Efektifitas of the Open Ended Approach to Increasing Students' Mathematical Creative Thinking Ability in Elementary Schools

Vidanisa Nurkhotimah[1]✉, Turmudi[2], and Italyani Nurhaifa[3]

[1,2,3]Primary Education, School of Postgraduate Studies, Indonesian University of Education, Bandung, Indonesia
✉ nisa.vida@student.upi.edu

Abstract. The need for an innovation in learning that must be done by the teacher to achieve the expected learning outcomes. On the other hand, sometimes students do not like mathematics because they find it difficult to determine how to solve a math problem, especially word problems. The ability to think creatively mathematically is needed by students in solving problems. With the Open Ended Approach it is hoped that it can assist students in solving problems so that their mathematical creative abilities will increase. This article aims to conduct a literature review related to the goodness of the open ended approach to improving students' mathematical creative thinking abilities in elementary schools. This study is qualitative and the method used in this research is SLR (Systematic Literature Review). Data collection was carried out by reviewing all articles related to the open ended approach to improving students' mathematical creative thinking abilities in elementary schools which were published in the 2018-2022 period. The articles used in this study were 15 journal articles. Based on this research, it was found that the open ended approach can improve mathematical creative abilities.

Keywords: Open Ended approach, mathematical creative abilities

INTRODUCTION

A person is considered qualified if he has a high educational experience. Educational experience will lead to becoming someone who is able to compete with the outside world. The presence of education will change a person's mindset in dealing with the problems they face, because the education instilled will become a way of life. To become a quality figure, one must be prepared to see the times. The world of education also adapts to the changing times. Education is closely related to schools, teachers and students.

Teachers who are in charge of being educators play an important role in the progress of their students. Teachers are trying to be able to apply how to deal with a problem, through mathematical creative abilities. One of the mathematical creative abilities that exist in elementary schools is in mathematics. Hearing the word mathematics, students think that mathematics is the most difficult subject. But in reality mathematics can facilitate students in their daily lives, because both at school and outside of school mathematics will always be present in front of students.

Teachers need to carry out learning innovations as an effort to improve skills in learning,especially by paying attention to the skills or competencies needed by students. One of the learning innovations that can be carried out by the teacher is by selecting a good and appropriate learning model for use in the teaching and learning process. Selection of an good and appropriate learning model can improve the creative abilities of elementary school students.

The learning approach is one of the learning innovations in improving the quality of learning. The learning model is a design that describes the detailed process of creating an environmental situation that allows learning interactions to occur so that changes or self-development of students occur (Sukmadinata, Syaodih, 2015: 151). The needed of learning models greatly influences the success of the teaching and learning process in schools. But in fact, many obstacles are experienced by teachers in carrying out activities or learning processes.

The results of the study (Waluyo, 2018) Learning using the Open Ended approach can improve the mathematical creative thinking abilities of elementary students in the volume of cubes and blocks. This understandable based on the second hypothesis test using the Wilcoxon test, the P-value Sig(1-tailed) = 0.000. These results indicate that the P-value <α so that it understandable that there is a significant average difference between the results of the pretest

and posttest of the experimental group in learning mathematics with the volume of cubes and blocks.

Subsequent research conducted by (Muazaroh & Abadi, 2020) the results of testing the assumptions, namely the data normality test and the homogeneity of the variance, are obtained if the gain data normalized scores for the ability to think creatively for the two groups are normally distributed and homogeneous. The results of the t-test analysis of data gain normalized scores obtained tcount = 9.6812, at a significance level of 5% and dk = 85, then ttable = 1.9883. Test criteria with a significance level of 5% with dk = n1 + n2 – 2. If the value of tcount ≤ ttable, then H0 is accepted and Ha is no accepted if the price is tcount > ttable, then H0 is no accepted and Ha is accepted.

Based on the calculation of the t-test, it is found that if tcount > ttable, then H0 is no accepted and Ha is accepted. In this sense, there is a significant influence of the Open Ended learning model assisted by student worksheets on the ability to think creatively in mathematics in class IV SD Gugus VII Kompyang Sujana Academic Year 2019/2020.

From this research, researchers are interested in examining mathematical self-efficacy abilities in mathematical critical thinking skills. The discussion in this article uses a review of relevant literature

METHODS

This study used the SLR (systematic literature review) method. This study aims to draw conclusions from the results of research that examines self-efficacy and mathematical critical thinking. SLR is a research method for collecting and evaluating research results related to research topics. SLR research aims to identify, examine, and make conclusions from all research results related to the research topic.

The research method used includes data sources, data collection, and data analysis. The data collected and reviewed is secondary data in the form of research results which include books, journal articles, and conference proceedings that are relevant to the topic. The author examines ideas, opinions, or findings contained in the literature so that they can provide theoretical information related to the goodness of the open ended approach to increasing creative mathematics.

RESULTS

The Open-Ended Approach (Sari, Wahyuni, & Rosmaiyadi, 2016) is a learning approach that builds interactive activities between mathematics and students so as to invite students to answer problems in their own way (Sutikno, 2013: 114). Open learning or often known as the Open-Ended approach is a learning process that This learning model emphasizes the process not the result. An important feature of Open Ended problems is the freedom for students to use a number of methods and all the possibilities that are considered most appropriate to solve the problem.

Lessons usually begin by introducing open-ended problems, and ensuring that students understand the problems and what is expected of them. The next step is students solve problems, work both individually and in small groups. According to (Aras, 2018) during this process, students draw on their own natural way of thinking in finding solutions. While they were doing that, the teacher purposely walked around, observing students' work, and asked various students to place their work on the blackboard for everyone to see. This is in preparation for the next part of the lesson, which will consist of comparing and discussing productions (solutions/works) from students (and not necessarily from teachers or textbooks).

At the end of the lesson, the teacher summarizes the lesson. The students could then be asked to write down what they learned as a way for the teacher to judge goodness. Meanwhile, according to (Faridah & Aeni, 2016) the learning syntax with an open-ended approach is the stage of exposing students to open problems, the stage of guiding students to find patterns and constructing their own knowledge or problems, the stage of letting students find solutions and solving problems with various solutions and finally namely the stage of students presenting their findings.

The advantage of the Open Ended approach is that it can encourage and hone students' potential to acquire and have skills in deciding the method used to solve problems in learning.

Table 1. Open Ended Approach to Increasing Students' Mathematical Creative Thinking Ability

Researcher and Year	Research Title	Research result
(Waluyo, 2018)	The Effect of an Open-Ended Approach on Students' Creative Thinking Ability in Mathematics Subjects in Elementary Schools.	Learning using the Open Ended approach can improve the mathematical creative thinking skills of elementary students in the volume of cubes and blocks. This understandable based on the second hypothesis test using the Wilcoxon test, the P-value Sig(1-tailed) = 0.000. These results indicate that the P-value $<\alpha$ so that it understandable that there is a significant average difference between the results of the pretest and posttest of the experimental group in learning mathematics with the volume of cubes and blocks.
(Hidayat & Widjajanti, 2018)	Analysis of creative thinking skills and students' learning interest in working on open ended questions with the CTL approach	After getting the CTL approach learning with open ended questions, there were no more students whose KBKM level was in the very low and low categories. It understandable that 1 person (2.9%) has KBKM in the very high level, 18 people (52.9) in the high level, and 15 people (44.1%) in the medium level. So it can be concluded that by providing a CTL approach with open ended questions, the largest percentage of students' creative thinking abilities are in the high level
(Dwipayana & Diputra, 2019)	The Effect of Open Ended Based Realistic Mathematics Education Approach on the Thinking Ability of Grade V Elementary Students	the average score of the experimental group's mathematics learning outcomes was higher than the control group. Before carrying out the hypothesis test, several provision tests must be carried out, provision analysis tests include the normality test and homogeneity test of variance. The data distribution normality test was carried out on the experimental and control group learning outcomes data. The normality of the distribution of data was tested using the Chi-Square formula, with the criteria for testing the data to be normally distributed if χ^2 count $< \chi^2$ table at a significance level of 5% and degrees of numbness dk=(number of classes - parameter - 1). Based on the results of calculations using the chi-square formula, the experimental group's creative thinking ability is (X2Count = 6.554 <X2 table = 9.49), so that the experimental group's creative thinking ability data is normally distributed. Meanwhile, the

Researcher and Year	Research Title	Research result
		learning outcomes of the control group were (X2count = 4.147 <X2 tables = 5.99), so that the control group's learning outcomes were normally distributed. After carrying out the normality test, then proceed with the homogeneity test. Homogeneity test was carried out to find out whether the data from the two groups was homogeneous or not. The homogeneity test is calculated by dividing the largest variance by the smallest variance. Data is declared homogeneous if Fcount <Ftable with a significance level of 5%. Based on the results of the F test, it was obtained that Fcount was 1.22 while Ftable with db numerator = 25-1=24, db denominator = 27-1=26, at a significance level of 5% was 1.97. This means that Fcount is smaller than Ftable. So it can be stated that the variance of the post-test results of the experimental and control groups is homogeneous. After carrying out a description analysis and provision test, it is followed by carrying out a hypothesis test, namely that there is an good effect of implementing an openended-based realistic mathematics education approach on the creative thinking abilities of class V students in Cluster VII Sukasada Tagun District, 2017/2018 Class. Testing the hypothesis is done through T-burning. Analysis with T-burning shows that the value of goodness size (ES) is 1.028. If it is included in the criteria for determining goodness, then the value is at (0.8 < 1.7) which means it has high goodness.
(Mariam et al., 2019)	Analysis of Mathematical Problem Solving Ability of Mtsn Students Using the Open Ended Method in West Bandung	Based on the research and discussion, it can be concluded that the researchers conducted research in two classes, namely class VIII E and VIII F at MTsN Bandung Barat, using two methods, namely the experimental and control classes. Based on the test results using problem solving ability questions with the material applied is SPLDV. By testing using the Kolmogorof-Smirnov obtained (1) the significance value of the post-test in class VIII E, namely the experimental class, there was an experimental result of 0.076 because it was > 0.05. And has an average value of 15.6296. (2) The significance

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		value of the post-test in class VIII F, namely the experimental class, has a control result of 0.068 because it is > 0.05. And has an average value of 10.4815.
Indrianti Rahayu, Pupun Nuryani, 2019)	The Effect of Applying the Open-Ended Approach to the Ability to Think Mathematically Creatively Based on Learning Independence in Public Junior High School Students 2 Pekan Baru	the results of data analysis for the second hypothesis using a two-way ANOVA to see different in students' mathematical creative thinking abilities based on independent learning showed (FB)HIT = 130.84 and (FB)T = 3.12 at a significant level of 5%. With the conclusion (FB)HIT > (FB)T which means accepted and no accepted. This means that there are differences in the ability to think creatively mathematically between students who have high, medium, and low learning independence at SMPN 2 Pekanbaru. The results of data analysis for the third hypothesis using a two-way ANOVA show the values (×) = −9.39 and (×) = 3.12 at a significant level of 5%. With the conclusion (×) < (×) which means accepted and no accepted, it can be shown that there is no interaction effect between the Open-Ended learning approach and independent learning on students' mathematical creative thinking abilities.
(Muazaroh & Abadi, 2020)	The Goodness of Open Ended Learning Models Aided by Student Worksheets on Creative Thinking Ability	The results of the t-test analysis of data gain normalized scores obtained tcount = 9.6812, at a significance level of 5% and dk = 85, then ttable = 1.9883. Test criteria with a significance level of 5% with dk = n1 + n2 – 2. If the value of tcount ≤ ttable, then H0 is accepted and Ha is no accepted if the price is tcount > ttable, then H0 is no accepted and Ha is accepted. Based on the calculation of the t-test, it is found that if tcount > ttable, then H0 is no accepted and Ha is accepted. In this sense, there is a significant influence of the Open Ended learning model assisted by student worksheets on the ability to think creatively in mathematics in the class.
(Utami, Endaryono, & Djuhartono, 2020)	Improving Students' Mathematical Creative Thinking Skills Through an Open-Ended Approach	In learning mathematics, according to learning objectives will be achieved if there is a change in students, for example from those who do not understand to understand. Supported by Suherman's statement (2003) that the objectives of learning mathematics are considered achieved if students already have a certain

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		amount of knowledge and skills in the field of mathematics they are studying. With creative thinking skills, students will involve all their thinking abilities to find solutions to a problem they are facing. Although sometimes there are too many ways that will make it difficult for students to arrive at the final result, having many choices will allow students to reach their goals compared to students who do not have a way to arrive at a solution to the problem. One approach that can be a solution in an effort to improve the quality of learning mathematics to improve mathematical creative thinking skills is an open-ended approach. Shimada (in Soeyono, 2013) suggests that the open ended approach is an approach in learning that begins by presenting a problem to students, where the problem has more than one correct method or solution.
(Komarudin, Monica, Rinaldi, Rahmawati, & Mutia, 2021)	Analysis of Mathematical Creative Thinking Ability: The Impact of Open Ended Models and Adversity Quotient (AQ)	The sig.model value = 0.000 <0.05 , then H0A is no accepted, which means that there is an influence of the open ended learning model on students' mathematical creative thinking abilities. (2) sig AQ = 0.155 <0.05, then H0B is accepted, which means that there is no effect of AQ type on students' mathematical creative thinking abilities. (3) sig. mode AQ=0.229>0.05 , then H0B is accepted, which means that there is no interaction between the learning model and AQ on students' mathematical creative thinking abilities. The results showed that the creative thinking skills of students who studied with the open ended model were better.
(Pratiwi & Pujiastuti, 2020)	Analysis of Mathematical Creative Thinking Ability Through Open-Ended Assignments	Knowing the various possible sizes of squares and rectangles, this suggests that high-ability groups can think creatively very well. For the moderate ability group, the creative thinking is quite good. Because you can find other types even if they are not complete. The low-ability group found only a few types of rectangle sizes and only one type of square size. This shows that students in the low ability group in creative thinking are still not good.

Researcher and Year	Research Title	Research result
(Auliah, Syaiful, & Syamsurizal, 2020)	Development of a Digital Module for Mathematics Learning Based on an Open Ended Approach to Improve Mathematical Creative Thinking Ability	Digital modules for learning mathematics are valid, good and practical so that it can be concluded that digital modules for learning mathematics based on an open ended approach are feasible to use. To find out the impact of using digital modules on students' creative thinking skills, a gain test was carried out, based on the gain test results obtained 0.55 with moderate improvement criteria, and the average level of creative thinking ability (TKBK) increased from level 1 (less creative) to level 3 (creative) by meeting the indicators of fluency and flexibility. So it was concluded that digital modules for learning mathematics can improve students' creative thinking skills.
(Utami, Endaryono, & Djuhartono, 2020)	Improving Students' Mathematical Creative Thinking Skills Through an Open-Ended Approach	In learning mathematics, according to learning objectives will be achieved if there is a change in students, for example from those who do not understand to understand. Supported by Suherman's statement (2003) that the objectives of learning mathematics are considered achieved if students already have a certain amount of knowledge and skills in the field of mathematics they are studying. With creative thinking skills, students will involve all their thinking abilities to find solutions to a problem they are facing. Although sometimes there are too many ways that will make it difficult for students to arrive at the final result, having many choices will allow students to reach their goals compared to students who do not have a way to arrive at a solution to the problem. One approach that can be a solution in an effort to improve the quality of learning mathematics to improve mathematical creative thinking skills is an open-ended approach. Shimada (in Soeyono, 2013) suggests that the open ended approach is an approach in learning that begins by presenting a problem to students, where the problem has more than one correct method or solution.
(Muazaroh & Abadi, 2020)	The Goodness of Open Ended Learning Models Aided by Student Worksheets on Creative Thinking Ability	Analysis of data gain normalized scores obtained tcount = 9.6812, at a significance level of 5% and dk = 85, then ttable = 1.9883. Test criteria with a significance

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		level of 5% with dk = n1 + n2 – 2. If the value of tcount ≤ ttable, then H0 is accepted and Ha is no accepted if the price is tcount > ttable, then H0 is no accepted and Ha is accepted. Based on the calculation of the t-test, it is found that if tcount > ttable, then H0 is no accepted and Ha is accepted. In this sense, there is a significant influence of the Open Ended learning model assisted by student worksheets on the ability to think creatively in mathematics in the class.
(Komarudin, Monica, Rinaldi, Rahmawati, & Mutia, 2021)	Analysis of Mathematical Creative Thinking Ability: The Impact of Open Ended Models and Adversity Quotient (AQ)	The sig.model value = 0.000 <0.05 , then H0A is no accepted, which mean that there is an influence of the open ended learning model on students' mathematical creative thinking abilities. (2) sig AQ = 0.155 <0.05, then H0B is accepted, which means that there is no effect of AQ type on students' mathematical creative thinking abilities. (3) sig. mode AQ=0.229>0.05 , then H0B is accepted, which means that there is no interaction between the learning model and AQ on students' mathematical creative thinking abilities. The results showed that the creative thinking skills of students who studied with the open ended model were better.
(Saddiati & Nuriadin, 2021)	Analysis of Students' Mathematical Creative Thinking Ability on Opportunity Material with an Open-Ended Approach Through Learning	Students' mathematical creative thinking abilities in opportunity material with an open-ended approach through online learning can be concluded, AP and AS are students in very uncreative and non-creative categories, where the range of values in the indicators of mathematical creative thinking ability is very low in completing the given test, there is only 1 correct question, the rest are wrong numbers and don't understand the process. AST and MNH are students in quite creative and creative categories, where the range of values in indicators of ability to think creatively is good enough in completing the given test, only a few AST questions have wrong numbers in the test and give one answer and one way, MNH only gives one way in some of the questions given. Then AY is a student in a very creative level, where the range of values in indicators of mathematical creative thinking ability is very high in

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		completing the given test, each AY question gives more than one answer and has two ways of solving it. The open-ended approach also influences students' mathematical creative thinking abilities. Thus mathematics teachers are recommended to use an open-ended approach to develop students' creative thinking abilities and student learning outcomes
(B. Molina, Djawa Djong, Beda Nuba Dosinaeng, & Ovaritus Jagom, 2021)	Students' Creative Thinking Ability in Solving Open Ended Questions	Based on the results of the study, it appears that female subjects with high mathematical abilities are able to work on the questions given. In the aspect of fluency, the subject can directly work on the questions given and find 5 different answers. In the aspect of flexibility, the subject uses another way to find the price of pencils and pens. But in these two aspects (fluency and flexibility) the subject solves the problem in the usual way or that has been taught by the teacher. So that in the elaboration aspect the subject cannot find another way that is different from the way that has been taught by the teacher.

Research that has been carried out, as listed in the explanation of the table above, it can be ascertained that the open ended approach is goodly applied to learning activities to improve mathematical creative abilities and support 21st century skills or competencies.

DISCUSSION

Based on a study of the results found previously, The open ended approach is suitable for use in learning mathematics. Increasing mathematical creative thinking cannot be done without planned and systematic efforts, but must be done deliberately by making plans that are right on target, such as making open-ended and less structured questions to start learning, assigning students to solve problems. systematically, and direct students to search for information systematically. independently regarding the given problem.

CONCLUSION

Open ended approach is very goodly used in learning, an approach with good learning stages to hone the character readiness, skills and literacy of students needed in the 21st century. This is because the open ended approach can have a positive influence on developing one or several potentials. students towards 2nd century competencies, increasing student interest and learning outcomes. Thus, the open ended approach is very good in learning.

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