

# Analysis of Practicum Implementation in Laboratory and Its Problems in Biological Learning at MAN 1 Tidore

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**Keywords:** Practicum, Laboratory, Biology, Tidore.

**Abstract:** Biology is a complex science related to how to find out about nature systematically, so that biology is not only mastery of the collection of knowledge in the form of facts, concepts, or principles but also is a process of discovery. One characteristic of biology learning is the presence of practical activities that can be carried out both in the laboratory and in nature. Through practical activities, experience will be gained including cognitive, affective and psychomotor domains. However, in reality not all teachers can use the laboratory in biology learning at school. This study aims to obtain information on practical labors in the laboratory and identify problems in biology learning. Data collection research using observation and interview methods of practicum activities in terms of analysis of Basic Competency 4 (KD 4) from curriculum 2013 (K13). The results of the analysis of the practicality of laboratory activities in biology learning in MAN 1 Tidore were categorized as low with the percentage of laboratory practicum implementation for class X of 45.45%, class XII 38.8%, and in class XII of 14.28%. The problems faced by biology teachers in the implementation of practical activities in the laboratory are the lack of availability of materials and tools in practical activities, the availability of guidance, and the teacher has not been able to utilize materials and other tools as a substitute for tools and materials in practical activities. Teacher assistance in the preparation of practicum guidelines that utilize natural materials and used goods solutions to improve lab activities in the laboratory.

## 1 INTRODUCTION

School is the main means in education to be able to develop all potential, creation and self-actualization. Schools can function properly if supported by supporting facilities and infrastructure, one of which is a laboratory. The existence of a laboratory in secondary schools is a must in modern education. The laboratory has become one of the supporting facilities for learning activities. With the existence of a laboratory, students can develop technological capabilities through the equipment in them. Students are easier to find the learning resources they want. The existence of a laboratory through practical activities in schools can support learning activities and can achieve educational goals both in the cognitive, affective and psychomotor fields (Hofstein, 2007).

Learning by applying theory in the form of laboratory activities (practicum) can improve

process capability, ability to solve problems and increase students' interest and attitudes towards learning. The laboratory is very necessary as a place to learn to provide real experiences to students as one of the factors supporting the implementation of learning. Laboratory activities not only aim to improve the theory, but students can find their own knowledge (Feyzioglu, 2009).

Practical activities in the laboratory are used as a way for students to easily understand the material and can build knowledge by experiencing their own process or experiment. The higher the involvement of students in practical activities the higher the achievement of students' understanding and process skills (Widayanto, 2009). This can be interpreted that through laboratory activities, students can build their own knowledge of facts, concepts, and theories contained in biological material so that it can last longer in the memories of students.

Biology learning can not only be done in the classroom. One characteristic of biology learning is

the presence of practical activities that can be carried out both in the laboratory and in nature. Many complex biological concepts that require an activity to facilitate students in understanding the concept. Practical activities are very suitable to facilitate students to learn through direct experience. Practicum provides an opportunity for students to get a picture in the real situation of what is obtained in theory and sensory contact occurs. In addition, in practical activities students do not just observe directly but must live, be directly involved in the actions and be responsible for the results. The laboratory is a place where the teaching and learning process takes place with practical activities involving interactions between students, equipment, and materials. Suprayitno (2010) suggests that the teaching and learning process through practical activities in the laboratory is expected that students can learn, gain direct understanding and experience about the nature, secrets and symptoms of natural life that cannot be explained verbally.

Judging from the material aspects, biology has specific material characteristics that are different from other fields of science. Biology examines living things, the environment and the relationship between the two. Biological material is not only related to scientific facts about natural phenomena that are concrete, but also related to things or objects that are abstract such as: chemical metabolic processes in the body, hormonal systems, coordination systems, etc. The nature of the material objects studied in biology is very diverse, both in terms of size (macroscopic, microscopic such as: bacteria, viruses, DNA etc.), affordability (polar, desert, tundra, etc.), safety (bacteria / viruses that are pathology), language (use of Latin in scientific names), etc. Thus to design biology learning various supporting tools are needed such as: the use of learning media, laboratory facilities, etc.). The characteristics of biological material require high-level thinking skills such as thinking critically, logically, analytically, sometimes even requiring combinatorial thinking (Rustaman, 2010).

In fact, not all laboratory activities in biology learning in schools can be implemented and implemented properly. There are teachers who rarely use laboratories in biology learning, laboratories that are not equipped with tools and materials that can support the implementation of learning in the laboratory, poor management of laboratory management, teachers have a large number of lesson hours, teachers have less creativity in developing practical activities, lack of support from schools and there is an assumption that biology learning

activities in the laboratory are not important and learning activities in the laboratory take a long time. Some of these things can be found both in schools that have a well-equipped laboratory and a laboratory with enough or even less trapping.

## 2 METHOD

Research analysis of practical implementation in the laboratory and its problems in biology learning is carried out in the months of August - October 2018. The research was conducted at the Tidore 1 State Islamic Middle School. This research uses descriptive research with a qualitative approach. The qualitative approach in this study resulted in descriptive data covering the state of the laboratory and the implementation of lab work in the laboratory as well as the problems in biology learning. The results of this qualitative approach analysis will be described as they are without the intention of making conclusions that apply to the public. The object in this study focused on biology teachers in class X, XI, and XII and laboratory managers. Analysis of the implementation of practical activities in biology semester and even semester X, XI, and XII. Stages of research include; laboratory observations, interviews and filling out the questionnaire on laboratory work.

## 3 RESULTS AND DISCUSSION

This research is directed at the implementation of practical activities in the laboratory based on basic competency analysis (KD 4) in curriculum 2013 (K13). This research was conducted in the school of MAN 1 Tidore with the research subjects being biology teachers in class X, XI, and XII. This study focused on practical activities in the laboratory in odd and even semester and the problems faced by the teacher in their implementation.

### 3.1 Observation of MAN 1 Tidore Laboratory

MAN 1 Tidore is one of the schools that has implemented the 2013 curriculum (K13). Laboratory observations show that MAN 1 Tidore has a laboratory building that is separate from the classroom, but the laboratory is a joint laboratory named the Science Laboratory. This means that the laboratory is used for Biology, Physics, and

Chemistry practicum activities. It has an administrative room and a practicum room that can accommodate 25-30 practitioners, a practicum room equipped with a stone table and a tub of water. Has a storage area for tools and materials, but has not been well organized. Having tools and supporting materials for biological practicum activities that have not been able to fulfill the overall implementation of practical biology activities both in class X, XI, and XII.

Laboran is one of the components in a laboratory organization that is very important to support the implementation of the management of a laboratory. The MAN 1 Tidore Laboratory does not have laboratory assistants who can assist both the administration and cleanliness of laboratories and assist teachers in preparation and implementation of practical activities. This leads to preparation, implementation, and cleaning of practical activities carried out by the teacher themselves assisted by students. So that time both for practicum activities and teacher teaching time and student learning time is not well implemented.

### **3.2 Implementation of Practical Activities at the Laboratory in Biology Learning Class X MAN 1 Tidore**

The results of the analysis of Basic Competence which is devoted to KD 4 class X there are 11 KD points 4 out of 10 material including: 1) Biological scope, scientific method, and work safety; 2) Biodiversity; 3) Viruses; 4) Bacteria; 5) Protists; 6) Fungi; 7) Plantae; 8) Animalia; 9) Ecosystems; 10) Environment. In the elaboration of 11 Basic Competencies 4, 16 practicum activities were obtained and 11 of them were practicum activities which were carried out in the laboratory. The results of the analysis obtained five practical activities that can be carried out in the laboratory or amounted to 45.45% of the implementation of biological practicum activities in the laboratory. Based on the Guttman scale analysis with two criteria (Yes and No), the use of the laboratory in the implementation of practical activities in class X biology learning is in the low category.

The use of laboratories in practicum in the laboratory in class X biology learning is in the low category. This is due to several problems faced by teachers, namely:

1. The existing laboratory building is a joint laboratory that is used for biology, physics, and chemistry practical activities.
2. There are no tools and materials needed in biological practicum activities on certain materials.
3. There is not enough time in the implementation of practicum activities, so the teacher often adds student study time outside the normal schedule.
4. Teachers have not been able to replace materials or tools in practical activities with other tools or materials that can support the implementation of practical activities.
5. The LKS used by the teacher is the LKS available in the book, there has been no effort from the teacher to design the LKS itself so that it can utilize natural materials to replace chemicals and the use of used goods to replace lab equipment in the laboratory.

### **3.3 Implementation of Practical Activities in the Laboratory in Biology Learning Class XI MAN 1 Tidore**

Analysis of Basic Competence (KD 4) biology class XI obtained 14 points of basic competency 4 in 11 biological materials taught. From the KD 4, there were 25 experimental / practical activities, 18 of which were practicum activities carried out in the laboratory. The results of analyzing laboratory use in the practical implementation of class XI biology learning were obtained in 7 activities carried out. Thus there were 38.8% of practicum activities carried out in the laboratory in class XI biology learning. Based on the Guttman scale analysis with two criteria (Yes and No), the use of laboratories in the implementation of practical activities in biology learning class XI is in the low category.

The low percentage of laboratory utilization in the implementation of practical activities in biology learning in class XI is caused by:

1. The existing laboratory building is a joint laboratory that is used for biology, physics, and chemistry practical activities.
2. There are no tools and materials needed in biological practicum activities on certain materials.
3. There is not enough time in the implementation of practicum activities, so the teacher often adds student study time outside the normal schedule.
4. The reduction of time from 3x45' lesson hours to 2x45' lesson hours

5. There is a demolition / renovation of the building, the laboratory is used as a class for other subjects.
6. Teachers have not been able to replace materials or tools in practical activities with other tools or materials that can support the implementation of practical activities.
7. The LKS used by the teacher is the LKS available in the book, there has been no effort from the teacher to design the LKS itself so that it can utilize natural materials to replace chemicals and the use of used goods to replace laboratory equipment.

### 3.4 Implementation of Practical Activities in the Laboratory in Biology Learning Class XII MAN 1 Tidore

Biology learning material in class XII as many as 10 material with details of Basic Competency (KD 4) as many as 10 points of competence and as many as 16 experimental / practicum activities. The results of the analysis were 7 experimental / practicum activities which were carried out in the laboratory and only 1 practical / experimental activity was carried out. This means that there are only 14.28% of practical activities carried out in class XII. Based on the Guttman scale analysis with two criteria (Yes and No), the use of the laboratory in conducting practical activities in class XII biology learning is in the low category. Just like practicing practicum in class XI, the low utilization of laboratories in the implementation of laboratory activities is caused by:

1. The existing laboratory building is a joint laboratory that is used for biology, physics, and chemistry practical activities.
2. There are no tools and materials needed in biological practicum activities on certain materials.
3. There is not enough time in the implementation of practicum activities, so the teacher often adds student study time outside the normal schedule.
4. The reduction of time from 3x45' lesson hours to 2x45' lesson hours
5. There are demolition / renovation of buildings, laboratories are used as classes for other subjects.
6. Teachers have not been able to replace materials or tools in practical activities with other tools or materials that can support the implementation of practical activities.

7. The LKS used by the teacher is the LKS available in the book, there has been no effort from the teacher to design the LKS itself so that it can utilize natural materials to replace chemicals and the use of used goods to replace laboratory equipment.

The process of discovery (scientific work) in biology learning in the form of practical activities is needed to strengthen students' understanding of the concept. This is because practicum provides an opportunity for students to discover for themselves the facts needed to improve their understanding of material that has been learned through direct experience. This is in accordance with the learning experience revealed by Shea (2000) in Sumiati and Asra (2011), that students learn 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what seen and heard, 70% of what he said and 90% of what he said and did. So the learning experience directly carried out by students through practicum is certainly able to increase their understanding of the subject matter.

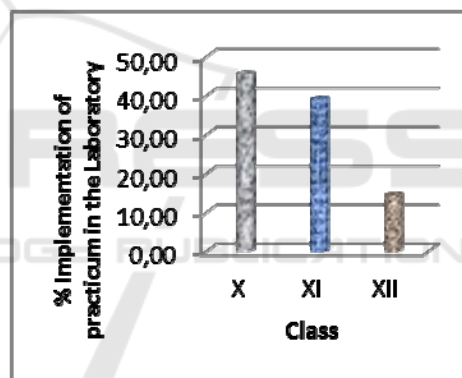


Figure 1: Percentage of Implementation of Practicum in the Laboratory on Biology Learning in Man I Tidore.

The graph above is an illustration of the implementation of practical activities in biology learning in the laboratory. The picture above shows that the percentage of implementation of practical activities in MAN I Tidore is in the low category. Practical activities in the laboratory in class X have a greater percentage than those in class XI and XII. This is caused by several factors that hinder the implementation of practical activities that can come from the school or from the teacher itself.

Although formally practicum has become a component in science learning especially biology, it seems that practicum implementation in schools is still not optimal for achieving learning goals. Just as found in MAN 1 Tidore, laboratory use in the

implementation of practical activities in biology learning both in class X, XI, and XII is categorized as low. This is caused by the lack of availability of laboratory facilities, the unavailability of guidance for all practical activities, no laboratory staff in this case is laboratory staff, and there has been no teacher effort to design their own practical activities using natural materials and used goods that can replace materials and practical tools which does not exist so practicum activities can be carried out. Simamora (2012) explains that some of the problems that are often encountered in the field that cause obstruction of practicum activities are inadequate biological laboratory facilities, unavailability of tables and chairs in the laboratory that are in accordance with the number of students, lack of practical guidance, no clear practicum schedule, the ability of teachers in the implementation of biology labs is still lacking and there are no laboratory special officers.

Seeing the problems that exist in MAN 1 Tidore related to practicum in the laboratory in biology learning is a complex problem and related to the school management system, then a solution that can be done to help biology teachers in terms of laboratory practice in guiding and training teachers - the teacher in designing his own practical activities with a more simple and systematic approach to the demands of K13. The practicum guide design is also made by utilizing natural materials and used items that are available and easily available.

## 4 CONCLUSIONS

The implementation of practicum activities in the laboratory in biology learning is categorized as low both in class X, XI, and class XII. Lack of tools and materials, limited time for practicum activities, and not yet available practicum guides prepared by the teacher become a problem in learning biology at MAN 1 Tidore.

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