

# Laboratory Management of Science in Improving Student Achievements in Sma Lubuklinggau

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**Abstract:** Laboratory as a place of observation, experimentation, training and testing of knowledge and technology concepts. The Natural Sciences Laboratory (IPA) functions as a place for learning activities that require special equipment that is not easily presented in the classroom. The Science Laboratory functions as a place for learners to attempt to imitate natural science experts in revealing natural secrets in the form of a learning process. This research was conducted to find out how much the Laboratory supports the teaching and learning process to achieve learning objectives, in an effort to improve student achievement is increasing. The research method uses a qualitative method by focusing on the problem being studied to be understood more deeply by comparing it from various relevant sources and literature. The results of this study indicate that: (1) Complete Science Laboratory Infrastructure Facilities are able to provide projections to students in science learning, (2) Can be seen by the management of natural science laboratories that meet the standards resulting in increased test scores, (3) Management of laboratories that conform to standards reflect quality schools.

**Keywords:** management, laboratory, projection, infrastructure, natural sciences (IPA)

## INTRODUCTION

The use of laboratories to be effective requires the best management. The existence of a laboratory is very dependent on its management. A laboratory in a school is important for a school to improve the quality and quality of student education. With a laboratory, it is hoped that students can more easily understand the material being studied while doing the practice. Science Laboratory Management is a valuable field of science in an effort to improve students or students to improve the quality of education and teaching

In connection with this, all elements involved in the management of the Natural Sciences laboratory must have competencies, namely the abilities, attitudes, and skills that must be possessed and capable of being applied by the Natural Sciences laboratory managers as educational staff in carrying out laboratory management tasks. The utilization and management of the science laboratory as a school facility must pay attention to the condition and quality of the facility, because both of these factors can directly influence the educational process (Amiruddin and Zainal Askin, 2008). but in fact there are still many schools that have not used the laboratory as an effective learning media. Material that should use the experimental method is the first choice for teachers of Natural Sciences to explain a material, so students better understand the material.

The low utilization of science laboratories in schools as a means of supporting the learning process, is one of the inhibiting factors in increasing the ability or skills. By implementing a learning process that utilizes a laboratory or practice room. In the use of laboratories, students are expected to be able to master the subject matter, not only through theory alone, but also through practice. The existence of a science laboratory in a school, its role in the teaching and learning process is due to many learning facilities or media that are not available in the learning room or classroom and are only available in the science laboratory (Tilaar 1999: 42).

Related to the education unit level curriculum, PP Number 19 of 2005 Article 42 Paragraph 1 states that one of the educational facilities that serves as a support in the implementation of the learning process in schools is the Laboratory. And according to the Minister of Education Ministerial Appendix 24 of 2007 states that laboratory facilities and infrastructure must meet the minimum ratio which includes (1) building / laboratory room, (2) furniture, (3) educational equipment, (4) tools and experimental materials, (5) media education, (6) consumables, and (7) other equipment.

With this foundation, it means that the laboratory must function effectively, and various management of science laboratories must be effective. Science teachers should do practical work in the science laboratory, because many subjects must use the experimental method. If the delivery of material in theory without practice, the achievement of indicator objectives will not be achieved or abstract, as a result many students do not or do not understand. In fact, many schools do not function as a laboratory as it should, delivering subject matter only as a theory. Many schools have unprofessional laboratory coordinators, who do not even have laboratory assistants.

In a good laboratory have a direction of how (1) Sense of Goal: goals (2) Sence of Regularity: regularity (3) Sence of Crisis: seriousness (4) Sence of Harmony: cooperation. For this viewpoint to be achieved, the existence of a laboratory must be neatly arranged in all respects. The laboratory should be equipped with complete equipment, ready to use, and equipped with good administration. Because without good management, the teaching and learning process will not be effective.

To be more effective in the use of science laboratories there are a number of administrations that must be prepared, namely: (1) student attendance list; (2) diary of science laboratory activities; (3) schedule and list of users of science laboratory equipment / materials; (4) inventory list of science laboratory equipment and materials; (5) list of tools / practicum materials; (6) planned maintenance schedule and work mechanism; (7) request format for science laboratory equipment / materials; (8) tool lending forms; (9) science laboratory materials (Bon loan); (10) tool borrowing cards; (11) to borrow tools (Examples of coins); (12) receipt of goods; (13) the format of the proposed equipment and material; (14) repairs; (15) card stock; (16) sample label; (17) evidence of sanctions for replacing devices; (18) financing sanction cards; (19) list of job sheets; (20) list of submission of practicum results and (21) list of practicum scores According to Purwanto. G. (2006: 2-7).

The reality in the field, in practice there are still various obstacles in the management of good science laboratory and meet the standards that can hamper the success of laboratory management. The implementation of the laboratory work program is not yet fully running well, and the supervision of the principal is still focused on teaching and learning activities in the classroom. These problems certainly need serious attention so that the goals of good laboratory management can be achieved.

Regarding laboratory management and its problems, the researcher wants to evaluate laboratory management in SMA 1 Lubuklingau, where the school is a superior school that has achievements in various fields. As a superior school, with what kind of laboratory management capabilities that makes the school have good achievements. Therefore, researchers will evaluate the management of science laboratories at Lubuklinggau 1 High School in depth.

The focus of the problem in this research is how to manage the Natural Sciences laboratory at SMAN 1 Lubuklinggau Province: South Sumatra?, the purpose of this study was to evaluate and describe the management of a natural science laboratory at SMAN 1 Lubuklinggau in the province of South Sumatra.

The Science Laboratory is a place where practicum and experimentation, research take place. The use of laboratories to be effective requires the best management. The existence of a laboratory is very dependent on its management. Good management there is a process of planning, organizing, implementing and monitoring.

## **THEORETICAL REVIEW**

### ***Science Laboratory***

Riskiono Slamet (2004: 1) mention "the main functions according to Sudaryanto (1998: 6) can be divided into three things, namely: the laboratory becomes a source of learning, the laboratory as an educational method and the laboratory as an educational tool. The main role of the laboratory in the learning process according to science Richardson (1957 : 69) Science Laboratory are: (1) The laboratory is the main source of the emergence of knowledge problems for students; (2) The laboratory is a solution to solve problems faced by students when studying in class or elsewhere; (3) The laboratory encourages students to understand the scientific methods commonly used in scientific societies; (4) Science Laboratory provides a real picture of the phenomena, principles, applicable laws and their application in science; (5) The Science Laboratory influences students' knowledge and understanding of the facts, principles, concepts and generalizations in natural science; (6) The Science Laboratory plays a role in developing students' skills, behavior and attitudes.

Melalui kegiatan belajar di Laboratorium, siswa dapat mengamati proses atau gejala alam sehingga Through learning activities in the Laboratory, students can observe natural processes or phenomena so that understanding of the concept of science becomes easier. The lab gives students the opportunity to practice solving problems based on clues and finding something useful for the development of science. With exercises students are accustomed to being careful, patient, diligent, honest, responsible, willing to cooperate with others, tolerance and so on. The habit will later shape itself into a scientific attitude (Siu, Lau and Cheung: 1999).

So it can be concluded that the Natural Sciences laboratory is a place where practical and experimental activities take place, research. The laboratory is an academic instrument, in addition to books and other media. This shows that the Laboratory is not only a place where activities are carried out, but also personal with qualifications which include expertise, skills and broad insights to reach the future and ability to hold high social transactions. In science learning activities at school, the Laboratory is used as a place for scientific research, experiments, demonstrations and tool design. The core of the activity is the verification and reconstruction of existing IPA concepts, although new concepts may not be found (Aladejana and Aderibigbe: 2007).

### ***Science Laboratory Management***

In laboratory management there is a laboratory management process which includes laboratory planning, organizing, laboratory utilization. Laboratory Management is the resources and coordination of organizational resources (people, equipment, procedures, preparation) to provide quality laboratory services as efficiently (financially, operationally) and as effectively as possible (patient-oriented, safe). Success requires a variety of knowledge based on strong management science principles "(agreed to be added)" (Weiss: 2011).

According to Newby and Marcoulides (2008) there are three types of laboratories:

1. **Structured laboratory:** Structured laboratories are closed or formal laboratories. These are scheduled in the same way as lectures and tutorials with specific exercises set for students. Such laboratories are generally managed by instructors, who are available to help guide students.
2. **Open laboratory;** open or public laboratories are provided so students can complete exercises and assignments outside of scheduled laboratory classes. Students are allowed to come and go as they please with technical assistance, if any, provided by laboratory assistants who are often senior undergraduate or graduate students. For open laboratories, an instructor assigns a problem and students work on it in their own time usually individually but sometimes in groups.
3. **Special laboratories:** special laboratories, which are provided to support the latest programs with advanced technology.

## RESEARCH METHODS

This type of research used in this research is qualitative research. The selection of this type of qualitative research is based on the reasons for wanting to test a theory derived from a hypothesis, and this study uses that method. In this qualitative method, researchers try to understand phenomena through data collection techniques in the form of observations, interviews, and documentation. This data is collected from primary data and secondary data, according to Sugiyono (2014: 39), primary data is a data source that directly provides data to data collectors. This primary data is the main data that contains the results of interviews with informants and direct observation notes in the field. Sugiyono (2013: 309) argues that secondary data are data sources that do not directly provide data to data collectors, for example through other people or through documents. Secondary data that researchers obtained from the results of the study are student attitudes records, photo files of teacher and student activities, in the implementation of learning and implementation of school culture and the results of literature studies.

Data collection techniques used in this study include interviews, observation, and documentation. This interview aims to explore and obtain more in-depth information about the procedures for laboratory management activities by schools and the efforts made by school principals and related parties to improve laboratories and inhibiting factors and support laboratory management. Observation was carried out to find out how laboratory management at Lubuk Linggau High School 1. Observation was carried out in two ways, namely direct observation, namely observation and recording carried out on the object at the place where the event took place or so that the observation was with the object being investigated, and observation indirect, ie observations that were not made when the event will be investigated.

To ensure the validity of research data, researchers use the following principles: Credibility, which is carried out by researchers through adequate involvement, careful investigation, and triangulation of sources. Transferability, researchers try to describe the settings as completely as possible, thereby increasing opportunities for research accuracy. Dependency (can be justified), researchers conducted an audit of the process. In this case, the guiding team, both directly and indirectly, acts as a check on the entire course of the study from beginning to end. Confirmability (confirmation or certainty), researchers to strengthen the suitability of the findings and interpretations of researchers with all data collected during the study. The researcher carries out the triangulation process, "member checks" and through an audit of the results carried out by the supervisory team.

## RESEARCH AND RESULTS

### *Science Laboratory Management*

Based on the results of interviews, observations, and documentation of eating in the processor, SMA Negeri 1 Lubuklinggau has conducted laboratory management by observing the laboratory management process which includes laboratories according to Terry GR theory, namely Planning (planning), Actuation (implementation), Organizing (organizing) Control (controlling) • Laboratory Planning.

SMA Negeri 1 Lubuklinggau is right in determining its location by taking into account the factors of waste disposal, safety and comfort of electricity, water supply and suber gas. Plan a building that includes the practice room preparation room, building, dark room, weigh room and glass room. Especially the chemistry laboratory. Equipping the laboratory with furniture, props, tools and other props, such as firefighters and first aid kit and their contents.

### *Laboratory Planning*

SMA N 1 Lubuklinggau has been right in determining its location by considering the factors of waste disposal, safety and comfort of electric water, gas water and gas. Plan a building that includes a preparation room for practice rooms, buildings, dark rooms, weigh rooms, and glass rooms. Especially the chemistry laboratory. Equipping the laboratory with furniture, props, tools and other test equipment, such as fire extinguishers and first aid kits and their contents.

### *Organizing laboratories*

In managing schools, SMAN 1 Lubuklinggau has created an organizational structure and laboratory implementation flow involving: the principal, vice principals in the curriculum and facilities / infrastructure, administration (distribution of equipment), the person in charge of laboratory management, practicum supervisors. Conducting laboratory administration activities: General includes (Preparation of activity, archiving and financial schedules). Specifically includes inventory and management arrangements for tools, materials and other equipment, maintenance and repair of equipment, practicum services, plans for procurement of tools and practicum materials.

### *Utilizing the Laboratory*

SMAN 1 Lubuklinggau has used the laboratory to improve when all topics in science learning are taught with a process skills approach and make the laboratory the center of learning activities, it is hoped that every subject teacher will always carry out learning activities using equipment in the laboratory, where the laboratory needs to be supported by increasing quantitative and qualitative tools and activity sheets.

### *Evaluation of laboratory activities*

In evaluating the SMAN 1 Lubuklinggau school towards planning and carrying out activities, the aim is to see suitability and improve the quality of the process and learning outcomes..

The results of improving the quality of science learning with good management, namely students can utilize the existence of laboratories to carry out useful activities such as practicum, research, and strengthen Olympic understanding. The level of understanding of students about the material is better when directly practicum. Student achievement in natural science is better, so students often take part in national science olympiad in natural science as proven by getting

an award from the Ministry of Education and Culture in 2016 who got the chance to become an OSN Biology finalist and get a bronze, then in 2017 received an award silver and bronze for OSN Physics and chemistry. Opened an OSN class with 29 students joining the class in 2017 and in 2018 there were 30 students. The existence of a laboratory that supports the application of practicum makes students feel happier and more comfortable when studying in the laboratory will be significant with the results obtained.

The inhibiting factors of science laboratory management are the lack of technicians to maintain laboratory equipment, limited teaching staff, limited laboratory space, limited waste disposal sites. While supporting factors include competent human resources in their fields including (head of laboratory, laboratory staff and science teacher), good student input, adequate facilities (tools and practicum materials).

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