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Mathematic Creative Thinking Processes Through Mind-Mapping Based Aptitude Treatment Interaction Learning Model: A Mixed Method Study

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Abstract: This study aims 1) to determine the effectiveness of the Mind-Mapping based Aptitude Treatment Interaction model towards creative thinking and 2) to explain the mathematical creative thinking process based on the creative level. The number of participants was 26 students who took the Multivariable Calculus course in the odd semester of 2020/2021. This research used the mixed-concurrent embedded method. The data collection techniques were validation, observation, creative thinking tests, and interviews. The results showed that 1) the Mind-Mapping based Aptitude Treatment Interaction model was effective in developing creative thinking, as indicated by the average creative thinking score of the experimental class, which was higher than the control class and 2) the characteristics of students mathematical creative thinking process varied following the creative thinking levels. The students mathematical creative thinking level consists of not creative (CTL 0), less creative (CTL 1), quite creative (CTL 2), creative (CTL 3), and very creative (CTL 4). Students at the CTL 2, CTL 3, and CTL 4 can meet the aspects of fluency, flexibility, and originality.

Keywords: *Aptitude treatment interaction, creative thinking ability, mind mapping, Wallas creative thinking process.*

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Introduction

Creativity is one of the 21st century skills that students need to acquire. According to Geisinger (2016), there are four skills needed in the 21st century: problem-solving, collaboration, creativity, and digital information literacy. Creativity is an essential requirement in every type of work (Kay & Greenhill, 2011). The demand is to produce a unique or new product (innovation). Creativity is the main factor producing innovation (Lewis, 2009). In learning mathematics, to solve problems, creative ideas are needed. Thus, creativity is an essential component in problem-solving (Ellwood et al., 2009; Plucker et al., 2004).

Creativity is a person's ability to generate new theories or knowledge (Chamberlin & Moon, 2005; Simonton, 2000). M. Runco and Jaeger (2012) also explain that creativity is related to the originaity of knowledge or idea. Creativity consists of four parts: creative products, creative people, creative environment, and creative thinking processes (Wadaani, 2015; Welsh, 1973). Creative people have intelligent, imaginative, and original personalities. A creative environment refers to a social environment facility to support productivity and the emergence of creative thinking. The steps taken to obtain new ideas are related to the creative thinking process. This understanding of creativity is the basis for measuring creative thinking.

Wallas (1926), in his book *"The Art of Thought,"* wrote four creative thinking processes: preparation, incubation, illumination, and verification. The preparation stage includes problem identification and information gathering. This activity is the initial stage of the emergence of inspiration. Van Hooijdonk et al. (2020) explain the importance of finding facts and problems as the beginning of new ideas. The preparation stage of creative thinking includes writing down general information, writing down the core of the problem, re-explaining in detail, and determining the initial problem. The incubation stage means that the student escapes from the problem, but the brain works to find inspiration. In the incubation stage, the ide connection depends on the emerging ideas. The time required varies depending on the

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problem at hand. The illumination stage is also known as insight. It is a process to gather all knowledge and create initial creative ideas. The illumination stage also seeks to connect the knowledge and the given problem. Bacanlı et al. (2011) and Sitorus (2016) explain that connecting concepts are helpful to finding creative solutions. The verification stage is to reexamine and refine creative ideas. Creative ideas do not come easily, so some effort is needed. The highest level of creative thinking lies in the novelty aspect of the idea (Siswono, 2010).

Silver (1997) revealed three indicators of creative thinking in solving problems: fluency, flexibility, and originality. Fluency is the ability to produce different answers correctly. Flexibility describes the ability to solve problems correctly from different perspectives. Meanwhile, originality refers to generating unique or unusual ideas. Sitorus et al. (2019) explain the characteristics of each indicator of fluency, flexibility, and originality. The aspect of fluency is giving more than one answer. Flexibility has the nature of creating various ideas, having different points of view in solving problems, getting many alternatives, and changing the thinking process. The originality aspect is observable from making unusual combinations of knowledge and thinking in unique ways. The context of novelty is not finding something new but the new student using the idea for the first time. In this case, students create original or unusual ideas.

A series of excellent and exciting learning activities can develop creative mathematical thinking. Teachers' teaching techniques also reflect the learning quality. One of the learning models is the Aptitude Treatment Interaction (ATI). Learning contains several ways to create effective learning according to the character of students' abilities (Cronbach, 1981; Fuchs et al., 2014). The strategies consider the talents and experiences of students. The ATI model has three main keywords: aptitude, treatment, and interaction (Cronbach, 1981). The ATI learning model consists of several stages, including measuring the abilities/talents of each student, grouping students based on skill, giving treatment to each group, and giving tests (Hanum & Johar, 2021). The treatment given to each talent group is different. Hwu et al. (2014) found a positive correlation between the treatment given and the character of one's talent. Creative thinking needs specific treatment. One of them applies the mind mapping method. According to Davis et al. (2000), mind mapping combines specific learning models in increasing knowledge and creative thinking ability, including the ATI model.

A British psychologist named Tony Buzan introduced the mind mapping method in 1974. Mind Mapping is a visual method used to record graphic-based thought activities and ideas. Buzan (1974) and Joao and Silva (2014) describe the four characteristics of mind mapping: identifying ideas as a central topic, using the main themes from the central issue, using keywords, lines, or images to connect between concepts/themes, and to represent sub-theme to a higher level. Mind Mapping helps students explore further information, creating a vibrant learning atmosphere and generating creative ideas.

Several studies have studied this topic. Zubaidah et al. (2017) describe the differences in creative thinking ability using conventional models with an integrated Mind Mapping Inquiry model. Leeds et al. (2019) stated that the mind mapping approach could help students think divergently. In this case, divergent thinking refers to generating several different solutions. Hanum and Johar (2021) describe students' ability to solve higher-order thinking problems (HOTS) through Aptitude Treatment Interactions (ATI). In line with the research results of Maskur (2020) that the aptitude treatment interaction model has more influence on creative thinking ability than Problem-Based Learning (PBL). Nuha et al. (2018) focus on students' thinking patterns at each stage of Wallas' creative thinking process. They found differences based on creative thinking using a problem-posing model based on lesson study. In this study, one of the indicators at the incubation stage is to make simple notes to find ideas.

The difference with the current study lies in the Aptitude Treatment Interaction model from the previous studies. The researcher integrated the ATI with Mind Mapping (ATI-MM). Students received special treatment using a mind mapping approach. The Mind Mapping approach is an essential aspect of developing creative ideas. Students had to find more information, perform simple calculations, connect mathematical concepts, and make conceptual designs through mind mapping to find inspiration. These patterns belong into the incubation stage at the stage of the creative thinking process of Wallas.

From the background description, the research objectives are 1) to determine the effectiveness of the Mind-Mapping based Aptitude Treatment Interaction model on creative thinking, and 2) to analyze the characteristics of the Wallas-type mathematical creative thinking process at each level of creative thinking.

Literature Review

Creative Thinking Process

Wallas (1926) suggested four stages of creative thinking, namely preparation, incubation, illumination, and verification. Sapp (1991) explains that the preparation stage is a process to explore problems. The stage where the subconscious mind works and escapes from the problem is incubation. The illumination stage is an idea that appears suddenly based on the accumulation of knowledge. The verification stage is the testing of ideas/concepts.

Mace and Ward (2002) developed four stages of the creative thinking process: understanding the concept of creativity; identifying various ideas; developing and evaluating ideas; changing the initial idea to be unique and different, and solving problems and evaluating. Sadler-Smith (2015) developed five stages of the creative thinking process: preparation, incubation, intimation, illumination, and verification. The intimation stage refers to raising feelings due to a combination of a body of knowledge and new ways or the feeling of knowing.

This study adopted the mathematical creative thinking process from the Wallas (1926): preparation, incubation, illumination, and verification. Table 1 describes the cognitive indicators of each stage of creative thinking in the Wallas model.

Table 1. Indicators of Mathematical Creative Thinking Process

Process	Indicator
Preparation	1. Write down known information
	2. Write down the essence of the problem
Incubation	1. Remembering previously acquired knowledge
	2. Imagining the relationship between concepts
Illumination	1. Apply ideas to problems
	2. Solve problems with various solutions
Verification	1. Recheck the ideas found
	2. Fix the error
	3. Write a conclusion

Mind-Mapping Based Aptitude Treatment Interaction Model (ATI-MM)

The ATI-MM model results from a modified Aptitude Treatment Interaction (ATI) model with a mind mapping (MM) approach. The ATI model is a model that provides several treatments according to the student's ability level (Fuchs et al., 2014; Pirayanti, 2012). The primary key of this model lies in the treatment given to students. This model can be combined with several treatments, one of which is mind mapping. The characteristics of the ATI-MM model lie in the treatment given in the form of a mind mapping strategy. The goal is to improve the ability to think creatively. The ATI-MM model stage refers to the theory developed by (Maskur, 2020), as shown in Table 2 below.

Table 2. ATI-MM model steps

Steps	Activities
Step 1	Measuring student abilities (aptitude testing)
Step 2	Organizing students to study (in groups)
Step 3	Guiding students (Treatment and Interaction)
Step 4	Develop creative designs (mind mapping)
Step 5	Presenting results
Step 6	Giving test

Methodology

Research Design

This study uses a mixed-method of a concurrent embedded type. Research that applies qualitative and quantitative data collection strategies at one time (Creswell, 2014; Sugiyono, 2015). Figure 1 below illustrates the research design.

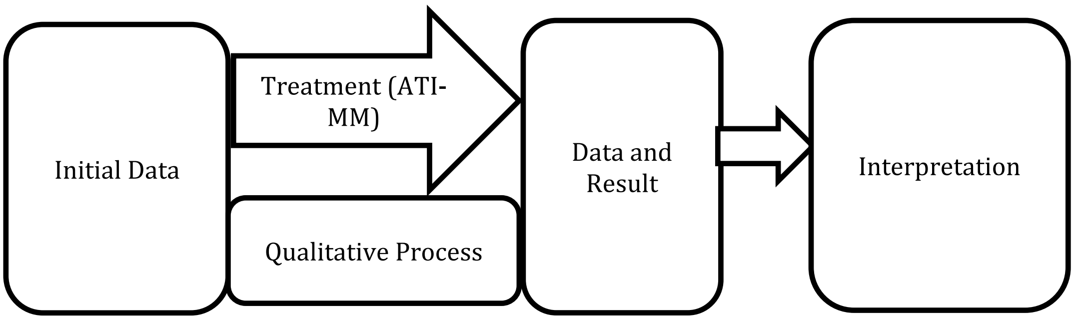

Figure 1. Concurrent Embedded Method Research Design

Populations and Samples

In quantitative research, the researchers took the third-semester students of the Mathematics Education Study Program, the University of Muhammadiyah Purwokerto, for the 2020/2021 academic year as the population. The first group, the experimental group, consisted of 11 female and two male students. They received ATI based on mind-mapping. Then, the control group received cooperative learning. The participants consisted of 11 female and two male students for the control group.

In qualitative research, the researcher used the experimental group of students and grouped them based on their level of creative thinking. Two students took each group as research subjects to study the mathematical creative thinking process. Analysis of the mathematical creative thinking process test answers using the creative thinking ability.

Data Collection Tools

The experimental class received a creative thinking ability test based on indicators of creative thinking ability. They were fluency, flexibility, and originality. Before the test is used, it is validated by experts. Expert validators have researched creativity and focused on creativity. The evaluation results show that the creative thinking test is valid and reliable. The researcher used an observation sheet while applying the mind mapping-based aptitude treatment interaction model. Two observers assisted the researcher. In practice, the observer observed the activities of lecturers and students. In addition, the observer also observed the learning steps of the aptitude treatment interaction model based on mind mapping. Researcher also distributed questionnaires to experimental class students and tested learning effectiveness.

Researcher used observations, interviews, and documentation to obtain data on the mathematical creative thinking process. After observing for three meetings, interview were conducted with the subjects to obtain detailed information and confirm all findings during the observation process. Then, cross-checked the interview results and observations as a part of data triangulation. The results of student work are documented in photos and videos during the interview.

Data Analysis

The researcher grouped the initial creative thinking ability test results based on the level of creative thinking. Siswono (2010) grouped levels of creative thinking ability from level 0 to 4 based on indicators of fluency, flexibility, and originality. The researcher used some symbols of creative thinking level, such as CTL 0 (not creative), CTL 1 (less creative), CTL 2 (creative enough), CTL 3 (creative), and CTL 4 (very creative). Table 3 describes the criteria and categories for each level of creative thinking.

Table 3. Criteria and Categories of Mathematical Creative Thinking Level

Creative Thinking Level (CTL)	Category	Indicators		
		Fluency	Flexibility	Originality
CTL 4	Very Creative	√	√	√
CTL 3	Creative	√	-	√
		√	√	-
		-	√	√
CTL 2	Creative Enough	-	√	-
		-	-	√
CTL 1	Less Creative	√	-	-
CTL 0	Not Creative	-	-	-

In this research, the researcher validated with expert judgment. The researcher involved three experts. The aptitude treatment interaction based on mind mapping (ATI-MM) required two people to observe the activities of lecturers and students. The average score of the observations used some criteria.

Learning using an aptitude treatment interaction model based on mind mapping is said to be effective if 1) Students obtain classical learning mastery, 2) The average value of creative thinking ability in the experimental class is higher than the learning mastery limit, and 3) The average creative thinking score in the class experimental class is better than the control class.

Students fulfill classical learning completeness if the number of students who complete learning is more than 75% of the total number of students in the class. The researcher used a one-sample t-test with a significance of 5%. Before the test is carried out, it is first checked that the data is normally distributed. If the value of sig. shows more than 0.05, then it is normally distributed. The test results provide information that the data is normally distributed. To test the difference in the average value of creative thinking skills, the researchers used a t-test of two independent samples. The researcher describes the creative thinking process based on Wallas's theory. The analysis technique used is data reduction, presentation, and conclusion drawing (Sugiyono, 2015).

Reliability and Validity

The researcher used method triangulation to ensure the qualitative data validity of the mathematical creative thinking process. There are three kinds of triangulation: source, technique, and time. Source triangulation means taking more than one research subject at each level of creative thinking. The researcher compared the creative thinking process data between observation and interview methods. The researcher observed the process for more than one for each research subject.

Findings/Results

Quality of Mind-Mapping Based Aptitude Treatment Interaction Learning Model

The results of the creative thinking ability test showed a difference. Table 4 describes quantitative data on creative thinking for each experimental and control class.

Table 4. Independent Sample t-test

	Pre Test						Post Test					
Class	**N**	**Mean**	**SD**	**T**	**Df**	**Sig(2-tailed)**	**N**	**Mean**	**SD**	**T**	**Df**	**Sig(2-tailed)**
Experiment	13	83.33	18.37	2.04	22.85	0.86	13	86.92	12.32	4.98	22.85	0,00
Control	13	82.35	13.18	2.01	20.2		13	65.15	9.813	4.98	20.8	

Based on the table above, the value of sig (2-tailed) = 0.00 < 0.05. It can be concluded that there is a significant difference between the results of the mathematical creative thinking ability test in the control class and the experimental class. The p-value < 0.05 using the Cohen Hedges formula is 0.369. This value is included in the medium category. Mind-mapping based aptitude treatment interaction learning model is better at improving creative thinking ability.

Table 5. Completeness Test Results

Class	Test Value = 75					
	t	**df**	**Sig. (two-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Experiment	3.49	12	0.00	11.92	4.48	19.37

Based on the t-distribution table with df = 12, it is obtained t_{table} = 2.179. Based on table 5, the KKM value is 75 and t_{count} = 3.49. So, the value of $t_{count} = 3.49 \geq t_{table} = 2.179$. Thus, using the mind-mapping based aptitude treatment interaction learning model, students creative thinking skills can achieve the minimum completeness criteria (KKM). The number of students who achieved the KKM score was 12 out of 13, or 92.3%. Thus, students in the experimental class achieved classical mastery.

Mathematical Creative Thinking Process

Based on the results of the initial test of mathematical creative thinking ability in the experimental class, each student identified the level of creative thinking based on predetermined criteria. Figure 2 explains the number of students at each level of creative thinking.

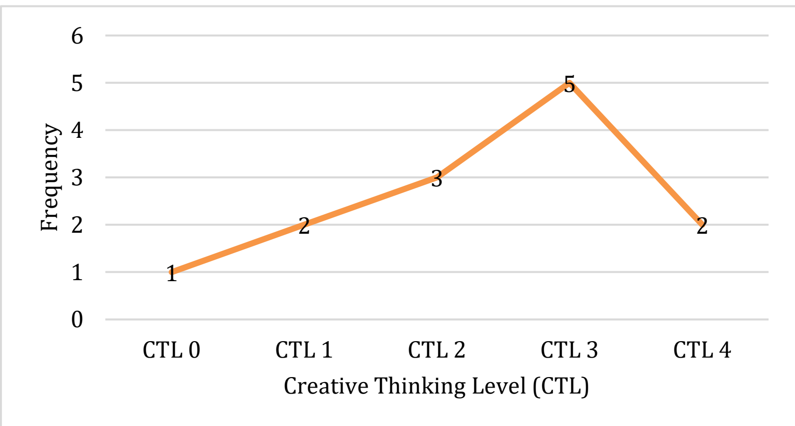

Figure 2. Analysis of Creative Thinking Level in the Experimental Class

The results of the identification were: one person was not creative (CTL 0), two people were less creative (CTL 1), three people were creative enough (CTL 2), five people were creative (CTL 3), and two people were very creative (CTL 4). The researcher explained each research subject's mathematical creative thinking process. The following are the results of the analysis of the creative thinking process based on the Wallas model, namely preparation, incubation, illumination, and verification.

Table 6. Student Mathematical Creative Thinking Process

Stages Levels	Preparation	Incubation	Illumination	Verification
Very Creative	Understand the essence of the problem and write down the known information	Perform a simple calculation (trial) using the formula	Using multiple solutions to solve the problem	Re-checking solving steps and math symbols
Creative	Understand the essence of the problem and write down the known information	Perform a simple calculation (trial) using the formula	Using multiple solutions to solve the problem	Re-checking solving steps and math symbols
Creative Enough	Understand the essence of the problem and write down the known information	Perform a simple calculation (trial) using the formula	Using multiple solutions to solve the problem	Re-checking solving steps and math symbols
Less Creative	Understand the essence of the problem and write down the known information	Perform simple calculations (trials) without formulas	Use one solution to solve the problem.	Didn't double-check the answer.
Not Creative	Understand the essence of the problem and write down the known information	Difficulty finding inspiration	Using one solution but doing it wrong	Didn't double-check the answer

Based on table 6, all subjects could find the core of the problem at the preparation stage and write down the known information at this stage. Following are the results of an interview with one of the CTL 3.

R : Why did you rewrite the function *f* in your answer?

S6 : Because it is easier for me to do the questions. By writing down what I know, I can quickly answer questions. I use that information to get solution ideas.

R : Do you usually write down what you know in answering questions?

S6 : Yes, I usually like that. Write down what is known.

At the incubation stage, research subjects at the CTL 1, CTL 2, CTL 3, and CTL 4 levels had different stages in obtaining inspiration. Unlike the case with subjects at CTL 0, they did not try to find ideas to solve problems. Therefore, they did not answer all questions. The following is an example of student 2 (CTL 1) in the process of finding inspiration at the incubation stage shown in Figure 3.

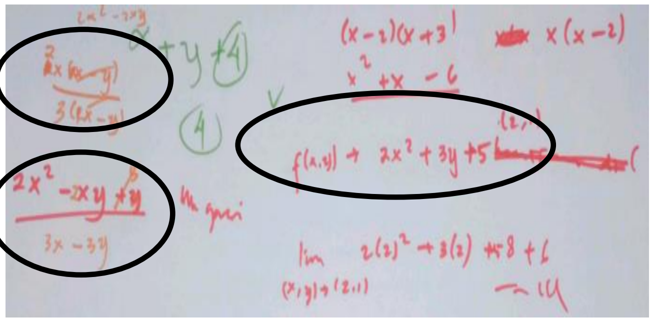

Figure 3. Response of Student 2 in the Incubation Stage

The interview with subject 1 (CTL 0) showed difficulty finding inspiration. Here are the results of the interview.

R : Do you find it challenging to come up with ideas?

S1 : Yes, I can't come up with any ideas at all.

R : What's the reason?

S1 : I don't understand the material, limit. In my opinion, the material is complex.

In the illumination stage, research subjects at the CTL 0 level did not meet the indicators of creative thinking ability. Each subject gave one answer and one solution. Meanwhile, the subjects on CTL1 only gave two different answers (fluency). On the other hand, research subjects CTL 2, CTL 3, and CTL 4 met the aspects of fluency, flexibility, and originality.

At the verification stage, the research subjects at CTL 0 and CTL 1 did not reexamine their answers because of running out of time. However, the subject admitted that the subject usually rechecked the work. The following excerpt is from student 2 (CTL 1) regarding the idea verification stage.

R : Did you recheck the written answer?

S2 : No, because the time is up.

R : Do you usually check your answers after you finish working?

S2 : Yes, I checked the answer quickly. It means it is not detailed.

Unlike the research subjects CTL 2, CTL 3, and CTL 4. There are three ways to double-check answers: checking all answered item completion, rechecking the completion step, and correcting the written mathematic symbol mistakes. CTL 2 checked the number of questions without considering the correctness process. Here is the interview with subject CTL regarding idea verification.

R : After completing the questions, what do you do?

S7 : I rechecked the completion steps, checked the writing of math symbols, and fixed them. I usually leave a few minutes to review the answers.

Discussion

The Effectiveness of the Mind-Mapping based Aptitude Treatment Interaction Learning Model on creative thinking

The integration of the mind mapping approach in the aptitude treatment interaction model contributes to thinking creatively. The combination of mind mapping in the treatment section will make it easier for students to explore information and find new ideas. Students can improve their creative thinking ability with intensive treatment (Syazali et al., 2019). The ability to generate new ideas is the key to creative thinking.

The initial stage is to make a learning implementation plan (RPP). The model used in the lesson plan was aptitude treatment interaction based on mind mapping. Two observers checked the validity of the lesson plans. The validation results of the two validators showed a score of 3.2. Thus, the RPP was valid. Then, the researchers prepared creative thinking ability test questions based on three indicators: fluency, flexibility, and originality. The result showed an average validation of 3.13. This score indicates that the mathematical creative thinking ability test questions were valid.

At the implementation stage, the learning activities went well. Lecturers could manage the learning based on the arranged plan (observation score 3.3). The average score of student responses also obtained 3.31 toward the applied model, categorized excellent. Fuchs et al. (2014) and Pirayanti (2012) explain the characteristics of the aptitude treatment interaction model is to provide treatment based on the student's ability level.

The final stage is to evaluate the learning impact of the aptitude treatment interaction model based on mind mapping. The results were 1) Learning using the Mind Mapping based Aptitude Treatment Interaction model achieves classical learning mastery, 2) The class average score of creative thinking ability that apply the Mind Mapping based Aptitude Treatment Interaction model exceeds the minimum learning mastery value, and 3) The class that uses the Mind Mapping based Aptitude Treatment Interaction model has a higher average creative thinking ability score than the class that applies the cooperative model. It proved the effectiveness of the Mind Mapping based Aptitude Treatment Interaction model. Maskur (2020) also explain that the Aptitude Treatment Interaction model effectively improves mathematical creative thinking ability. Leeds et al. (2019) and Ramdhani et al. (2015) also found the Mind Mapping approach could improve creative thinking. Zip and Maher (2013) found Mind Mapping method could improve people's ability to organize ideas creatively.

Mathematical Creative Thinking Process

The preparation stage is the beginning of the creative thinking process. At this stage, the subjects understood the core of the problem. Then, they wrote the given information. Wulantina et al. (2015), in their research, also found all subjects identified problems at the preparation stage. They wrote information to solve problems. They selected the data and created an initial completion plan from the information. Purba et al. (2017) explain that the information obtained at the preparation stage is useful for finding the right solution.

The incubation stage becomes very important because the inspiration process takes shape. The constructed ideas are interconnected and arranged in the brain unconsciously to work on the problems. Each research subject had a different way in the process of inspiration. The order of the process is irregular. The subject searched for relationships between concepts to get the right solution for inspiration. Sitorus (2016) found that students learned by rereading the problem at the incubation stage. They did it to find the problem core, understand the information, use the background knowledge, and connect each knowledge. Hines et al. (2019) designed an incubation model as a motivation for the emergence of the inspiration process. The incubation model consists of three phases, namely Heightening Anticipation (phase 1), Deepening Expectations (Phase 2), and Keeping it Going (Phase 3). In phase 2, namely Deepening Expectations, students explore deeper information and find new connections between objects or mathematical ideas. This process is the beginning of the emergence of creative ideas.

In the illumination stage, the subject found an idea to solve problems. The process to get the idea included convergent thinking. It refers to the ability to choose relevant ideas for the problems. King (1982) explains the realm of the preparation and incubation stages includes divergent thinking, while the illumination stage includes convergent thinking. Subjects with a non-creative level could only write down one answer and a solution. Likewise, research subjects with less creative levels could only achieve fluency aspects. Zubaidah et al. (2017) found the low creative thinking students could not apply mathematical ideas to solve problems. Students still focused on specific solutions without attempting other ways.

Subjects with categories of creative enough, creative, and very creative levels could write answers and different ways to solve them. In this case, the students met the aspects of fluency and flexibility. Students solved problems with an unusual, claimed method. This method required creativity so that the subjects met the originality indicator. Nuha et al. (2018) also found students with thinking categories of creative enough, creative, and very creative successfully performed aspects of fluency, flexibility, and originality at the illumination stage.

The importance of reexamining the answers was to check whether they were from the problems. This stage is usually called verification. The research subjects reexamined the implemented ideas and revised errors in writing symbols or notations at this stage. Allen and Thomas (2011) explain using the verification stage for reexamining the generated ideas. In this research, two types of thinking were formulated at the verification stage, namely types 1 and 2. Type 1 developed ideas better, while type 2 developed ideas with some steps.

Conclusion

The results and research above provide the following conclusions. The Mind-Mapping based Aptitude Treatment Interaction model (ATI-MM) is effective in developing creative mathematical thinking. All students could understand the problem core and write the given information to solve problems in the preparation stage. In the incubation stage, students at each level of creative thinking had different sequences to get inspiration. In the illumination stage, students at CTL 0 can only write one answer and the solution. Then, CTL 1 students could achieve fluency. Students at CTL 2, CTL 3, and CTL 4 can achieve fluency, flexibility, and originality. Eventually, in the verification stage, the students rechecked the steps of the idea, checked the answers, and corrected the writing errors.

Recommendations

For further research, the researcher provides several recommendations. The use of an aptitude treatment interaction model based on mind mapping can be implemented on other cognitive abilities such as critical thinking or mathematical problem-solving because this ability is an essential component needed in the 21st century. Furthermore, the flexible aptitude treatment interaction model is combined with other approaches, including RME or inquiry. Because the main focus of this research is to generate creative ideas, this approach can help students find creative ideas. For practitioners, it can be investigated about the creative thinking process in depth, how students think in finding new ideas, and what thoughts can be used in creativity, such as divergent thinking.

Limitations

In this study, the material used is limited and continuity. This material is limited to universities. The results obtained to describe the stage of thinking to get new ideas and treatments that can be applied to students to achieve creativity. This research can be continued at the secondary school level. Then, the material used adjusts the school level and involves open-ended problems. Thus, the mind-mapping based aptitude treatment interaction learning model can be integrated from secondary to tertiary institutions at every school level. This shows the innovation of learning models.

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Authorship Contribution Statement

Gunawan: Designing research, collecting and analyzing data, compiling and completing the script. Kartono: Designing research and finalizing the manuscript. Wardono: Critically reviewed and finalized the manuscript. Kharisudin: Correcting and finishing the script.

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