# Developing a Learning Tools of Problerm Based Learning (PBL) Using Number Pockets Media To Improve The Student's Critical Thinking Ability in Social Science Subject Of 4th Grade Student of Elementary School

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| Article Info | Abstract |
|---|---|
| | This study aims to (1) determine the validity of the learning tools of Problems Based Learning using the Number Pocket media in the 4th grade student of elementary school; (2) determine the students' response to the development of the learning tools of Problem Based Learning using the Number Pocket media in the 4th grade student of elementary school; (3) determine the effect to students' learning achievement; (4) determine the effect to students' critical thinking ability; (5) determine the quality of the learning tools of Problem Based Learning using the Numbers Pocket media in terms of validity, practicality and effectiveness aspects. The type of this study is research and development with 4-D model. The sampling technique used was purposive sampling, obtained by class IV-A of Pakunden Elementary School as a control group and class IV-B as an experiment group. The result of this study showed that (1) The validation result of the RPP, LKS and the Numbers Pocket media obtained an average score 4.36, 4.49, and 4.75 "very good classification"; (2) Students' response questionnaire analysis obtained score 4.19 "very good classification"; (3) developing a learning tools of PBL using Number Pocket media has an effect to students' learning achievement; 4) developing a learning tools of PBL using Number Pocket media has an effect to students' critical thinking ability; (5) the learning tools that developed has valid, practical, and effective qualities. |

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**INTRODUCTION**

Learning in elementary schools covers a variety of subject. Law Number 20 of 2003 concerning the National Education System Chapter X article 37 explained that "the elementary and secondary education curriculum required contains religious education, civic education, language, mathematics, natural sciences, social sciences, arts and culture, physical education and sports, skills/vocational and local content". Based on the explanation, social science is a subject that must be taught in elementary school level. This is in line with the Minister of National Education Number 22 of 2006 stated that social science is one of the subjects that seeks to equip students' knowledge and skills with the ability to think logically, critically, the ability to communicate, cooperate, and compete in a pluralistic society at the local, national, and international levels. Students who have the ability to think logically and critically are expected to be able adapt to dynamic changes.

Regarding critical thinking, R. Ennis in Nitkodan Brookhart (2011:232) "Critical thinking is reasonable, reflective thinking that is focused on deciding what to belief or do...". Critical thinking are reasonable and reflective thinking that focused on deciding what to belief and what to do. It's meant by using a critical thinking ability will be able to decide appropriately according to what is believed and understand what to do.

Current condition showing the social science learning that applied in elementary schools is not packaged attractively and do not stimulate students' critical thinking. Social science as one of the subject that not interesting for student, because it content reveals about history and social theories in the form of rote and has not shown its existence in improving students' thinking ability, so the students do not understand the subject matter that presented by the teacher during the learning process.

The interviews result with fourth grade teacher that conducted during observations at Pakunden Elementary school showed that learning proces was still textual, the limitations of media and learning model used was affect to the learning system in schools. Learning activities is still teacher-centered and the teaching materials or learning tools used by the teacher has not been maximized. This causes students' achievement and students' critical thinking ability in understanding social science has not been maximized. The results of the social science test show that students who achieved the KKM are <50% and those who not completed are 57.4%. Based on the case, the problem that arises is how teachers could develop the learning tools that lead students to find the material concepts of the learning and improving students' critical thinking ability. RPP is one of the learning tools used by the teachers as a reference in implementing learning activities. Besides RPP, another learning tools is LKS that uses as a guide by students to carry out the investigation activities or problem solving (Trianto, 2010: 22). LKS contains are the activities steps that must be done by students to find the concepts. The learning tools that developed are packaged in an attractive learning model and can improve the students' critical thinking ability. One of the learning models that used as an alternative choice is the Problem Based Learning model.

Arends (2008:43) states that Problem Based Learning is a learning model that designed to help students develop thinking skills and problem solving skills, learn adult roles and become independent learners. Problem Based Learning model use a real world problems as a basis for acquiring knowledge and concepts through critical thinking skills and solve various problems and can be used as learning resources. This is in accordance with the results of Kono's research (2016) showing that there is an effect of the implementation of problem based learning model on concepts understanding and student's critical thinking skill.

The learning that implemented a more innovative model will be maximized if it supported by the media as an explanation of various materials that cannot be presented verbally by the teacher. Naz & Akbar (2010) states that media or learning aids can help teachers to transfer a knowledge in impressive method, and design more effective learning. One

of the media that can create a more pleasant learning atmosphere and be able to improve the quality of the learning process is the Numbers Pocket media. Heruman (2007: 8) explains that number pockets as storage that placed on a piece of cloth or board.

Based on the description above, it is necessary to develop a learning tools of Problem Based Learning using Numbers Pocket Media to improve the students' critical thinking ability in social science subjects of 4th grade elementary school students.

**METHOD**

The type of this study is Research and Development. Study of Researh and development (R&D) can be interpreted as a scientific method to research, design, produce and test the validity of the products that have been produced (Sugiyono, 2015: 30). The products of this study are learning tools in the form RPP based on PBL, Student Worksheets (LKS), and Numbers Pocket media. The R&D model used in this study were 4-D that developed by Thiagarajan and Semmel (1974: 5). The 4-D model consists of 4 stages, namely: Define, Design, Develop and Disseminate.

The populations of this study were fourth grade students of elementary schools in Dewantara cluster, Banyumas District, Banyumas Regency which consisted of six schools. The sampling was done by purposive sampling by considering: the schools was implemented 2013 curriculum, learning process is still textual, especially in social science subject, the limitation of uses media and learning model. Based on these considerations, it was gained that grade IV-A students of Pakunden elementary school as a control group, and grade IV-A students as experimental group.

Data analysis techniques used in this study include: (1) Tools validity data analysis; (2) Practical data analysis was obtained from students response questionnaires and observation sheets of learning implementation; (3) The effectiveness analysis was obtained from the observation sheet of students' critical

thinking ability and students' learning achievement.

Tools validity date and practicality data were analysis using learning tools assessment criteria, student response questionnaires, and observation sheets. The Implementation of learning follows the rule that adapted by Eko Putro Widyoko (2009:238). While the effectiveness analysis is carried out before the research data being analyzed, a prerequisite test must be done first to determine the statistics will be uses in data analyze. The prerequisite test covered normality and homogenity test. The data analysis technique used was the N-gain test to determine the magnitude improvement of students learning achievement from pretest to pos-test results. Then, Independent Sample T-test to determine the significance improvement of student's critical thinking ability of the experimental and control group.

**RESULTS AND DISCUSSIONS**

Learning tools of problem based learning using number pocket media that developed was validated by three validators, namely material expert lecturers, media expert lecturers, and fourth grade teachers. RPP assessment is based on seven aspects, namely, RPP identity, formulation of competency achievement indicators and learning objectives, selection of learning materials, selection of learning models/methods, selection of learning resources/media, learning activities, and assessment of learning outcomes. The results of the RPP assessment by all validators are presented on Table 1.

**Table 1.** The results of the RPP assessment by all validators

| No | Aspect | Validators | | avera ge | categ ory |
|---|---|---|---|---|---|
| | | Exper t Lectu rer | Teac her | | |
| 1 | RPP identity | 5,00 | 4,92 | 4,96 | Very good |
| 2 | formulati | 4,40 | 4,20 | 4,30 | Very |

| | | | | | |
|---|---|---|---|---|---|
| | on of competency achievement indicators and learning objectives | | | | good |
| 3 | selection of learning materials | 4,40 | 4,00 | 4,20 | Good |
| 4 | selection of learning models/ methods | 4,00 | 4,00 | 4,00 | Good |
| 5 | selection of learning resources / media | 4,00 | 4,00 | 4,00 | Good |
| 6 | learning activities | 5,00 | 5,00 | 5,00 | Very good |
| 7 | assessment of learning outcomes | 4,00 | 4,20 | 4,10 | Good |
| Average | | | | 4,36 | Very good |

Based on the Table 1, it was known the quality of the RPP based on the validator's assessment shows very good criteria with an average score 4.36 from a maximum average score 5.00. Clearer data regarding the assessment of the expert lecturer validators and fourth grade teachers can be seen in Figure 1.
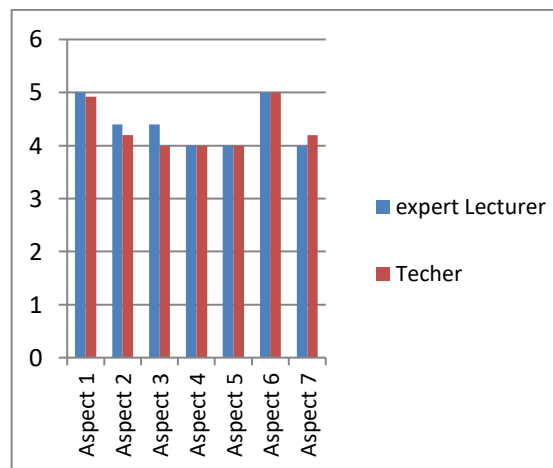


**Figure 1.** RPP assesment histogram

Revision on RPP is based on validators sugestion include clarifying the writing on learning resources and time allocation in closing activities.

The LKS assessment is based on four aspects, namely, the content feasibility, material presentation, language and graphics. The results of the LKS assessment by all validators are presented on Table 2.

**Table 2.** The Assessment Result of LKS

| No | Aspect | validators | | average | category |
|---|---|---|---|---|---|
| | | Expert Lecture | Teacher | | |
| 1 | content feasibility | 4.00 | 4.50 | 4.25 | Very good |
| 2 | Material presentation | 4.00 | 4.67 | 4.33 | Very good |
| 3 | Language | 5.00 | 4.75 | 4.87 | Very good |
| 4 | Graphics | 4.56 | 4.53 | 4.54 | Very good |
| Average | | | | 4.49 | Very good |

Based on the Table 2, it was known the quality of the LKS based on the validator's assessment shows very good criteria with an average score 4,49 from a maximum average

score 5.00. Clearer data regarding the assessment of the expert lecturer validators and fourth grade teachers can be seen in Figure 2.
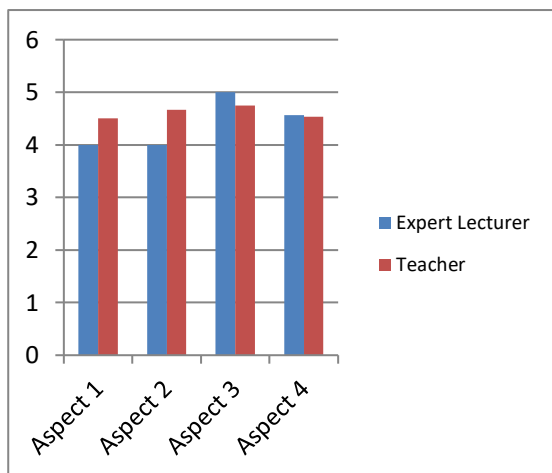


**Figure 2.** The LKS Assesment Histogram

Revision on LKS is based on validators sugestion include the selection in color combinations on each LKS page and replacement of greeting words.

The assessment of Number Pockets media is based on three aspects, namely, media content, language, and presentation. The assessment results of the number pockets media by all validators are presented on Table 3.

**Table 3.** The Assesment Result of Number Pockets Media

| No | Aspect | validators | | avera ge | catego ry |
|----|--------|------------|---|----------|-----------|
| | | Expert Lecture re | Teach er | | |
| 1 | media content | 4.00 | 4.50 | 4.25 | Very good |
| 2 | language | 4.00 | 4.67 | 4.33 | Very good |
| 3 | presentat ion | 5.00 | 4.75 | 4.87 | Very good |
| Average | | | | 4.49 | Very good |

Based on the Table 3, it was known the quality of number pockets media based on the validator's assessment shows very good criteria

with an average score 4,75 from a maximum average score 5.00. Clearer data regarding the assessment of the expert lecturer validators and fourth grade teachers can be seen in Figure 3.
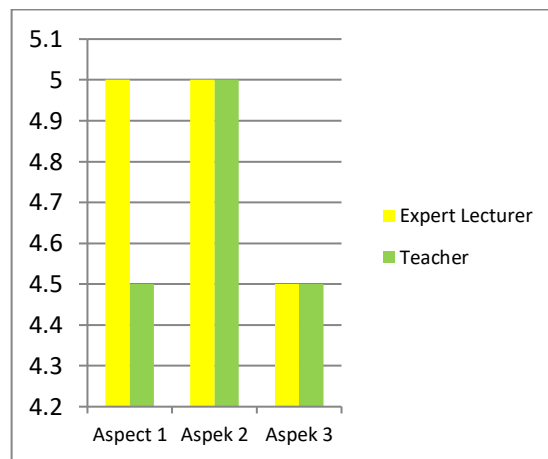


**Figure 3.** The Number Pocket Media Assesment Histogram

Revision on Number Pockets media is based on validators sugestion include selection in color combinations on each LKS page and replacement of greeting words, fixes some images resolution and more attention to the balances of text and images.

Classification of RPP, LKS and Number Pockets media was qualify a very good criteria, that indicating the RPP, LKS and Number Pockets media was valid, so the RPP, LKS and Number Pockets Media that developed were suitable for learning. The explanation above shows the learning tools of Problem Based Learning using the Number Pockets Media in social science subjects developed has valid, practical and effective qualities. This is in accordance with the opinion of Strobel & Barneveld (2009) suggested the PBL model was successful in creating effective learning strategies.

The results of the student response questionnaire analysis were used to assess the practicality of the LKS in terms of content feasibility, material presentation, language and graphics. Student response questionnaires were filled by experimental group students after participating the learning activities using learning tools and Number Pocket media that

developed.The results of the student response questionnaire are presented in Table 4.

**Table 4.** The Results of Student Response Questionnaire

| No | Assesmen Aspect | Average | Category |
|----|-----------------|---------|----------|
| 1 | content feasibility | 4.11 | Good |
| 2 | material presentation | 4.24 | Very Good |
| 3 | language | 4.20 | Very good |
| 4 | Graphics | 4.22 | Very good |
| Average | | 4,19 | Good |

Student responses to the LKS that used show a good category with an average score 4.19 from a maximum average score 5.00. The questionnaire given to students has good assessment criteria. The results of the student response questionnaire are in accordance with Muntaha's research (2013) states that more than 50% of students give a positive response to the development of learning tools.

The observation sheet analysis result of the implementation of the PBL that used to asses the practicality of the LKS. The analysis result can be seen on Table 5.

**Table 5.** Observation Result of the Implementation of PBL

| Implementation | Average percentage | category |
|----------------|--------------------|----------|
| RPP I | 100% | Very Good |
| RPP II | 95% | Very Good |
| Average | 97.5% | Very Good |

Observations result of the implementation of PBL that developed shows 97.5% category. Classification of student response questionnaires and observation sheets on the implementation of PBL was qualified "good" and "very good"

criteria. This Indicating the learning tools used has practical qualities.

The learning tools of PBL and number pocket media that validated and declared was suitable to use, then tested on a small scale. It is called small scale because it only involves one elementary school, namely Pakunden elementary school which uses class IV-A and class IV-B as the experimental group and the control group. The trial design used was Noneequivalent control group. This design is performs a pretest and posttest for both classes. In addition analyzing student achievement, researchers also analyze the students' critical thinking ability.

Before learning achievement and critical thinking ability were analyzed, prerequisite test are first conducted to determine the statistics would be used in data analysis. Prerequisite test result of normality and homogeneity test using the Lilliefors test on the Kolmogorov-Smirnov column. It is known the significance value of the experimental group pretest was 0.188>0.05, while the control group obtained 0.076>0.05. The significance value result of the experimental group posttest was 0.134>0.05, while the control group obtained 0.116>0.05. The results of the pretest and post-test normality tests showing normal distribution of the data because the significance value obtained is greater than 0.05. Furthermore, the results of the normality test of the initial critical thinking ability of the experimental group students obtained 0.078>0.05 and the control group obtained 0.073>0.05. then, the normality test result of the final critical thinking ability of the experimental group obtained 0.200>0.05 and the control group obtained 0.200>0.05. The normality test results of the pretest and posttest and critical thinking sability showing normal distribution of the data because the significance value obtained is greater than 0.05. the homogeneity test result using the Levane's test, the significance value of the pretest was 0.686>0.05, while the posttest homogeneity test obtained was 0.704>0.05. The homogeneity test result of the initial critical thinking ability obtained 0.926>0.05, then the final critical thinking ability obtained

0.267>0.05. These results indicate the variance was homogeneous, because the significance value obtained is greater than 0.05. Based on the normality and homogeneity tests result, thus analysis of the research data can be continued with parametric statistics.

The Improvement in learning achievement and students' critical thinking ability in experimental and control group were analyzed using the N-Gain test to determine the magnitude of the iprovement in student achievement from pretest to posttest results and initial to the final critical thinking ability. The N-Gain test result of the pretest and posttest can be seen on Table 6.

**Table 6.** N-Gian of Learning Achievement

| Group | Average | | N-Gain | Remark |
|---|---|---|---|---|
| | *Pretest* | *Postest* | | |
| Experimental | 51,5 | 80,5 | 0,60 | moderate |
| control | 51 | 75,75 | 0,51 | moderate |

Based on the Table 6, it was known the N-gain of students' learning achievement of experimental group obtained 0,60 with moderate category, while the control group obtained 0,51 with moderate category . Then the N-gain Result of students' critical thinking ability can be seen on Table 7.

**Table 7.** N-gain of Students' Critical Thinking Ability

| Group | Average | | N-Gain | Remark |
|---|---|---|---|---|
| | *Pretest* | *Postest* | | |
| Experimental | 69,5 | 80 | 0,34 | Moderate |
| Control | 69,25 | 75 | 0,22 | Poor |

Based on the Table 7, it was known the N-gain of students' critical thinking ability of experimental group obtained 0,34 with moderate category, while the control group obtained 0,22 with poor category. After knowing the magnitude improvement of the learning achievement and students' critical thinking ability in experimental and control group. Then,

analyzed used the Independent Sample T-test to determine the significance of the average difference. The results of the average difference test can be seen on Table 8.

**Tabel 8.** The Average Differences of Student Achievement

| | | Levene's Test for Equality of Variances | | t-tes for Equality | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | T | df | Sig. (2-tailed) |
| Prestasi Belajar Siswa | Equal variances assumed | .146 | .704 | 2.113 | 38 | .041 |
| | Equal variances not assumed | | | 2.113 | 37.916 | .041 |

Based on the Table 8, it was known the sig.(2tailed) value is 0,041 these results indicate the significance value obtained is lesser than 0.05 with a significance level of 5%. Refers to the test criteria, if the Sig. (2-tailed) <0.05. Thus, it could be concluded there was a significant difference in student learning achievement that implementing the learning tools of PBL using the number pocket media compared to the average difference in student achievement that implementing conventional learning model. This is accordance with research conducted by Aidoo (2016) showed there was a significant difference in student achievement between the experimental class and the control class. This opinion was strengthened by the results of Fatchurrohmah (2017) showed the average of student posttest score in the experimental group exceeds the minimum completeness criteria (KKM) set, namely 80.00 (92.75 > 80.00), and the N-gain result showing moderate category (0.59), while in the experimental class 2, only

few that exceeded the minimum completeness criteria (KKM) set, namely 80.00 (84.58 > 80.00), and the N-gain result showing moderate category (0.44). Similar thing also was found in research conducted by Celik et al. (2018) obtained the data score 3,81 and p value was 0,00 or P < 0.5. These results indicate the implementation of problem based learning model is is effective in improving student learning outcomes compared to conventional methods. Then research conducted by Wau (2017) showed there was a significant differences in social science learning outcomes between students that implementing a problem based learning model with the student that implementing the conventional learning model.

In addition analyzing the average difference in student learning achievement, the researcher also analyzed the average difference of student's critical thinking ability of students in the experimental and control group using the Independent Sample T-test. The results of the average difference test can be seen on Table 9.

**Tabel 9.** The Average Differences of Student's Critical Thinking Ability

| | | Levene's Test for Equality of Variances | | t-tes for Equality | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | T | Df | Sig. (2-tailed) |
| Kema mpuan Berpik irKritis | Equal varianc es assume d | 1. 26 7 | .26 7 | 2.2 97 | 38 | .027 |
| | Equal varianc es not assume d | | | 2.2 97 | 35.278 | .028 |

Based on the Table 8, it was known the sig.(2tailed) value is 0,027. these results indicate the significance value obtained is lesser than 0.05 with a significance level of 5%. Refers to the test criteria, if the Sig. (2-tailed) <0.05. Thus,

it could be concluded the average of student's critical thinking ability that implemented a learning tools of PBL using the number pocked media was higher than the one that impelemented a conventional learning model. This is in accordance with Sujiono's research (2014) states that the development modeul based on PBL that developed improves students' critical thinking ability by obtaining an average score of 0.6 with moderate criteria. This research was strengthened by Qomariyah's research (2016) showed there are differences in students' critical thinking skills in social science subjects using the PBL-SETS learning model and conventional learning models.

The learning tools that developed contains a series of activities that can stimulate students to solve the problems that presented in learning process. Through these activities, students' critical thinking ability could be improved by implementing a learning tools based on PBL using the number pocket media that developed. This is in accordance with Farisi's research (2017) states the implementation of PBL could improve students' critical thinking skills that evidenced by the results of data analysis obtained t-count score 6.71 and t-table 1.68 with a significance level 0.05, so, it could be satated that t-count 6.71 > 1.68 t table. similar research conducted by Ismiati (2020) shows the results of the effectiveness of the learning tools based on PBL that developed indicate the critical thinking ability obtained N-gain 0,70 with high category.

The presentation showed the problem based learning was effective to use in learning process, because it could improve the student learning achievementt and students' critical thinking ability. This is in accordance with the research conducted by Muntaha (2013) reveal there are significant differences and improvements in learning outcomes before and after the development of learning tools in the experimental and control class. This is because learning process by implementing the Problem Based Learning model presented a contextuals problems, and involved students in acquiring knowledge through the scientific process. so the students understanding of the material being

studied can be applied in students daily life. Learning activities with learning tools based on PBL, in addition to activating students, it also reduce the role of the teacher so the learning process not dominated by the teacher. Problem Based Learning is a model that designed to enable students actively knowledge acquisition process, the teacher is only a facilitator that stimulates students' curiosity and guides students in planning an investigations or conducting experiments to solve problems that presented in learning process. This is similar to the opinion of Giyantono (2013) states the role of the teacher in PBL model is, among others, as an instructions to help students if they find difficulties in solving problems. This opinion was strengthened by the results of Riswati's research (2018) reveals there is a significant effect of the Problem Based Learning model with the demonstration method on students' problem solving abilities. The observation result about students involvement in learning process indicate that students are actively involved.

**CONCLUSION**

Based on the study research and discussion regarding the developing learning tools based on problems based learning model using the number pocket media can be concluded that learning tools that developed has valid,practicial, and effective. The improvement of student achievement and students' critical thinking skills in the experimental group that implemented learning tools based on Problem Based Learning using the number pocked media media that developed is higher than the one that implemented conventional learning model. This is evidenced by the N-Gain test result showed the average improvement of students learning achievement in experimental group is 0.60 "moderate category", and the control group is 0,51 "moderate category". The improvement test that analized using the  independent sample T-test showed the sig.(2tailed) value was 0.041 <0.05, which means  there was a significant difference between the learning achievement between the experimental   and the control

group. The N-gain test result shows the average of students' critical thinking ability in experimental group was 0.34 "moderate category", and the average of students' critical thinking ability in control group was 0.22 "poor category". The improvement test result that analyzed used the Independent Sample t-test showed a Sig.(2-tailed) value 0.027 < 0.05, which means there was a significant improvement between the students' critical thinking abilities of the experimental  and control group.

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