



Media Learning Patch Board in Science Learning Energy Change Materials for Children with Intellectual Disabilities

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ABSTRACT

The purpose of this study was to determine the use of patch board learning media in science learning about energy changes for children with intellectual disabilities. The method used in this research is one group pretest-posttest. The subjects in this study were children with intellectual disabilities who attended a special school in Indonesia. Children with intellectual disabilities are students at the senior high school level. After learning to use the patch board media, the test results increased. The average initial score obtained through the initial test was 3.75 and then increased to an average of 8. This was because the use of patch board learning media was interesting and easily understood by children. This is also proven that the use of patch board media in science learning materials on energy change can improve the understanding of children with intellectual disabilities, especially in learning science for energy change materials.

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1. INTRODUCTION

Children with intellectual disabilities or mental retardation are children who have intellectual functions that are significantly below average along with obstacles in Environmental adaptation that occur during development. Based on this definition, it can be concluded that children with intellectual disabilities experience obstacles in their learning process. Learning for children with special needs is designed to develop their potential and abilities. The characteristics of science learning are the existence of inquiry and discovery activities carried out by students, so media that are following the characteristics of children with special needs are needed (Fajrie & Masfuah, 2018; Prabowo, 2015).

Children with intellectual disabilities need more interesting learning media so that the learning material can be understood by children easily. The use of interactive multimedia learning media which includes audio and visuals is very influential in motivating and increasing the enthusiasm of children with intelligence barriers (Maulidiyah, 2020; Arief & Isnain, 2020). Holida and Wijiastuti (2018) revealed that the implementation of the scientific approach with herbarium media succeeded in increasing the mastery of science learning materials for mild mentally retarded students. The use of computer animation media also affects increasing science learning outcomes for mild mentally retarded children (Soendari & Asri, 2012). The use of computer-based learning media has been proven to increase student activity and participation in the learning process (Prihati & Paramita, 2016). There are several types of media, one of them, is a patch board. Patch board is an infraboard-based learning media equipped with pictures that have been glued with velcro. This learning media is considered suitable for use in science learning about material about energy changes.

Currently, there are many studies on science learning about energy changes. Among them, there are moving media such as dioramas of energy changes from electricity to light, motion, and sound. Learning science using visual media can improve the learning outcomes of mentally retarded students (Istanti & Triwidjaja, 2014). Picture media in practical activities and visual communication can improve science learning (Herlianti, 2015; Yarkova et al., 2017) and make it easier for students to learn (Fatma, 2013). Learning science by using teaching aids can improve learning achievement (Taryono, 2019). However, until now there has been no research on media learning patch boards in science learning energy change materials for children with intellectual disabilities.

Therefore, this study aims to determine the use of patch board learning media in science learning about energy changes for children with intellectual disabilities. The method used is one group pre-test and post-test. The research subjects were 4 children with intellectual disabilities at Special School in Indonesia. The novelty of this research is a patchboard learning media about changing energy into electricity. We believe that this study can create inspiration for developing more creative learning media to support the learning of children with intellectual disabilities.

2. METHOD

2.1. Research Subjects

The method used in this research is one group pretest-posttest. The subjects in this study were children with intellectual disabilities who attended a special school in Indonesia. Children with intellectual disabilities are students at the Senior High School level. There are three stages in this research. The first stage is preparation before doing the treatment. The second stage is implementation. The implementation stage is divided into three, namely pre-

implementation to give an initial test, giving a treatment by applying patch board media in learning, and giving a final test.

Interviews with teachers at schools were also conducted to obtain student demographic data and the level of students' cognitive abilities. The data collection was carried out to develop research instruments. To analyze the data obtained from the research results will be compared. The data collected in the form of pretest and posttest scores were then compared.

2.2. Research Procedure

The research conveys learning materials about energy changes. This study focuses on introducing energy changes to students with intellectual disabilities in grade 10 extraordinary high school. The flow of research carried out includes: (i) the preparation stage, (ii) the implementation stage, and (iii) the final stage of the research.

Figure 1 explains the procedure for classroom action research which consists of several stages. The first stage is the preparation stage.

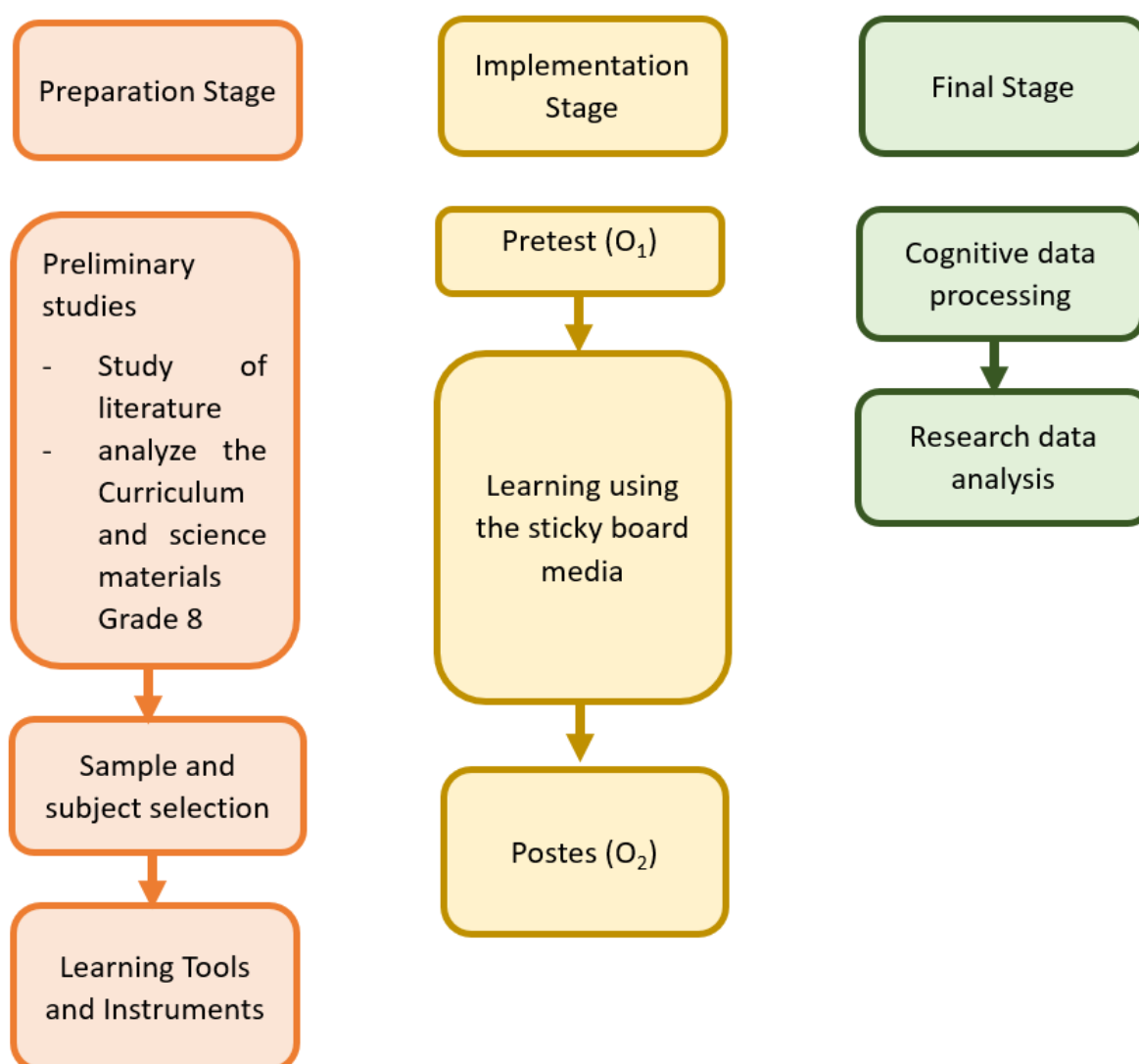


Figure 1. Research flow.

The preparation stage is divided into 3 parts. The first part is a preliminary study that contains activities to conduct a literature study on relevant theories regarding the learning

media that will be used. The second part is to analyze the curriculum and science material regarding energy changes for grade 8. The second part is to conduct sample and subject selection activities. The third part is to design learning tools and research instruments in the form of tests to measure children's understanding at the beginning of learning and final tests to measure learning outcomes after using patchboard learning media. After going through the preparation stage, then the next is the implementation stage.

The implementation phase is divided into 3 stages. The first stage is to give an initial test to measure science process skills and student learning outcomes before being given treatment. The second stage is to provide treatment, namely by applying patch board learning media to science learning about energy changes. The last stage in the implementation stage is to give a final test to measure the improvement in children's understanding after being given treatment. The last stage in this research procedure is the final stage. The final stage of the research was divided into 2 stages, namely processing the pretest and post-test data and analyzing the research data.

3. RESULTS AND DISCUSSION

3.1. Student Demography

Figure 2 describes the demographics of students consisting of reading skills, writing skills, numeracy skills, and motor skills. The subjects in this study were students with intellectual disabilities.

Student A can copy simple sentences from the blackboard and books but is still unable to read simple sentences. Student A has been able to count with the addition operation but has not been able to count with the minus, multiply, and divide operations. Student A has good motor skills. Student AN can make sure simple sentences from the whiteboard and books but has not been able to read simple sentences. In learning, Student AN is already active in communicating but is still difficult to understand. Student AN has quite good motor skills although they still need assistance. Student M can read and write well. Student M has been able to count with addition and subtraction operations less than 100. Student M has very good motor skills. Student S can read and write very well. Student S can count using operations plus, minus, times, and for less than 100. In classroom learning, Student S can communicate well and actively.

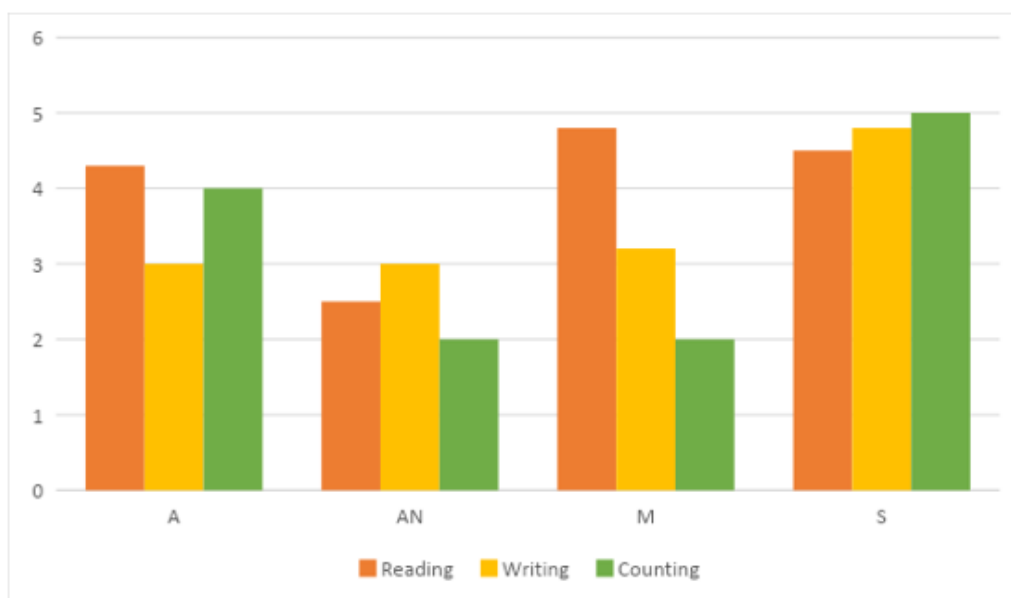


Figure 2. Student's ability condition.

3.2. Learning Process Activities

Activities carried out before the learning process are preparing patch board learning media. The patch board consists of two parts, namely the board to paste and the image to be pasted. Patch board learning media is made of lots of infraboard attached with Velcro.

Learning activities begin with reading a prayer together, then the teacher takes action to approach and apperception to children. In the apperception activity, the teacher also relates the lesson to be learned today, namely about energy changes.

In the core activity, the teacher will ask questions on the initial test sheet orally and the child will answer orally as well. The teacher will assess the results of the initial test to determine the child's initial ability regarding science lessons on energy change material. After the initial test activity was completed, the teacher started learning using the patch board learning media. Children are asked to observe pictures and match pictures by pasting pictures according to the material being studied. During the activity of observing and matching the children, one by one mentioned their experiences when they saw the pictures on the patch board. The teacher asks the children to name the types of energy changes, such as water energy, solar energy, and wind energy. At the end of the activity, the teacher and children conclude the learning activities that have been carried out. Students work on written questions about the material learned today.

3.3. Analysis of Result Data

Table 1 describes the students' scores in answering the initial test questions regarding energy changes. These results describe the child's initial ability which is still far from the minimum completeness criteria value. Student A and student S answered with a correct score of 5 and the test result was 50. Several questions were not answered by student A and student S. Student AN answered with a correct score of 3 and the test result was 30. Not much different from Student ANs, M students only answered with a correct score of 2 and the test result was 30. In their activities, student A and student AN did not answer the questions given. The child's response is related to learning barriers in mentally retarded students. Learning barriers in mentally retarded children are limitations in their thinking functions. Overall students get an average value of 3.75. One of the other causes of low initial test scores is the condition of children who are not enthusiastic and not interested in learning activities. Using interesting learning media for children is proven to increase children's learning motivation (Kuswandi & Mafruhah, 2017; Sari & Suryana, 2019). Increasing children's learning motivation can affect the final test results which show children's understanding of the learning material being studied.

Table 1. List of student scores (initial test).

No	Student's name	The correct answer on the initial test	Acquired Value
1.	A	5	50
2.	AN	3	30
3.	M	2	20
4.	S	5	50

Table 2 describes the score acquisition of students with intelligence barriers in answering test questions regarding energy changes. These results illustrate that maximum results have been achieved and have exceeded the predetermined minimum completeness criteria. After doing the treatment, children's understanding of science learning material changes in energy so much improved. student A increased 40% from 5 correct answers to 9 correct answers.

Student AN experienced an increase of 30% from 3 correct answers to 6 correct answers. Student M experienced an increase of 30% from 2 correct answers to 6 correct answers. Student S experienced an increase of 50% from 5 correct answers to 10 correct answers.

Table 2. List of student scores (final test).

No	Student's name	The correct answer on the final test	Acquired Value
1.	A	9	90
2.	AN	6	70
3.	M	5	60
4.	S	10	100

Figure 3 shows a comparison of the results of the learning test on energy changes which shows an average value of 8. This proves that students have increased their ability to understand science by learning material energy changes. Based on the two data above, the results of the initial test can be compared with the results of the final test. This comparison proves that the patch board learning media is proven to be able to improve children's understanding of science learning about energy change materials.

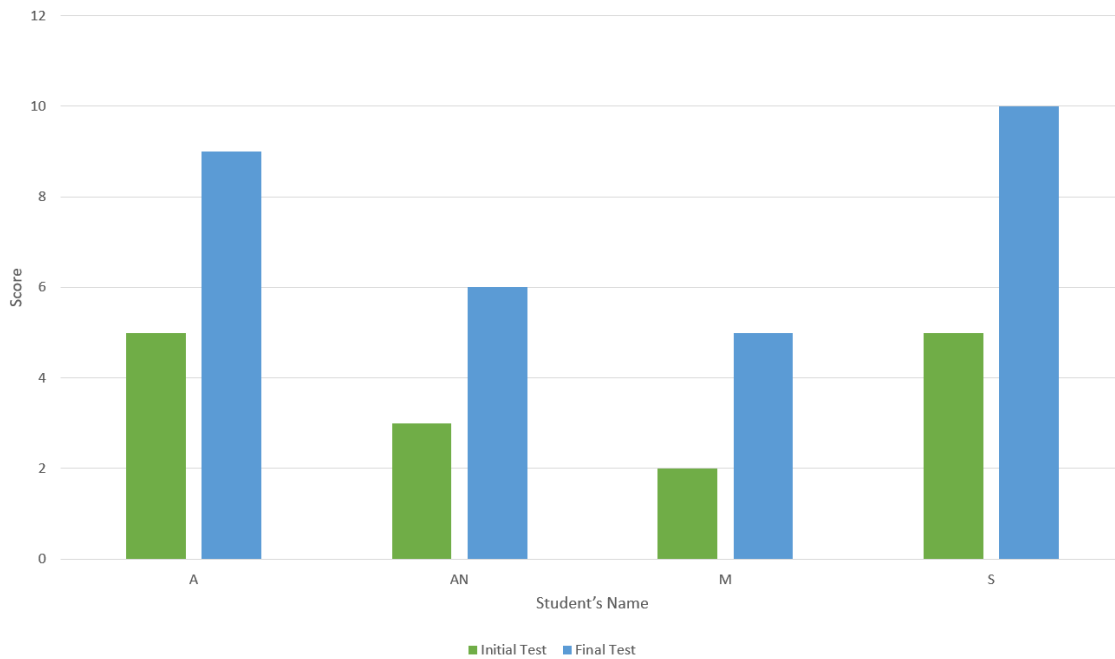


Figure 3. Comparison of pre-test and post-test scores.

4. CONCLUSION

The purpose of this study was to determine the use of patch board learning media in science learning about energy changes in children with intellectual disabilities. This study uses the one-group pretest-posttest method. Learning of children with intellectual disabilities using patchboard media is proven to increase children's understanding of science learning about energy changes. Before using the patch board media the students got an initial test score with an average of 3.75 but after learning to use the patch board media the test results increased by an average of 8. The increase in value occurred because of the results of using patch board learning media. This also proves that the use of patchboard media in science

learning material on energy change can improve the understanding of mentally retarded children, especially in science learning about energy change.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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