Abdurrauf Science and Society
Vol. 1, No. 4, 2025, pp. 596~603
ISSN: 3090-093X; DOI: 10.70742/asoc.v1i4.310

Laboratory Head Strategy in Improving Laboratory Management Effectiveness in Junior High Schools

Sarwendah C. Luma[1]; Jeffry SJ Lengkong[2]; Elni J. Usoh[3]
[1,2,3]Universitas Negeri Manado, Indonesia
Email: carolsarwendah@gmail.com; jeffrylengkong@unima.ac.id;elni.usoh@unima.ac.id

ARTICLE INFO

Article history:

Received 21-05-2025
Accepted 17-06-2025
Published 18-06-2025

Keywords:

Strategy;
Laboratory Head;
Effectiveness;
Laboratory Management;
Junior High School
Quantitative.

Corresponding Email:

carolsarwendah@gmail.com

Competing interest:
The author(s) have declared that no competing interests exist

ABSTRACT

The objectives of this study are (1) To analyze the strategies implemented by the Head of Laboratory in improving the effectiveness of laboratory management at State Junior High School 3 Belang. (2) To investigate the factors that influence the success of implementing the strategy. (3) To describe the impact of the strategies implemented on the quality of student learning at State Junior High School 3 Belang. The research method used is qualitative. Data collection techniques using interviews, observations, and documentation. The data analysis technique in this study uses data analysis techniques in the field of data reduction, with the process of data reduction and presentation. The results of this study are (1) The strategy of the head of the laboratory in improving the effectiveness of laboratory management at State Junior High School 3 Belang must include several main things, namely, mature planning and management, training and development of Human Resource competencies, utilization of information technology, security and safety in the use of the laboratory, and building internal and external collaboration, all of which are still not optimal. (2) Factors that influence the success of implementing the laboratory head's strategy in improving the effectiveness of laboratory management at State Junior High School 3 Belang are the competence of laboratory staff and technicians, support from the school, and good coordination with subject teachers and laboratory staff. (3) The impact of the strategy implemented on the quality of student learning at State Junior High School 3 Belang is that students become enthusiastic about learning when learning is carried out in the laboratory and students become more active and teachers are more assisted in teaching

Citation: Luma, S. C., Lengkong, J. S. ., & Usoh, E. J. . (2025). Laboratory Head Strategy in Improving Laboratory Management Effectiveness in Junior High Schools. *Abdurrauf Science and Society*, *1*(4), 596–603. https://doi.org/10.70742/asoc.v1i4.310

INTRODUCTION

Every Indonesian citizen (WNI) is required to receive education. Education equips us with academic knowledge, shapes personality, and teaches practical skills that can be applied in everyday life. Realizing the importance of education for the progress of the nation, the government has established a policy of compulsory education for all citizens as the main means in the learning process (Amirul & Latip, 2017). In Law of the Republic of Indonesia No. 20 of 2003 concerning the national education system, Chapter 1, Article 1, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state.

Education cannot stand alone, but requires supporting components such as students, teachers, facilities and infrastructure, curriculum, funds or budget, and the environment (Kurniadin & Machali, 2016). All components must work together in order to run the wheels of education at all levels and types effectively. Good education is able to facilitate students optimally so that they can contribute positively to national development and development (Maris, 2018). One of the components of education that must be present in education is facilities and infrastructure. Educational facilities include all equipment and supplies that directly support the educational process, while educational infrastructure includes all equipment and supplies that indirectly support the educational process. Educational facilities and infrastructure are mandatory factors because they are very important to be used to optimize teaching and learning activities.

Effective educational management is key to shaping the quality of learning in schools, and this also applies at the Junior High School (SMP) level (Siregar & Lubis, 2017). The laboratory is one of the important facilities to facilitate inquiry-based science learning (Fizka, 2014). Through practicums, students can understand concepts more deeply, develop science process skills, and increase interest in learning. Optimal utilization and management of the laboratory will help students solve problems involving process skills and critical thinking.Often the potential of the laboratory has not been optimally utilized (Dzakiyah, 2023). Obstacles such as inadequate facilities, lack of teaching materials, or inefficient management can prevent the laboratory from becoming an effective learning tool.

The head of the laboratory, as the main person in charge, has a strategic role in overcoming this challenge (Djumhur, 2015). He not only manages the facilities and infrastructure, but is also responsible for developing a practice-based curriculum, improving teacher competency in utilizing the laboratory, and ensuring the safety and comfort of the learning environment (Ehma, 2006). Without a clear and planned strategy from the head of the laboratory, practical activities can be just a formality, far from its main goal of improving student understanding and skills.

Some of the obstacles that are often encountered include limited facilities and infrastructure, lack of teacher competence in managing the laboratory, and lack of support from the school (Rahmadani, 2023). Managing a laboratory involves various aspects, from planning, organizing, implementing, to evaluating. The management of school laboratories, especially junior high schools, has an organizational structure in maximizing the use of the laboratory. This structure usually involves the Principal, Curriculum Manager, Head of Laboratory, Laboratory Assistant, and Subject Teachers (Sujatmiko, 2015). Not all teachers have adequate competence in managing the

laboratory. Effective laboratory management has a significant impact on performance and is a supporting facility for learning in schools.

Any organizational structure will run optimally and have a big impact if all components in it carry out their duties and responsibilities accordingly (Sukarso, 2005). The same thing is also a challenge in laboratory management at SMP Negeri 3 Belang based on initial observations. The head of the laboratory has a very strategic role in overcoming existing obstacles. The head of the laboratory at SMP Negeri 3 Belang also often faces various challenges, such as no synergy in the organizational structure within it, lack of training, heavy workload, and lack of support from the school. A clear and effective organizational structure in a junior high school laboratory can be a very valuable learning center for students. This study aims to analyze the strategies implemented by the head of the laboratory in improving the effectiveness of laboratory management at SMP Negeri 3 Belang and the factors that influence the success of implementing these strategies and their impact on the quality of student learning.

METHOD

This research is a field research, which is a type of research conducted in the original location or real environment where the phenomenon or problem being studied occurs. Unlike research conducted in a laboratory or in a controlled setting, field research collects data directly from primary sources in the field. The purpose of this study is to explore the phenomena that occur directly in the community or environment being studied and focus on collecting relevant and contextual information with real conditions in the field. So as to provide an overview of the effectiveness of laboratory management at SMP Negeri 3 Belang. This research was conducted at SMP Negeri 3 Belang.

In this study, the data collection techniques used are through: Observation is a data collection technique by directly observing behavior or phenomena in the field. Observations in this study were obtained from data by means of direct observation in the field Interviews are data collection techniques carried out by communicating directly with informants or research subjects. The questions in the interview come from comprehensive observation results. Documentation in this study is needed especially to obtain administrative data and data on documentary activities. In this case, documentation is obtained through documents and photographs.The data analysis technique in this study uses data analysis techniques in the field of data reduction, with a data reduction and presentation process.

RESULT AND DISCUSSION

The results of the analysis of this study lead to research findings based on the results of research at SMP Negeri 3 Belang which have been presented in the previous chapter. Based on the explanation above, the findings that can be put forward in relation to the strategy of the Head of Laboratory in improving the effectiveness of laboratory management at SMP Negeri 3 Belang are as follows:

1. Laboratory Head Strategy in Improving Laboratory Management Effectiveness

a. Thorough planning and management

A Laboratory Head has a key role in ensuring that laboratory operations run effectively, efficiently, safely, and in accordance with established standards. Planning is an important foundation in laboratory management. Good planning will determine the direction, goals, and allocation of resources efficiently. Kurniadin & Machali (2016:139)

state that planning is basically a process of activities that systematically prepare activities that will be carried out to achieve certain goals. As one of the management functions, planning has a very important and primary role, even the first among other management functions. Planning is the initial step in laboratory management which includes the preparation of SOPs (Standard Operating Procedures), laboratory usage schedules, and inventory of tools and materials. Each practicum activity has a standard operating procedure (SOP), including procedures for borrowing and returning tools, using chemicals, and work safety protocols.

In addition to planning, the process of managing available resources, both physical and financial, is very important in increasing the effectiveness of laboratory management in schools.The head of the laboratory must be able to design, implement, and evaluate management strategies that include human resources, tools and materials, and budget. Laboratory management includes layout, laboratory layout, coordination of practicum activities with teachers, implementation, namely preparing a laboratory activity schedule, implementation of practicums, evaluation, namely evaluating laboratory activities, preparing laboratory activity reports, monitoring, etc. This is in accordance with Permendiknas No. 24 of 2007 which has been explained previously regarding the description of laboratory facilities.

In relation to the conditions that occur in the laboratory at SMP Negeri 3 Belang, the planning and management have been running well but have not met the ideal standards of a laboratory, because based on the explanation above there are still obstacles or challenges in laboratory management, especially in planning and management. One of them is the limited budget and the practice schedule that often changes which results in clashing subject schedules. In laboratory management, there is also no follow-up plan in an effort to meet the needs of laboratory management. This RTL (Follow-up Action Plan) is usually prepared by the laboratory team responsible for laboratory management. This follow-up plan functions to plan the steps for improvement or follow-up needed to improve the quality and effectiveness of activities in the laboratory.

From the results of interviews, observations, and documentation, it can be concluded that the management of laboratory management at SMP Negeri 3 Belang has been running quite well in terms of planning, but there are still shortcomings in terms of formal implementation and organization, activity evaluation, and maintenance of facilities and infrastructure.

b. Training and Development of Human Resources (HR) Competencies

Improving the competence of Human Resources (HR) is one of the key strategies in effective laboratory management. Improving the competence of human resources will strengthen the ability of laboratory heads, science teachers, and students in carrying out laboratory functions.Several strategic steps and important elements in improving human resource competency in school laboratory management are strengthening competency, mastery of technology, and training.Competence improvement is not only technical, but also interpersonal. The head of the laboratory needs to encourage cooperation between teachers, laboratory assistants, and students. According to some experts, competence is a characteristic that underlies a person's achievement of high performance in their work. Employees who do not have sufficient knowledge will work haltingly and also result in wastage of materials, time, and energy (Nurillah, 2014).

Improving human resource competency is the main strategy of the laboratory head in managing the school laboratory professionally and effectively. With competent

human resources, laboratory operations become more organized, practical activities run optimally, and science learning objectives can be achieved well. Thinking power is intelligence that is innate while skills are acquired from efforts such as studying or attending training. The conditions in the laboratory at SMP Negeri 3 Belang, especially in human resources, in reality still require special training to improve competence. Competent human resources are characterized by being able to operate equipment, conduct tests, manage data, and understand laboratory safety procedures. In addition, they must also be able to work together in a team and communicate well with all parties. Based on the results of interviews with the principal and science teacher who is also the head of the laboratory that have been explained previously, it is known that training and development of Human Resources competency in laboratory management does not yet have a structured planning system. There is no written document that specifically contains a training plan for laboratory assistants or science teachers related to laboratory management. Training activities are only incidental and depend on invitations from the Education Office or other external institutions. Laboratory management runs functionally, but does not meet ideal safety and work efficiency standards.

c. Utilization of Information Technology

The use of information technology in laboratory management in schools can significantly improve the efficiency, accuracy, and accessibility of data. This not only makes it easier for teachers and staff to manage inventory and schedules, but also provides a better learning experience for students. The use of information technology in laboratory management at SMP Negeri 3 Belang is currently still limited and unstructured. Activities such as inventory recording, reporting, and coordination have partly utilized digital tools such as MS Word and communication applications, but have not been accompanied by a formal and integrated system. The use of information technology in laboratory management is no longer just an option, but a crucial need in this digital era. Its importance in laboratory management lies in its ability to drastically increase operational efficiency. At SMP Negeri 3 Belang, based on the results of interviews and direct observations, no web-based laboratory management system or special digital applications were found. All documentation activities such as practicum schedules, tool usage, and tool damage reports are still done manually. Meanwhile, information technology plays an important role in optimizing resource utilization.

d. Security and Safety in Laboratory Use

The laboratory environment, although an interesting place to learn and experiment, also holds the potential for danger if not managed properly. The implementation of strict safety and security standards is key to protecting students, teachers, and the laboratory assets themselves. At SMP Negeri 3 Belang based on the results of the studyScience teachers and laboratory heads rely solely on verbal instructions to ensure student safety. Basic safety equipment such as lab coats, gloves, masks, and goggles are not yet available. which is personal protective equipment. Socialization regarding work safety in the laboratory was only carried out as far as teacher briefing before the practicum began. This is one of the most striking weaknesses. Limited knowledge and facilities are the main obstacles in the laboratory at SMP Negeri 3 Belang in implementing a comprehensive safety system. In fact, most practicums are carried out without personal protective equipment (PPE), and minor risks such as splashes of acid solutions or chemical spills have not been handled with standard procedures. Teachers only rely on direct supervision and personal experience

in anticipating potential hazards, but cannot guarantee that all students have the same awareness or ability to maintain their safety. In the documentation at SMP Negeri 3 Belang, no records of incidents or reports of minor accidents that have occurred were found, this indicates that the school does not yet have a laboratory incident reporting system.

e. Building Internal and External Collaboration

The laboratory as one of the important facilities in science learning at SMP Negeri 3 Belang has a strategic role in developing students' science process skills. However, optimizing laboratory functions does not only depend on the completeness of the tools and materials, but also on the school's ability to build internal and external collaboration as part of a sustainable laboratory management strategy. The implementation of training is divided into two main forms: internal training (in-house training) and external training organized by external parties such as the Education Office, Training Center, or industry partners. Internal training is usually carried out through workshop activities that present speakers from senior teachers or school supervisors. Common topics discussed include the preparation of lesson plans, the implementation of the independent curriculum, the use of learning technology, and digital literacy. Based on data from interviews, observations, and documentation, it can be concluded that training and development of human resource competencies in laboratory management at SMP Negeri 1 is still very limited and has not been managed systematically. Science teachers as those in charge of the laboratory play a dual role without the support of appropriate technical training. Laboratory management runs functionally, but does not meet ideal safety and work efficiency standards. Internal and external collaboration in the school laboratory at SMP Negeri 3 Belang is still in its early stages and requires strengthening from various sides. Internal collaboration is still limited to informal communication without a clear organizational structure, while external collaboration is still incidental and not long-term oriented.

Based on the discussion above, it can be concluded that the strategy of the Head of Laboratory in improving the effectiveness of laboratory management at SMP Negeri 3 Belang is still not effective because based on the description of the duties and responsibilities of the Head of Laboratory, there are many things that are not in accordance with the work guidelines for laboratory personnel in schools issued by the Ministry of Education and Culture.

2. Factors influencing the successful implementation of the Laboratory Head's strategy in increasing the effectiveness of laboratory management.

The success of the implementation of the strategy by the Head of Laboratory in improving the effectiveness of laboratory management is influenced by various factors. Good coordination with subject teachers and laboratory staff is one of the factors that influences it. Management is the coordination of all resources through planning, organizing, directing, and controlling in order to achieve certain goals that are desired (Hanafi: 2015). Good coordination allows the delivery of information regarding the practicum schedule, the need for tools and materials, and the correct implementation procedures. Conversely, poor coordination can cause overlapping schedules, technical errors, and low quality practicum activities. Another factor that influences the success of the implementation of the Head of Laboratory's strategy in improving the effectiveness of the laboratory in schools is the competence of laboratory staff and technicians. Competence is a combination of knowledge, skills, attitudes, and behaviors that must be possessed, understood, and mastered by someone to carry out certain tasks or jobs professionally and effectively. It can be interpreted that

competence shows skills or knowledge that are characterized by professionalism in a particular field as something that is most important, as the superiority of that field (Made, 2016).School laboratory staff and technicians require a variety of competencies, ranging from technical expertise to managerial skills. These competencies also include the ability to collaborate, communicate, and manage laboratory activities. Another factor that influences the implementation of the Laboratory Head's strategy in increasing the effectiveness of laboratory management is the support from the school.The school plays a role in providing a budget for the procurement of equipment, materials, and maintenance of laboratory facilities. Without adequate financial support, laboratory head strategies such as procuring new equipment, developing practical curriculum, or training technicians are difficult to implement. Qomar said that the absence of educational facilities in the education process will result in failure in the education process. This is something that must be avoided by all parties involved in the world of education (Miski, 2015; Nur Mujahiddah, 2022). Therefore, support from the school to meet the needs of facilities and infrastructure, especially in management in the school laboratory, is very important. Based on the ideal conditions explained above regarding the phenomena that occur in the field at SMP Negeri 3 Belang, there are several things that need to be improved. Support from the Principal, teamwork, and careful planning are things that need to be considered in order to increase the effectiveness of laboratory management in schools.

3. The impact of the strategies implemented on the quality of student learning at SMP Negeri 3 Belang

The implementation of effective laboratory management strategies by the head of the laboratory at SMP Negeri 3 Belang can have a significant impact on the quality of student learning, especially in science subjects. One of the impacts is the understanding of science concepts by students which increases students' enthusiasm for learning. Learning that was previously theoretical is now reinforced with practical activities that allow students to directly observe scientific phenomena. In addition, effective laboratory management strategies also have an impact on increasing students' interest and motivation to learn. An active and exploratory learning atmosphere in practical activities makes students more enthusiastic in following lessons. They feel they have a pleasant and relevant learning experience to everyday life, so that their attendance in class increases and participation in discussions becomes more active. This is in line with what happened at SMP Negeri 3 Belang, students became enthusiastic in following learning. Another impact on the student learning process seen from the laboratory management aspect is that with the existing obstacles, for example the availability of inadequate tools and materials, the competence of laboratory assistants or staff involved in laboratory management that still needs to be improved and planning and organizing that are not yet optimal, then there needs to be improvements in these aspects to be able to increase the effectiveness of laboratory management.

CONCLUSION

Laboratory Head Strategy in Increasing Laboratory Management Effectiveness, from the results of interviews, observations, and documentation, it can be concluded that the laboratory head's strategy in increasing the effectiveness of laboratory management is that laboratory management at SMP Negeri 3 Belang has been running quite well in terms of planning, but there are still shortcomings in terms of formal

implementation and organization, activity evaluation, and maintenance of facilities and infrastructure.

Factors influencing the success of implementing the Laboratory Head's strategy in increasing the effectiveness of laboratory management. The success of implementing strategies by the Head of Laboratory in increasing the effectiveness of laboratory management is influenced by various interrelated factors.And the success of the Laboratory Head's strategy in improving the effectiveness of laboratory management at SMP Negeri 3 Belang is influenced by several factors, namely coordination between staff and all those involved in laboratory management, increasing the competence of staff and teachers in the laboratory, and support from the school.

The impact of the strategies implemented on the quality of student learning at SMP Negeri 3 Belang, overall, the laboratory head's strategy in improving the effectiveness of laboratory management at SMP Negeri 3 Belang contributed greatly to creating quality, active, and contextual science learning. This effort is also in line with the spirit of the Merdeka Curriculum which emphasizes project-based learning, learning independence, and character building.

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