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LABORATORY MANAGEMENT UPT SFT SMP NEGERI 27 MAKASSAR

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Abstract: This research aims to: 1) To find out the management of science laboratories at UPT SPF SMP Negeri 27 Makassar in the planning aspect. 2) To find out the management of science laboratories at UPT SPF SMP Negeri 27 Makassar in the aspect of implementation.3) To find out the management of science laboratories at UPT SPF SMP Negeri 27 Makassar in the evaluation aspect. The type of research in this article is descriptive using a quantitative approach at UPT SPF SMP Negeri 27 Makassar. The population in this study was UPT SPF SMP Negeri 27 Makassar and the sample selected was the laboratory using the saturated sampling method. The research instruments and data collection techniques used were observation sheets. Descriptive statistical analysis is the analysis technique used in this study. The results showed that: on planning indicators, science laboratory management at UPT SPF SMP Negeri 27 Makassar was in the very poor category with a score of 24.24. Meanwhile, the implementation indicator shows that the science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the insufficient category with a score of 35.29. Then, on evaluation indicators, science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the insufficient category with a score of 25.92.

Keywords: Laboratory management; descriptive; UPT SPF SMP Negeri 27 Makassar

MANAJEMEN LABORATORIUM UPT SFT SMP NEGERI 27 MAKASSAR

Abstract: *Penelitian ini bertujuan untuk: 1) Untuk mengetahui manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar pada aspek perencanaan. 2) Untuk mengetahui manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar pada aspek pelaksanaan.3) Untuk mengetahui manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar pada aspek evaluasi. Jenis penelitian dalam artikel ini adalah deskriptif dengan menggunakan pendekatan kuantitatif di UPT SPF SMP Negeri 27 Makassar. Populasi dalam penelitian ini adalah UPT SPF SMP Negeri 27 Makassar dan sampel yang di pilih yaitu laboratorium dengan metode sampling jenuh. Adapun instrumen dan teknik pengumpulan data penelitian yang digunakan yaitu lembar observasi. Analisis statistik deskriptif adalah teknik analisis yang digunakan dalam penelitian ini. Hasil penelitian menunjukkan bahwa: pada indikator perencanaan, manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar berada pada kategori sangat kurang dengan skor 24,24. Sedangkan, pada indikator pelaksanaan menunjukkan bahwa manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar berada pada kategori kurang dengan skor 35,29. Kemudian, pada indikator evaluasi, manajemen laboratorium IPA di UPT SPF SMP Negeri 27 Makassar berada pada kategori kurang dengan skor 25,92.*

Kata Kunci: *Manajemen laboratorium; deskriptif; UPT SPF SMP Negeri 27 Makassar*

INTRODUCTION

Natural Science (IPA) is a branch of science that studies natural phenomena with a scientific approach, which involves three main aspects: product, process, and attitude. Science

includes disciplines such as biology, chemistry, and physics. Science learning involves practicum activities that play an important role in developing process skills and the application of theory. Through practicum, students can deepen their understanding of the theory taught. Sulitiyono's research revealed that practicum can increase students' motivation to learn science, hone basic experimental skills, and support the science-based learning process. To support this practicum activity, special facilities are needed in the form of a laboratory (Rifai., Fibriana., & Nur, 2021).

A laboratory is a space where experiments and research are carried out in a particular field of science. In the laboratory, researchers usually conduct experiments, collect data, and analyze the research results they obtain (Susanti, 2021: 2). According to Muryanto (2021: 2) A laboratory is a place to conduct measurements, training, experiments, and scientific research. Usually, laboratories are built to support the implementation of these activities in a controlled manner. Scientific laboratories are generally categorized based on the discipline studied, such as physics laboratories or chemistry laboratories, and others.

Schools should ideally have laboratories that meet the standards set out in Government Regulation of the Republic of Indonesia Number 32 of 2013 regarding the amendment of Government Regulation Number 19 of 2005 concerning National Education Standards. In accordance with Article 43, paragraph (2), laboratory facilities must be indicated by a minimum ratio of the number of equipment based on the number of students. The mismatch between the number of students and the existing laboratory equipment facilities causes variations in how science laboratories are run.

In addition, laboratories used for the learning process must have several rooms including a practicum room, preparation room, storage room, and teacher's room (Permendiknas, 2017). Each room is designed in such a way that the shape, size, layout, design, and facilities allow the activities carried out in it to take place properly and comfortably, as well as facilitate access from one room to another, facilitate supervision, maintain equipment security, and ensure work safety (Daryanto, 2018).

According to Hofstein and Lunetta (1982), laboratory activities are learning activities designed to allow students to interact with subject matter while looking at objects. Laboratory activities have the potential to improve students' abilities in analysis, communication, process skills, and understanding of scientific phenomena. Therefore, laboratory experiences are essential for improving students' understanding and scientific attitudes. A laboratory in teaching means a group of students conducting research or experiments under the guidance of a teacher. Laboratory does not only mean a room filled with practicum equipment usually found in schools, but also the environment used as a laboratory (Sekarwinahyu, 2010).

Laboratory as one of the learning resources requires effort in management, organization and supervision in its operation. Laboratory management refers to the management, organization, and supervision of laboratory operations as a learning resource. The purpose of laboratory management is to ensure that laboratory operations and governance are carried out properly to ensure that practicum is carried out safely and smoothly (Tawil, 2016: 7). Therefore, facilities, human resources, equipment, and laboratory use are things that need to be considered in laboratory management. Laboratory management is very important for success in science learning (Anggreni, S. & Ikbal, S.: 2018).

For science teachers who want to use the laboratory as one of their learning approaches, the success and efficiency of laboratory management can only be achieved if they know the basics of laboratory

management. According to Harlen (2000) Sweeney, & Paradis (2003), organizing and managing laboratories is the most difficult and challenging aspect of science teaching. Teachers need to address the various science laboratory environments involved such as the appearance of learners in the laboratory, how skilled laboratory assistants should make it easy for teachers to teach during practice, the types of laboratory activities, adequate laboratory equipment and medical supplies, safety features and liabilities in laboratory settings, sufficient time for learner investigations and laboratory infrastructure (Kamarudin, 2018).

The results of a study by Susenu, Partono, & Riswanto (2019) related to school laboratory management found several obstacles, namely: 1) the school laboratory management system is not yet adequate and orderly, 2) the absence of professional and persistent human resources in managing school laboratories, and 3) communication between teachers and laboratory managers is still limited. This results in less interest and motivation for teachers to use the laboratory because in the implementation of the practicum the teacher must prepare the practicum tools. In addition, laboratory tools and materials are not well organized, so that to find one type of tool alone requires a lot of time and energy. The root of the problem is the absence of an effective and efficient laboratory management model/system that is easy to implement. Some schools have also carried out laboratory management well, for example, such as the existence of a person in charge of the laboratory, placing tools and materials in their place. In the implementation of the use of the laboratory, there is data on laboratory rules, the structure of the person in charge of the laboratory. In addition, there is also the management of tools and materials, the placement of tools and materials is in accordance with laboratory criteria by being stored separately or classified so that later it is easy to find when we need it (Irjus, 2020).

Based on this statement, this article will describe quantitatively the management of science laboratories at UPT SPF SMP Negeri 27 Makassar. The school was chosen because it was considered appropriate for conducting research and its strategic location.

METHODS

The type of research in this article is descriptive research with a quantitative approach using observation and research design, namely descriptive. The population used in this study was UPT SPF SMP Negeri 27 Makassar, then the sample was determined using the saturated sampling method. The sample selected was the laboratory at UPT SPF SMP Negeri 27 Makassar. Researchers used research instruments to collect and organize all the necessary data. The research instruments and data collection techniques used were observation sheets. There are three stages or steps in this research, namely preparation, implementation and the end. Preparatory stages such as making letters, compiling research instruments. The implementation stage such as researchers visiting the school, giving explanations and permission letters to the principal and teachers. The final stage such as collecting and processing data.

Descriptive analysis is the analysis technique used in this article. This analysis shows the data obtained from the research directly, then analyzes it in a descriptive way to understand the facts that appear. The analysis technique applied to calculate the percentage score of each aspect of laboratory management.

The purpose of descriptive statistical analysis is to understand the percentage related to laboratory management indicators. After that, the calculated percentages will be grouped into five categories (very good, good, fair, less, and very poor).

RESULT AND DISCUSSIONS

Result

Based on a quantitative study with a descriptive approach that has been conducted at UPT SPF SMP Negeri 27 Makassar, data were obtained regarding the results of observations of science laboratory management in the laboratory.

Category Description of Science Laboratory Management Planning Indicators

The results of observations of planning indicators of science laboratory management at UPT SPF SMP Negeri 27 Makassar are described on Table 1.

Table 1. Laboratory Management Score Planning Indicators

No.	Statement	Score				Total Score	Information
		0	1	2	3		
1.	There is a science laboratory work program at the school	✓				0	There isn't any
2.	There is a science practicum schedule at school	✓				0	There isn't any
3.	There is a Cost Allocation Plan (RAB) for the science laboratory at school	✓				0	There isn't any
4.	There are science laboratory practical guides in schools	✓				0	There isn't any
5.	There are Standard Operating Procedures (SOP) for the practical process in the science laboratory at school.	✓				0	There isn't any
6.	There are Standard Operating Procedures (SOP) for the use of equipment in science laboratories at schools.	✓				0	There isn't any
7.	There are Standard Operating Procedures (SOPs) for protecting against hazards in science laboratories at schools.			✓		2	Enough
8.	There is an organizational structure for science laboratories in schools			✓		2	Enough
9.	Tools and materials in the laboratory are equipped with labels		✓			1	Not enough
10.	Storage of tools and materials is classified according to their groups				✓	3	Good
11.	Dangerous laboratory equipment is stored in a special place	✓				0	There isn't any
Average						**24.24**	**Very less**

The table shows the results of observations of laboratory management planning indicators that have been implemented at UPT SPF SMP Negeri 27 Makassar, where statement 1 which includes sub-indicators of the preparation of work programs with a total score of 0 which means very less or none. In statement 2 which includes sub-indicators of the practicum schedule with a total score of 0 which means

very less or none. In statement 3 which includes sub indicators of the budget with a total score of 0 which means very less or none. In statement 4 which includes sub indicators of the practicum guide with a total score of 0 which means very less or none. Statements 5, 6 and 7 include sub-indicators of Standard Operating Procedures (SOP), for statements 5 and 6 the total score is 0 which means very less or none, while for statement 7 the total score is 2 which means sufficient. In statement 8 which includes sub-indicators of the laboratory organizational structure with a total score of 2 which means sufficient. Statements 9, 10 and 11 include sub-indicators of inventory of goods, for statement 9 a total score of 1 which means less, for statement 10 a total score of 3 which means good and for statement 11 a total score of 0 which means very less or none.

As for each statement on the observation sheet, there is a rubric for scoring the observation sheet, as an example showen in Table 2.

Table 2. Example of Observation Sheet Scoring Rubric

Indicator	Rubric
Is there a Standard Operating Procedure (SOP) for the practical process in the science laboratory at school?	• There is an explanation of how to dress and personal protective equipment. • There is an explanation regarding what can and cannot be done during the practicum process • There is an explanation of procedures for cleaning and returning practical tools and materials

The results of the categorization analysis of the overall science laboratory management score on the planning indicator are described in Table 3.

Table 3. Results of Analysis of Overall Laboratory Management Observation Sheet

No.	School	Planning Indicator Score	
		Score	Category
1.	SPF Unit of Public Middle School 27 Makassar	24, 24	Very less

The results of the analysis of the Laboratory Management observation sheet as a whole on the planning indicator have a score of 24.24 which is included in the very poor category.

Category Description of Science Laboratory Management Implementation Indicators

The results of observations of implementation indicators of science laboratory management at UPT SPF SMP Negeri 27 Makassar are described in Table 4.

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Table 4. Laboratory Management Score for Implementation Indicators

No.	Statement	Score				Total Score	Information
		0	1	2	3		
1.	The implementation of the practicum was carried out according to the	✓				0	There isn't any

	predetermined schedule.					
2.	Implementation of mentoring activities during practicum	✓			0	There isn't any
3.	Students wash their hands properly after completing the practical work.	✓			0	There isn't any
4.	Students carry out work steps in a full, systematic manner and carefully calculate the time.			✓	3	Good
5.	Students enter the laboratory wearing lab coats	✓			0	There isn't any
6.	The practicums carried out utilize the available practicum facilities.	✓			0	There isn't any
7.	Students use practical tools according to instructions	✓			0	There isn't any
8.	Students use practical materials according to the measurements efficiently	✓			0	There isn't any
9.	Students sterilize tools using a spirit lamp correctly	✓			0	There isn't any
10.	There is a warning symbol for dangerous chemicals		✓		2	Enough
11.	The laboratory space has good lighting.		✓		2	Enough
12.	The laboratory room has clean water facilities			✓	3	Good
13.	The laboratory has strong and stable chairs and tables.			✓	3	Good
14.	Students clean tools and materials properly	✓			0	There isn't any
15.	Students clean the lab table after the lab		✓		2	Enough
16.	The laboratory is cleaned on a scheduled basis	✓			0	There isn't any
17.	There is use of laboratories in educational research or learning in laboratories by external parties.	✓			0	There isn't any
Average					**29.41**	**Very less**

The table shows the results of observations of indicators of laboratory management implementation that have been carried out at UPT SPF SMP Negeri 27 Makassar, statements 1, 2, 3, 4 and 5 including sub-indicators of practicum implementation activities where statements 1, 2, 3 and 5 with a total score of 0 which means very less or none, while statement 4 with a total score of 3 which means good. Statements 6, 7, 8, 9 and 10 include sub-indicators of the utilization of laboratory facilities with a total score of 0 which means very less or none, while statement 10 has a total score of 2 which means sufficient. Statements 11, 12, 13, 14, 15 and 16 include sub-indicators of laboratory hygiene maintenance where statements 14, 16 and 17 with a total score of 0 which means very less or none, while statements 11 and 15 have a total score of 2 each which means good.

As for each statement on the observation sheet, there is a rubric for scoring

the observation sheet, as shown in Table 5.

Table 5. Example of Observation Sheet Scoring Rubric

Indicator	Rubric
The practicums carried out utilize the available practicum facilities.	• Utilizing infrastructure in the form of tables and chairs in practical work • Utilizing projectors and teaching aids in practical activities • Utilizing teaching aids and KIT in practical activities

The results of the categorization analysis of the overall science laboratory management score are described in Table 6.

Table 6. Results of Overall Laboratory Management Observation Sheet Analysis

No.	School	Implementation Indicator Score	
		Score	Category
1.	SPF Unit of Public Middle School 27 Makassar	35, 29	Not enough

The results of the analysis of the overall Laboratory Management observation sheet on the implementation indicator have a score of 35.29 which is included in the less category.

Category Description of Science Laboratory Management Evaluation Indicators

The results of observations of evaluation indicators of science laboratory management at UPT SPF SMP Negeri 27 Makassar are described as follows.

Table 7. Laboratory Management Score Evaluation Indicator

No.	Statement	Score				Total Score	Information
		0	1	2	3		
1.	The effectiveness of the practical process in the laboratory is well measured	✓				0	There isn't any
2.	Teachers develop science process assessments in the laboratory		✓			1	Not enough
3.	Laboratory Standard Operating Procedure (SOP) implemented	✓				0	There isn't any
4.	Evaluation of the implementation of the practicum was carried out				✓	3	Good
5.	Practical supervision activities were carried out				✓	3	Good
6.	There is a technical report on tools and materials by the laboratory assistant to the head of the laboratory.	✓				0	There isn't any
7.	There is a laboratory management report by the laboratory head to the	✓				0	There isn't any

	principal			
8.	There are reports on budget utilization that are made in a transparent and accountable manner.	✓	0	There isn't any
9.	Use of laboratory costs in accordance with the Cost Allocation Plan (RAB)	✓	0	There isn't any
Average			**25.92**	**Very less**

The table shows the results of observations of laboratory management planning indicators that have been implemented at UPT SPF SMP Negeri 27 Makassar, where statements 1, 2 and 3 include sub-indicators of the effectiveness of the practicum process in a well-measured laboratory, where statements 1 and 3 with a total score of 0 which means very less or none, while statement 2 with a total score of 1 which means less. Statement 4 includes sub-indicators of the evaluation of program implementation carried out regularly with a total score of 3 which means good. Statement 5 includes sub-indicators of supervision and guidance for each practicum with a total score of 3 which means good. Statements 6 and 7 include sub-indicators of practicum process activity reports to the principal carried out regularly with a total score of 0 each which means very less or none. Statements 8 and 9 include sub-indicators of transparent budget utilization reports to the principal with a total score of 0 each, which means very less or none.

As for each statement on the observation sheet, it is assessed based on the rubric for scoring that has been prepared before making observations, as the following example:

Table 8. Example of an Observation Sheet Scoring Rubric

Indicator	**Rubric**
Practical supervision activities were carried out	• Supervision of practical work ensures that students follow the established practical work procedures correctly. • During supervision, the supervisor can quickly identify problems or errors that may arise during the practicum. • Practical supervision allows for periodic evaluation of student performance.

The results of the analysis of the categorization of the overall science laboratory management score can be seen in the table as follows.

Table 9. Results of the Overall Laboratory Management Observation Sheet Analysis

	School	**Evaluation Indicator Score**	
		Score	**Category**
1.	SPF Unit of Public Middle School 27 Makassar	25, 92	Not enough

The results of the analysis of the Laboratory Management observation sheet as

a whole on the implementation indicator have a score of 25.92 which is included in the less category.

Discussions

Analysis of indicators of the overall implementation of science laboratory management in UPT SPF SMP Negeri 27 Makassar. The planning indicator obtained a score of 24.24% in the very poor category. This school does not have a laboratory work program, Cost Allocation Plan (RAB) and science practicum schedule. Based on the results of observations, UPT SPF SMP Negeri 27 Makassar has LKPD as an instruction for the implementation of science practicum on several materials and there is no Standard Operating Procedure (SOP) for the practicum process and safety from hazards. The organizational structure is not neatly installed, it appears that the position of the laboratory assistant is filled by the science subject teacher. Tools and materials for practicum have not been neatly arranged and grouped according to the type of substances and materials in the storage cabinet. The placement of tools in the cupboard looks out of place due to the lack of storage cabinets to store these tools. However, not all laboratory equipment is labeled, and there are no instructions for using the equipment.

Then, analyze the indicators of the overall implementation of science laboratory management at UPT SPF SMP Negeri 27 Makassar. The implementation indicator obtained a score of 35.29 with a category of less. There is no practicum schedule, but it has not been implemented as planned. On the other hand, the laboratory does not yet have good lighting, sturdy chairs and tables, and clean water facilities available at all times. The laboratory is also cleaned on a scheduled basis, the teacher provides a rotating cleaning picket schedule for each class. Furthermore, analysis of evaluation indicators of overall science laboratory management at UPT SPF SMP Negeri 27 Makassar. The evaluation indicator obtained a score of 25.92 with a category of less. Practical activities during one semester have been reported by the laboratory head to the principal in the form of a written report. However, the supervision and evaluation process has not run optimally and there is also no laboratory financial report.

CONCLUSSIONS

Based on the results of the research that has been carried out, it can be concluded that science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the insufficient category with an average score of 28.48. In planning indicators, science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the very poor category with a score of 24.24. While in the implementation indicator, science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the insufficient category with a score of 35.29. Then, in the evaluation indicator, science laboratory management at UPT SPF SMP Negeri 27 Makassar is in the insufficient category with a score of 25.92.

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