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Reviewing Lessons With Mind Mapping By The Help Of 6 Questions Cognitive Model To Help Students Learn Better

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***Abstract**: Review lessons after class can help students increase student achievement but not necessarily students know how to review effective and efficient learning. This learning goal is to explain how to review effective and efficient lessons using Mind Mapping and 6 Cognitive Model Questions. The subject on this study are 155 junior high school students. The topic of Linear Mathematics Equations in Two variables is described using a qualitative method. Experimented with 3 classes with the same level in the Pianlian Central SchoolStudy, The three teaching effects of using and not using mind mapping and 6 Questions Cognitive Model were compared, shows that Mind Mapping and 6 Cognitive Model Questions can improve critical thinking skills, high order thinking abilities and systematic thinking skills. Mind Mapping and 6 Cognitive Models Helping Students to review Linear Equations in Two Variables and get Deep Learning.*

Keyword: Linear equations in two variables1, 6 questions cognitive model, Mind mapping

INTRODUCTION

Students get math courses at each level of education from elementary to high school (Wijaya, Purnama, & Tanuwijaya, 2020; Wijaya, Sukma, Purnama, & Tanuwijaya, 2020). Without realizing it, children have learned mathematics even before entering school (Anthony & Walshaw, 2009; Bertram & Pascal, 2016; Sun, Rao, & Pearson, 2015). This proves that life is inseparable from mathematics (Bernard & Chotimah, 2018; Kulsum, Hidayat, Wijaya, & Kumala, 2019). Students also need mathematics in everyday life (Bernard & Chotimah, 2018; Dewi, Wijaya, Budianti, & Rohaeti, 2018). But mathematics remains a difficult lesson and is not liked by students (Iswahyudi & Soenarto, 2019; Tamur & Juandi, 2020). From this background, Many countries continue to develop learning tools and interesting ways to improve students' mathematical abilities(Juandi, Kusumah, Tamur, Perbowo, & Wijaya, 2021; Pereira, Huang, Chen, Hermita, & Tamur, 2020; Tan, Zou, Wijaya, Suci, & Dewi, 2020; L. Zhang, Zhou, & Wijaya, 2020; X. Zhang, Zhou, & Wijaya, 2020). Figure 1 shows the strategies for students to achieve better math scores.

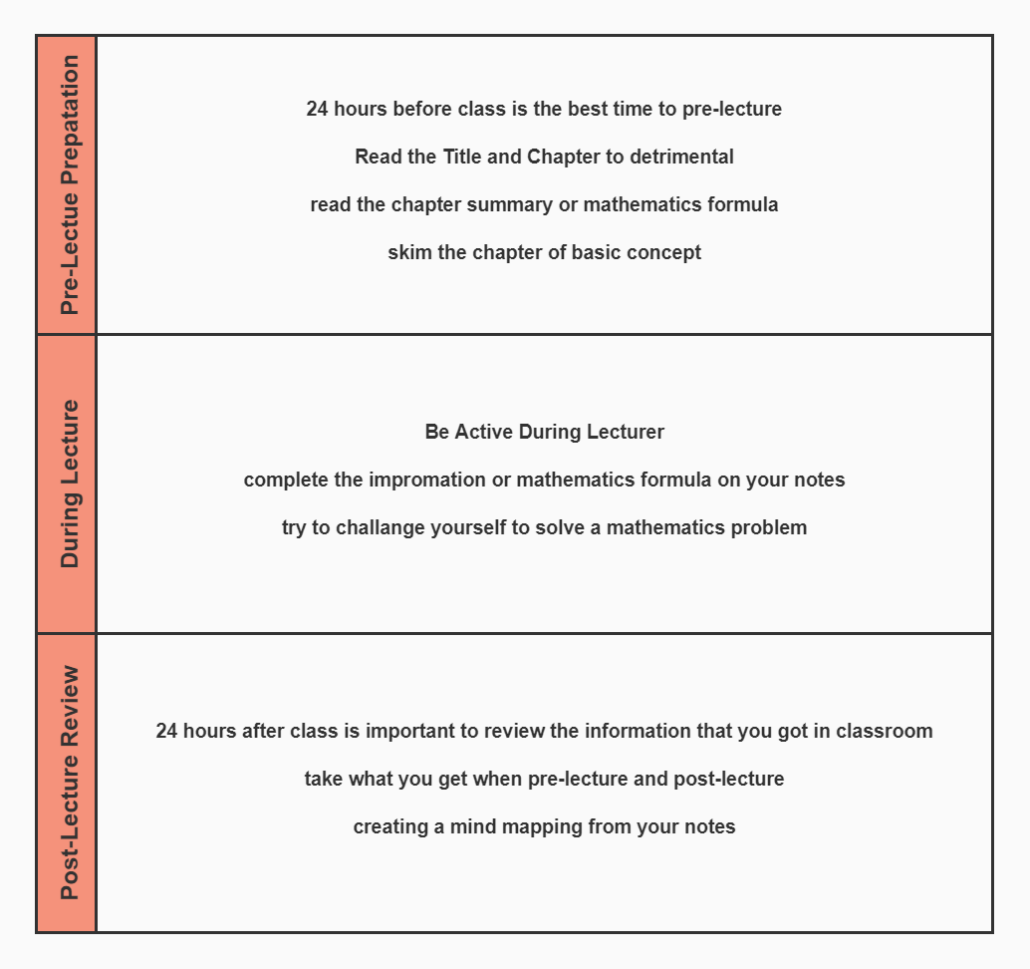

Figure 1. Strategies for Getting Good Math Scores

One way to increase student achievement is with an effective learning strategy (Koh, 2006; Lapitan, Tiangco, Sumalinog, Sabarillo, & Diaz, 2021; Sumarni, Hapizah, & Scristia, 2020). Effective learning strategies can be seen in Figure 1. Students make good preparations before, During and after class. Before and after class, students can use Mind Map to review lessons (Peeraer & Van Petegem, 2012). Buzan introduced mind Map as one of the best learning to help the brain considering all information received at the time of teaching and learning activities (Murphy, 2020; Suherman, 2008). Mind map also increases systematic thinking that makes students not easily forget the concept of mathematics or knowledge that students get in the classroom (Flogie, Lakota, & Aberšek, 2018). Mind Mapping Shaped Visual Tools by using lines, colors, images and symbols or keyword knowledge that help students while revising, recalling and getting deep learning. Mind mapping helps and provides learning directions to students to be able to understand mathematics material better. Some studies show Mind Mapping can improve the ability of high order thinking skills (Liu, Lin, & Tsai, 2009; McLay & Reyes, 2019; Shieh & Chang, 2014).

Linear Equations in Two Variables is mathematical material at the junior high school level (Syafitri, Mujib, Netriwati, Anwar, & Wawan, 2018; Wati, Fitriana, & Mardiyana, 2018). Linear equations in Two variables are difficult algebraic material (Zulfah, 2017). Various problems about linear equations in two variables existed in Times Test in 1999. Linear equations in two variables are usually provided in the form of stories and requires high-level analysis (Puspitasari, Yusmin, & Nursangaji, 2015). Linear equations in Two variables are often used as exercises to improve high-order thinking skills. Pangaribuan

research (Pangaribuan, 2018) shows that linear equations in two variables are associated with students' ability and students need guidance when improving abstraction capabilities in Linear Equations in Two Variables subjects. Fatio et al analyzed 118 Junior High School students in Indonesia, where 118 of these students had studied the Topic Linear Equations in Two Variables. The **Fatio** study (Fatio, Fatimah, & Rosjanuardi, 2020) results showed that there were 448 errors when students worked on the Linear Equations in Two Variables. research shows these errors because students do not understand the Basic Concept of Linear Equations in Two Variables, the existence of a Lack of Information that makes students Misunderstanding and the teacher not give the practice questions in the form of stories to students. With the Mind Mapping, Basic Concept and this Lack of Information can be pointed. Mind Mapping makes students think systematically and efficiently.

6 Question Cognitive Models is one of the learning models that help the systematic thinking process (Wijaya, Ying, Cunhua, & Zulfah, 2020). 6 Question Cognitive Models developed by Zhou Professor of 4mat Model (Lin, Zhou, Wang, & Wijaya, 2020). The development makes 4mat models more effective and efficient for teaching (Cunhua, Ying, Qunzhuang, & Wijaya, 2019). Make the atmospheric learning more alive and students continue to concentrate during learning. 6 Question Cognitive Models remind students to problem Raising, Development, solving problems, making the conclusion, deep learning processes, and easy to connect the knowledge that students have learned with students whom students will learn (Yi, Ying, & Wijaya, 2019).

Many research development uses 6 questions cognitive models. Previous research focuses on using 6 questions cognitive models for teaching mathematics. But there has been no research that develops 6 questions cognitive models to help students when reviewing lessons. This research aims to describe how to use 6 questions cognitive models To help make mind map so that students can review topic mathematics effectively and efficiently.

METHOD

This research discuss using a qualitative method about the use of Mind Map and 6 Question Cognitive models to review learning. The subject in this study was junior high school students who had studied Linear Equations in Two variables. Development research is carried out in Guangxi Normal University. The discussion was carried out between 2 Chinese students, 1 International and Professor Zhou students. Road Map Research Development 6 Question Cognitive Models can be seen in Figure 2.

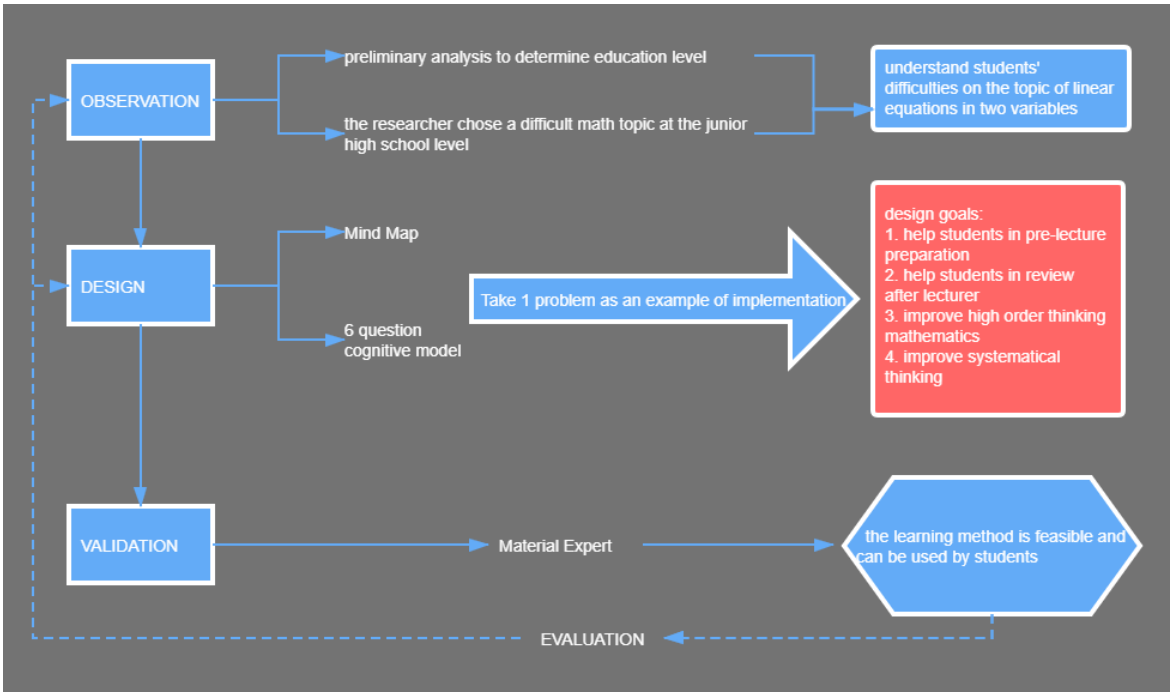

Figure 2. Planning Developing 6 Questions Cognitive Model On Linear Equations In Two Variables

RESULT AND DISCUSSION

Mind Mapping And 6 Questions Cognitive Model

When students use Mind Mapping to review lessons, they break down intact information into important information that is smaller and easier to understand. After students understand any information in detail and specifically, students organize this information into perfect intact information. Information can be in the form of ideas, concepts, methods, or strategies and solutions. When students use this Mind Mapping, passively students have done Systematical Thinking. So students don't easily forget information that students have mastered. Establish a good cognitive structure and strong information recall.

6 Cognitive Questions Models talk about where the knowledge came from? What knowledge is it? Where did the knowledge be obtained? How is there a change? Why can knowledge be like that? How students conclude from all of this knowledge. 6 Cognitive Model Questions can be included when students make Mind Mapping. So that knowledge can always be a student remember, the information in the brain is structured, explanation strategy is good, has a deep understanding of the information obtained. In essence, students review all sources of knowledge vertically and horizontally with the help of 6 cognitive model (Figure 3) and mind mapping.

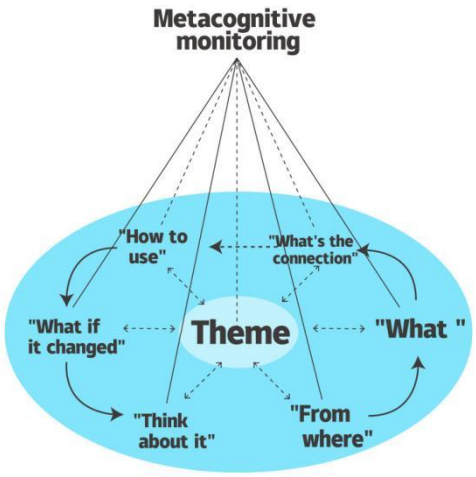

Figure 3. 6 Questions Cognitive Model

Linear Equations In Two Variables Using Systematic Thinking With 6 Questions Cognitive Model

Researchers took the example of linear equations in two variables in 7th-grade junior high school using Mind Mapping and 6 Cognitive Model Questions. Linear Equations in Two Variables is Basic of Mathematical Equations in Junior High School. The results of the initial observation of the 7th-grade junior high school book and teachers' observations of Linear Equations in Two variables in class help researchers get teacher habits to provide open questions with realistic problems. Linear Equations in Two Variables is in the role of connecting the preceding and the following in the whole junior high school equation family. The teacher should know and teach the students first: in the junior high school mathematics equation family, the teaching process and the research path are very similar, both come from life and serve life, and finally unify the thought of equation modeling. The teacher uses realistic problems to improve the critical thinking skills and creative thinking of students. Realistic problems can improve students' mathematical abilities and hots. After students can resolve the problem, the teacher explains linear equations in two variables, how to formulate linear equations in two variables, how to complete the method of linear equations in two variables and how to apply linear equations in two variables in student daily lives (Figure 4).

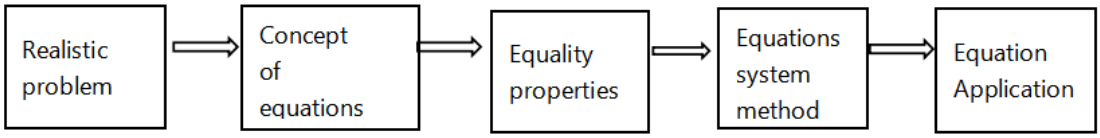

Figure 4. Teacher Observation Results Teach Linear Equations in Two Variables

6 Cognitive Questions Model Direct Students to Think Systematically and Understand Linear Equations in Two Variables

When reviewing Linear Equations in Two Variables after Lecture, students can use 6 cognitive model questions and discuss with classmates to get the best answers. When students discuss the ability of communication and self-confidence students can increase (Bakar, Ayub, Luan, & Tarmizi, 2010; Pieters, Voogt, & Roblin, 2019; Ruqoyyah, Murni, & Wijaya, 2020). The late review of students together with conclusions from the knowledge students who have learned students. How to use 6 Cognitive Model Questions with Mind Mapping On Linear Equations in Two Variables can be seen in Figure 5.

Figure 5 shows that what students remember are scattered and not systematic ; Figure 6 shows that students are not complete enough . Can be seen in Figure 7, students using 6 Questions Cognitive Model and Mind Mapping to understand all information, Basic Concept of Linear Equations in Two Variables, Relationship between Information on Linear Material Equations in Two Variables, How to Complete Linear Equations in Two Variables Problems , What is a linear equations in two variables and concludes how to use linear equations in two variables in everyday life, so that improve critical thinking skills, high order thinking abilities and systematic thinking skills.

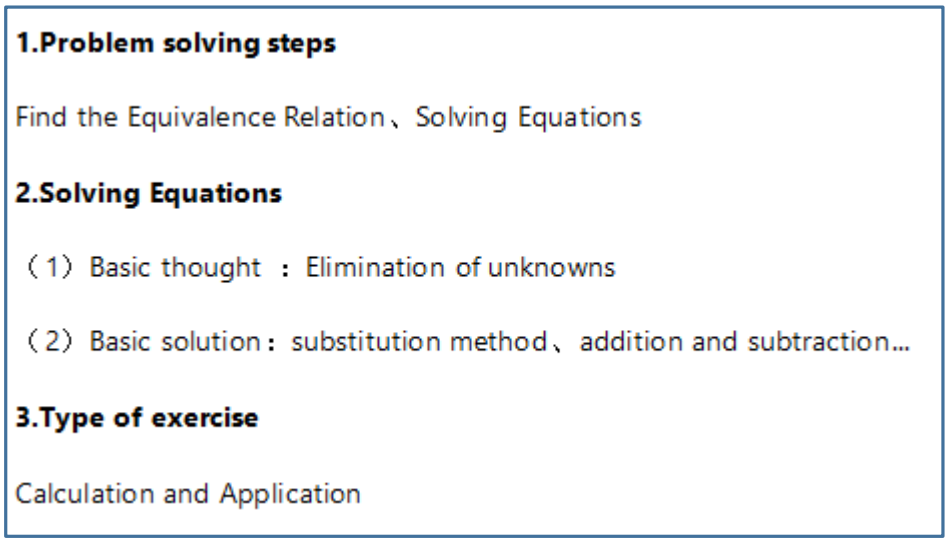

Figure 5. The Result Of Without Teaching The Mind Mapping And The 6 Questions Cognitive Model (The first classes**)**

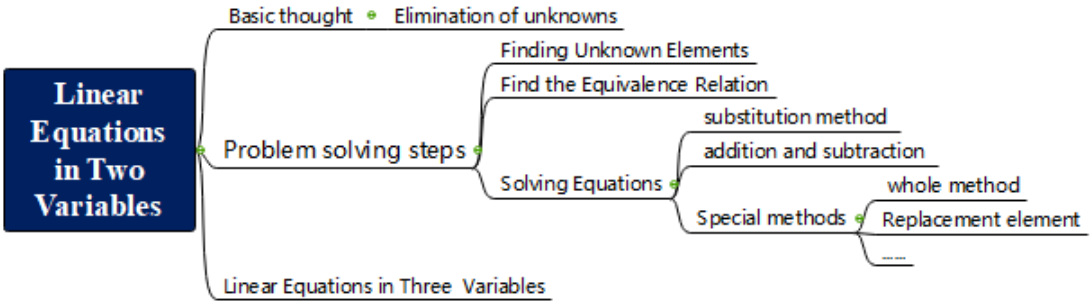

Figure 6. The Result of Students Were Taught To Make Mind Mapping (The Second Classes**)**

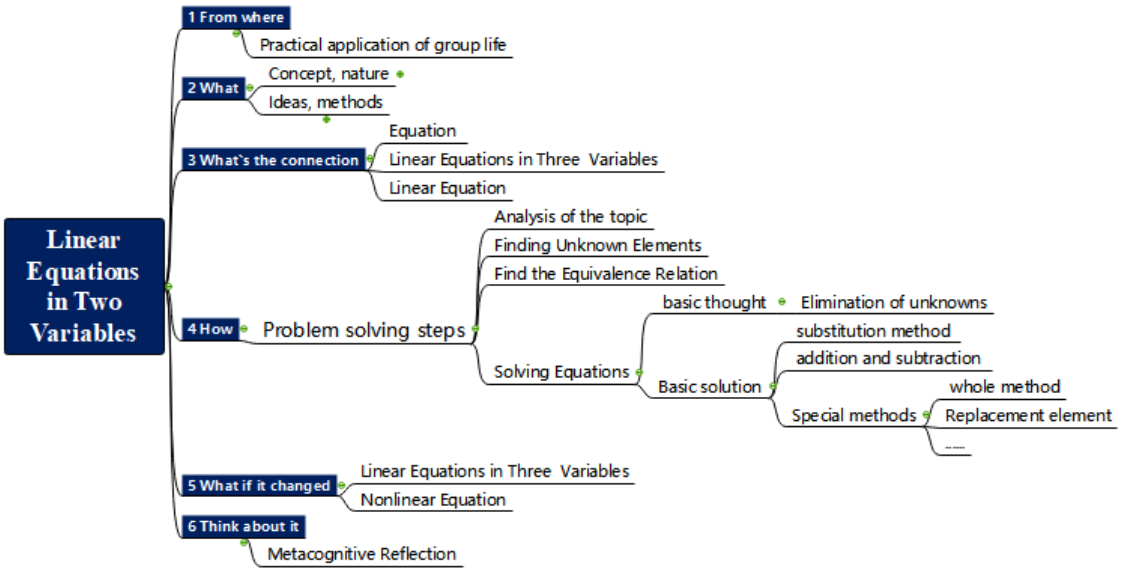

Figure 7. Guide To Make Mind Map of The Linear Equations In Two Variables With 6 Questions Cognitive Model (The Third Classes**)**

CONCLUSION

Mathematics is a systematic science and an organic whole and a difficult lesson. The knowledge system of mathematics is closely related and dialectical, and the system between chapters and teaching materials contains a spiral rising model. When students review the lessons, a model is needed to think systematically so that students do not easily forget and can master the concept of mathematics. Mind Map and 6 Cognitive Model Questions Proven to make it easier for students to understand Linear Materials Equations in Two Variables. Therefore, in mathematics class, teachers can use Mind Map and 6 Cognitive Model Questions to construct logical and coherent teaching mode, so that students can master learning methods and improve critical thinking ability, higher thinking ability and systematic thinking ability.

The content of this experiment is only linear equations in two variables, which does not expand the scope of the experiment; secondly, the object of the experiment is only the students in three classes of ordinary middle school, which is not representative enough; Finally , the method of comparing the teaching effect is relatively rough , only based on the classroom performance and notes .

The final purpose of the review lessons from the perspective of systematic thinking is not to pile up, repeat and reproduce the teaching content, but to master what knowledge system, what study habits, what learning ideas and methods, and what systematic knowledge context can be formed through the review class. Suggestions for teachers to share effective and efficient learning methods to students. Subsequent research can develop the Mind Mapping learning model and 6 cognitive model questions on other mathematical topics.In the next step, we can compare the teaching effect of using this model with that of not using it.

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