Elementary School Teacher’s Training and Coaching as Trustees of the National Science Olympiad (OSN) in Surabaya Using Science Practicum at SDN I Airlangga Surabaya

Asnawi¹*, D Iriyani², T Prakoso³, and L E Setijorini⁴

¹Department of Physics, Universitas Negeri Surabaya, Indonesia
²Department of Biology Education, Universitas Terbuka Surabaya, Indonesia
³Department of Indonesia Language, Universitas Terbuka Surabaya, Indonesia
⁴Department of Biology Education, Universitas Terbuka Jakarta, Indonesia

Email: asnawi@unesa.ac.id

Abstract. The purpose of this community service activity is to provide knowledge and practical science skills to support the National Science Olympiad (OSN) activities for teachers at SDN I Airlangga Surabaya and its surroundings. Based on the questionnaire distributed to the teachers of the SDN I Airlangga Surabaya, it showed that most of the teachers (87%) had never carried out practicum or experimental activities to support the OSN of Science at school. One of the targets to be achieved through this activity is to change attitudes and to increase the knowledge and skills of the SDN I Airlangga Surabaya teachers who have skills in science practicum to support OSN. The training was conducted using lecture methods, slides and videos, question and answer, interactive dialogue, brainstorming and work practices. There are three things that the partners got after holding the training, namely a) Knowledge; it seems that participants have gained new knowledge about the implementation of elementary science practicums after the training, b) Skills; participants seem to have had the skills to carry out practical science activities of elementary school, c) Attitude (behaviour); according to the practicum activities carried out, scientific attitudes were formed by the participants in supporting science olympic activities. In implementing the training, the partners generally have a great willingness and interest to participate on the training.

1. Introduction

The dynamic and rapid development in the era of globalization has had a tremendous influence on the value system in the life of the nation and state. Meanwhile, the development of science, technology and art is another challenge that needs to be anticipated as well as possible [1]. These influences and challenges need to be addressed wisely and intelligently, to prevent inequality in the life of the nation and state in the future. This implies the importance of improving the quality of human resources in various fields including the world of education and the human resources. Various strategies which are improving the quality of education are directed at improving the quality of teachers in mastering science, technology, and foreign languages. To be able to achieve, the above can be done with assistance and training. This agrees with the opinion of Listyarti as Secretary General of Federation of Indonesian Teachers' Unions (FSGI) who stated "The low quality of teachers is not the fault of the teachers". This
is because the capacity of educators is not built through training [2]. Likewise, the trainings that are often held for elementary school teachers in East Java are expected to make a positive contribution to teacher professionalism and need full support, follow-up and monitoring after training from the government or educational institutions which in this case are universities. The results of the field survey show that the teacher training system that has been held has not shown optimal results regarding its performance [3].

Empirically, it can be seen that the success of quality education development is influenced by the availability of various supporting components. One of them is teachers who have competences in their field of work. Therefore, it is necessary to have a teacher training system that focuses on improving teacher performance in order to support teacher professionalism. This will also have a positive impact on student achievement [4]. One of the ways to improve the quality of education related to teacher professionalism is by holding teacher training in assisting the activities of the National Science Olympic (OSN). So far, science learning is taught by classroom teachers who have unsuitable teacher education background, so that the teacher did not implement science learning accordingly with the nature or essence of science. Science learning should be oriented to the nature of science, namely as learning in the form of processes and products [5]. This means that science learning is not only enough to be carried out by delivering information about science concepts and principles but also must be balanced with real activities in the field. Students must understand the process of the occurrence of science phenomena through sensing as much as possible when they are learning science. This means that when the students are learning science, they must actively observe, try, and discuss with fellow students and teachers. The concept of science learning like this can only be implemented by teachers who are really understand the characteristics of science and its learning strategies [6].

The integration of biology, physics, and chemistry courses in science or science learning in elementary schools does not have an impact of a well-established mastery of science material with a broad range of scientific studies. By giving the incompatibility of the science teachers’ qualifications with the quality of their fields of expertise, the mastery of teachers in science learning must be improved, so that teachers have more skills in learning management [7]. One alternative that is considered important in this regard is through an academic refresher (refreshing program) whose core activities include training in designing and implementing science or science practicums. It is hoped that through the implementation of this program, the teacher will gain something new and it can be used as a teacher's foothold in developing the profession which will also directly increase the productivity of their performances [8].

The urgent problems are faced by not only the teachers of SDN I Airlangga Surabaya and its surrounding s whose tenure is less than three years, but also the teachers who have already experienced in the performance period of seven years. The results of field observations related to OSN, especially for science Olympic at SDN I Airlangga Surabaya are still dominated by explanations of theoretical OSN science concepts. Teachers often complain about the classic problem such as the lack of time and facilities to implement OSN, especially science by applying the OSN Science strategy, either theory or practicum and experiment, which is the demand for the current Olympic curriculum. Likewise, according to the questionnaire distributed by community service Universitas Terbuka Surabaya team, teachers in carrying out science or its practicum activities in OSN are still low in SDN I Airlangga Surabaya and its surroundings. It shows that most of the teachers (87%) has never carried out practicum/experimental activities as a support of OSN Science activities at school. Realizing the importance of the above questions, it is seemed necessary for us to carry out community service as a tri dharma activity for higher education. We carried out this activity to related issues to increase the insight and ability of teachers in the field of science practicum, especially at the elementary school level since it is very feasible to be used as one of the focuses of community service activities at SDN I Airlangga Surabaya.
2. Method
Community service program was conducted for three meetings with activities in the form of training for teachers of SDN I Airlangga to get debriefing and understanding for training OSN to students, both theoretically and practically. It was attended by 20 participants from SDN I Airlangga. In the first stage, community service Universitas Terbuka Surabaya team conducted a survey at SDN I Airlangga Surabaya. The team conducted interviews with the school regarding the problem of teachers’ development as OSN supervisors. In addition, we also offered an OSN debriefing in the form of training for teachers as OSN supervisors. In the second stage, the OSN pre-training activities were carried out, especially for science concepts and science practicums to support teachers’ understanding in making OSN questions for their schools. Based on the above research, the problem-solving framework that offered as follows:

2.1. The preparation stage
At the preparation stage, a study of the science syllabus (OSN) material is carried out annually, which the provision of knowledge of OSN material both theoretically and practically is in accordance with the form, model, and characteristics of OSN. The results at this stage will provide an overview of the basic concepts and practicum of the National Science Olympiad (OSN) for elementary students. At this stage, the training participants are also able to learn examples of OSN activities in conceptually and practically as well as their scientific analysis, given by some examples of practice-based Olympic questions to provide a clear picture of OSN that has been running so far. Before the implementation stage, the participants were asked to identify OSN problems in the science practicum that had been carried out, which was done to obtain the Term of Reference (TOR). The purpose of this stage is to inform the training participants about the OSN materials and practices that will be implemented.

2.2. Implementation Stage
At the implementation stage, based on science or science practicum, an OSN implementation assistance is carried out to provide provisions for training participants in implementing OSN guidance in their respective schools [9]. Assistance for training participants will also be carried out until the analysis and completion of the practicum-based science or science Olympic are carried out, so that the training participants are expected to be able to master the concepts, types, and models of OSN natural science well.

2.3. Evaluation stage
At the end of evaluation stage, this activity is carried out by monitoring and evaluating sustainability after mentoring [10]. The results of the performance at this stage will monitor the extent of the teacher's understanding of the material that has been delivered earlier to mentoring OSN training participants both conceptually and practically about natural science based on OSN. Thus, at the end of this stage, the results of the enrichment of OSN material can be analysed either in an efficient or in a practical manner.

From the stages carried out above, the methods and the strategies used in the implementation of this activity are in the form of knowledge information, question and answer session, discussion, training, and practice as well as mentoring by using the evaluation procedures and tools to assess the success of the training participants in the form of tests. Giving tests to training participants is intended to determine the extent to which the success rate of this activity is carried out. The data were collected by testing the participant's ability to analyze questions and to practice science in supporting OSN primary school activities rather than the early activity (pre-test) and the lately activity (post-test).

3. Results and Discussion
The results of the service activities consist of: (1) the results of team discussions related to primary school science practicum materials to support OSN activities, and (2) pre-tests related to practicum materials and group discussions about practicum reports. Based on the discussion that has been carried out by community service Universitas Terbuka Surabaya team, it was decided that the primary school
science practicum material is determining the optical properties of the reflection system and the results of the final image performance, magnetic system, and irregular motion of straight objects. Furthermore, the three materials are summarized into one document in the form of theoretical and practical questions to be implemented, then community service Universitas Terbuka Surabaya team members analysed the document about the practicum. The analysis is focused on the content and writing. This analysis activity is expected to produce a practical question document that is easily understood by the participants. To find out the participants' understanding regarding theories, concepts, or other supporting information, a pre-test was carried out. Questions are focused on exploring the knowledge of participants who will carry out the three practical activities mentioned above as shown in Table 1.

**Table 1.** Percentage of Knowledge Level of Elementary Teacher’s Training Participants Using Science Practicum Materials Based on OSN.

| Understanding Trainees                              | Optics | Magnetic Electricity | Motion | Average |
|-----------------------------------------------------|--------|----------------------|--------|---------|
| Concepts of natural science (OSN)                   | 71.5   | 82.3                 | 71.2   | 75.0    |
| Derivation of mathematical equations                | 73.7   | 83.3                 | 70.5   | 75.8    |
| The calculated value                                | 77.3   | 82.1                 | 73.5   | 77.6    |
| Practicum implementations                          | 70.0   | 85.0                 | 73.5   | 76.2    |
| Practicum data analysis                             | 72.6   | 80.7                 | 71.5   | 76.8    |
| Conclude the result of practicum                    | 74.8   | 81.7                 | 73.9   | 76.8    |
| Report the results of practicum                     | 72.6   | 79.5                 | 73.3   | 75.1    |

**Table 2.** Recapitulation of the Implementation Value of Elementary Teacher’s Training Participants Science Practicum to Support OSN Activities

| Aspects                                      | Sub Aspects                              | Team | Score Average | Category  |
|----------------------------------------------|------------------------------------------|------|---------------|-----------|
| Science practicum preparation                | Practicum Purpose                       | 4    | 3.67          | Very good |
|                                             | Determination of tools and material      | 4    | 3.33          | Good      |
|                                             | Practicum Step                          | 3    | 3.33          | Good      |
|                                             | Observation data                        | 4    | 4.00          | Very good |
| Natural science practicum implementation     | Results of compiling practicum          | 3    | 3.67          | Very good |
|                                             | Operate Practicum                       | 3    | 3.33          | Good      |
|                                             | Analysing Practicum data                | 3    | 3.67          | Very good |
|                                             | Practicum data retrieval                | 3    | 3.00          | Pretty good |
|                                             | Concluding the results of the practicum  | 4    | 4.00          | Very good |
| Submission of practicum reports             | Practicum report results                | 3    | 3.67          | Very good |
|                                             | Submission of practicum information     | 4    | 4.00          | Very good |
|                                             | Report supporting data                  | 3    | 3.00          | Pretty good |

From Table 1, it can be explained that generally the participants who are teachers of SDN I Airlangga Surabaya have been able to explain the concepts, theories, and mathematical equations related to the quantities to be measured and calculated during the natural science practicum. In addition, teacher’s practicum activity is presented in question. However, most of the participants had not seen on how to process the data obtained to answer the problems and the objectives of the
practicum. Given the number of participants in this activity as many as 20 teachers who become OSN guidance teachers and the number of practicums that can be done and the time availability, this activity is made into 3 groups with 6 to 7 members each. This activity is hoped that the natural science practicums activities carried out by participants as OSN supervisors can take place as planned and there will be an exchange of experiences on findings or new things during the science practicum. Therefore, the activities carried out which were observed from each group when doing practicum and reports on each group from the implementation of the practicum to reporting the results that have been obtained can be seen in Table 2.

From the results of the observations above, they are shown each aspect of the group assessment in Table 2. In the aspect of practicum preparation, the objectives and analysis of temporary observation data are in the very good category where all the groups got a score of 4 when it was only group 3 got a score of 3. Likewise, for the determination of the material tools and practicum steps to be carried out from the three groups got a score of 3.33 which is categorized good. To arrange tools in the implementation of practicum, the three groups could assemble practical tools with good categories. This means that the three groups can carry out practicum as determined by the service team. When data collection was conducted, observations of groups 2 and 3 show that the category is very good and only one group which got the good category. In other words, all groups are in good categories. Each group member contributed to data collection. The data obtained can be justified. From the results of the observational data analysed by the three groups show a score of 3 which are included as the good category. The aspect of submitting practicum reports on the sub-aspects of the results in delivering practical information with very good categories are for all groups. From the observations of community service Universitas Terbuka Surabaya team, the final activity of the practicum was carried out for each group, where the group that did the practicum with the same type delivered the results of their research in turn and was continued by other groups using the same type of practicum. The findings are based on the aspects that were assessed during group discussions for each of the following causal practices. During the group discussion, the two groups showed different abilities. However, there are several things that need to be underlined that the lack of other supporting data related to reference sources and incomplete data analysis is incomplete which is categorized as fairly good. At the end of this activity, community service Universitas Terbuka Surabaya team provided this feedback regarding the practicum activity to support OSN in schools. This feedback is needed as an evaluation material for activities in the coming year. In general, participants felt the benefits of this activity for classroom learning. Several participants suggested that this activity was not limited to theory and practicum tested in OSN but for other subjects, such as the Biology and Mathematics Olympiad as well as Social Sciences. In addition, the implementation day should not be on Sunday and the time is somewhat extended. This kind of activity should be held periodically and scheduled by moving around with the school coordinators.

4. Conclusion

From the activities that have been carried out, the understanding of the participant’s activity for the science practicum material tested by OSN such as optics, magnetism and motion image of objects, magnetism-electricity system, and motion of straight objects that are irregular can be concluded. For the formulation of how the reflection system practicum and the shadow results from the practicum can be carried out, 70% could explain well, and only 15% of the participants could not explain the stages of the magnetism and electricity system practicum occurence. This was due to the fact the natural science practicum material for OSN for some of the participants who were teachers of SDN I Airlangga Surabaya was new in this case. Participants are able to compile reports and discuss the results in the class discussions. The practicum report format is in accordance with the standard form that has been determined by the service team. The presentation of practicum results by each group went quite well. In the discussion of this material, the natural sciences practicum for OSN participants describe the experiences gained during the training.
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