Improving students' cognitive abilities through *predict observe explain* enhancing students' cognitive abilities through predict observe explain

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Abstract : *The* basic ability possessed by students is cognitive ability. The background of this study is the low cognitive ability of students in mathematics in mathematics learning at Bonang State Elementary School. The low cognitive ability is seen from the initial data of students in mathematics lessons, namely many students are still below the KKM. In this case the teacher tries to get students to learn mathematics by using the Predict Observe Explain learning model. With the aim of improving students' cognitive abilities in learning mathematics. Thus, students are able to find their own way to solve problems in mathematics lessons. The research method used is Classroom Action Research. This study was carried out in two cycles consisting of several actions that discuss mathematics material in grade IV of elementary school. Based on the results of the study using Predict Observe Explain, cognitive abilities increased. This can be seen in the test given by researchers to all students in grade IV of Bonang Elementary School, namely there was an increase from the initial condition of 25 students, only 32% or 8 students completed and 68% or 17 students who had not completed. Then it increased in cycle I by 16%, namely from 25 students there were 48% of students who completed and 52% of students who had not completed. In cycle II, which marked the end of the study, the learning outcomes increased by 32%, with 80% completing the 25 students and 20% remaining incomplete. Student-to-student and teacher-to-student interactions were more conducive, and student cognitive abilities improved in each activity during the study.

Keywords: Predict Observe Explain, cognitive abilities, mathematics learning.

Abstract: The basic abilities that students possess are cognitive abilities. The background of this research is the low cognitive ability of students in mathematics on mathematics Learning in the elementary school of Bonang state. The low cognitive abilities are seen from the student's initial data on mathematics, which are many students who are still under the KKM. In this case the teacher seeks to allow students to learn mathematics using the Learning model Predict Observe Explain. With a contribution to improving the student's cognitive ability in learning mathematics. Thus,

students are able to find their own way to solve problems in math lessons. The research method used is class action research. The study was conducted in two cycles consisting of several actions discussing mathematics material in grade IV Elementary School. Based on the results of the study using Predict Observe Explain, the cognitive ability increased. This is evident in the tests given by researchers to the research of students in class IV of Bonang Elementary School which was an increase in the initial conditions of 25 students, only 32% or 8 students were completed and 68% or 17 students were not completed. Then increased in cycle I as much as 16% of 25 students there are 48% of students who are completed and 52% of students who are not completed. In cycle II, which became the end point in this study increased by 32% of 25 students, 80% of students were completed and 20% of students were not completed. Student interactions with students and students with teachers are more conducive, the student's cognitive ability results in the course of an action during the study.
Keywords: Predict Observe Explain, cognitive skills, math learning.

INTRODUCTION

Learning and education are inseparable. Therefore, without learning, there would truly be no education. According to Syah (2013:93) "learning is a key term in every educational endeavor . " As a process, learning always has a very broad place in various disciplines related to educational endeavors. Learning is a set of processes that involve various aspects to form something new based on the stimulus carried out by students. According to Santoso, Erik (2017) "Mathematics seems abstract because students assume that the connection between mathematics subjects and the real world cannot be seen in everyday life." Therefore, there needs to be an improvement in the process of learning carried out by teachers to eliminate the abstract impression of mathematics. The use of varied learning models is expected to improve students' cognitive abilities in learning Mathematics. One of them is by using the Predict Observe Explain model. In their research, Warsono and Hariyanto (2012:93) stated that: The POE model is based on constructivist learning theory which assumes that through the activities of predicting, observing and explaining something the results of observations, the cognitive structure will be formed well. observation or proof of assumptions (observe), as well as explanation to the observation results (explain). Based on the results of the researcher's observations regarding the condition of Mathematics learning in grade IV at Bonang State Elementary School, the researcher still observed that teachers have not used a variety of learning models and tend to use the lecture method more. In fact, currently there are many learning models that can be used as references for teachers to make learning interesting. In some conditions, the lecture method can be used in Mathematics learning in elementary schools, however, if it is implemented continuously , students will feel bored more quickly and less motivated in participating in the learning process, which ultimately will lead to low cognitive abilities of students. In addition to the use of conventional learning models, this is also due to the lack of supporting facilities and infrastructure, so students feel bored and unenthusiastic in participating in Mathematics learning. It can be seen from the initial data on the cognitive abilities of grade IV students at Bonang State Elementary School in Mathematics, many received scores below the Minimum Completion Criteria (KKM). For grade IV Mathematics at Bonang State Elementary

School, the KKM score was 72. In the initial conditions, out of 25 students, only 32% or 8 students completed the learning process and 68% or 17 students did not. If this problem continues, the learning process will be disrupted. learning will not achieve the expected goals, also hindering the acquisition of students' cognitive abilities. Therefore, there needs to be innovation in the Mathematics learning process as well as teacher creativity in conditioning the class and delivering learning materials so that students do not feel bored with the Mathematics learning process. In accordance with Trianto's opinion (2012: 152) explains that: Through Predict Observe Explain, teachers explore students' understanding by asking them to carry out three main tasks, namely prediction, observation, and explanation. Predict Observe Explain abilities can investigate students' ideas and how they apply knowledge to real situations.

METHOD

Type and Design

Based on the type of research chosen, the research design used is a cycle that refers to the model developed by John Elliot. According to Kusumah and Dwitagama (Novianti, 2013:54) stated that, "John Elliot's CAR design is implemented in one cycle consisting of several actions, namely action one, action two and action three." In each action includes activities, planning, implementation, observation and reflection. The design used in this study is the John Elliot design.
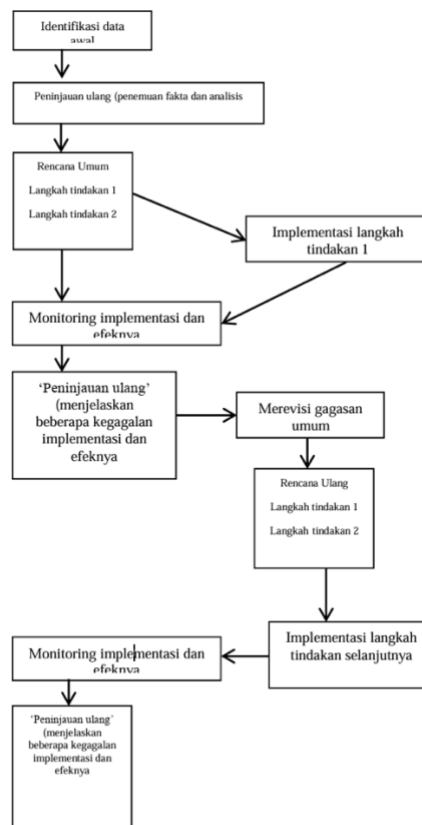
Gambar 1 Alur PTK Model John Elliot
(Novianti, 2013:54)

Data and Data Sources

RESULTS AND DISCUSSION

This study uses a **Classroom Action Research (CAR) approach** with the primary goal of improving students' cognitive abilities through the application of **the Predict–Observe–Explain (POE) learning model** in mathematics. The CAR model was chosen because it can solve learning problems directly in the classroom through repeated action cycles, allowing teachers to continuously improve learning.

The research subjects were 28 fourth-grade students of SDN Bonang, consisting of 15 male students and 13 female students. The research was conducted over three cycles, where each cycle consisted of four stages: (1) planning, (2) implementation of actions, (3) observation, and (4) reflection.

In the **planning stage** , researchers and class teachers developed a Learning Implementation Plan (RPP) that integrated the steps of the POE model into teaching and learning activities. The materials selected were mathematical concepts relevant to the curriculum and that enabled the application of prediction, observation, and explanation, such as measurement, number operations, and plane figures. The research instruments prepared included student activity observation sheets, teacher performance observation sheets, cognitive learning outcome tests, and documentation.

implementation phase of the action is carried out according to the lesson plan. In the **Predict phase** , the teacher presents an initial problem or phenomenon and asks students to predict the outcome based on their existing knowledge. Next, in the **Observe phase** , students observe the process or data presented through simple experiments, demonstrations, or explorations of mathematical material. Finally, in the **Explain phase** , students are asked to explain the correspondence or discrepancy between predictions and observation results and relate these explanations to correct mathematical concepts.

observation phase was conducted by the researcher and the accompanying teacher to record student engagement, the accuracy of the concepts presented, and the dynamics of the discussions. The purpose of this observation was to collect qualitative data on the learning process and student participation, while also noting areas for improvement in the next cycle.

reflection phase is conducted after each cycle to analyze the results of the actions. The analysis is conducted on student learning outcome test data and observation notes. If weaknesses are identified, such as students still having difficulty connecting predictions with observations, the teacher adjusts the strategy for the next cycle, such as providing concrete examples or increasing visual media.

Data analysis in this study was conducted quantitatively and qualitatively. Quantitative data, in the form of student learning outcome test scores, was analyzed by calculating the percentage of learning completion and the average grade. Qualitative data, in the form of observation notes, was analyzed descriptively to assess the development of student engagement and skills in discussions.

The research results show that the POE learning model significantly improves students' cognitive abilities. In the first cycle, the learning completion rate was only around 60%, but increased to 78% in the second cycle and over 90% in the third cycle. Furthermore, students' learning activities during the lesson became more active, enthusiastic, and engaged in scientific thinking.

Thus, the application of the classroom action research method with the POE model is not only effective in improving mathematics learning outcomes, but is also able to develop students' critical thinking skills and mathematical communication abilities.
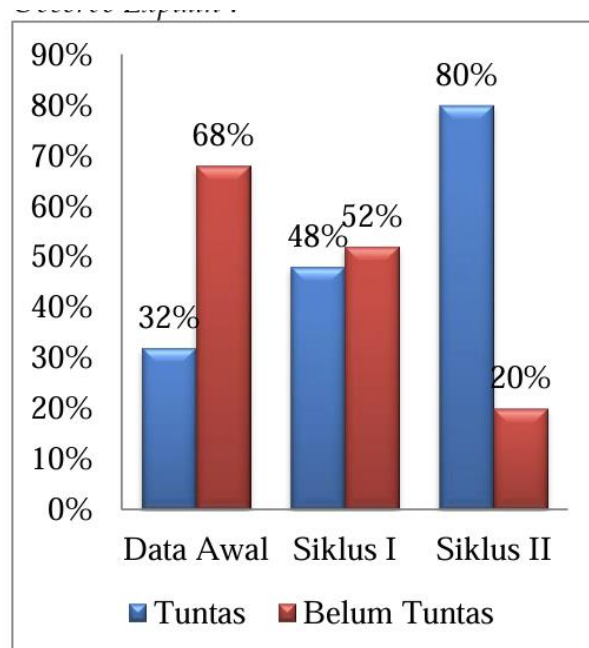
From 68% 32% 48% 52% 20% Initial Data Cycle I Cycle II Completed Not Completed diagram above, the results of student completeness per action and per cycle, that in the initial conditions of 25 students only 32% or 8 students completed and 68% or 17 students who have not completed. Then increased in cycle I by 16%, namely from 25 students there were 48% of students who completed and 52% of students who have not completed. In cycle II which is the end point in this study increased by 32%, namely from 25 students 80% of students completed and 20% of students who have not completed. In accordance with the opinion of Trianto (2012: 152) explains that: Through Predict Observe Explain, teachers explore students' understanding by asking them to carry out three main tasks, namely prediction, observation, and explanation. The ability to Predict Observe Explain can investigate students' ideas and how they apply knowledge to actual conditions. Sa ' adah conducted classroom action research on improving the cognitive abilities of class VIII students of SMP Negeri 3 Banguntapan in mathematics learning through the Indonesian Realistic Mathematics Education (PMRI) approach in 2010. From the results of his research, it was proven that the cognitive abilities of class VIII-A students of SMP Negeri 3 Banguntapan increased from cycle I to cycle II after implementing learning with the PMRI approach. Based on the results of the research and relevant research above, it can be concluded that implementing Predict Observe Explain can improve the cognitive abilities of elementary school students.

CONCLUSION
Based on the results of the description of the discussion and analysis of previous data, in this study the researcher can conclude that the application of the Predict Observe Explain model can improve students' cognitive abilities. Students' cognitive abilities after the application of the Predict Observe Explain model in the mathematics subject

of class V of SDN Bonang have really increased, it is said to have increased because after the implementation of learning cycles one to two, namely This can be seen in the tests given by researchers to all students in class IV of Bonang Elementary School, namely there is an increase. Cooperation and interaction between students and students and students with teachers are more conducive, the results of students' cognitive abilities in each action during the study have increased.

SUGGESTION

The suggestions that the author can provide are: a. In delivering mathematics material to students, teachers should truly instill an understanding of basic concepts, definitions, and principles of the material. b. Mathematics learning will be more interesting if it is linked to real problems that occur in everyday life.

bibliography

Ministry of National Education. (2003). Law No. 20 of 2003 concerning the National Education System. Jakarta: Ministry of National Education.

. (2004). Regulation of the Director General Dimyati, M. (2013). Learning and Teaching. Rineka Cipta: Jakarta. Heriawan, A, et al. (2012). Learning Methodology. Banten: LP3G.

Novianti, Anita. (2013). Application of the Search, Solve, Create, and Share (SSCS) Learning Model to Improve Conceptual Understanding of Class X IPS 1 Students of SMA Negeri 4 Bandung. Educational Thesis, Faculty of Education, Indonesian University of Education.

Siregar, E. (2010). Learning and Teaching Theory. Bogor: Ghalia Indonesia.

Sudjana, N. (2010). Assessment of the Results of the Teaching and Learning Process. Bandung: Remaja Rosdakarya.

Sugiyono. (2009). Educational research methods (quantitative, qualitative, and R&B approaches). Bandung: Alfabeta.

Sa ' adah, WN (2010). Improving the cognitive abilities of eighth-grade students of SMP Negeri 3 Banguntapan in mathematics learning through the Indonesian Realistic Mathematics Education Approach (PMRI). Thesis. State University of Malang: Unpublished.

Suryosubroto, B. (2009). Teaching and Learning Process in Schools. Jakarta: Rineka Cipta.

Tirtonegoro, S. (2001). Supernormal Children and Their Education Programs. Yogyakarta: Bumi Aksara. Trianto. (2011). Integrated Learning Model. Jakarta: Bumi Aksara.

Santoso, E. (2017). "Bridging the abstractness of mathematics through realistic mathematics learning" Jurnal Theorem volume 2 no.1.

Warsono and Hariyanto. (2012). Active Learning. Bandung: PT. Remaja Rosdakarya.

Wiraatmadja, R. (2006). Classroom Action Research Method. Bandung: Remaja Rosdakarya