Abdimas Umtas: Jurnal Pengabdian Kepada Masyarakat
LPPM-Universitas Muhammadiyah Tasikmalaya
Volume: 6 Nomor: 1
E-ISSN: 2614 - 8544

Early Introduction of Science and Technology Through Optimizing the Use of Science Props Media for MI Muhammadiyah Wonorejo Students

Mohtar Yunianto[a)], Suparmi, Cari, Fuad Anwar, Suharyana and Darmanto

Department of Physics, Universitas Sebelas Maret, Surakarta, Indonesia
[a)]Corresponding author : mohtaryunianto@staff.uns.ac.id

Abstract

Learning science and technology to children so far by telling stories so that children are easily bored, and as a result, children lack understanding of science and technology learning. Efforts in introducing science and technology to early childhood have been made to minimize this incident. The activity is in the form of training in using electrical and magnetic props for MI Muhammadiyah Wonorejo students. The activity begins with a pretest to determine students' initial ability, followed by introducing the concept of theory and practice of props in groups, electrical material related to series and parallel circuits for magnetism related to static magnets and dynamic magnets. The result is that there is more interest from students to learn, and there is an increase in student understanding of magnetic electricity material and can use teaching aids.
Keywords: teaching aids; science; electricity; magnetism; experiments

INTRODUCTION

Primary school education is to lay the basic intelligence, knowledge, personality, noble character, and skills to live independently and follow further education (Raharjo, 2010). In addition, this basic education can make a child form an individual who can live in groups (Rofiah, 2016). Through basic education, students will be equipped with basic skills related to the ability to think critically, read, write, count and mastery - basic mastery to learn science and technology and the ability to communicate, which is a minimum ability requirement in social life (Saidah, & Ngazizah 2022).

As long as the teacher introduces science learning to children by telling stories, children are easily bored, and as a result, children do not understand science learning (Mayangsari & Nurrachmah, 2021). The application of learning is an interactive activity between teachers and students, which will end with the process of evaluating learning outcomes. Evaluation or assessment is a way to measure the progress of implementation, success and cognitive development and its problems related to the expected learning outcomes in children (Khadijah & Amelia, 2020). Science learning can be defined as the science of nature or the study of events that occur in nature (Narut & Supardi, 2019). Science is a system about the universe obtained through data collection by observation and controlled experiments (Laila et al., 2014).

Learning experiences obtained by children from the environment through observing, imitating and experimenting take place repeatedly, including stimulation that will affect all the potential and intelligence of children (Tomasselo et al., 1993). Therefore, efforts are needed to facilitate children's growth and development in the form of education and learning activities according to their age, needs and interests. In essence, science and technology are directly related to children through natural processes that occur around children (Izzuddin, 2019). The introduction of science and technology should be done from an early age with fun activities and through habituation so that children can directly experience science and technology (Mustika, 2018). Experience is done so that children not only know the results but also understand the process of their science activities (Mulholland & Wallace, 2001). This activity was carried out because the teacher still introduces science learning to elementary school children by telling stories so that children are easily bored. As a result, children lack an understanding of science learning (Gelman & Brenneman, 2004). The lack of science learning props in partner schools, and many still do not understand the use of animation, internet media, and 3D videos in teaching science (Hoban et al., 2011).

METHOD

The activity was carried out in Polokarto District, Sukoharjo Regency, at MI Muhammadiyah Wonorejo, which 60 students in 6 classes attended. The activity's main target is to produce students who can think critically, innovatively, creatively, independently and process-oriented based on learning experiences. This student empowerment activity is carried out with a training method that is carried out continuously.

The activity is carried out in the form of stages. The first stage is a Pretest to determine the extent of students' understanding of practical learning based on teaching aids. The second stage is training using science teaching aids kits, electricity and magnetism to better understand science learning materials. The third stage is using simple teaching aids around the school environment. The fourth stage is a posttest to determine the success of this activity, and the fifth stage is monitoring the sustainability of this activity, as shown in Fig 1.

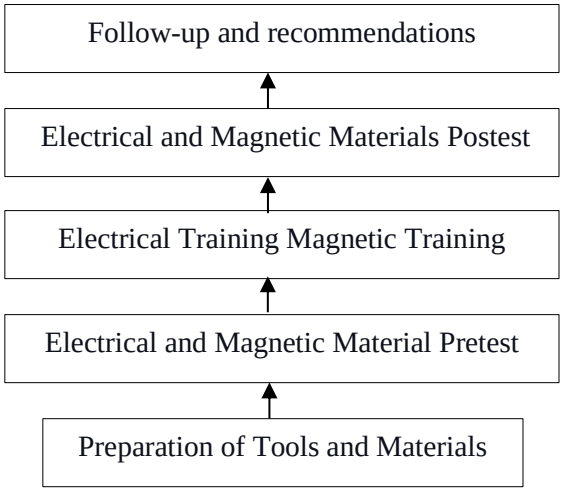

Figure 1. Methods

RESULTS AND DISCUSSION

Community service activities at MI Muhammadiyah Wonorejo are carried out by providing training related to introducing teaching aids in electricity and magnetism. As explained in the Implementation method section, the activity has been carried out in several stages. The initial stage was the implementation of a pretest to test the extent of the student's abilities before training. The pretest was given in a multiple-choice sol of 20 questions, ten electrical materials and ten questions of magnetic material. The results obtained by most students do not understand that they are related to electricity and magnetism material. The result can be seen from the average value of 45 obtained.

The next activity was a theoretical explanation by the Pengabdi Team, carried out by Dr Fuad Anwar, Mohtar Yunianto, M.Si, Drs Suharyana, M.Sc and Drs Darmanto, M.Si, before the students were trained to be introduced to the props. Explained theory related to electricity, the type of circuit in electricity, and the concept of magnetism and events related to magnetism. The introduction activity was divided into two classes to be more effective, with each class consisting of 30 children, as shown in Fig. 2.

Figure 2. Providing material on the theory of electricity and magnetism

After providing electricity and magnetism material, training on using electrical and magnetic props was delivered. Ten props kits were used, assuming the participants were divided into ten groups per class. Each group had three children. So that all children can practice using these props. The props given are magnetic, as shown in Fig 3. Magnetic props that are taught can contain three sub-subjects, namely Electromagnet, Magnetic Field and Gravitational Force Practice.

Figure 3. Magnetic Props

The props consist of iron sand, a compass, a ladam magnet, a shaped magnet (U, I and O), a car magnet, a doughnut magnet, a nail wrapped around the copper wire, thread, an iron clip and a large type D battery.

These magnetic tools are used for educational materials, including Electromagnet Education, Iron Sand Media Magnetic Force Education, Donut Magnet Emergency Lamp Education, Learning the Compass Work Process, Gravity Force Education, Education on Making Compasses with Magnets, Education on Making Magnetic Induction with Nails and Education on Making Windmills with Magnets, wires and batteries.

Students carry out magnetic Props training activities as service assistants. The tools are introduced to students for approximately 2 hours. The children are introduced to magnetic props. Students are enthusiastic about the event, can use the tools directly and do not experience obstacles, as presented in Figure 4.

Figure 4. Training on magnetic props

The next props that were trained were electrical, and these props were used to explain basic electrical concepts and create series and parallel circuits. Consists of a 2.5v flashlight, flashlight fittings, a 2-foot on-off switch, 2 AA batteries, AA batteries, cable insulation, and cables of 2 different colours, as shown in Figure 5.

Figure 5. Electrical teaching aids

The next activity was the introduction of electrical props, where students were taught to make circuits both in series and in parallel. This activity was also carried out for 2 hours after receiving magnetic material. Students were very enthusiastic about the training and managed to make circuits for several models, as shown in Figure 6.

Figure 6. Training on electrical props

After the training was carried out on both electrical props and props to determine the success of the implementation of the activity, a posttest was carried out using the questions given at the time of the pretest, and the results obtained were a significant increase in the ability of students, namely the average score of 65. However, the results were not optimal but provided an increase from the previous score of 45. Efforts from the school are expected to improve further students' abilities by intensely providing teaching with the methods that have been given. At the end of the session, memories were given to the students who were most enthusiastic about participating in the activities and obtained the best scores, As shown in Figure 7.

Figure 7. Appreciation for the best participants

CONCLUSION AND RECOMMENDATION

Activities have been carried out to improve students' ability to understand magnetic electricity material using simple teaching aids, and training is done in groups. After training, students better understand magnetic electricity material and can use teaching aids properly. Recommendations for schools can use the same method for other subjects besides science and technology so that students are more eager to learn.

ACKNOWLEDGEMENTS

Our gratitude to LPPM UNS for funding this activity through the 2022 Group Research Service Grant Scheme and to all the principals and teachers of MI Muhammadiyah Wonorejo for their excellent cooperation so that this activity can be carried out smoothly.

REFERENCES

Gelman, R., & Brenneman, K. (2004). Science learning pathways for young children. Early childhood research quarterly, 19(1), 150-158.

Hoban, G., Loughran, J., & Nielsen, W. (2011). Slowmation: Preservice elementary teachers representing science knowledge through creating multimodal digital animations. Journal of research in science teaching, 48(9), 985-1009.

Izzuddin, A. (2019). Sainstek dan Pembelajarannya pada Anak Usia Dini. BINTANG, 1(3), 353-365.

Khadijah, K., & Amelia, N. (2020). Asesmen Perkembangan Kognitif Anak Usia 5-6 Tahun. Al-Athfaal: Jurnal Ilmiah Pendidikan Anak Usia Dini, 3(1), 69-82.

Laila, M. (2014). Peningkatan Aktivitas Belajar Peserta Didik Menggunakan Metode Percobaan dalam Pembelajaran Sains. Jurnal Pendidikan dan Pembelajaran Khatulistiwa, 3(6).

Mayangsari, M. D., & Nurrachmah, D. (2021). Kiat pembelajaran daring di era covid-19 sebagai upaya penerapan psikologi pendidikan pada proses belajar siswa SMP. Jurnal Pengabdian ILUNG (Inovasi Lahan Basah Unggul), 1(1), 125-133.

Mulholland, J., & Wallace, J. (2001). Teacher induction and elementary science teaching: Enhancing self-efficacy. Teaching and teacher education, 17(2), 243-261.

Mustika, Y., & Nurwidaningsih, L. (2018). Pengaruh Percobaan Sainstek Anak Usia Dini terhadap Perkembangan Kognitif Anak di TK Kartika Siwi Pusdikpal Kota Cimahi. Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 2(1), 94-101.

Narut, Y. F., & Supardi, K. (2019). Literasi sainstek peserta didik dalam pembelajaran IPA di indonesia. JIPD (Jurnal Inovasi Pendidikan Dasar), 3(1), 61-69.

Raharjo, S. B. (2010). Pendidikan karakter sebagai upaya menciptakan akhlak mulia. Jurnal Pendidikan dan Kebudayaan, 16(3), 229-238.

Rofiah, N. H. (2016). Menerapkan multiple intelligences dalam pembelajaran di sekolah dasar. DINAMIKA Jurnal Ilmiah Pendidikan Dasar, 8(1).

Saidah, I. N. A., & Ngazizah, N. (2022). Analysis of small group and individual teaching skills students of microteaching learning. IPA EDU: Jurnal Pendidikan IPA, 2(1), 11-20.

Tomasello, M., Savage-Rumbaugh, S., & Kruger, A. C. (1993). Imitative learning of actions on objects by children, chimpanzees, and enculturated chimpanzees. Child development, 64(6), 1688-1705.