

Development of Science Learning Tools Based on Guided Inquiry Learning Model to Increase Creative Thinking Skill of Junior High School Students.

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Abstract- Research was aimed to developed science learning tools with guided inquiry on subject matter sense of hearing and sonar system through 4D models to increase creative thinking skill of Junior High School and tested on 32 of junior high school's students with one group pretest-posttest design. Analyzed by descriptive quantitative-qualitative and the result are: (1) Validity of learning tools very valid category (3,62); (2) practicality based on: a) Feasibility of instruction good category (3,7), b) The response of students positively (90%); (3) Effectivness based on: a) Student's activities who stand out were done more experiments with high category (23,4%), b) Student creative thinking skill achievement increase (N-Gain: intermediet-high category). Conclusion of this research was science learning tools which developed based on guided inquiry, feasible and can be used to increase student's creative thinking ability.

Index Terms- *Guided Inquiry, Creative thinking, Science learning*

I. INTRODUCTION

Learning is the most important activity in the process of interaction between teachers with students and the other learning resources in the learning environment. In the learning process, teachers have important role to control condition in the class's environment in order to establish a good communication between teachers and students. According to Law no. 20 of 2003, education is a conscious and planned effort to create an stmosphere of learning process so the student can actively develop their potential to have spiritual quotient, self-control, personality, intelligence, good character, as well as skills they need for daily life (Rafli Z., et al, 2016).

Various ways have been taken as an effort to improve the quality of education in Indonesia that will indirectly also affect the progress of technology and science. One of the efforts undertaken by the government is to improve the curriculum, both in primary, secondary, and tertiary education. This is done in order to obtain a quality of society in order to realize a better Indonesia. The curriculum currently being used and continuously developed is the 2013 Curriculum known as K13. The development of Curriculum 2013 is a follow-up step for the development of Competency Based Curriculum which was released in 2004 and KTSP 2006 covering integrated attitude, knowledge and skill competencies. The 2013 curriculum is developed to guide learners to: [1] qualified and capable human beings respond proactively to the challenges of modern era; [2] educated human beings who have spiritual quotient, have good character, healthy, knowledgeable, capable, creative, independent; And [3] democratic, responsible citizens.

Tools of Natural Science in K13 is a combination of the fields of Physics, Chemistry, Biology, also Earth and Space Science so it needs to be presented as a unity. Natural Science is concerned with how to systematically find out about nature, so Natural Science is not only the mastery of a collection of knowledge in the form of facts, concepts or principles but also a process of discovery. Science education is expected to be a vehicle for learners to learn about themselves and the environment, as well as the prospects for further development in applying it in everyday life. The learning process emphasizes the provision of hands-on experience to develop competencies to explore and understand the natural surroundings with a scientific approach.

The material of natural science is generally difficult for students to understand because the material being studied is invisible, such as the auditory senses and sonar systems. The student may understand that the ear is a hearing instrument but the student can not see the parts inside the ear and how the sound can be heard. Same with the sonar system, bats can fly by exploiting the frequency of certain sound waves. Although not able to see, bats never hit the wall in front of him when flying. This kind of thing may be difficult to understand by the students. For that we need a model of learning that can provide experience directly on the students so that students can understand the material well.

One of the learning models that conforms to the principles of the scientific approach is guided inquiry. Guided inquiry is a learning model that focuses on the process of thinking of learners. In this model the teacher only provides questions or problems as a stimulus and learners can freely arrange steps to answer questions or solve problems (Djamarah, S. B. and Aswan Zain, 2010).

II. METHODS

This research is a developmental research of 4D model to develop learning tools covering Syllabus, Learning Implementation Plan (RPP), Student Textbook (BAS), Student Worksheet (LKS), and Creative Thinking Skill Test. Target of the research was 32 junior high school students of class VIII on academic year 2018-2019. Research, development and validation of instructional media is done at State University of Surabaya and implemented in SMP PGRI 1 Buduran Sidoarjo, East Java, Indonesia.

The variables to be observed in this study are the validity of the learning tools, practicality of learning tools which include the implementation of learning and student activities, the effectiveness of the learning tools which include student response and the ability to creative thinking. The data analysis technique uses descriptive qualitative. The data obtained were analyzed with an average score of each aspect translated into categories.

III. RESULT AND DISCUSSION

Based on results of data research, application of science learning tools based on guided inquiry learning model to increase creative thinking skill of junior high school students indicated that:

A. Validity of The Learning Tools

Learning tools that have been developed include Syllabus, Learning Implementation Plan (RPP), Student Textbook (BAS), Student Worksheet (LKS), and Creative Thinking Skill Test (KBK) were validated by two validators. The data analysis techniques of the validation of learning tools use qualitative descriptive. The data obtained were analyzed with an average score of each aspect. The results of the validation can be seen in *Figure 1* below:

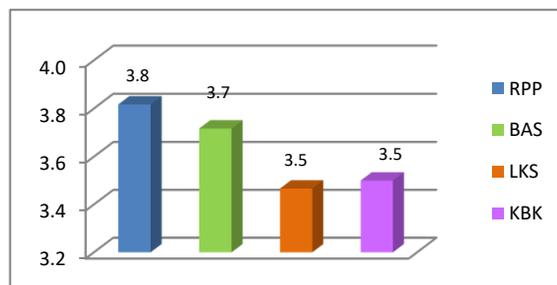


Figure 1. Validation Result of The Learning Tools

Based on *Figure 1* above it can be seen that the learning tools developed has obtained very valid results which score 3,62 (Ratumanan & Laurens, 2006). This is because the preparation of learning tools is in accordance with the guidelines given by the government.

B. Implementation of The Learning Tools

The implementation is carried out three times in the same class by using the previously validated Learning Implementation Plan (RPP). In the implementation process there are two observer teachers who will provide an assessment during the learning process. The results of the implementation of the learning tools can be seen in *Figure 2* below:

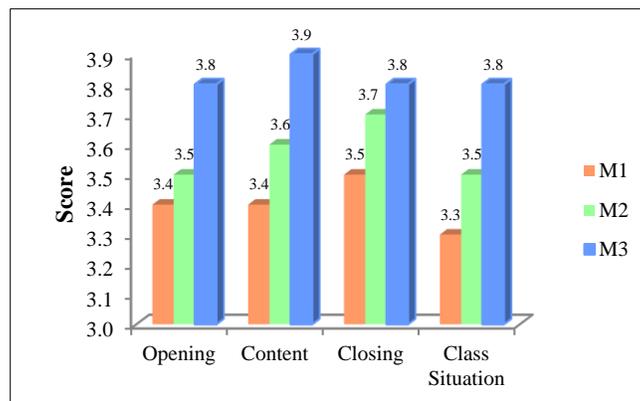


Figure 2. Implementation of The Learning Tools

The activities and steps listed in the RPP can be implemented in good category with an average RPP reliability of 98.1%. This shows that in the implementation of RPP using guided inquiry-based learning tools can be categorized as reliable, because the reliability value $\geq 70\%$ so that it can be used in the learning process. The lesson plans developed in this study also contain some actions taken by the teacher to encourage students' ability to think creatively in class, such as encouraging students to think divergently, educating students to be tolerant with differences of opinion in groups and discussions in class, and students are given material, space and time to do creative projects.

C. Student Activities

The implementation is carried out three times in the same class by using the previously validated Learning Implementation Plan (RPP). Same as the implementation process, Student activities observed by two observer teachers who will provide an assessment every 4 minutes during the learning process. The results of the implementation of the learning tools can be seen in Figure 3 below:

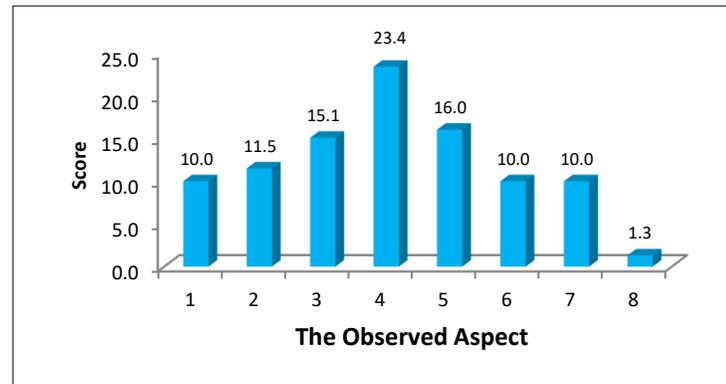


Figure 3. Student Activities

Student activities observed during the learning process which include: 1) listening and paying attention to the teacher's explanation; 2) reading student worksheets and books; 3) ask lots of questions or opinions; 4) conducting experiments / observations; 5) do worksheets / complete study assignments; 6) present the results of the experiment; 7) listen and listen to presentations; 8) shows behavior not relevant to learning. Observation Results Student activity by two teachers as observers is that after participating in learning the highest percentage of meetings 1, 2 and 3 is obtained, namely the activity of conducting experiments / observations (23.4%). While the lowest percentage of meetings 1, 2, and 3 namely the activity shows behavior that is not relevant when learning (1.3%). Activities undertaken by students during learning indicate that students carry out activities according to their proportions. The high percentage of activities conducting experiments / observations due to these activities carried out entirely by students with guidance from the teacher, so this causes students to become accustomed to doing these activities. This activity is also in accordance with Vygotsky's theory, the Zone of Proximal Development (ZPD) where students will try to complete tasks in the learning process with adult guidance or with peers so that the task will become easier. Social interaction will be able to maximize students in solving complex problems (Slavin, 2011). Cooperation can remove mental barriers due to limited experience. In the activities carried out by working together the group will progress well because each part of the group will be interconnected in such a way that the knowledge possessed by one person will be an output for others and this output will be an input for others so that they will form a more integrated system. better than if someone worked alone (Johnson, 2012). In the inquiry component students are required to conduct investigations related to the problems given in each meeting. This learning process is based on search and discovery through a systematic thought process (Sanjaya, 2011).

D. Creative Thinking Skill

Creative thinking skill tests are carried out twice before and after learning. Aims to measure student creative thinking skill after learning process. Creative thinking skill test contain 4 description items. First problem variable is fluency (mentioning an error or deficiency in an object or situation), the second problem variable is flexibility (giving an explanation that fits the concept), the third problem variable is originality (expressing an original new idea) and fourth is elaboration (enriching or developing other people's ideas / giving further answers). The result of creative thinking skill test can be seen in Figure 4 below:

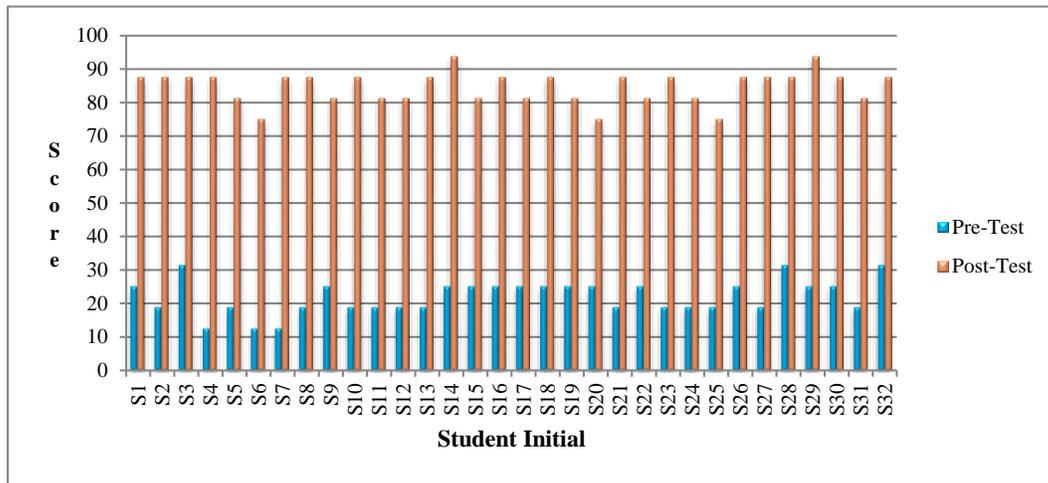


Figure 4. Creative Thinking Skill Test Result

The average pre-test score of indicators creative thinking (fluency, flexibility, originality and elaboration) obtained by students is quite low with the category of less creative. This condition occurs because students are not accustomed to giving ideas or reactions in verbal form related to the questions given and the level of originality of ideas and students' elaboration abilities are still low. Students are not accustomed to thinking about things that are outside the general context and thinking in detail and in depth related to learning materials. Most students feel that the creative thinking ability test as tested is new and they have never done it before so that the results obtained are not optimal. The results of the post-test of the four indicators of creative thinking shows that students are included in the Creative category with moderate to high N-gain. These results indicate that the ability of students to think creatively develops after participating in learning by using learning tools that have been developed. The ability to think creatively or divergent thinking is obtained when students are given the opportunity to experiment and explore information and express their opinions.

E. Student Respons

The recapitulation of the results of 32 students' responses to learning activities and learning tools developed with the guided inquiry learning model is presented in Figure 5 below:

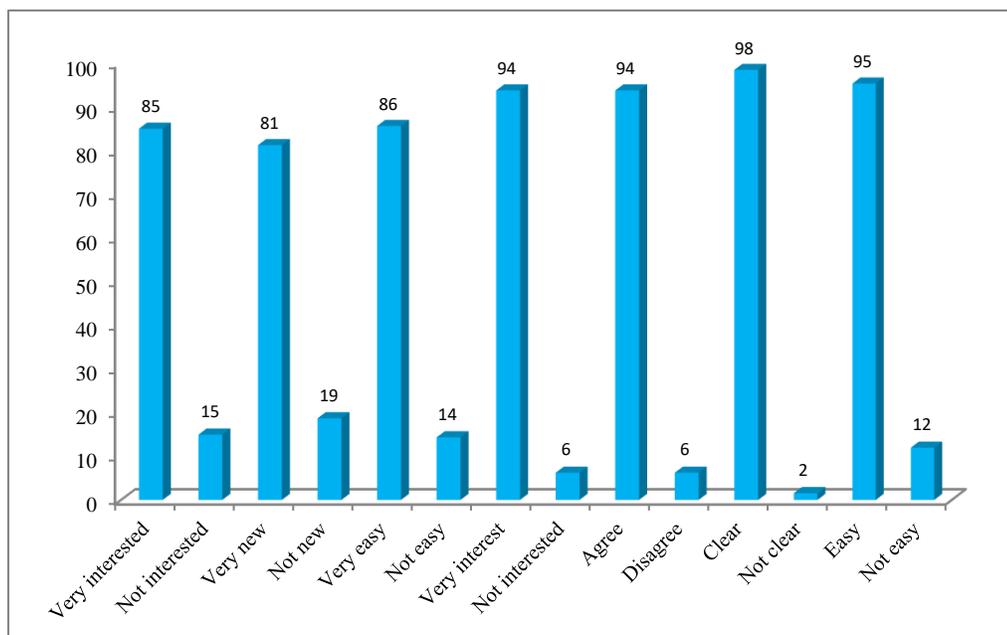


Figure 5. Student Respons

Student responses to the lesson plans that were developed also looked positive by 90% and students' negative responses were 10%. Student responses to the developed creative thinking skills assessment instrument looked positive at 94%. These results are in accordance with the conversion of student response questionnaire data using the Guttman scale ie the interval score of 80% -100% categorized as very strong (Riduwan, 2010).

IV. CONCLUSION

Conclusions that can be taken based on the results of research that has been carried out that the learning tools based on guided inquiry-based science that have been developed are suitable for use in learning and can improve the creative thinking abilities of junior high school students.

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