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The application of fairy Tale-Based Learning methods in improving student learning outcomes in Photosynthesis Materials As the most Important Process on Earth for grade IV Students of Mi Muhammadiyah Cekel for the 2023/2024 Academic Year

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Abstract:
This study aims to analyze the effectiveness of fairy tale-based learning methods in improving the learning outcomes of grade IV students of MI Muhammadiyah Cekel in photosynthesis materials. Photosynthesis is a fundamental process for life on Earth, so a good understanding of this concept is very important for students. The fairy tale method was chosen as an innovative approach to increase students' interest and understanding of the material. This study uses a quantitative approach with a pseudo-experimental design. Data was collected through learning outcome tests before and after the application of the fairy tale method and observation of student learning activities. The results of the study showed that there was a significant increase in student learning outcomes after the application of the fairy tale-based learning method. Students are more enthusiastic, easily understand concepts, and able to remember the material longer compared to conventional methods. Thus, this method is recommended as an effective learning alternative in teaching science concepts to elementary school students.

Keywords: Story-Based Learning, Fairy Tales, Learning Outcomes, Photosynthesis, Elementary School.

INTRODUCTION

Photosynthesis is a fundamental process in life on Earth because it is the basis of the food chain and the supply of oxygen. Understanding this concept is very important for elementary school students so

that they can appreciate the role of plants in life. However, in classroom learning, students often have difficulty understanding the concept of photosynthesis because of its abstract nature. According to recent research, innovative learning methods are indispensable to increase the effectiveness of students' understanding in science subjects (Rahman & Putri, 2021). Conventional learning methods, such as lectures and textbook reading, are often less effective in improving students' understanding. Several studies have shown that the use of more interactive and experiential methods can help students in understanding complex material (Sari et al., 2022). Therefore, innovations are needed in learning methods that can increase students' absorption and interest in learning, one of which is a fairy tale-based learning method.

The fairy tale method involves delivering material through an interesting narrative, making it easier for students to understand and remember the concepts taught. Recent research shows that a story-based approach can improve student motivation and learning outcomes in a variety of subjects (Hidayat & Kusuma, 2023). However, the application of this method in science learning, especially in photosynthetic materials, is still not widely done. This is a research gap that needs to be explored further. Based on this background, this study aims to answer several key questions. First, how to apply the fairy tale-based learning method in teaching the concept of photosynthesis to grade IV students of MI Muhammadiyah Cekel? Second, how effective is this method in improving student learning outcomes compared to conventional learning methods? By answering this question, it is hoped that new insights can be obtained about the effectiveness of the fairy tale method in science learning.

A number of studies have proven that story-based learning methods can improve student learning outcomes in certain subjects, especially in the field of language and social (Prasetyo & Lestari, 2021). However, there are still few studies that specifically examine the application of this method in science learning, especially in photosynthetic materials. Therefore, this study aims to fill this gap by exploring the effectiveness of the fairy tale method in improving students' understanding of the concept of photosynthesis. This study aims to analyze the application of fairy tale-based learning methods in teaching photosynthesis materials to grade IV students of MI Muhammadiyah Cekel. In addition, this study also aims to measure the effectiveness of this method in improving student learning outcomes compared to conventional methods. It is hoped that this research can contribute to the development of more innovative and effective learning methods in improving students' understanding of natural sciences.

This study uses a quantitative approach with a pseudo-experimental design. The subject of the study is grade IV students of MI Muhammadiyah Cekel for the 2023/2024 academic year. Data collection was carried out through pre-test and post-test to measure student learning outcomes before and after the application of the fairy tale-based learning method. In addition, observations and interviews were conducted to obtain additional data regarding student responses and involvement in learning. Data analysis was carried out using statistical tests to determine the significance of the difference in learning outcomes between the experimental and control groups. Thus, this research is expected to contribute to science learning innovation at the elementary school level.

METHODS

This study uses a quantitative approach with a quasi-experimental method. The main source of data in this study is grade IV students of MI Muhammadiyah Cekel for the 2023/2024 academic year. Sample selection was carried out by purposive sampling technique, where two classes were selected as the experimental group and the control group. The experimental group will be given fairy tale-based learning, while the control group will receive learning with conventional methods. Primary data was obtained through the results of the pre-test and post-test of the application of the fairy tale-based learning method. In addition,

secondary data was obtained from literature studies related to fairy tale-based learning and its effectiveness in improving student learning outcomes (Yusuf, 2021).

In this study, a pre-test was conducted before the learning intervention began to determine students' initial understanding of the concept of photosynthesis. Post-test was carried out after all learning sessions were completed to measure the improvement of students' understanding after applying the fairy tale-based learning method in the experimental group and the conventional method in the control group. The test questions used in the pre-test and post-test are designed in the form of multiple choice and description, which reflects an indicator of students' understanding of photosynthesis. These questions have been validated by education experts to be in accordance with the applicable curriculum.

In addition to test results, research data is also collected through observation and interviews. Observations are made during the learning process to record student engagement, interaction with teachers, and their level of participation in learning. Meanwhile, interviews were conducted with class teachers to get perspectives on students' difficulties in understanding the concept of photosynthesis and teachers' experiences in using fairy tale-based learning methods. The data from these observations and interviews aim to provide a deeper understanding of the effectiveness of the learning methods used in this study.

Documentation data from schools, such as student report card scores in Natural Sciences (IPA) subjects, is also used to understand students' academic backgrounds. This documentation serves as a comparison in assessing the effectiveness of the learning methods applied. By combining various data sources, this study is expected to be able to provide more valid and comprehensive results regarding the impact of fairy tale-based learning on student learning outcomes.

The data obtained from the pre-test and post-test will be analyzed using descriptive and inferential statistical tests. Descriptive analysis was conducted to see an overview of the improvement of student learning outcomes, including average, median, and standard deviation. Meanwhile, inferential analysis uses a paired sample t-test to measure the significance of differences in learning outcomes before and after the application of the fairy tale-based learning method (Setiawan, 2022). In addition to test analysis, data from observations and questionnaires were also analyzed qualitatively. Observation is used to evaluate student interactions in learning as well as how fairy tales help understand the concept of photosynthesis. Data from the questionnaire given to students and teachers is used to determine the level of student involvement and their perception of the learning methods applied.

Normality and homogeneity tests are performed first to ensure that the data meet the assumptions of parametric statistics. If the data are normally distributed and homogeneous, then the paired t-test will be used to compare the pre-test and post-test results in each group. Meanwhile, an independent t-test will be applied to compare the improvement of learning outcomes between the experimental group and the control group. If the data does not meet the parametric assumptions, then non-parametric analyses such as the Wilcoxon test or the Mann-Whitney test will be applied. With these various analysis methods, the study is expected to show that the fairy tale-based learning method is more effective than the conventional method in improving students' understanding of the concept of photosynthesis. Thus, this research can contribute to the development of innovative learning strategies in elementary schools.

RESULTS

This study aims to analyze the effectiveness of fairy tale-based learning methods in improving students' understanding of the concept of photosynthesis. Data were obtained through pre-test and post-test given to two groups, namely the experimental group using the fairy tale method and the control group using the conventional method. Using a quantitative approach, this study evaluates the improvement of student learning outcomes after the application of different learning methods.

Before being given the treatment, students from both groups underwent a pre-test to measure their initial understanding of the concept of photosynthesis. The results of the pre-test showed that the two groups had almost the same level of understanding, with the average pre-test score of the experimental group of 60.2 and the control group of 61.0. This shows that before the treatment was given, students' understanding of the material had not experienced significant differences.

After the learning method is applied, students are given a post-test to measure the improvement of their understanding. The post-test results showed that the experimental group that used the fairy tale method experienced a greater increase than the control group that used the conventional method. The average post-test score of the experimental group reached 85.4, while the control group only reached 75.6. Thus, the increase in understanding in the experimental group was more significant than in the control group

Pre-Test and Post-Test Results

Group	Number of Students	Average Pre-Test	Average Post-Test	Increase (%)
Experiment	25	60.2	85.4	41.89%
Control	25	61.0	75.6	24.10%

In addition to quantitative data from the pre-test and post-test, observations during the learning process also showed that students in the experimental group were more active in asking questions, more enthusiastic about learning, and easier to remember the concepts taught through fairy tales compared to the control group. This student activity shows that the fairy tale-based method is able to increase student engagement in learning.

The analysis of the results of the questionnaire given to students also supports the findings. Most of the students in the experimental group stated that they had an easier time understanding the concept of photosynthesis through fairy tales because the interesting storyline helped them remember the information longer. In contrast, students in the control group felt that conventional methods were less interesting and tended to be boring.

To ensure the validity of the data, several verification steps are carried out as follows:

Normality Test: Pre-test and post-test data are tested using the Kolmogorov-Smirnov normality test to ensure that the data is normally distributed before conducting an inferential statistical test. Homogeneity Test: The Levene test is performed to ensure that the variance between the experimental and control groups is homogeneous. Paired Sample T-Test: Used to compare pre-test and post-test results in each group to see the significance of the improvement in learning outcomes.

Independent Sample T-Test: Used to compare the difference in learning outcomes between the experimental and control groups to ensure the effectiveness of the fairy tale-based learning method. The results of the statistical test showed that there was a significant difference between the learning outcomes of students who used the fairy tale method and the conventional method ($p < 0.05$). Thus, it can be concluded that fairy tale-based learning has a significant positive impact on students' understanding of photosynthesis.

DISCUSSION

Data validation is carried out to ensure that the results of this study have a high level of accuracy and reliability. One of the validation steps used is data triangulation, where the results of the pre-test and post-test are compared with observation data and student questionnaire results. In addition, validation is also carried out through checking the reliability of the research instrument using the Cronbach's Alpha reliability test. The results show that the instrument used has a high level of reliability. To minimize bias, the data collection process was carried out by following strict procedures, including ensuring that the environmental conditions during the pre-test and post-test were similar for both groups. In addition, teachers who provide material in both groups have the same qualifications to avoid the influence of differences in teaching methods. The validation results show that the data obtained has high consistency, with valid pre-test and post-test results based on statistical analysis. The normality test showed that the distributed data was normal, and the homogeneity test confirmed that the variance between the groups did not differ significantly. The paired t-test also proved that there was a significant improvement in students' understanding after the application of the fairy tale-based learning method. In addition, observation during the learning process supports quantitative outcomes, where students in the experimental group are more actively involved and show greater interest in the material being taught. Data from the questionnaire also showed that students preferred the fairy tale-based learning method over the conventional method because it was considered more interesting and easy to understand. Based on the results of this validation, it can be concluded that the findings of this study have a strong level of validity and show that the fairy tale-based learning method is effective in increasing students' understanding of the concept of photosynthesis.

CONCLUSION

Based on the findings of this study, it can be concluded that the fairy tale-based learning method has a significant positive impact on improving student learning outcomes in understanding the concept of photosynthesis. This was evidenced by higher *post-test* results in the experimental group compared to the control group, which showed that students who learned through a fairy tale-based approach had a better understanding of concepts compared to those who used conventional learning methods. In addition, the results of observations made during the learning process also showed that students in the experimental group were more active in participating in discussions, more enthusiastic in participating in lessons, and had higher engagement compared to students in the control group who received conventional learning.

In terms of academic impact, this research makes a valuable contribution to the development of more innovative and effective learning methods, especially in science learning at the elementary school level. Fairy tale-based learning methods have been proven to be able to help students understand complex concepts in a more understandable and engaging way. By using relevant and contextual storylines, students more easily relate the material they learn to their daily experiences, thereby improving memory and deeper understanding. These findings have important implications for educators in designing more effective learning strategies, not only in Natural Sciences (IPA) subjects, but also in various other fields of study that require a strong understanding of concepts.

In addition to providing academic benefits, the use of fairy tale-based learning methods also has a significant social impact in creating a more interactive and fun learning environment. With this approach, students feel more motivated to learn, more courageous in expressing their opinions, and more active in participating in class discussions. This shows that story-based learning not only helps improve learning outcomes, but also contributes to the development of students' social skills, such as communication skills, critical thinking, and cooperation with classmates. Thus, this method can be one of the effective learning strategies to improve the quality of education in a more holistic way.

Furthermore, the findings of this study indicate that fairy tale-based learning can be an alternative teaching method that is more inclusive and can be adapted to various characteristics of students. This approach is not only beneficial for students with high academic ability, but it also helps students who have difficulty understanding abstract concepts in a more concrete and interesting way. Therefore, the application of this method in elementary schools needs to be considered more broadly, with the support of teachers, curriculum, and facilities and infrastructure that support story-based learning.

Overall, this study shows that fairy tale-based learning methods can be an effective strategy in improving student learning outcomes, both in terms of academic understanding and the development of their social skills. Considering the benefits that have been proven in this study, it is hoped that this method can be more widely applied in science learning and other fields of study at the elementary school level, in order to create a more interactive, fun, and meaningful learning environment for students.

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