The Effectiveness of Student Worksheet Based on 4'Cs Skills to Improve Higher Order Thinking Skills Students’ SMP Pekanbaru

P Yuanita1, Maimunah2, Arnellis3
1,2Department of Mathematics, Universitas Riau, Indonesia
3Department of Mathematics, Universitas Negeri Padang, Indonesia

*corresponding author : put_yuanita@yahoo.co.id

Abstract. This study aims to determine the effectiveness of Student Worksheet (LKPD) based on 4'Cs skills and its effect on improving higher-order thinking skills of class VIII SMPN 4 Pekanbaru. The design used in this study was pre-experimental with the Static Group Comparison design. The data analysis technique was performed using statistical t-test. The results showed that this LKPD was declared effective as a learning innovation based on indicators of higher-order thinking skills. The effectiveness of the LKPD based on 4'Cs skills is proven to be influential in improving higher-order thinking skills based on the acquisition of results using the difference test

1. Introduction
Increasing high-order thinking skills (HOTS) has become one of the priorities in school mathematics learning. In the current era of globalization, students are required to have the ability to solve new problems innovatively. Students are expected to be able to work collaboratively, behave in a unique way and be able to think divergent. The thinking skills needed by students to be successful in working and having a career in the era of the global are Critical Thinking and Problem Solving, Communication, Collaboration, and Creativity and Innovation, known as 4C's [1]; [2] states that high-order thinking skills include mathematical critical thinking skills, mathematical creative thinking skills and mathematical problem solving skills. Likewise, the opinion of [3] HOTS is the ability to think which consists of critical thinking, creative thinking, and problem solving.

Increasing HOTS has become one of the priorities in the 2013 curriculum. The 2013 curriculum demands that students in addition to having good attitudes and knowledge also demand creative, productive, critical, independent, collaborative, and communicative skills in the realm of reasoning and knowledge, realm through a series of learning to observe, ask, try, reason, present, and create. The purpose of developing HOTS in mathematics learning is to equip students with skills in giving reasons and making decisions. Increasing high-order thinking skills has become one of the priorities in school mathematics learning. In the current era of globalization, students are required to have the ability to solve new problems innovatively. Students are expected to be able to work collaboratively, behave in a unique way and be able to think divergent. The thinking skills needed by students to be successful in working and having a career in the era of the global economic community are Critical Thinking and Problem Solving, Communication, Collaboration, and Creativity and Innovation, known as 4C's [4].
In fact, the learning process that trains students to think at higher orders has several obstacles. One of them is the too dominant role of the teacher in schools as a spreader of knowledge or a source of knowledge, so that students are only considered as a container to be filled with knowledge by the teacher. From the results of observations and interviews on the implementation of learning that took place at SMP Pekanbaru, it was found that the learning carried out by the teacher so far seemed to have not taught students. The learning activities carried out are explaining the subject matter as well as possible, giving examples of questions, and then giving practice questions and, giving assignments at home.

The constraints of high-order thinking skills of students, cannot be separated from the role of the teacher, one of which is in the learning tool Student Worksheets (LKPD) that are used have not been able to guide students to find or construct their own knowledge of the material being taught. The questions contained in the LKPD have not been linked to real life, so they cannot train students' abilities such as critical thinking, creative and collaborative thinking, and student communication. The above fact is in accordance with the results of interviews by researchers with several mathematics teachers at SMPN in Pekanbaru. Teachers only use students' books in schools, without designing their own LKPD. If there is a form LKPD that are sold in the market are not LKPD that teachers make according to circumstances and needs learners.

From the studies that have been stated above, it shows that higher order thinking skills is an important competency that must be developed in students. Learning so far has not paid attention to the development of this competency. The hope is that LKPD -based 4C’s skills can provide learning experiences for students, and provide space for students to practice communicating mathematics well. The teacher develops learning tools in the form of LKPD that can explore 4C's skills. Learning that integrates 4C's in LKPD is expected to lead students to high-order mathematical thinking skills and can solve math problems in everyday life. For that, it is seen how the effectiveness of LKPD based 4C’s skills to improve students' higher order mathematical thinking skills.

One of the characteristics of learning in the 2013 Curriculum is that it must be able to direct students to be prepared to have skills that are in accordance with the skills demands of the 21st century, namely integrating 4C’s skills in learning as follows. Critical Thinking and Problem Solving Skills; Communication Skills; Creativity and Innovation; Collaborative. In line with this, the Ministry of Education and Culture formulates that the 21st century learning paradigm emphasizes the ability of students to find out from various sources, formulate problems, think analytically and collaborate and collaborate in solving problems [5]. The explanation regarding the 21st century learning framework is as follows: (a) Critical-Thinking and Problem-Solving Skills, being able to think critically, laterally, and systemically, especially in the context of problem solving; (b) Ability to communicate and collaborate (Communication and Collaboration Skills), able to communicate and collaborate effectively with various parties; (c) Ability to think critically and problem solving (Critical-Thinking and Problem-Solving Skills), able to think critically, laterally, and systemically, especially in the context of problem solving; (d) Ability to communicate and collaborate (Communication and Collaboration Skills), able to communicate and collaborate effectively with various parties; (e) The ability to create and renew (Creativity and Innovation Skills), able to develop their creativity to produce various innovative breakthroughs; (f) Information and Communications Technology Literacy, able to utilize information and communication technology to improve performance and daily activities; (g) Contextual Learning Skills

Student Worksheets or LKPD are sheets containing tasks that must be done by students in accordance with the basic competencies to be achieved [6] states that LKPD is a student guide used to carry out investigative or problem-solving activities. Based on the above opinion, it can be concluded that LKPD is a written learning tool that can help teachers to facilitate students in the learning process. According to [7] the effectiveness of learning tools is measured based on the achievement of learning objectives using learning tools that have been developed. better than other learning tools. Learning tools are said to be effective if the learning objectives that have been planned are achieved so that the learning outcomes obtained by students are better. Based on the LKPD regarding the effectiveness of
the learning tools described, the researcher can draw the conclusion that the effectiveness of learning devices can be measured based on the achievement of learning objectives using the developed learning tools. The achievement of learning objectives is obtained from the test results of students' mathematical problem solving abilities.

Furthermore, the effectiveness of learning is also determined by the reliability of the learning objectives. Based on the benchmark reference assessment (PAP) set by the government, it is 75% mastery of teaching materials or the minimum competencies that students must master. Meanwhile, the LKPD assessment, namely the completeness of individual student learning, is said to have been complete in learning, if the student has reached 65% absorption and classical learning completeness is 80%. Assessment of learning completeness, namely: 1). As a group, it is stated that it has been achieved if at least 85% of the students in the group concerned have met the criteria for individual learning completeness. 2). Individually, completeness of learning has been fulfilled if a person has reached the minimum order of mastery that has been determined for each unit of material studied. 3). The minimum mastery order of students is 75% in each lesson unit. Noting some of the opinions above, related to the learning objectives, the limits of the effectiveness of learning from the aspect of learning objectives can be stated by the achievement of the KKM. Thus, understanding the limits that as a group it is stated to have been achieved if at least 85% of students in the group concerned have met the criteria for individual learning completeness, it can be summarized that from the aspect of achieving learning objectives, learning effectiveness is achieved if at least 85% of students in the group concerned have fulfilled the KKM.

2. Methods
This research includes that the study was a pre-experiment with a Static Group Comparison design. The experimental design involved two classes, one experimental class and one control class. The control class is class VIII-3 SMP Negeri 4 Pekanbaru and the experimental class is class VIII-1 SMP Negeri 4 Pekanbaru. The data on the effectiveness of the LKPD were analyzed on the test results of students' higher order thinking skills which was shown by the scores obtained by students after taking the test. The results of the tests of students' higher order thinking abilities in the experimental class were compared with the results of tests of students' higher order thinking abilities in the control class. This analysis is used to determine the order of differences in the higher order thinking skills of students. The high-order thinking ability of students is shown through the scores obtained by students after taking the test using the high-order thinking ability score criteria. using conventional learning. This analysis is used to determine the level of differences in the higher order thinking skills of students between the experimental class and the control class. To determine these differences, a statistical analysis can be performed using the t-test (t-test). Before carrying out the t test, first the normality test and homogeneity test were carried out. The normality test aims to determine whether the data is normally distributed or not. The data being tested were the results of the higher order thinking skills test in the control class and the experimental class. After the normality test is carried out, then the homogeneity test is carried out. The homogeneity test aims to determine the variance (diversity) of the data. The homogeneity test was carried out using the Levene test with the help of the SPSS 23 application. The results of the normality test showed that the data were not normally distributed, so the difference test was carried out using non-parametric statistical techniques using the Mann Whitney U-Test. The difference test was carried out with the help of the SPSS for Windows version 16.0 application.

3. Results and Discussion
The results of data analysis using LKPD based on 4C's skill can improve students' high-order thinking skills, it can be seen from the treatment given to the experimental class given the treatment of learning students using LKPD based on 4C's skill, while the control class as comparison does not use LKPD based on 4C's skill. Researchers act as teachers using learning tools developed in the experimental class. The learning process begins with preparing students physically and psychologically.
Researchers then convey motivation, make apperception, convey learning objectives, and outline the material coverage. Students are then asked to discuss and learn using LKPD related learning materials. At core activities, students are asked to observe the problems that exist in the LKPD. Students are then asked to identify the problem given. Students collect various information by reading references related to learning material. Students then process the information and solve the problems given. Students are asked to conclude the results of problem solving. Students then present the results of group work. In the closing activity, students conclude the material then are given a written test related to the material that has been studied. Students are then given assignments and material information to be studied at the next meeting.

The researcher then gave a test of higher order thinking skills to students after the trial was carried out. Students are then asked to identify the problem given. Students then present the results of group work. In the closing activity, students conclude the material then are given a written test related to the material that has been studied. Students are then given assignments and material information to be studied at the next meeting. The researcher then gave a test of higher order thinking skills to students after the trial was carried out.

Based on the results of the high-order thinking skills test, it was analyzed using the normality test, the homogeneity test, and the difference test for the improvement of students' higher order thinking skills. The test results of higher order thinking skills in the experimental class and control class: The normality test aims to determine the results of the higher order thinking skills test results for the experimental class and control class with normal distribution or not. The data normality test was carried out with the help of the SPSS for Windows version 16.0 application using the Kolmogorov-Smirnov test. The hypothesis for the normality test is as follows.

$H_0$: The results of the tests of higher order thinking skills in the experimental class and the control class are normally distributed.

$H_1$: The results of the high-order thinking skills test results in the experimental class and the control class were not normally distributed.

**One-Sample Kolmogorov-Smirnov Test**

| Unstandardized Predicted Value |
|-------------------------------|
| N                             | 33 |
| Normal Parameters, a, b       |
| Mean                          | 61.8484849 |
| Std. Deviation                | 3.29556496 |
| Most Extreme Differences      |
| Absolute                      | .135 |
| Positive                      | .135 |
| Negative                      | -.103 |
| Statistical Test              | .135 |
| Asymp. Sig. (2-tailed)        | .136c |

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

**Figure 1.** The results of the normality test of higher order thinking skills

Based on the results of the Kolmogorov-Smirnov test, it can be seen that the test results of higher order thinking skills in the experimental class $\alpha = 0.136 \ 0.05 >$ then $H_0$ received. The results of test of
higher order thinking skills in the control class. = 0.009 <= 0.05 then rejected. This means that the test results of high-order thinking skills in the experimental class and the control class are not normally distributed. The results of the normality test show that the data are not normally distributed, so the difference test is carried out with non-parametric statistical techniques using the Mann Whitney U-Test. The difference test was carried out with the help of the SPSS for Windows version 16.0 application. The results of the difference test showed that the results of the students' high-order thinking skills in the experimental class were better than the control class. The results of the higher order thinking skills test were then analyzed based on the Minimum Completeness Criteria (KKM). The achievement of students 'high-order thinking skills was obtained by comparing the results of the students' higher order thinking skills test results with the specified KKM, which was 78.

The results of the high-order thinking ability test in the control class showed that 23 out of 33 students reached the KKM, so the percentage of students' high-order thinking skills in the control class was 63.16% with high criteria. Achievement of students' high-order thinking skills in the experimental class achieved a minimum of 80% learning completeness with KKM, so it can be concluded that the LKPD based on 4C's skill can improve higher-order thinking skills in the space geometry building material for class VIII SMP. The results of the research that have been done show that the LKPD based on 4C's skill can improve higher-order thinking skills in the material of flat-sided building materials for class VIII SMP.

4. Conclusion

Based on the results of the research and discussion, it was concluded that the LKPD based on 4C's skill was effective for improving the high-order thinking skills of grade VIII students of SMP 4 Pekanbaru on the material of space geometry. The effectiveness of LKPD based on 4C’s skill is proven to be influential in improving higher-order thinking skills, based on the acquisition of difference test results.

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