

TRAINING ON THE USE OF THE ELECTRICAL PHYSICS KIT TO IMPROVE THE COMPETENCY OF SCIENCE TEACHERS

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ABSTRAK

Abstrak: Guru IPA SMP perlu menguasai pengetahuan dan keterampilan menggunakan alat peraga berupa KIT Fisika untuk percobaan atau praktek tentang konsep Fisika yang diajarkan agar siswa dapat semakin paham akan ilmu dan konsep Fisika yang mereka pelajari. Kebanyakan alat-alat KIT Fisika yang ada di sekolah jarang digunakan guru IPA karena waktu guru terpakai lebih banyak dalam menyampaikan materi teori yang cukup banyak. Tujuan pengabdian adalah untuk memberikan ilmu pengetahuan dan keterampilan melalui pelatihan di laboratorium untuk para guru, agar mereka dapat mengenali dan menggunakan KIT Listrik SMP untuk melakukan percobaan Fisika sehingga KIT listrik yang ada di sekolah mereka dapat termanfaatkan. Metode pengabdian berupa pelatihan penggunaan KIT Listrik. Lokasi pelatihan dilakukan di laboratorium SMP Negeri 1 Painan Pesisir Selatan yang dihadiri oleh 17 orang guru IPA. Evaluasi pelatihan dengan menggunakan lembar kuesioner. Pelatihan mendapat penilaian yang sangat baik oleh guru pada aspek materi (80,88%) dan sangat baik untuk aspek penyelenggaraan (83,53%) pelatihan serta nilai baik untuk aspek kemampuan pemateri (79,41%).

Kata Kunci: Komponen Instrument Terpadu; Fisika; Listrik; Pelatihan; Guru IPA SMP.

Abstract: Middle school science teachers need to master the knowledge and skills of using teaching aids in the form of physics KIT for experiments or practice on the physics concepts being taught so that students can better understand the physics science and concepts they are studying. Most of the Physics KIT tools in schools are rarely used by science teachers because the teacher's time is used to convey quite a lot of theoretical material. The aim of the service is to provide knowledge and skills through laboratory training for teachers, so that they can recognize and use SMP Electrical KITs to carry out physics experiments so that the electrical KITs in their schools can be utilized. The service method is training in the use of Electrical KIT. The training location was held in the laboratory of SMP Negeri 1 Painan Pesisir Selatan which was attended by 17 science teachers. Evaluation of training using a questionnaire sheet. The training received a very good assessment in the material aspect (80.88%) for the teachers and very good in the implementation aspect (83.53%) of the training as well as good marks for the aspect speaker's ability (79.41%).

Keywords: Integrated Instrument Components; Physics; Electricity; Training; Secondary Science Teacher.



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A. INTRODUCTION

Teacher education and competency must be prepared to be competent and appear in the world of education globally Satria (2016); Sudarsana et al. (2020) while still upholding national culture (Sudarsana et al., 2020; Wikandaru et al., 2020; Morales-Obod et al., 2020). To prepare teachers who are competent in their field, it is necessary to provide a lot of training and update new knowledge material for teachers who teach or prospective teachers who are being prepared (Har et al., 2018; Satria et al., 2023; Satria et al., 2023). Providing training will be able to fill the need for teachers to be more competent in teaching, especially teaching Natural Science (IPA) material, especially Physics. Science teaching in schools by teachers and students cannot only be done by reading textbooks. Media is needed in the form of teaching aids and KIT (Integrated Instrument Box) for science as well as digital application technology that can help teachers to be able to teach science well and correctly (Satria & Sari, 2018; Sudarsana et al., 2019; Sudarsana et al., 2019; Satria et al., 2024). Currently, training and providing learning materials can be done offline or online (Sudarsana et al., 2019; Satria et al., 2023). The use of digital technology has also been widely used by lecturers to assist teachers in conducting training or teaching for their students in learning science or material other than science (Sudarmo, Rasmita, et al., 2021; Rahmat et al., 2021; Maruf et al., 2022). The development of science and technology has greatly helped science teaching and training both during normal situations and during pandemic conditions (Manullang & Satria, 2020; Satria et al., 2023). Technological advances obtained to help science teaching cannot be separated from the role of scientists who like to experiment, carry out experiments, observe, and think critically and creatively about everything in life (Satria & Sopandi, 2019; Satria & Widodo, 2020; Satria et al., 2023). Scientists always strive so that advances in science, technology, engineering and mathematics can be utilized to help humans in all fields, especially in the field of education and advances in laboratory facilities (Satria, 2018; Zulkifli et al., 2022; Ichsan et al., 2023), especially in teaching science experiments in schools. Teaching aids and science KITs really help teachers in teaching abstract concepts so that they are easier for students to understand (Satria, 2013; Satria, 2018; Satria, 2019). Science KIT also functions to hone students' process skills or scientific skills to imitate what scientists do in observing physical phenomena to solve problems (Egline & Satria, 2014; Satria, 2015; Satria, 2021).

Physics science material is interesting to teach, especially Electricity material, where there are lots of experiments that students or teachers can do (Satria, 2016; Lusiani et al., 2021). Using the Physics Science KIT is very helpful in the process of carrying out experiments and proving or discovering the concepts being studied (Satria, 2015; Satria, 2016; Satria, 2017). The use of KIT technology and practical learning media, both virtual and real, really helps teachers in the education and learning process (Noris et al., 2023).

Currently, there are also many teaching applications that provide interesting laboratory activities and can help teachers carry out science learning practices in the classroom in this digital age. Digital applications that teachers can use are those that can make students happy in learning, are not boring, can encourage students to be creative in learning, learn to experiment, discover, and are in line with current advances (Wahyuningtyas et al., 2022; Abidin et al., 2023; Arifin et al., 2023). However, the use of digital laboratories for experiments still has many limitations compared to the use of real experimental equipment with more interesting KIT Science components (Satria, 2019).

The use of teaching aids and Physics Science KITs is very important in supporting Physics learning for conducting experiments at school (Satria & Sari, 2018). In junior high schools, especially in Painan city and Pesisir Selatan district, many have been equipped with Electrical Science KIT boxes and based on surveys and interviews with science teachers before the training, it appears that many science teachers have not yet utilized them in teaching Electrical Physics material. The problem is that many teachers don't know how to use Electrical KIT components, have never tried existing electrical KITs, and don't have time to use these KITs to learn Electrical Physics concepts. To overcome the lack of knowledge and lack of skills of science teachers in using junior high school Electrical KITs and to encourage teachers to want to use electrical KITs in their Physics learning, training was held so that later the knowledge and skills gained could be applied in Electrical Physics learning in the classroom or school science laboratory. By using the Electrical KIT in learning, it is hoped that teachers can show students abstract electrical concepts so that the concepts are easier for them to understand and students can carry out their own experiments to prove and discover the electrical physics concepts they are studying. So that the theories read in books can be proven empirically by teachers or students through experimental activities carried out in the laboratory or demonstrations in class.

The benefits and advantages of using KIT Science for teaching Physics material to elementary, middle school, high school and university students have been widely researched by lecturers and students in Indonesia. These include the results of research by Satria (2015), (Satria, 2019), (Satria, 2020), (Satria 2021). Here the author offers the use of the Electrical Science KIT for training junior high school science teachers so that the Electrical KIT in schools can be utilized optimally by teachers in learning electrical physics material to help students' understanding of the material being taught (Nurdin et al., 2019; Abdullah et al., 2019; Satria et al., 2022). By using the Science KIT, teachers can teach students how to solve physics phenomena problems easily with the help of the KIT provided (Suharyat et al., 2022; Suharyat et al., 2022; Haniko et al., 2023). By teaching training using the Science KIT, it will improve the process skills of teachers and students, hone

investigation skills and discover Physics concepts, and improve the way of thinking of teachers and students to think systematically and critically in observing a Physics experiment (Satria; 2019; Saddhono et al., 2019). The aim of implementing the service by providing training on the use of Electrical KITS to science teachers in the cities of Painan and Pesisir Selatan is to increase the competency of science teachers in carrying out the science teaching process and improve expertise or skills in conducting experiments on Electrical Physics material in the science laboratory class.

B. METHODS

1. Implementation Methods

The service was using a training method with an introduction to the Electrical Physics KIT where the presenter delivered material using a projector and participants listened, participated in knowing the form and various functions and uses of Electrical KIT components and participants also tried using several Electrical KIT experimental topics contained in the KIT guide. Training implementation data was collected through a series of activities consisting of literature reviews, interviews, observations, surveys and documentation (Sudarmo et al., 2021).

2. Partner Profile

The training location was held at the Science Laboratory of SMP Negeri 1 Painan City, South Coast Regency. The location of the service is three hours away by car from the Bung Hatta University campus, Padang city, West Sumatra. The training was attended by 17 junior high school science teachers from several state junior high schools in Painan city and Pesisir Selatan Regency. The training location is located not far from the center of Painan city so it is easy for participants to get there either by car, motorbike or by city transportation. SMP N 1 Painan was chosen as the place of service because the school has a fairly good science laboratory and has there are many teaching aids and science kits which are sufficient for holding training. Apart from that, SMP Negeri 1 Painan is the best state junior high school in Painan and Pesisir Selatan Regency.

3. Implementation steps

a. Pre-Activities

Before the training is held, the head of service talks first with the Painan city education office and the principal of SMP N 1 Painan, regarding the possibility of implementing the service, participating junior high school teachers, and a survey of the availability of laboratory equipment and Electrical Physics KIT in the school which can support the successful implementation of the service through the training carried out. Activities prior to the implementation of the service also began with the head of the Biology Education study

program, Mrs. Dra. Gusmaweti, M.Si. make a letter of permission to carry out the service to the head of the Painan Pesisir Selatan city education service and ask for the willingness of the science teachers at the State Middle School in Painan city to be able to attend training and provide a training place and use of Electrical KIT at one of the State Middle Schools in Painan city. After the invitation was sent, the head of the study program prepared an event schedule consisting of four speakers, Dr. Erman Har, M. Si, who discussed labor issues, Dra. Lisa Deswati, M. Si, who discussed laboratory knowledge, Drs. Wince Hendri, M.Si. who presented science learning material, and Erwinsyah Satria, M. Si., M.Pd. with training material on the use of the Electrical Physics KIT. The head of the study program also prepares training facilities and infrastructure with the help of students (making and installing banners, arranging training rooms, preparing laptop and projector connections, documentation, and preparing participants' consumption) and obtains activity permits from the Dean of the Faculty. Each presenter prepares training materials according to their field. In preparation for implementing service activities in this training, the author prepared a laptop, training materials, Shoulder Electrical KIT training materials and tried several electrical experiment topics that would be trained later. The implementation of the service at the location was assisted by several Biology Education students class of 2013.

b. Training Activities

The training activities were carried out in a science laboratory room at SMP Negeri 1 Painan Pesisir Selatan which was large enough to accommodate 30 training participants. The service activity was carried out on Monday 1 June 2015 for six hours. The training carried the theme "Through Laboratory-Based Learning Training Can Improve the Competency of Science Teachers in Pesisir Selatan". The main training activities are carried out in five stages. The first stage was a welcome from the head of the Pesisir Selatan Regency service, the principal of SMPN 1 Painan, and an introduction by the head of the FKIP service at Bung Hatta University, Padang, West Sumatra. Introduction of the presenters and participants taking part in the training. In the second, third, and fourth and fifth stages, the presenters gave lectures on science learning concept material, laboratory knowledge material, laboratory problems, and Electrical Physics KIT training material to junior high school teachers. In the training to introduce the Electrical Physics KIT, an introduction to the components of the Electrical KIT, functions, uses and experimental topics that can be carried out by teachers with the electrical KIT is also explained and it is also explained how to use and care for the components of the Electrical KIT.

c. Monitoring and Evaluation

The final session evaluated training activities regarding the provision of laboratory materials and Electrical KIT training carried out by resource persons. Evaluation of activities also asked for responses from teachers who took part in the training through questionnaires, to determine participants' satisfaction with the material and training carried out, as a material for improvement for the implementation of training activities in the future. All training service activities are well documented. Analysis of data obtained from the implementation of training was carried out qualitatively and quantitatively descriptive (Satria, 2013).

C. RESULTS AND DISCUSSION

Data from the service results in the form of an introduction to Electrical KIT material, data on the results of training carried out by participants, and data on the results of evaluations of training activities by teachers regarding the training provided. The results of training activities carried out were presented as follows:

1. Pre-Activity

After the author received an invitation letter as a presenter on Electrical KIT Physics from the head of the PBio FKIP department at Bung Hatta University, the author immediately prepared training materials for the introduction of the Electrical Physics KIT at the Science Laboratory of SMP N 1 Painan, so all the presentation material slides were prepared to make it easier for the training participants to take part in the activity. The provision of materials and training on introducing Electrical KITs is planned for two hours from 14.00-16.00. The scheduled training activity event began with welcoming remarks from the head of the Pesisir Selatan education service, the principal of SMP N 1 Painan, the head of the service executive, and self-introductions of four speakers who delivered the training material and continued with self-introductions from the teachers who came. Participants who were asked to come were science teachers from several state junior high schools in Painan City and Pesisir Selatan Regency. Through a survey before the activity was carried out, it was seen that the facilities and facilities in the SMP N 1 Painan Science laboratory were sufficient to enable the implementation of Electrical KIT service and training events because there were many new and unused Electrical KIT boxes available for Physics learning.

The author prepared 5 pairs of ABC dry cell size D 1.5 Volt batteries, two for each group of electrical KIT experimental activities later. The electricity KIT training activity groups are planned to consist of five groups consisting of 3 or four science teachers. Each group was prepared with an Electrical KIT box complete with an electrical experiment manual. The author also prepared plug cables for electrical connections for each group if they later use a 3V DC

power supply from an AC power source. The Electrical KIT used in this laboratory training is a SMP Electrical and Magnetic KIT box from Puduk Scientific which is of very good quality, quite complete, widely used and available at Pesisir Selatan State Middle School. In this training, the Magnet KIT was not introduced and its use was not trained because there was not enough time to implement it.

2. Electrical KIT Training Activities

The training activity began with remarks from the head of the Pesisir Selatan education service, the principal of SMP N 1, and an introduction to the training presenters by the head of service (a) and continued with presentations of material by presenters one, two, three and four (b)(Figure 1). The participants listened to what was said by the presenter. Participants also asked if there was any information they did not understand. In delivering the introductory material to the Electrical KIT, what was conveyed was why teachers need to use the KIT in Physics learning, what components are in the Electrical KIT box. What are the component names, component codes and quantities as well as pictures of each component to make it easier to recognize them. Here we also explain what experimental topics can be carried out with all components of the SMP Electrical KIT produced by Puduk Scientific. There are 28 experimental topics that teachers can carry out using this Electrical KIT. All the experiments are quite supportive of the explanation of the Electrical concepts contained in the Middle School Electrical Physics science book material. The Electrical KIT box being demonstrated is a product from PUDAK Scitific which is quite compact and practical to carry, not too heavy and easy to maintain and store. This KIT box is also equipped with a user manual and various experiments that can be carried out. By reading and applying the guidebook it is enough for teachers to be able to practice it in their classes with students. It is best for teachers to practice using each experimental topic that will be demonstrated to students before class time so that the implementation of the experiment can be more efficient and free from errors, as shown in Figure 1.



Figure 1. (a) Greetings and Introduction of Training Presenters, and (b) Delivery of Electrical KIT Material by Resource Person (writer)

Apart from the main components, the speaker also said that this Electrical KIT is equipped with supporting components and supporting tools which teachers must know about their use in supporting experiments. Each experiment is adjusted to the Competency Standards and Basic Competencies in the Middle School Science book. The experimental topic is equipped with the aim of the experiment, the tools and materials used as well as the steps for carrying out the experiment. The speaker said that the modular KIT was created for physics experiments for junior high school students so that basic concepts regarding physics theories could be easily absorbed. Each modular kit box consists of tools that can be used for several types of experiments. Modular Kits must be maintained and maintained as best as possible. After one trial is complete, each tool used must be returned to the place provided, according to the layout drawing printed on the inside of the KIT box cover. The names of the KIT modular tool components are listed on the inside of the box cover of each KIT, as an explanation of the component layout for students. A small number of tool components used in this Electrical experiment are not included in the Electrical KIT box. These tools are found in the Mechanics KIT, Hydrostatics and Heat KIT and General Tools, said the speaker.

It was stated that in certain experimental cases, the supervising teacher's creativity was requested, to find replacement components for tools that were not or were not yet available in the KIT. For example, looking for suitable tools from the school's stock of equipment, or making/procuring them yourself. The shape and model of the replacement component may be different from the image stated in the guide sheet, as long as its function and use are appropriate to the experiment. In the Physics subject, the speaker also said that concepts and sub-concepts are studied through simple research, experiments and a number of practical activities with a focus on developing process skills. Ideally, every topic in a science lesson should be taught through demonstration to students, in the form of practicals or demonstrations. The speaker said that the sequence of types of experiments in the guide sheet for examples of Electrical experiments in the electrical KIT box is arranged based on the level of difficulty in carrying out the experiment. In its implementation, the type of experiment that needs to be carried out can be chosen according to the ongoing lesson. Thus, it is recommended that when a Physics teacher makes a teaching plan, at that time the teacher must also see and plan the types of experiments that are necessary and can be carried out. This means that every Physics teacher must be wise in giving practical assignments to students, choosing types of experiments that are appropriate to the current lesson.

Training on the use of Electrical KIT for teachers was directly demonstrated in front of them. The teacher can hold and look at the shapes and names of the Electrical KIT components in the KIT box and ask how to use and assemble them. The author explains how to use and how to install existing KIT components (Figure 2). The speaker shows an example of an experimental topic and puts it into practice for the teachers so that they understand how to assemble the components of the Electrical KIT. An experiment in assembling a series circuit using two lights, a switch, two batteries and an extension cable was demonstrated to see and increase the teacher's understanding of the concept of series circuits in Physics material, as shown in Figure 2.



Figure 2. Speaker Shows and Give Direction to the Teacher How to Assemble Components Using an Electrical KIT

Then the presenter asked the teachers to try their hand at assembling a parallel circuit using the existing Electrical KIT components. The presenter guides and assists the participants if there is an error in installing the KIT component connections or the circuit made by the teacher does not function and run as it should (Figure 3 (a)). There are teachers who have tried to assemble electrical KIT components to make a series or parallel circuit but the lights won't turn on and they don't know why. Even though they have assembled the Electrical KIT components according to the instructions in the manual. Then they asked the presenter why it didn't work. Then the presenter provides assistance. Experiments using an Electrical KIT are unique, there are many things that must be considered so that the circuit that is arranged can function as desired. Installing the battery poles upside down can result in the circuit not turning on or installing the light in a loose socket can also cause the light not to turn on. Installing the connecting bridge on the electrical circuit board incorrectly can also make the circuit not work as desired. So teachers need proper and lots of practice to understand the problems that exist in assembling Electrical KIT components so that later, if they carry out experiments in front of students or students face problems with their electrical experimental activities, the teacher can overcome and provide solutions, as shown in Figure 3.



Figure 3. Training Atmosphere (a) Presenter Guiding and Helping Training Participants, and (b) Teachers Tries to Practice Together Using the Electrical KIT

Figures 2 and 3 show the atmosphere of the Electrical KIT trial training that was carried out, where the trainer introduced and explained to the participants the names and functions as well as the installation or assembly of the Electrical KIT components in the available KIT box. Using an Electrical KIT is actually not difficult as long as the teacher has been trained to use it by paying attention to safety when conducting experiments so that the existing KIT components don't get damaged quickly and after carrying out the experiment don't forget to arrange the electrical components according to their proper position so that the KIT components are maintained for longer use and Avoid rust if not stored in a closed box. Mastering the skills of using an Electrical KIT only requires a lot of practice by the teacher by trying each experimental topic that is suitable for the material being taught so that using it in class does not take up a lot of time and does not make the teacher bothered.

In Figure 3 (b), participants can be seen practicing together using the Electrical KIT and seeing how to assemble an electrical experiment topic, namely assembling a series circuit with the existing Electrical KIT components. At first, many people asked the speaker directly because there were still many who didn't know how to install and assemble electrical components because previously at school they had never used an Electrical KIT. After being given an explanation, direction and a little help from the presenter, the teachers only understood how to assemble the components of a series electrical experiment correctly even though previously they had experienced a few problems.

3. Monitoring and Evaluation

To determine the impact of the training provided on this service and training activity, the presenters asked teachers' responses to the training provided and observed teachers in practice using electrical components for an easy circuit experiment topic, namely series and parallel circuits. Almost all groups of teachers who carried out Electrical KIT trial training successfully carried out the assigned Electrical KIT experiment. From the results of monitoring and direct observation regarding the introduction of Electrical KITs and their use, around 85% were able to understand and assemble the KIT components for series and parallel experiments. Overall, the teachers already know what the electrical KIT components are in the KIT box. Data on the results of teacher responses via questionnaires regarding the training provided can be seen in Table 1. Evaluation of the activity process is very important for improving the process of implementing subsequent activities so that they can be carried out better and more efficiently with better results (Sugiarto Maulana et al., 2021).

Tabel 1. Assessment of the Quality of Community Service (PKM)

No.	Aspects and Indicators	Score	Percentage
A. Training Material			
1.	Systematic presentation of material	13	55/68 = 80,88%
2.	Clarity and ease of understanding of the material	13	
3.	Material contribution in increasing knowledge and skills	14	
4.	Benefits of material that can be used in school learning	15	
B. Organizing Training			
5.	Suitability of training content with training objectives	16	71/85 = 83,53%
6.	Suitability of material content to the time provided	12	
7.	Impressions of the implementation of the training for participants	14	
8.	Facilitator's willingness to guide training participants	15	
9.	Availability of tools and Electrical KIT for training participants	14	
C. Presenter Ability			
10.	Mastery of material	15	81/102 = 79,41%
11.	Material delivery techniques	13	
12.	Quality and way of answering questions	14	
13.	The language used by the presenter	13	
14.	The speaker's intonation and speed of speech	13	
15.	The speaker's gestures and facial expressions	13	
Total:		207/255	81,17%

To evaluate the quality of service implementation, there are three aspects that are asked to be assessed by training participants, namely assessment of aspects of the material provided, assessment of aspects of training implementation, and assessment of aspects of material delivery with good and bad choices. The assessment of the aspects of the material provided resulted in an average of 80.88% of participants stating that the material presented was useful and good for application in learning junior high school material. The assessment of the quality of training implementation obtained an average score of 83.53% of participants stating that it was quite good regarding the suitability of the material for the time provided. Meanwhile, from the assessment results from the aspect of material delivery, an average of 79.41% of participants stated that the presenters were quite qualified in their ability to master the material, explain and help participants practice using Electrical KIT components. Overall, the training carried out received quite a good response from the training participants and added new knowledge to them in terms of getting to know and experimenting with Electrical KIT components. During the training the teachers asked a lot of

questions related to using and assembling KIT components. Even though there were not too many public junior high school science teachers who came, the training carried out was quite satisfactory and could bring many benefits to the Pesisir Selatan science teachers who attended. At the next opportunity, efforts will be made to bring in more science teachers.

The use of a good Physics Science KIT really supports the learning of Physics material taught by teachers (Satria, 2018a) for a better understanding of Physics concepts. Therefore, every junior high school science teacher must master the correct use of the Physics Science KIT because they cannot only teach theoretical science without conducting experiments with the help of the Physics KIT. Because learning Physics is synonymous with conducting experiments to discover or investigate natural science phenomena that exist in nature.

Several studies have proven that the use of the Physics Science KIT in learning Physics material can motivate students to learn the material provided and stimulate students' curiosity to experiment (Satria, 2016a; Iskandar et al., 2019; Satria, 2020). Using the Physics Science KIT in learning can hone students' process skills so they can act like scientists making discoveries (Satria, 2018a; Suharyat, Supriyadi, Satria, & Santosa, 2022). Science KIT is a form of learning media that can help teachers convey material or introduce concepts being studied (Satria, Musthan, et al., 2022; Satria et al., 2024; Satria, Gusmaweti, et al., 2024). Using the Electrical Science KIT is also a form of STEM learning that teachers can carry out using electrical measuring instruments (Saddhono et al., 2019). It is hoped that laboratory training on the use of Electrical KIT for teachers can make junior high school students more motivated and critical in learning. It will also make teachers the best teachers by students (Abdullah, Hartono, et al., 2019) equipped with the skills to use KIT Science in teaching. Training like this needs to be repeated many times so that teachers become more stable in using the Science KIT for learning and as an improvement in the subsequent training process so that it is better (Kurniasih et al., 2019; Sugiarto Maulana et al., 2021). With the teacher's skill in using teaching aids and the Physics Science KIT, it becomes one of the best assessments for students (Abdullah, Hartono, et al., 2019). The use of Physics KIT by teachers also facilitates students' plural intelligence (Agustin et al., 2019; Satria & Sopandi, 2022).

4. Obstacles Faced

The implementation of the training also has obstacles or shortcomings, including, there are not many participants, limited training time so that the training provided cannot be carried out optimally for all experimental topics, and the unavailability of many Electrical KIT boxes that can be used by teachers to practice together so that more optimal training. For further training, the head of the Pesisir Selatan education office was asked to invite more junior high school science teachers to take part in the training, provide

more time for training, perhaps two days, and provide more Electrical KIT boxes for training groups of two or three.

D. CONCLUSIONS AND RECOMMENDATIONS

Community service activities through providing training materials and training on the use of electrical science KIT went well with quite satisfactory results for State Middle School teachers. The assessment of the implementation of the training by the teachers was very good in the material aspect (80.88%) and very good in the implementation aspect (83.53%) of the training as well as good marks in the aspect of the presenters' abilities (79.41%). In general, participants were able to understand the components of an electrical KIT and how to use them in several electrical material experiments that they did not previously know and had never tried and demonstrated the KIT to their students. For further training, it is planned to train all the Electrical KIT experiments in the manual plus the Magnetic experiments with a longer and well-structured training time. The number of Electrical KIT boxes can be increased from other schools so that experimental practice can be carried out optimally.

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