFI	0.92	High
4. RFI	0.91	High

Based on Table 5, it can be seen that there is 1 GOF size that is in the medium category and 6 other GOF sizes that are in thehigh category including GFI, RMSEA, RMSR, NFI, CFI, and RFI. This indicates that although there is a GOF measure that shows a poor match, most GOF measurements show a good fit so that it can be concluded that the overall fit of the model is good (model fit). From the results of the model tests conducted on 18 indicators, it is known that all the model is declared fit.

1. Learning Style on Metacognitive Reconstruction Learning

Learning style is an activity carried out by someone to make it easier to understand a new concept or knowledge. Based on the results of the research, it was found that the learning style influenced the metacognitive reconstruction in analytical learning.The learning process emphasizes more on the metacognitive process, namely thinking before think. This was due to the students' analytical learning was not only focused on problem-solving but also must be able to understand each step taken until the proof process was completed. In the process of analytical learning, many cognitive strategies were chosen by students in the learning process. Cognitive strategies that can be chosen by students in constructing knowledge were more influenced by how students chose the way or style of learning. The strategy chosen has a significant effect on one's learning style. According to Muhtaran and Abidin in their research on trigonometry material, it was stated that students withvisual learning style have good ability in compiling and testing conjectures while students with auditory learning style have good abilities in giving explanations and expressing arguments(Muhtaran & Abidin, 2018)

Learning styles that exist affect the learning process and learning outcomes. In learning mathematics, learning styles influence the mastery of mathematical concepts in the form of the concept of calculation and the concept of analysis. Research conducted on students of Mathematics Education Department of UIN Raden Intan Lampung in the real analysis course obtained surprising results. Learning styles possessed by students were divided into 3

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Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

categories, namely students with visual type learning styles, students with kinesthetic type learning styles and students with audio type learning styles.

In the learning process in class, the three characteristics of this learning style showed some differences, namely: a) Students with visual types learning style were more likely to read a definition and theorem very carefully; b) Students with visual learning learning style paidmore attention to the lecturer's explanation on the board seriously; c) students with visual learning style tended to repeat learning by remembering and paying attention to peers who were talking; and d) Students with kinesthetic learning style were more likely to write and describe concretely a concept while moving their mouth in an effort to remember.

Related to the results of metacognitive reconstruction, there are differences in the results of metacognitive reconstruction obtained under the three categories of student learning styles. Students who have visual type learning styles got good metacognitive reconstruction results. In the process of work and the steps given by students with visual learning, types were well organized and algorithmic. The process of identifying the problem and the accuracy of the problem-solving strategy chosen also matches the problem at hand. The following is an illustration of the results of the metacognitive reconstruction of Mathematics Education Department students of UIN Raden Intan Lampung by categories of learning type.

Table 6. Metacognitive Reconstruction based on Students' Learning Style Types of Mathematics Education Department of UIN Raden Intan Lampung

Types of Learning Style	Metacognitive Reconstruction
Visual	Good
Kinesthetic	Medium
Audio	Low

Based on Table 6, students with visual learning styles had good metacognitive reconstruction on real analysis course. The effects or influences of learning styles may change due to the learned mathematical concepts. Students who have kinesthetic type learning styles tend to get moderate results in metacognitive reconstruction. Moderate metacognitive reconstruction represents the half-correct work, yet, sometimes the process of selecting a completion strategy is still incorrect. Students with an audio learning style still show low metacognitive reconstruction results. Students with audio learning styles are more likely to only remember, whereas, in the learning process of analysis, viewing and writing exercises are highly recommended. Students with visual and kinesthetic type learning styles often do the exercises and rewrite some definitions and theorems.

2. Mathematical Disposition of Metacognitive Reconstruction

Mathematical disposition is a pleasure, motivation, desire, enthusiasm, and self-acceptance in mathematics. Someone who has a high mathematical disposition is always accompanied by liking and always wants to explore mathematics. In analytical learning in the classroom, students who have a high mathematical disposition will always have alternative answers and ideas in the problem-solving analysis. The mathematical disposition of students who tookthe analytical learning course is classified into three categories, namely high

Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

mathematical disposition, moderate mathematical disposition, and low mathematical disposition. In the process of learning, each student with each category displayed different symptoms or characteristics, especially when solving problems and the results obtained from learning.

The results of the analytical learning process obtained three categories of mathematical disposition that showed different results. Students with high mathematical disposition can find ideas and solving problems even though not using formal thinking patterns, however, theycould solve the given problem.

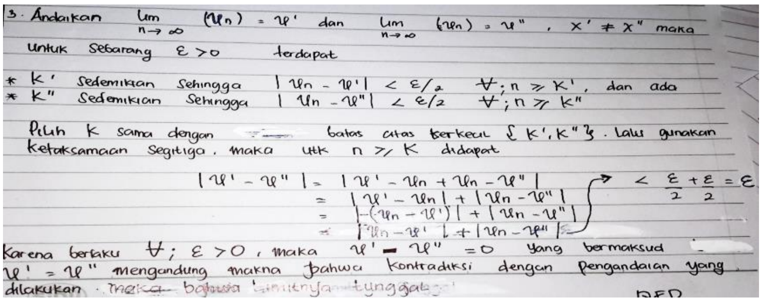
3. Andaikan $\lim_{n\to\infty}(x_n) = x'$ dan $\lim_{n\to\infty}(x_n) = x''$, $x' \neq x''$ maka untuk sebarang $\varepsilon > 0$ terdapat
* K' sedemikian sehingga $|x_n - x'| < \varepsilon/2$ $\forall; n \geq K'$, dan ada
* K'' sedemikian sehingga $|x_n - x''| < \varepsilon/2$ $\forall; n \geq K''$
Pilih K sama dengan batas atas terkecil $\{K', K''\}$. Lalu gunakan ketaksamaan segitiga, maka utk $n \geq K$ didapat
$|x' - x''| = |x' - x_n + x_n - x''| = |x' - x_n| + |x_n - x''| = |-(x_n - x')| + |x_n - x''| = |x_n - x'| + |x_n - x''| < \frac{\varepsilon}{2} + \frac{\varepsilon}{2} = \varepsilon$
Karena berlaku $\forall; \varepsilon > 0$, maka $x' - x'' = 0$ yang bermaksud $x' = x''$ mengandung makna bahwa kontradiksi dengan pengandaian yang dilakukan.
QED

Figure 4. The Answerof Student with High Mathematical Disposition

Based on the description within the answer, it appears that the problem was identified in a simple and detail wayby writing mathematical symbols without the use of words and solving problems directed to find a state in algebraic manipulative equations. Thestudent identifieda row of real numbers by defining two rows that have two different limits which means the students, in solving the problem,usedthe use of indirect proof. The selection of alternative solutions in solving mathematical problems shows that students with high mathematical disposition identified the problems and selected appropriate solutions. In the metacognitive discussion, the flow of thinking about which way to solve problems is the most basic. That is why metacognitive is called thinking before thinking. On the results of metacognitive reconstruction for students with high mathematical disposition, they are more likely to see problems as something that must be identified, raises cognitive questions, and looks for the best alternative as a solution.

For students with moderate disposition, it can be seen that in working on the given metacognitive reconstruction questions, they followed the pattern or path of students with high dispositions although missingsome steps. The following is an illustration of the answer to students with moderate mathematical disposition.

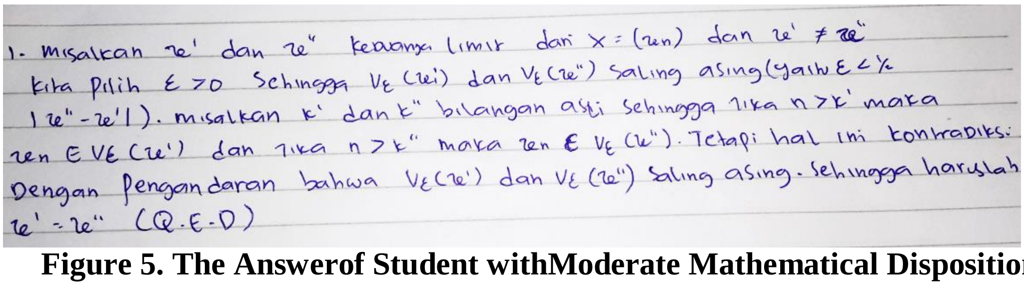
1. Misalkan x' dan x'' keduanya limit dari $X = (x_n)$ dan $x' \neq x''$
kita pilih $\varepsilon > 0$ sehingga $V_\varepsilon(x')$ dan $V_\varepsilon(x'')$ saling asing (yaitu $\varepsilon < \frac{1}{2}|x'' - x'|$). Misalkan K' dan K'' bilangan asli sehingga jika $n > K'$ maka $x_n \in V_\varepsilon(x')$ dan jika $n > K''$ maka $x_n \in V_\varepsilon(x'')$. Tetapi hal ini kontradiksi dengan pengandaian bahwa $V_\varepsilon(x')$ dan $V_\varepsilon(x'')$ saling asing. Sehingga haruslah $x' = x''$ (Q.E.D)

Figure 5. The Answerof Student withModerate Mathematical Disposition

The results of the work are a description of the metacognitive reconstruction of students with moderate mathematical disposition. At the stage of problem identification students are

aljabar : Jurnal Pendidikan Matematika
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both using indirect proof, but the students with the disposition category have not defined the variable x 'variable x' 'as a limit that differs from one line. There is a formal mathematical proof step that is missed in working on the problem. Students still haven't proven that the limit x 'and limit x' 'will be $\frac{\varepsilon}{2} + \frac{\varepsilon}{2} < \varepsilon$.

In working on mathematical reconstruction problems students with mathematical disposition are indicating that identification, selection of completion strategies and workflow are still not perfect. Several evidentiary steps were passed through in the end finding a solution. Some of these things that distinguish between students with high mathematical disposition. Another difference arises from students who have a low mathematical disposition. The results of student work in this category do not yet show any identification of problems and resolution strategies. Students do not solve problems at all. The following are the results of student work in the low category.

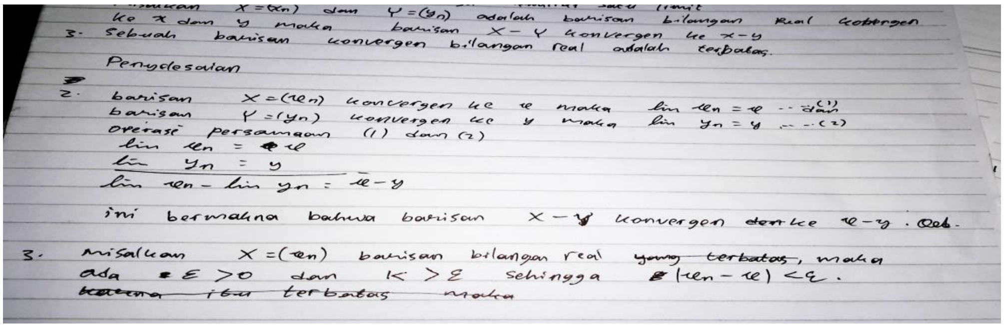

Figure 6. Results of Student Answers in the Low Mathematical Disposition Category

Based on pictures, it appears that, from the three questions given, students only answered two questions and it also still did not match the correct answers or in other words incorrect. It describes that students with low disposition have low concept mastery. By seeing the three phenomena that occur based on the students' mathematical disposition category, it can be concluded that mathematical disposition is a tendency to reflect on their thinking in the learning process. The students' disposition toward mathematics will be clearly seen when the problems are answered with confidence, full responsibility, perseverance, never give up, feel challenged with the problem at hand, have the willingness to find ways or alternative solutions, and reflect the way of thinking.(Najmul, Cahya, & Nurjanah, 2018) The same thing was explained by Wardani, Sumarmo, & Nishitani who stated that mathematical disposition was a desire or interest and appreciation for mathematics, namely the tendency to think and act positively which include self-trust, curiosity, perseverance, enthusiastic in learning, persistent in dealing with problems, flexible in thinking, willing to share with others, and reflective in mathematical activities. Thus, a mathematical disposition is more likely to be described as an awareness, desire, and strong dedication of a person to learn mathematics and carry out various mathematical activities (Wardani, Sumarmo, & Nishitani, 2011)

Based on observations of the mathematical disposition variable and the results of metacognitive reconstruction, the following results are obtained.

Table 7. Metacognitive Reconstruction based on Mathematical Disposition of Mathematics Education Department Students of UIN Raden Intan Lampung

Mathematical Disposition	Metacognitive Reconstruction
High	Good
Medium	Medium
Low	Low

The results obtained show that the mathematical disposition variable and the metacognitive reconstruction variable has a significant influence and has a positive correlational relationship and directly proportional. This illustrates that the higher the mathematical disposition, the better their metacognitive reconstruction is.The students with moderate mathematical disposition possess moderate metacognitive reconstruction and students with low mathematical disposition possess low metacognitive reconstruction

3. MathematicalAnxiety toward Metacognitive Reconstruction.

Mathematical anxiety is a negative perception or negative thoughts or anxiety in learning mathematics. In another opinion, Irfan explains that mathematical anxiety can occur when someone has negative views or thoughts toward mathematics learning or anything related to mathematical activities.(Irfan, 2018) Someone who has mathematical anxiety tends to avoid all activities related to mathematics. When that tendency arises, a person will withdraw from learning mathematics so that in the process of learning mathematics, they do not have much preparation which, consequently, lower their mathematical learning achievements.

In this research, data on mathematical anxiety was obtained using a questionnaire. It was found that there is an influence between anxiety students' mathematical and metacognitive reconstruction. According to Djiwandono and Wuryani in Hidayat, anxiety is divided into two categories, namely trait anxiety and state anxiety.(Hidayat, 2018)

Trait anxiety is a symptom of someone who has high anxiety or worries excessively as a result of excessive response when facing many situations. Trait anxiety is usually characterized by several characteristics, such as sweaty palms, high heartbeats, and rather heavy breathing. A person who experiences trait anxiety generally has sensitive anxiety compared to other people and usually occurs in a wider range of situations or conditions. The second is state anxiety which is an anxiety that occurs in a person when under certain pressure or threat so that anxiety arises when there is pressure from an ordinary or normal state.

The anxiety that arises or occurs when learning mathematics in state anxiety because the anxiety suddenly arises when there are activities or mathematical activities. Mathematical learning is considered as a threat that gives rise to momentary emotions in the form of tension, not relaxes, discomfort, and other symptoms. In learning mathematics, usually, students take the initiative to not present in class because they feel incompetent and afraid of ruining their self-esteem if others know that they are incapable of learning mathematics.

In mathematical analysis learning, some students are in the high anxiety category. Based on the observations, students who had high anxiety were passive in the learning process. They tended to sit in the back position to avoid the direct gaze of a lecturer and hide behind friends or other students in front of them. Low learning outcomes obtained by students with high

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anxiety. It can be concluded that there is a significant effect of anxiety toward analytical learning outcomes. The following is an example of the learning outcomes of a student with high anxiety.

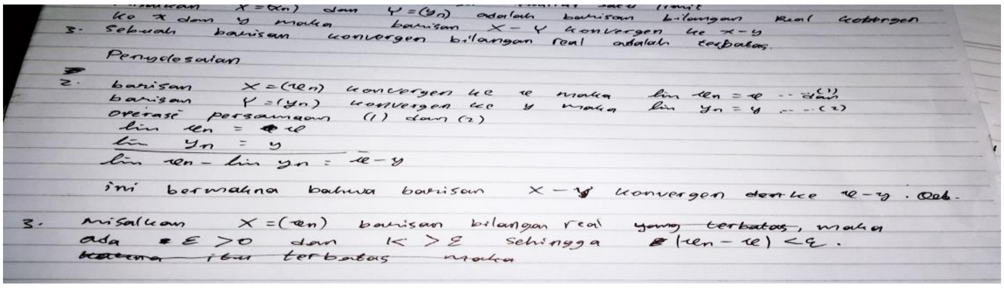

Figure 7. The Answersof a Student with High Anxiety

Based on Figure 7, it appears that students with high anxiety have irregular methods of resolution, even the identification of problems is very bad. The student tended not to answer the questions given. Students with low mathematical disposition have the same symptoms or characteristics as students who have a high level of anxiety. They feel anxious, awkward, and feel burdened by learning mathematics. In the process of learning, students with a high level of anxiety wanted to finish the lesson immediately. When they were appointed to explain a definition or theorem, they were silent and avoid to answer. There are a negative correlational relationship and a significant influence between students with high anxiety and students with low mathematical disposition. The following is an illustration of the anxiety variable and metacognitive reconstruction variable in Mathematics Education Department students of UIN Raden Intan Lampung in real analysis learning.

Table 8. Metacognitive Reconstruction Based on Mathematical Anxiety of the Mathematics Education Department Students of UIN Raden Intan Lampung

Mathematical Anxiety	Metacognitive Reconstruction
Low	Good
Medium	Medium
High	Low

Table 8 shows that the mathematical anxiety variable and metacognitive reconstruction variable have a significant influence and have a negative correlational relationship. This proves that the higher the anxiety level, the lower the mathematical disposition. Students with medium anxiety levels possess a moderate mathematical disposition and students with low anxiety levels possess a high mathematical disposition.

4. Learning Styles, Mathematical Disposition, and Mathematical Anxiety toward Metacognitive Reconstruction

Learning style, mathematical disposition, and anxiety are internal factors that affect students' learning process and learning outcomes. The same situation also affects the metacognitive reconstruction in real analysis learning. Based on the data obtained, it is illustrated that learning styles, mathematical disposition, and anxiety affect the results of metacognitive reconstruction. Together, the three variables affect the metacognitive reconstruction. Many factors affect the success of learning. Internal factors contribute to almost

Al-Jabar: Jurnal Pendidikan Matematika
Vol. 10, No. 2, 2019, Hal 187 - 200

50% of learning success. The learning style, mathematical disposition, and mathematical anxiety are examples of internal factors that can affect learning outcomes, especially the metacognitive reconstruction. Those results can be seen through testing. The results of student work in the early metacognitive reconstruction process provide a detailed description related to which direction the mindset and strategy chosen by students in finding solutions. Many possibilities occur by looking at the results of student answers. Based on the results of the answers, we can match or adjust the internal factors that exist within students. The relationship between learning styles, mathematical disposition, and mathematical anxiety of Mathematics Education Department students of UIN Raden Intan Lampung toward metacognitive reconstruction can be described through the following table.

Tabel 9. Metacognitive Reconstruction based on Learning Styles, Mathematical Disposition, and Mathematical Anxiety of Mathematics Education Department Students of UIN Raden Intan Lampung

Learning Styles	Mathematical Disposition	Mathematical Anxiety	Metacognitive Reconstruction
Visual	High	Low	High
Kinesthetic	Moderate	Moderate	Moderate
Audio	Low	High	Low

Based on data and research results, it can be explained that metacognitive reconstruction can be influenced by several internal factors, namely learning styles, mathematical disposition, and mathematics anxiety. Each of these influences is characterized by two correlational relationships, namely positive and negative or directly proportional and inversely proportional. Students with high metacognitive reconstruction categories prefer visual learning styles, have a high mathematical disposition and have a low level of anxiety. Students with moderate metacognitive reconstruction categories prefer kinesthetic learning styles, have moderate mathematical dispositions and have moderate anxiety levels. Besides, students with low metacognitive reconstructions prefer audio learning styles, have low mathematical dispositions, and have high levels of anxiety.

CONCLUSION AND SUGGESTION

Based on the results of research and discussion, it can be concluded that: 1) there is an influence of learning styles, mathematical disposition, and mathematical anxiety on metacognitive reconstruction in mathematics learning; 2) Students with high metacognitive reconstruction categories prefer visual learning styles, have a high mathematical disposition and have a low level of anxiety. Students with moderate metacognitive reconstruction categories prefer kinesthetic learning styles, have moderate mathematical dispositions and have moderate anxiety levels. Also, students with low metacognitive reconstructions prefer audio learning styles, have low mathematical dispositions, and have high levels of anxiety.

It is recommended for other researchers to review the influence of learning styles, mathematical dispositions, and mathematics anxiety on other abilities in learning mathematics or researching in the broader context of metacognitive reconstruction in mathematics learning. This research is expected to be used as reference material for further research.

REFERENCES

Ariany, R. L., & Dahlan, J. A. (2017). Penerapan Strategi Pembelajaran Multiple Intelligences (MI) untuk Meningkatkan Kemampuan Penalaran dan Disposisi Matematis Siswa SMP. *JES-MAT (Jurnal Edukasi Dan Sains Matematika)*, *3*(1), 1–10.

Diandita, E. R., Johar, R., & Abidin, T. F. (2017). Kemampuan Komunikasi Matematis Dan Metakognitif Siswa SMP Pada Materi Lingkaran Berdasarkan Gender. *Jurnal Pendidikan Matematika*, *11*(2), 79–97.

Fasha, A., Johar, R., & Ikhsan, M. (2018). Peningkatan Kemampuan Pemecahan Masalah dan Berpikir Kritis Matematis Siswa melalui Pendekatan Metakognitif. *Jurnal Didaktik Matematika*, *5*(2), 53–64.

Hidayat, R. (2018). Kontribusi Mathematics Anxiety terhadap Kemampuan Akademik Mahasiswa pada Pembelajaran Kalkulus. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *2*(2), 206–216.

Irfan, M. (2018). Proses Berpikir Siswa Yang Mengalami Math-Anxiety Dalam Menyelesaikan Masalah Sistem Persamaan Linier Dua Variabel. *Kalamatika*, *3*(1), 27–38.

Iriani, D., & Leni, M. (2013). Identifikasi Gaya Belajar Dan Pengaruhnya Terhadap Hasi Belajar Siswa Pada Materi Kubus Dan Balok Di Kelas VIII SMPN 2 Kerinci. *Jurnal FMIPA Unila*, *1*(1).

Izzati, N. (2017). Pengaruh Kemampuan Koneksi Dan Disposisi Matematis Terhadap Hasil Belajar Geometri Bidang Datar Mahasiswa IAIN Syekh Nurjati Cirebon. *Eduma : Mathematics Education Learning And Teaching*, *6*(2).

Jagantara, I. M. W., Adnyana, P. B., & Widiyanti, N. L. P. M. (2014). Pengaruh Model Pembelajaran Berbasis Proyek (Project Based Learning) Terhadap Hasil Belajar Biologi Ditinjau Dari Gaya Belajar Siswa SMA. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, *4*(1).

Muhtaran, A. Z., & Abidin, Z. (2018). Analisis Kemampuan Pembuktian Matematik Siswa Pada Mata Pelajaran Trigonometri Berdasarkan Gaya Belajar Siswa. In *Seminar Nasional Pendidikan Matematika Ahmad Dahlan* (pp. 25–29).

Najmul, I., Cahya, E., & Nurjanah, N. (2018). Pembelajaran Dengan Pendekatan Kontekstual Berbantuan Software Focusky Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Disposisi Matematis. *Jurnal Penelitian Pendidikan*, *17*(3), 213–219.

Rahmawati, A. Y., Rohaeti, E. E., & Yuliani, A. (2018). Analisis Kemampuan Berpikir Kritis Matematis Ditinjau Dari Kemandirian Belajar Siswa Kelas XI Melalui Pendekatan Metakognitif. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *1*(4), 607–616.

Rijal, S., & Bachtiar, S. (2015). Hubungan antara Sikap, Kemandirian Belajar, dan Gaya Belajar dengan Hasil Belajar Kognitif Siswa. *Jurnal Bioedukatika*, *3*(2), 15.

Sukardi, A. D., Susilo, H., & Zubaidah, S. (2015). Pengaruh Pembelajaran Reciprocal Teaching Berbantuan Peta Pikiran (Mind Map) terhadap Kemampuan Metakognitif dan Hasil Belajar Siswa SMA. *Jurnal Pendidikan Sains*, *3*(2), 81–89.

Sundayana, R. (2016). Kaitan antara Gaya Belajar, Kemandirian Belajar, dan Kemampuan Pemecahan Masalah Siswa SMP dalam Pelajaran Matematika. *Mosharafa: Jurnal Pendidikan Matematika*. https://doi.org/http://dx.doi.org/10.31980/mosharafa.v5i2.262

Suraji, S., Maimunah, M., & Saragih, S. (2018). Analisis Kemampuan Pemahaman Konsep Matematis dan Kemampuan Pemecahan Masalah Matematis Siswa SMP pada Materi Sistem Persamaan Linear Dua Variabel (SPLDV). *Suska Journal of Mathematics Education*, *4*(1), 9–16.

Wardani, S., Sumarmo, U., & Nishitani, I. (2011). Mathematical Creativity and Disposition: Experiment With Grade-10 Students using Silver Inquiry Approach. *Journal of Science and Mathematics Teaching, GUNMA University*, 1–16.

Wijayati, I., & Darminto, B. P. (2018). Penerapan Model Pembelajaran Mea Dengan Pendekatan Metakognitif Pada Ranah Koneksi Matematis Siswa SMP. *EKUIVALEN-Pendidikan Matematika*, *34*(1).

Zaozah, E. S., Maulana, M., & Djuanda, D. (2017). Kemampuan Pemecahan Masalah Dan Disposisi Matematis Siswa Menggunakan Pendekatan Problem-Based Learning (PBL). *Jurnal Pena Ilmiah*, *2*(1), 781–790.