THE DEVELOPMENT OF INQUIRY MODELS TO INCREASE CREATIVE THINKING ABILITY

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The development of learning model to improve the ability of primary school teachers to teach science, conducted to see the effectiveness of learning model and improve creativity ability of inquiry model development. Aspects in improving creativity in the development of inquiry model of the effort to identify real problems related to science and solving efforts one of them learning model by using the basic material, discussion, development of learning plan, simulation, enrichment and teaching real in elementary school to improve teaching ability of science students PGSD S1 UMK Kudus and PGSD S1 UNS Kebumen. This study aims to produce inquiry learning model in improving the ability of creative thinking in electrical matter in elementary school.

The research design refers to the design of R & D Cycle involving 70 students of PGSD S1 UMK Kudus and PGSD S1 UNS Kebumen and more than 200 elementary students. Pre-test postest one group desaign was used to determine the effectiveness of learning models before and after treatment subjected to the study subjects.

Based on the results of research it is proposed that the use of curriculum enrichment module of learning device in the learning process with this strategy can improve teacher's insight to the material learned and their ability to teach science in elementary school. Recommendations from this research need to be enriched curriculum in PGSD S1 study program that integrates science materials with methodology and program, developed as an example of teaching science.

Keywords: Development, Model, Creative, Science.

A. PROBLEM BACKGROUND

Learning inquiry model is expected to be able to train and improve the ability to think critically. Inquiry learning means learning involving inquiry activities in it. Inquiry is the act of gathering information about something. Victor and Kellough (Jacobsen, 2009) explain that inquiry is a process of answering questions and solving problems based on logical testing of the facts and observations. Callison and Lamb (2005) mentioned that inquiry is the process of formulating questions, processing ideas, digging and evaluating information, analyzing data, and finding relationships and conclusions. Problem solving and creative thinking have a close relationship (Marcut, 2005). Krulik and Rudnick (Somakim, 2011: 43) Argued that the ability to think creatively science students will emerge if in learning there are problems

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that become triggers. The existence of unfamiliar or unusual situations can stimulate the creative thinking ability of science (Glazer, 2001: 68). In science learning through problem solving, students must learn how to think creatively. Conversely, in training the ability to think creatively needed a science problem.

Problem solving is almost every subject matter in science subjects, including in the electrical materials taught in fifth grade. One of the basic competencies in this material is solving real electrical problems. Learning to achieve these basic competencies is considered in accordance with the effort to improve students' creative thinking skills through problem solving using inquiry model. The existence of models and learning tools inquiry is expected to motivate and direct science learning which is oriented to improve the ability of creative thinking. Based on the explanation, it is necessary to develop a learning model that involves inquiry activities to improve students' creative thinking ability in learning science. Furthermore, researchers are eager to conduct research on "Development of inquiry learning model to improve the ability of creative thinking in Electrical materials in elementary.

Creative thinking means reasonable and reflective thinking that is focused on deciding what to believe or do (Norris and Ennis, 1989). Ennis (1991: 6) adds that this definition does emphasize reflection, rationality, and decision-making (about belief and action). Dacey and Kenny (Desmita, 2009) define creative thinking as the ability to think logically, to apply the logical thinking to the assessment of situations, and to make good judgment and decision. While in the context of science learning, Glazer (2001: 68) interpreted creative thinking of science as the ability and disposition to incorporate prior knowledge, science reasoning, and cognitive strategy to generate, prove, or evaluate unfamiliar science situation in a reflective manner. These three meanings explain that creative thinking involves rational and reflective thinking to make a good decision / resolution in the face of unusual situations / problems. An ideal thinker can be characterized by twelve dispositions and interrelated abilities.

The ability to think creatively needs to be owned by students. Students who have creative thinking skills will tend to respect and respect others (Ennis, 2000). Creative thinkers also will not accept just how to do something just because it is so that way how to do it, and they also do not consider a statement true just because others justify it (Rahayu, 2011: 13). This characteristic is very important to be possessed by future generations living in the modern world. Based on the results of pre-research on 6th grade students Adiwarno 3 in Kudus show that the creative thinking ability of students is still included in the category of less critical. The researcher gives the students a creative thinking ability test and interviews them. The result of students' creative thinking ability is classically included in real life as a form of creative thinking learning development. Researchers observe that the problems contained in the student's book are less able to train students to think

creatively. The creative thinking ability of the students cannot be obtained directly, but is obtained through practice (Rofiah, 2013: 8). Students need to have the opportunity to train and develop their creative thinking skills. Teachers are expected to realize a learning that can activate and develop creative thinking skills in students (McMurarry, 1991).

Researchers are more interested in developing this research on PGSD students by (1) discussing the perception of elementary school teachers on electrical materials, (2) discussing the right learning tools for PGSD students for electrical materials, (3) Analyzing learning tools on electrical materials for PGSD students.

The specific purpose is to produce an inquiry learning model to improve the ability of creative thinking in electrical matter in elementary school. The significance of research urgency is a new finding in the development of appropriate learning models, especially electrical materials. Therefore the need to find and develop appropriate learning model especially for the concept of science

This study develops the model of learning and improves creativity with the development of inquiry model in science lesson. To improve the ability of creative thinking. The results of this study are expected to contribute are (1) curriculum development (2) finding learning design, (3) developing learning tools (d) developing evaluation and evaluation.

B. THEORITICAL REVIEW

1. Creative Thinking

Understanding creative thinking can be linked to creative thinking. The result of creative thinking is creativity. Hilgard sees "creative thinking" as a form of thinking, seeking new connections, obtaining answers, new methods or ways of responding to a problem, or producing new artistic forms (Uno, 2014: 113). The argument is in harmony that creative thinking is seen as the ability to see the various possible solutions to a problem, a form of thinking that has been lacking attention in education today (Guilford in Munandar, 2012: 31). Creative thinking is mental activity included originality , Sharp insight, and generating process (Sukmadinata in Rohaeti, 2010). The statement means that creative thinking is a mental activity that includes authenticity, keen insight, and development process. Meanwhile, according to Yudha (in Rohaeti, 2010) explains that:

> Stated five steps of creative thinking are: orientation of problem: formulate problem, and identify component of the problem; Preparation: collecting relevant information to the problem, incubation: taking a rest for a moment, when problem solving process was stag, illumination: looking for ideas and insight for solving problem; And verification: testing and assessing the solution critically.

The explanation means that there are several stages in the creative thinking process, namely the introduction of the problem (formulating the problem and identifying

the components contained in the problem), preparation (gathering relevant information on the problem), incubation (taking a break from the ongoing problem solving), Illumination (finding ideas and insights for problem solving), and verification (testing and developing more critical solutions).

2.   The Characteristics of Creative Thinking

A person has the ability to think creatively can be seen from the results of his creativity in the form of thought or attitude. To assess the level of one's creative thinking can also be seen from several aspects or visible traits. According to Filsaism (Fauziah, 2011) creative thinking is a thinking process that has fluency characteristics, flexibility, originality and elaboration. According to him there are four traits that can be used to measure the ability of one's creative thinking. There are four criteria of creative thinking: fluency, flexibility, authenticity (originality), and elaboration (Munandar, 2012: 43). Indicator of the ability to think creatively used by researchers in the form of fluency of thinking, flexibility of thinking, authenticity of thinking, elaboration, and judging against an idea.

3.   Understanding Learning

"Learning is a combination that is composed of human elements, materials, facilities, equipment, and procedures that influence each other to achieve learning goals" (Oemar Hamalik, 2001: 57). According to Corey (1986) cited by Syaiful Sagala (2007: 61) learning is the process whereby a person's environment is deliberately managed to enable him to participate in certain behaviors in specific conditions or generate responses to a particular situation, the learning is a special subset Of education. Thus, learning is the process of human involvement, environment, procedures, facilities and infrastructure in order to achieve the purpose of teaching and learning.

The term inquiry consists of English inquiry which means to investigate or inquire about something. There are several definitions related to inquiry: Margono (1998: 51) states that "the method of inquiry is a teaching approach where the students themselves are free to choose or manage their learning objects, from problem determination, data collection process, analysis to experimentation". According to Mulyati Arifin (1995: 76), "inquiry is a process where there is a high interaction between students, teachers, tools or materials, subject matter and the environment". Meanwhile, according to Moh. Amien (1979: 6), inquiry learning is a lesson that emphasizes the active role of students both physically and mentally in the learning process by emphasizing the learning experiences that encourage students to be able to find the concepts and principles through their own mental processes. The mental process is done such as formulating problems, designing experiments, conducting experiments, collecting and analyzing data, drawing conclusions, having objective, honest, curiosity, openness and so on.

Preliminary studies that have been done and roadmap research describes the study: a) the ability of reasoning and representation of low science learning b). Research will be conducted in the development of inquiry learning model to improve the ability of creative thinking.

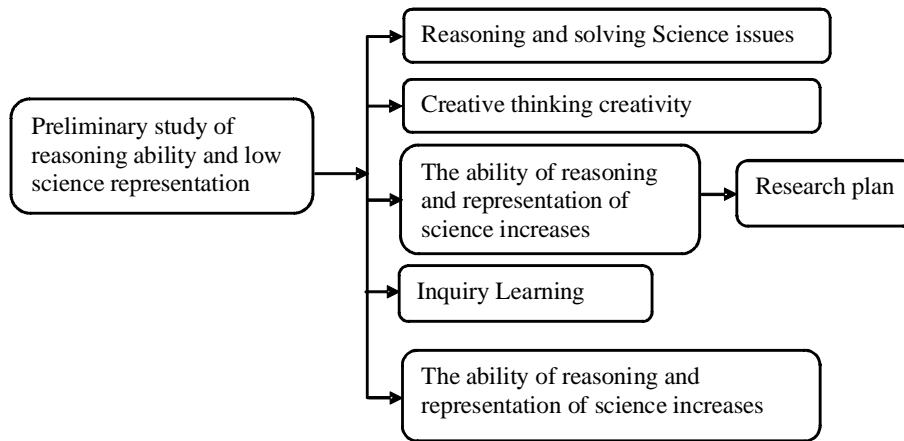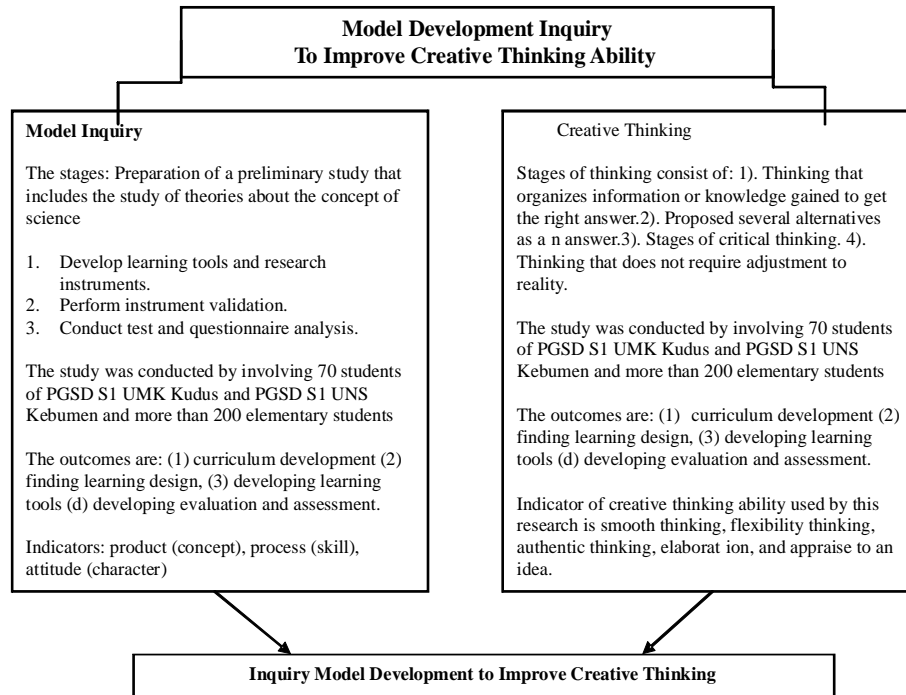Subsequent Research Plans The reasoning abilities and science representations are increasing

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│ Preliminary study of│          │ Reasoning and solving Science │
│ reasoning ability   │    ┌────→│ issues                        │
│ and low science     │    │     └──────────────────────────────┘
│ representation      │────┤     ┌──────────────────────────────┐
└─────────────────────┘    ├────→│ Creative thinking creativity  │
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                           ├────→│ The ability of       │─→│ Research    │
                           │     │ reasoning and        │  │ plan        │
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                           ├────→│ Inquiry Learning              │
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                                 │ representation of science     │
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Image: Road map research Image: Road map research

C.   RESEARCH METHODS

This research uses Research and Development method. The experimental design form modifies the 4-D model Thiagarajan and Semmel with Pre-test and Post-test type One Group Design. This study includes three stages, define or define, design or design, and develop or develop.

The stages of defining or define studies in this study began with observation to determine the condition of the region, condition of students, teaching and learning activities and learning devices used. After that, analyzing the curriculum of science study field for fifth Grade Elementary School, is the stage of preparing the material. The material in this research is electricity. After that, do the mapping of the science material. Learning tools are structured with reference to the curriculum and integrated with local wisdom.

In the learning tools loaded activities that can improve the ability of creative thinking. After the learning tools based on local wisdom, the next step is the development stage or develop which is the stage to test the feasibility of the device. Learning tools are tested by experts who are experts in education and development.

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│          Model Development Inquiry            │
│      To Improve Creative Thinking Ability     │
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Model Inquiry	Creative Thinking
The stages: Preparation of a preliminary study that includes the study of theories about the concept of science	Stages of thinking consist of: 1). Thinking that organizes information or knowledge gained to get the right answer.2). Proposed several alternatives as a n answer.3). Stages of critical thinking. 4). Thinking that does not require adjustment to reality.
1. Develop learning tools and research instruments. 2. Perform instrument validation. 3. Conduct test and questionnaire analysis.	The study was conducted by involving 70 students of PGSD S1 UMK Kudus and PGSD S1 UNS Kebumen and more than 200 elementary students
The study was conducted by involving 70 students of PGSD S1 UMK Kudus and PGSD S1 UNS Kebumen and more than 200 elementary students	The outcomes are: (1) curriculum development (2) finding learning design, (3) developing learning tools (d) developing evaluation and assessment.
The outcomes are: (1) curriculum development (2) finding learning design, (3) developing learning tools (d) developing evaluation and assessment.	Indicator of creative thinking ability used by this research is smooth thinking, flexibility thinking, authentic thinking, elaborat ion, and appraise to an idea.
Indicators: product (concept), process (skill), attitude (character)	

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│   Inquiry Model Development to Improve Creative Thinking       │
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Research Chart

Research procedure

The strategy used in the research is explanatory design. This strategy is applied by collection and analysis and quantitative in the first phase followed by the collection and analysis of quantitative data in the first phase followed by second phase data collection and analysis built on quantitative early results

Research design

The research design used the first stage with pre experimental design model designed in the form of one group pre test design designed in the form of one group pre test posttest design.

The first stage of the research involves a sample class. Before being treated, students get a preliminary test (pre-test) that serves to determine the ability of students' creative thinking before the implementation of inquiri teaching materials. After the application of the teaching materials the students get a final test (post test) which aims to determine the increase in creative thinking.

Data collection techniques used in the first phase of research are: documentation, written test and questionnaire.

Rumpang Analysis
1. Validity

Testing the validity of the test is carried out by consultation with experts. The reliability of the test passengers is not carried out, because the high-reliability test has a high reliability.

a. Analyze the result data from the research

b. Feasibility study of teaching materials

The percentage of feasibility level of science inquiry materials on electrical materials can be calculated using the following equation:

$$R = V / I$$

The level of eligibility of the teaching materials is in the table

Percentage eligibility	Criteria
20% - 30%	Not feasible
38%-52%	Not worth it
52%-68%	Quite decent
68%-84%	Well worth it
84%-199%	Very worth it

(*Source:* Sudjono. 2003: 40-41)

D. RESEARCH RESULTS AND DISCUSSION

During the process of implementing the development of inquiry models to improve thinking skills, evaluations were used to assess achievement of learning objectives. Evaluation in the development of this model consists of two activities, namely evaluation of the process and results.

Evaluation of the process is done through observation or observation of student behavior when formulating the problem, determine the hypothesis and discussion during the learning process took place by teachers and researchers who then combined results. Student behavior observed includes; Ask questions, answer questions, express opinions, seek information and conclude .

Evaluation of results is done through a written test in the form of an essay test. Measurements or tests on the evaluation of the results are done twice, namely pretest and posttest. The results of the measurements are presented in detail namely: 1). Evaluation of the process there is an increase in activity, namely: The decline of students who are less active with indicators only one activity only dominated by looking for data or information alone from 52.3%, 29.6%, 11.7% ,. 2) The occurrence of moderate activity category increases with student indicators performing two to three activities mostly dominated by activity; Searching for information, asking and summing up from 51.8%, 49.7%, this happens because

active activity goes up. 3) There is an increase in active activity with the student indicator performing four to five activities of asking questions, answering questions, finding data, expressing opinions and concluding the rises ranging from 0.06%, 19.7%, and 39.5%.

Evaluation The results show that the standard deviation score of one posttest is greater than the standard deviation on the second posttest. This means that the second student's ability shows a more even trend, the postest average score of 76.30 with a standard deviation of 12.60. Of the data shows that the average score obtained by students is greater than 5,878.

Discussion of findings during the learning process and the impact of the use of inquiry models in improving student thinking both seen from the evaluation process and hasil.Berdasarkan observation of the implementation of steps inquiry involves the process of involving students into the problems to be solved. Students look easier at identifying problems. In this process what Piaget (Hasan 1996: 85) termed the process of assimilation and accommodation. The process of assimilation is seen by students already able to recognize the problems faced, while the process of accommodation looks students have been able to adjust the new information with the experience they have. Thus they can build new knowledge based on their experience so that the learning process is more meaningful. The difficulties encountered are addressed by conveying examples of actual problems that occur around the student's life that serve as a stimulant to revisit the experience it has had. Students look enthusiastic in responding to questions from teachers, as well as courage to suggest in formulating problems and hypotheses.

E. CONCLUSION

Guided inquiry learning model that is used to improve students' thinking skills during the learning process seen in terms of process and results.

1. In terms of the process of this model is able to activate students reflected from the increased activity of each cycle in the form of activities to ask questions, answer questions, seek data, express opinions, summarize the effort to formulate problems, hypothesize, look for data to prove hypotheses and make recommendations.

2. In terms of results, this model also proved able to improve student learning outcomes which is an indicator of improving students' thinking ability.

From the above statement can be drawn the conclusion of learning problems of low ability of students' creative thinking that is characterized by the condition of students do not have the courage to express opinions, ask questions, answer questions, not creative and independent, in finding the source highly dependent what the teacher let alone think creatively and innovatively In finding the problems and solutions and the courage to make the conclusion of the topic being studied

can be overcome by the development of inquiry learning model able to improve students' creative thinking ability.

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