

The Effectiveness of Pedagogical Content Knowledge in English Teaching and Learning Process

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1. Abstract

This research is aimed to find the effect of using Pedagogical Content Knowledge (PCK) on the students' learning outcomes at SD N Klegenrejo. The population and sample of this research were the fourth grade of SD N Klegenrejo. This research was conducted from April to May 2023. This research was classified as a quasi-experimental study. It involved 42 students from two groups, they were experimental group and control group. The experimental group was students taught using Pedagogical Content Knowledge (PCK) whereas the control group was students taught using conventional method. The data were obtained by using pre-test and post-test. The pre-test was given to both groups before the treatment and the post-test was given after the treatment. The data of pre-test and post-test of both groups were analyzed by using descriptive and inferential statistics. After the data were tested and found to be homogeneous and normal, the hypothesis was tested using SPSS. The result of the research shows that the difference in the students' learning outcomes between the students taught using Pedagogical Content Knowledge (PCK) and those taught not using Pedagogical Content Knowledge (PCK) is significant. It can be seen in the result of the hypothesis testing. The significance value is lower than the significance level of 0.05 ($0.020 < 0.05$), which means that the data of this study are considered to have

significant difference. Therefore, the hypothesis of this study is accepted. It means that Pedagogical Content Knowledge (PCK) have significantly improved the student's learning outcomes in the English teaching and learning process of the experimental class at SD N Klegenrejo.

Keywords: *Pedagogical Content Knowledge (PCK), Learning Outcomes, Teaching and Learning Process*

2. Introduction

One important factor in achieving national education goals is the quality of the learning process done by a teacher. But this seems not in line with the quality of learning in Indonesia in certain area. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) survey on the quality of education in developing countries in Asia Pacific, Indonesia ranks 10th out of 14 countries and for the quality of teachers, its quality is at level 14 of 14 developing countries (Gumilar, 2013).

Brown (2000) stated that teaching is showing or helping someone to learn how to do something providing with knowledge, and causing to know or to understand. In teaching process, the teacher gives instruction to students to do something and make students actively explore various sources to increase their knowledge. Sadirman (2001) explains that teaching is organizing an activity or setting the environment as well as possible and connecting with the child, resulting in a process of learning. He also says teaching is an effort to create a conducive condition for ongoing learning activities for students. Sequeira (2017) stated that teaching is a set of events outside the learners which are designed to support the internal process of learning. Based on the description above, it can be concluded that teaching is the teachers' effort to convey knowledge to students.

Learning is about a change. The change brought about by developing a new skill, understanding a scientific law, changing attitude Sequeira (2017). Learning is about how we perceive and understand the word, about making meaning. Learning is not a single thing; it may involve mastering abstract principles, understanding proofs, remembering factual information, acquiring methods, techniques and approaches, recognition, reasoning, debating ideas, or developing behavior appropriate to specific situations; it is about change (Fry 2009). Harsono (2007) stated that learning is normally considered to be a conscious process which consists of the committing to memory of information relevant to what is being learned. Teaching-learning process is a process containing a course conducted by teachers and students based on reciprocal relationships that takes place in educational situation order to achieve certain goals (Suryosubroto 2001).

In teaching-learning process, the teachers play an important role in the classroom. They determine how deep and how far the material will be presented. It's not even just about the material, more than that the teachers also regulate the course of learning, build a comfortable atmosphere, guide and direct students, become a role model, and help solve problems that become obstacles during learning. Teachers' quality is one of the most important contributing factors to student learning. Other factors that also have an influence are such as setting the learning schedule, the number of students in the class, the profile of students in the class, class facilities and learning aids and so on. However, teachers also have various challenges when teaching in class. According to (Alimuddin, 2019), one of the biggest challenges in teaching process in the classroom was further in the process of delivering the material. Sometimes, students generally did not show interest in the material.

Based on preliminary research at SD N Klegenrejo showed that teachers teach using conventional methods. In addition, the teacher only focuses on student handout material even though the Merdeka Curriculum frees the teacher to take material based on student abilities. On the other hand, students' interest in learning also decreased which resulted in student learning outcomes. In line with that, there is a learning concept which makes students are challenges in teaching learning process and it should be had of teacher. Teacher should have knowledge of pedagogic content or what is known as PCK (Pedagogical Content Knowledge), (Shulman 1986; Magnusson, Krajcik, & Borko, 1999).

Pedagogical Content Knowledge is described as the result of a combination of understanding of teaching material (content knowledge) and understanding of ways of educating (pedagogical knowledge) that blend into one that needs to be possessed by a teacher. Pedagogical Content Knowledge is an understanding of what learning methods are effective to explain certain material, as well as an understanding of what makes certain material easy or difficult to learn (Eggen & Kauchak, 2004). PCK explains how the teacher correlates material-based knowledge with knowledge of how to teach and why teachers combine material knowledge as part of learning process (Ayuningtyas & Apriandi, 2020). A teacher who can master PCK properly will certainly improve his competence optimally because he is mastering the content and how to teach content (Mahen & Nuryantini, 2018).

According to (Alimuddin & HAFECS, 2022), there are 7 aspects of pedagogical content knowledge. They are:

a. Content Knowledge

Content knowledge is the teacher's way of describing a material. Content knowledge can also be understood as the teacher's flow of thought in developing a learning material.

b. Knowledge of Specific Context

Context knowledge is a competency that becomes the closest bridge or understanding between the essence of the material and the perceptions of students. The form of the context in question is in the form of phenomena or events experienced by students or in the form of everything that is close to them student life.

c. Knowledge of Learner and Learning

Knowledge of learners is knowledge of how far teachers understand students so that learning is more effective in order to help students to learn easier and every learner gets the opportunity to learn. A teacher must understand students from several aspects including: Learning Style, Prior Knowledge, Level of Learning Students, Life Experience, Emotions, and Behavior Issues.

Knowledge of learning That is a way that can be used in order to help the teacher deliver teaching by considering the characteristics of students, knowledge related to learning activities, tools/materials/learning media used, helping students who have difficulty, holding interesting activities or activities in learning, using interesting learning media, and helping students who find difficulty.

d. Pedagogical Knowledge

Pedagogical Knowledge describes knowledge in a related depth with teaching and learning theory and practice that includes objectives, processes, methods learning assessment, strategy and others. Pedagogical knowledge requires understanding of cognitive, affective, social and learning theory development and how the theory can be applied in the learning process.

e. Curriculum Knowledge

According to Nasution (2012) curriculum is a series of plans for expedite the teaching and learning process. Curriculum Knowledge is teacher knowledge on the connectivity of one content to other content. Neither the content before nor the after the content being taught. This is useful as a material map and as an input quickly to find out what material has not been mastered by students.

f. Knowledge of General Educational Context

Knowledge of General Educational Contexts is an understanding of the classroom, the governance and financing of school districts, the character of school communities (Shulman, 1986). In addition, Knowledge of General Education Context in the form of knowledge about the efficient use of teaching time, the number of students, school facilities, student abilities (Low Achiever, Middle Achiever and High Achievers). General Educational Context are the aspects behind the teacher's decisions in making lesson plans. The two decisions include of how deep is the scope of the discussion on the content taught in class and how wide is the content that can be taught by teacher

g. Assessment Procedures, Evaluation of Outcomes, Educational Ends, Goals, Purposes and Values

Assessment procedures are comprised of knowledge on how assessments should be done, what kind of assessments that should be run and all aspects of assessments required in classroom education. Evaluation outcomes are the knowledge regarding how the evaluation is to be used afterwards, such as for revising the curriculum or for students' benefit (high-stakes testing). Educational ends, goals, purposes and values are the knowledge regarding the various aspects that education is expected to contribute,

from classroom scale (e.g. students' understanding of content knowledge) to national or even worldwide scale (e.g. national education goals). (Shulman, 1986).

There have been some previously related studies of the implementation of Pedagogical Content Knowledge. First, the research by (Amanda & Karlina 2022). This research discussed about the implementation of pedagogical content knowledge (PCK) in numeracy and literacy. The result of the pretest conducted at the Global Islamic Boarding School, which was 49.0, increased the post-test score to 57.04. Meanwhile, the Numeration from 30.12 increased to 49.58. With an increase in the value of students, educators are able to improve the way that students are able to receive material well and easily accessible. Second, the research by (Effendy & Ellianawati 2018). This research discussed about the implementation of pedagogical content knowledge in physics. The result showed that there was an increase in learning outcomes by the implementation of pedagogical content knowledge (PCK) with t count $>$ t table and N-gain score of student learning outcomes of 0.60. Third, the research by (Assa'adah, 2021). This research discussed about the influence of pedagogical content knowledge in economy. The results showed that simultaneously there was an effect of Pedagogical 23 Content Knowledge (PCK) and Teacher Teaching Discipline on learning outcomes of 34.8%. Partially Pedagogical Content Knowledge (PCK) affects learning outcomes by 47.2% and teacher teaching discipline affects learning outcomes by 16.5%. Regarding to the background of the problem above, it is clear that teaching and learning activities cannot be separated from the implementation of the pedagogical content knowledge (PCK). Because of that, the researcher chooses the title "The Effectiveness of Pedagogical Content Knowledge in English Teaching and Learning Process". Based on the formulation above, the objective of this research is: To

determine the effect of using pedagogical content knowledge on student learning outcomes.

3. Methods

3.1. Participants and context

The subject of the research was the fourth grade of SD N Klegenrejo. The researcher chose two classes of the students from the whole class as sample in this research. The 4A was control class and 4B was experimental class. This research was conducted in April to May 2023. In this case, sampling technique was used to take sample is purposive sampling. According to Arikunto (2006) purposive sampling is the process of selecting sample by taking subject that is not based on the level or area, but it is taken based on the specific purpose. With purpose sampling the researcher can choose the sample those that representative and get represent of population.

3.2. Material

The instrument used in this study was test.

3.3. Data Collection and analysis

In collecting the data, the writer did test to the students. The test would be given twice: pre-test and post-test. The pre-test used for starting point of the investigation and to know the students' competence in English before they are given the treatment. Then, at the end of treatment, the post-test was given to find out the students' improvement and significance difference between both classes after the treatment were given.

According to Brown (2004) test is a method of measuring someone's knowledge, ability or performance in a given domain. Based on the statement above, test can be used to measure the students' ability or students' learning achievement. In this research, the researcher used pre-test and post-test. Pre-test will be given to both control group and experimental group. It will be conducted before the treatment and post- test. The purpose is to know students' outcome in. Meanwhile, post-test will be conducted after treatment. It also will be given to both control group and experimental group.

In this research, the data obtained from Quasi-experimental study were submitted for statistical analysis using the Statistical Package for the Social Science (SPSS) version 20. The researcher analyzed the data from the test (pre-test and post-test). First the data concerned with the post-test. In analyzing the data obtained from the text, the researcher used some techniques, they are:

1. Data Descriptions

In analyzing the data description, there are two analyses to be done, they are distribution of frequency data and descriptive statistics.

a. Distribution of frequency data

In distributions of frequency data, the students' score interval, frequency, percentage are achieved.

b. Descriptive statistics

In descriptive statistics, number of samples, the score of minimal, maximal, mean, standard deviation, and standard error of mean are obtained.

2. Prerequisite analysis

a. Normality test

The normality test is used to know the data normal distribution or not. In this research, the researcher will use SPSS version 25 to test normality of test.

b. Homogeneity Test

Test of homogeneity aims to determine whether the sample taken from the population have the same variance or do not show any significant differences from each other.

c. T-test

The researcher used SPSS version 25 program to analyze the data. The researcher applies the paired sample test and independent sample test to analyses the test. According to Widiyanto (2013), paired sample test is one of the testing methods uses the effectiveness of the treatment.

3.4. Limitations to the Study

In this research, the researcher will focus on of teaching and learning process using Pedagogical Content Knowledge in English material. As the research subject, the researcher chooses the students in 4th grade. One class will be control class and the other will be experimental class.

4. Results and Discussion

This research aims to determine the difference between the 4th grade students of SD N Klegenrejo taught by using Pedagogical Content Knowledge and those who are taught by using a conventional method. In addition, this research also aims to determine the effectiveness of using Pedagogical Content Knowledge in teaching and learning process. The data in this research include pre-test and post-test.

4.1. Result of Pre-Test

The control class is the class taught without using Pedagogical Content Knowledge. Subjects in the control group pretest are 22 students. From the results of the pretest, data showed the highest score achieved by students is 100 and the lowest score is 16. By using SPSS, it is known that the average score (mean) achieved by students in the control group pretest is 62,27; and the standard deviation is 20,624.

The experimental group is a group taught using Pedagogical Content Knowledge (PCK) in teaching and learning process. Subjects in the experimental group pretest are 20 students. From the results of the pre-test, the data showed the highest score achieved by students is 100 and the lowest score is 40. By using SPSS, it is known that the average score (mean) achieved by students in the experimental group pretest is 63,10; and the standard deviation is 16,039.

4.2. Result of Post-Test

A posttest of the control class aims to look at outcomes of learning outcomes without using Pedagogical Content Knowledge (PCK). From the results of the posttest, the data showed the highest score achieved by students is 100 and the lowest score is 13. By using SPSS, it is known that the average score (mean) achieved by students in the control group pretest is 68,59; and the standard deviation is 25,974.

A post-test of experimental class aims to determine the result of student learning outcome after treatment. From the post-test, data showed the highest score achieved by students is 100 and the lowest score is 26. By using SPSS, it is known that the average score (mean) achieved by students in the experimental group posttest is 86,10; and the

standard deviation is 20,222.

4.3. Result of Normality Test

The normality test was conducted on the data that obtained from the pretest and posttest, both the control group and the experimental group. Data is said to be normally distributed if the p value obtained from the calculation is greater than 0.05. The normality test results are known that value of sig. (2-tailed) is greater than 0.05, so it can be concluded that the distribution of the data of pretest and the data of the posttest both experimental and control groups are normal.

4.4. Result of Homogeneity Test

The homogeneity test is done after the normality test. Data is said to be homogeneous if the significance value is greater than 0.05 (significance level). The value of p (Sig.) of the pre-test control class and experimental class (0,393) was greater than 0.05 and value of post-test control class and experimental class (0,143) was greater than 0.05. It means that the sample variance was homogeneous.

4.5. Result of Hypothesis Testing

Paired Sample T-Test

In hypothesis testing, the writer analyzed a significant effect on the students' pre-test and post-test by using the Pedagogical Content Knowledge at SD N Klegenrejo. To find out whether or not there was a significant effect on the students' pre-test and post-test by

using the Pedagogical Content Knowledge at SD N Klegenrejo. the writer analyzed it using Paired Sample T-Test.

From analysis above, Since the p-output was lower than significant level of 0.05, it means hypothesis was accepted and null hypothesis was rejected. In the table was found the p-output 0.000, it was p-output $0.000 < 0.05$. The result of testing hypothesis was accepted and null hypothesis was rejected. It can be stated that there was a significant effect on the students' learning outcomes by using Pedagogical Content Knowledge.

Independent Sample T-Test

In hypothesis testing, the writer analyzed a significant difference on the students' learning outcomes by using the Pedagogical Content Knowledge than those who are taught by using conventional method at SD N Klegenrejo. To find out whether or not there was a significant difference on the students' learning outcomes by using the Pedagogical Content Knowledge than those who are taught by using conventional method at SD N Klegenrejo, the writer analyzed it using independent sample t-test.

From analysis above, Since the p-output was lower than significant level of 0.05, it means hypothesis was accepted and null hypothesis was rejected. In the table was found the p-output 0.020, it was p-output $0.020 < 0.05$. The result of testing hypothesis was accepted and null hypothesis was rejected. It can be stated that there was a significant difference on the students' learning outcomes by using Pedagogical Content Knowledge than those who are taught by using conventional method.

5. Conclusion

Based on the results of the research and discussion in the previous chapter, it can be concluded that there is significant differences in students' learning outcomes taught by Pedagogical Content Knowledge (PCK) with the students taught without Pedagogical Content Knowledge (PCK). Learning outcomes of Pedagogical Content Knowledge (PCK) shown by the results of experimental group post-test and control group. The p-output was lower than significant level of 0.05, it means hypothesis was accepted and null hypothesis was rejected. In the table was found the p-output 0.020, it was p-output $0.020 < 0.05$. The result of testing hypothesis was accepted and null hypothesis was rejected. It can be stated that "There is a significant difference on the students' learning outcomes by using Pedagogical Content Knowledge than those who are taught by using conventional method". This shows that Pedagogical Content Knowledge is effective to be used in English teaching and learning process for fourth grade of SD N Klegenrejo.

6. Acknowledgement

I would like to thank the school principal of SD N Klegenrejo who have collaborated to work together so that the research could be finished.

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