

Mathematics Creative Thinking Skill Viewed from the Student Life Skill in SAVI Model Based ICT

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Info Artikel

Article history:

Received 3 January
2019

Approved 06 July 2019

Published 23 August
2019

Kata Kunci:

Mathematics Creative
Thinking Skill, Life
Skill, SAVI Model,
ICT

Abstract

The background of the research was poor response of students toward the given stimulus by teacher in the form of exercise question and the answer of the question. This condition required teacher to think and act creatively to solve the students' difficulties. One of them could be done by using learning model to facilitate students in sharing responses dealing with materials or tasks given by the teacher in the form android application. It would facilitate students to think and present creative answers. The objective of this research was to analyze the effectiveness of SAVI model based ICT toward mathematics creative thinking skill of students seen from their life skill. This mix method research was typed sequential explanatory. The procedures to collect the data were qualitative and quantitative. The population consisted of all fifth graders of SD Islam Al-Azhar 25 Semarang. The samples were selected by purposive sampling. There were VA and VB students of the school, consisting of 60 persons as experimental group. While, VC and VE students of the school, consisting of 60 students were grouped as experimental group. The technique of collecting the data was test. The findings showed that mathematics creative thinking skill of experimental group was better than control group. Mathematics creative thinking skill and their life skills were categorized high, moderate, and poor. The categorization showed that mathematics creative thinking of the students had different mastering indicators seen from their life skills.

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p-ISSN 2252-6420

e-ISSN 2503-1732

INTRODUCTION

21st century educational advancement gets so enormous due to ICT development and wider access into various needed information, moreover in its utilization and use in education. Distribution of the access and improvement of education quality make Indonesian citizen have life skill to support in fostering complete and modern human whose Pancasila values (Perdana, 2019). Life skill education is an alternative as effort to prepare students to have attitudes and life skill for future life through creative, active, and joyful learning activities (Shaumi, 2015).

The context of 2013 curriculum development refers to 21st century skills: life and career skills, learning and innovation skills, and information media and technology skills. Those skills are summarized into a scheme called 21st century knowledge-skill rainbow (Trilling & Charles, 2009).

Survey of International Trends in International Mathematics and Science Study (TIMSS) is a survey followed by Indonesia to measure mathematics and science skills. TIMSS also helps the government to find out current curriculum development and International standard education so it could be used as reference to develop curriculum and education in Indonesia. TIMSS is an international study under direction of International Association for the Evaluation of Educational Achievement (IEA). Based on TIMSS 2015, Indonesian participated again at level of primary school. The result primary school mathematics showed Indonesia was in 44th rank out of 49 participating countries with score 397. It was not different to previous years. Rahmawati (2016) stated that Indonesian learners need to improve their skills in integrating, concluding, and generalizing information and their owned knowledge.

Current fast growing era makes the use of technology to be wider community needs, included in learning process. The use of ICT to test teacher's perception about learning process which is improved through ICT and made as innovation

in a learning (Sangra, 2010). Along with development of knowledge and technology, learning process should be more innovative and creative in using technology products. As learning facilitator, teacher is demanded to be able in using and developing skill of creating learning media by using technology products. Learning media based ICT could be developed by using an android application which could be download at *play store*. This research used 3D Charts Mobile application. The students would be easy to understand learning material by using learning media. The use of appropriate learning media could trigger learning interest even improve learning achievement (Daryanto, 2013).

According to Nurdin (2016), creative thinking is a reasoning process focusing on idea exploration, probability creation, and finding correct answer in which is not only one answer being corrected. However, in reality, the students did not have chance to consider creative thinking skill. Developing creative thinking ways could be done by teacher in classroom learning by posting questions to the students through asking-answering question until finding more than answers or solutions.

Purnomo (2015) explained that lack of life skill internalization of students caused them having difficulties to develop their skill, to cooperate in group and to communicate in group for solving problem. When they are taught, they do not think it will be useful for them and for their environment. They also do not think it could help them developing their skills. They only think once it has been done, it will bring no difference to their attitudes, communication ways, and their ethos.

Putri (2018) analyzed that Information and Communication Technology (ICT) discussing about mathematics material would facilitate learning process and learning based multimedia as learning module could be interesting and preferred method by students.

The development of mathematics learning media based ICT is done by utilizing information and communication technology such as Computer Based Learning (CBT), Web Based Learning (e-

learning), computer assisted learning, Audio-Visual learning (AVA), and learning which could be accessed from gadget/android. ICT based learning media are expected to be able in developing learning system oriented on learners and facilitating students for their challenging, active, creative, effective, and joyful learning needs. ICT brings new paradigm in education. It changes the traditional into new learning. ICT based media could be developed by utilizing an application downloaded from play store. This sophistication in such software could facilitate students in imagining because it attracts their attention and is very easy and joyful to use. Because of this function and ability of the android application, it is important to use it into learning on presenting data material. Learning media are tools or stimulus functioning to convey learning message (Rusnan, 2011). Learning media would be accessed through android and teacher can use Power Point slide to present the material in the beginning of teaching. It facilitates teacher to share knowledge. Such packaged learning materials are purposed to facilitate educating students systematically, directive, and in line with targeted objective. Learning media is presented by practicing (to input the data quickly and to show the result in the form of already selected diagram and to help them mastering the already learnt materials).

METHOD

This mix method research typed sequential explanatory design had procedures such as quantitative data collection and analysis followed by qualitative data collection and analysis.

The population consisted of all fifth graders of SD Islam Al-Azhar 25 Semarang in even semester, academic year 2018/2019.

The samples were taken by purposive sampling. It is a sampling technique by having consideration. VA class and VB class of the school were used as experimental group while VC and VE classes were used as control group based on relatively similar learning achievement average

consideration. The subjects consisted of each student on mathematics creative thinking skill and life skill.

Quantitative data collection technique was done by using test and inventory. The instrument of test was test of mathematics creative thinking skill (TKBKM). It covered 4 indicators (fluency, flexibility, originality, elaboration) and inventory consisted of 3 indicators (personal skill, thinking skill, and social skill). The qualitative data used documentation, interview, and observation on learning.

The data analysis was assisted by software SPSS 24.0 to have normality and homogeneity tests to check the hypothesis. The hypothesis test used independent sample t-test by using t-test and z-test.

RESULT AND DISCUSSION

Effectiveness of Somatic Auditory Visualization Intellectuality (SAVI) based Information and Communication Technology (ICT) was investigated to achieve mathematics creative thinking skill. The findings are explained below.

Initial Research Data

Three tests were done to analyze the initial data: normality, homogeneity, and equality of variance tests. The findings showed that Sig of both groups in Kolmogorov-Smirnov were 0.084 and 0.068. Both of them were higher than 0.05. Thus, H_0 was accepted. Therefore, the initial data was normally distributed for both groups. The homogeneity test used Levene t-test. It showed that Sig score of sample group was $0.646 > 0.05$. Thus, H_0 was accepted. Therefore, the initial data had homogeneous variants dealing with mathematics creative thinking for both groups. In testing equality of variance, the sig score was $0.579 > 0.05$. Thus, H_0 was accepted. It meant there was no difference in average score of initial mathematics creative thinking skills of both groups.

Final Research Data

Before testing the hypothesis, the first requirement test was done. It consisted of normality and homogeneity tests to determine whether the statistics test would be parametric or non-parametric tests. Generally, the result showed sig scores of both groups in Kolmogrov-Smirnov were 0.200 and 0.084. Both of them were higher than 0.5. Thus, H_0 was accepted. Therefore, the test of the data was normally distributed dealing with mathematics creative thinking skills for both groups. Homogeneity test was done by Levene t-test. It was obtained sig score of the sample class $0.126 > 0.05$. Thus, H_0 was accepted. Therefore, the test of the data had homogeneous variants for both groups.

Next, it would be hypothesis test. The t-test result of experimental group's minimum passing grade of mathematics creative thinking skill. The finding showed that $t_{\text{count}} = 5.87$ and $t_{\text{table}} = 1.67$. From the distribution table of students, t with numbers of data 60 with actual level $\alpha = 5\%$ (0,05) had $t_{\text{count}} > t_{\text{table}}$ $5,87 > 1.67$. Therefore, H_1 was accepted. It meant that mathematics creative thinking skill of experimental group students met the minimum passing grade, ≥ 70 . The second hypothesis was average of variance test done by using t-test. It was done to test the average score of mathematics creative thinking skill from experimental group compared to control group. The result showed that t_{count} was 4.44 and score of t_{table} from the actual level $\alpha = 5\%$ (0.05) $dk = (n_1 + n_2 - 2) = (60 + 60 - 2) = 118$ and the probability $(1 - \alpha) = (1 - 0,05)$. It had score 1.98. Then, $t_{\text{count}} > t_{\text{table}}$ $4.44 > 1.98$. Therefore, H_0 was denied and H_1 was accepted. It meant the average score of mathematics creative thinking skill of experimental group was better than control group.

The finding based on hypothesis test showed that learning by using SAVI based ICT was effective in achieving mathematics creative thinking skill. Learning effectiveness is a standard in determining learning success. It was seen in the experimental group while working on mathematics creative thinking stages assisted by ICT. Meanwhile, the control group was taught

without ICT assistance. Thus, the students would be more enthusiastic when the learning was integrated by using android technology to apply and create data presentation on the learning material as seen on experimental group. As quoted by Sivakova (2017), through e-learning, learning would not be limited again in term of time and space. It motivated students to analyze and synthesize knowledge, to explore, to process, to use information, to create a writing, to create information, and to create personal knowledge.

Qualitative analysis of this research was test result of mathematics creative thinking skill as seen from answer sheet of the students and also result of life skill inventory of the students. The students were categorized into high, moderate, and poor. The categorization was based on Azwar's guideline (2016). It was by finding out the lowest and highest scores which were the ideal and standard deviation by following formula.

$$\text{Ideal verage} = \frac{1}{2}(\chi_{\text{max}} + \chi_{\text{min}})$$

$$\text{Standard deviation} = \frac{1}{6}(\chi_{\text{max}} - \chi_{\text{min}})$$

The categories of mathematics creative thinking skill and lifes skill results can be seen on Table 1 and Table 2.

Table 1. KBKM Categories Group

Total Student	Categories Percentage	Categories
18 Students	30	Group On
24 Student	40	Group Middle
18 Student	30	Group Under

Table 2. Life Skill Categories

Interval Score	Categoriis
Score ≥ 90	High
$60 \leq \text{score} < 90$	Moderate
Score < 60	Poor

Based on the result, the obtained percentage of each KBKM and life skill category is shown on Figure 1.

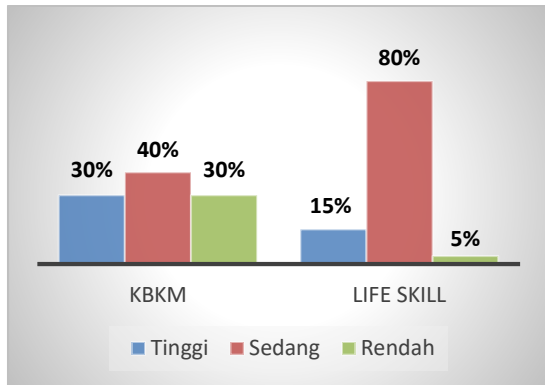


Figure 1. Level of KBKM and *Life Skill* Categories

Figure 1 shows that KBKM of 60 students in moderate category was higher than high and poor categories. It was 40% or 24 moderate typed students. The high category student was 30% or 18 students. The poor category student was 30% or 18 students.

On life skill result with equal numbers of students, the high category consisted of 9 students, 48 moderate students, and 3 poor category students. Each percentage respectively was 15%, 80%, and 5%.

The findings showed that students with high KBKM was fewer than students with high *life skill*. Students with moderate KBKM were many compared to moderate life skill students. The poor KBKM category students were many compared to poor life skill students. It showed that students with high KBKM would not always have high life skill and vice versa.

Indicators of mathematics creative thinking skills were: 1) fluency, 2) flexibility, 3) originality, and 4) elaboration.

As quoted by Atikasari (2015), students had implemented aspects of creative thinking in solving questions as follows: the first aspect dealing with fluency of thinking in solving accurately. Then, on flexibility indicator, it meant to have directive various reasoning. The third, originality of thought, it gave different answer to the other's thought. The fourth, elaboration, it elaborated in detail.

Initial data and final data results of both groups can be seen on Table 3.

Table 3. Result of Mathematics Creative Thinking Skill Analysis

		Mathematics Creative Thinking Skill Indicators			
		1	2	3	4
Experimental Group	Initial data	66%	70%	69%	65%
	Final data	82%	81%	80%	76%
Control Group	Initial data	60%	60%	62%	64%
	Final data	77%	72%	73%	72%

Based on the analysis of mathematics creative thinking of experimental group, it showed significant improvement. The indicator of fluently thinking gained improvement from 66% into 82%. Flexibility of thought gained improvement from 70% into 81%. Originality improved from 69% into 80%. Elaboration improved from 65% into 76%. The result of the skill analysis of control group gained insignificant improvement. The fluency of the group's thought insignificantly improved from 60% into 77%. Flexibility improved from 60% into 72%. Originality improved from 62% into 73%. Elaboration improved 64% into 72%. It could be concluded that mathematics creative thinking skill of experimental group was better than the control group.

Generally, all indicators of mathematics creative thinking mastered by most of the students were firstly fluency, then followed by flexibility, originality, and elaboration. It was in line with Putri et al. (2019) telling that students had not been able to solve problems by using a solution. Students had not been able to solve problems with various-different ways and had not been able to answer question in detail.

It could be concluded that students with high life skill did not always have high mathematics creative thinking skills and vice versa because it was a meaningful learning process and self-regulation of students which was supported by

surrounding environment. It would provide positive effect on life skill and mathematics creative thinking skill of the students.

It is in line with Mawaddah et al. (2015), the poor mathematics creative thinking skill of students was proven by their incapability to provide other alternatives to describe situation of the questions. Students also could not use various labels for each unknown side and their conceptual masteries were still poor plus the students still worked procedurally.

SAVI based ICT in this research showed that data analysis result of KBKM test of the learning. Generally, the students with high category were able to master the components of mathematics creative thinking skill properly. SAVI learning model could develop the students' knowledge based on their personal experience during learning process by involving their senses. The used theme was adjusted to the needs to be more active, creative, communicative, and cooperative. It also could create meaningful learning situation (Kurniawati et al., 2013).

Based on the obtained data, the implementation of SAVI based ICT for experimental group was effective. It was strengthened by Putra (2011) showing that students taught by SAVI model during learning mathematics assisted by Wingeom had better mathematics analogy skill than students taught by conventional model. And after having SAVI assisted by Wingeom, the students showed better attitudes. It was in line with Iskandar et al (2016) showing that creating joyful learning, creating active learning of students, and facilitating their learnings were important components in SAVI implementation. It was also important to make students enjoy by creating interesting mathematics learning and not boring since the students used their senses to get sensible information. Thus, the students could develop real image in their mind so their sensible experience became unforgettable knowledge.

Putri (2018) stated that mathematics based ICT would be easy to understand by students due to its interesting display of the media and joyful

explanation. Designing such system based on technology could improve students' interests in learning mathematics. This, learning activity would be interesting and effective.

SAVI learning process invited students to be active in learning both by acting, listening, observing, and thinking creatively. It was in line with Farokhah (2017) that in learning process, teacher tried to motivate somatic activities of students, to motivate their listening, visualization, and intellectuality for students. In this stage, teachers and students had started main activities in this learning process.

CONCLUSION

Based on the findings elaborated above, it could be concluded that there were differences of mathematics creative thinking skills of students taught by Somatic Auditory Visualization and Intellectuality (SAVI) based Information Communication and Technology (ICT) in learning activity. Based on the research, learning by using SAVI based on ICT was more effective to be implemented in learning. The result of variance average test showed that mathematics creative thinking skill of the experimental group students was higher than the control group.

ACKNOWLEDGEMENT

The research would like to thank those who helped during the research process, including as reviewer of the article and thanks to Headmaster of SD Islam Al-Azhar 25 Semarang and also the teachers in SD Islam Al-Azhar 25 Semarang to help this research.

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