

Development Physics Management of the Uhamka Laboratory



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ABSTRACT: This research aims to determine the planning, organization, maintenance or recording and supervision of the management and management of the Physics laboratory at the Prof. DR HAMKA Muhammadiyah University Physics Education. This research is a qualitative descriptive study. This research was conducted at the UHAMKA Physics Laboratory, Jakarta. Data collection methods include observation, interviews and documentation. Data analysis techniques consist of data reduction, data presentation, and drawing conclusions. Data validity techniques using source triangulation and triangulation. The research results show that: 1) Planning is carried out in the new school year By coordinating between all lecturers, the practicum time allocation is adjusted to the course schedule for one semester, because the laboratory layout does not fully comply with the established standards. 2) The organization has not gone well, there are no technicians and laboratory assistants who have been specifically assigned to manage the laboratory, managers and course lecturers, resulting in overlapping duties and responsibilities so that management cannot be said to be optimal. 3) Maintenance or recording of practical equipment cannot be separated from obstacles to repairing equipment, obstacles in laboratory maintenance are equipment damage more than 2 times, but the campus only has a budget for repairs once, 4) Supervision is carried out by making reports, and seeing the results when the laboratory that it runs according to its function means that supervision is carried out well. So it can be concluded that the development of the Physics laboratory at UHAMKA requires improvements in several aspects, including planning, organization, maintenance and supervision, to achieve the expected level of optimality in supporting the Physics Education learning process.

KEYWORDS: Management, Laboratory Management.

INTRODUCTION

In science education, laboratory activities are an integral part of teaching and learning activities. Through laboratory activities, students will be given the opportunity to encourage curiosity and the desire to try, so that students can more easily understand and comprehend the material they have received after carrying out experiments in the laboratory. The laboratory is an inseparable part of daily laboratory activities. A laboratory is a room, either closed or open, which is designed according to the need to carry out activities related to the functions of education, research and community service. Whether a laboratory can be managed well is determined by several factors that are interrelated with each other. a laboratory is "a place to carry out practical activities, community service and support teaching and learning activities".(1)

Laboratories make learning or lectures more meaningful, because students act directly in observing their experiments. However, currently many laboratories in schools or campuses have not been utilized optimally, this is due to a lack of interest, knowledge of management and use in utilizing human resources. is in the laboratory. The laboratory is managed for users according to their usage needs. According to Nina, laboratories at every school or campus should implement this effective and efficient laboratory management, so that practical activities can be carried out smoothly and can increase student enthusiasm.(2)

Laboratory management is an effort to manage a laboratory. According to G.R. Terry management is a process consisting of planning, organizing, activating, implementing and supervising, by utilizing both science and art in order to complete previously set goals (Management is a distinct process consisting of planning, organizing, actuating and controlling, utilizing in each both science and art and followed in order to accomplish predetermined objectives).(3) Laboratory management is an inseparable part of daily laboratory activities.

Meanwhile, according to Laboratory Management is an effort to manage a Laboratory based on standard management concepts.(4)Therefore, laboratory management is a part that cannot be separated from the daily activities of the laboratory, and effective laboratory management will support the laboratory administration learning process.

Good laboratory management depends on several factors that are interrelated with each other. Some sophisticated laboratory equipment with professional and skilled staff does not necessarily operate well. In managing a laboratory as a facility or

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as a place used to apply scientific theory, theoretical testing, proof of research trials, and so on (using tools that are part of the facility with adequate quantity and quality) refers to certain basic elements. Laboratory management is often referred to as laboratory management which is an activity related to planning, setting or organizing, recording and monitoring, for effective and efficient laboratory development. Laboratory management is also related to managers, users and laboratory facilities, basically all factors are jointly responsible for managing the laboratory.(5) Based on research by Neng Gustini regarding Science Laboratory Management to Improve the Quality of Learning, it is necessary to carry out evaluations every semester in the management of science laboratories.(6)

RESEARCH METHODS

This research is a descriptive research. The time for conducting the research is 02 August – 28 November 2023 at the Physics Laboratory FKIP UHAMKA, Jakarta. This research uses a proportional sampling technique. The proportional sampling technique is deliberate sampling in accordance with the required sample requirements. The subjects sampled in this research were the laboratory management lecturer, one lecturer and three students. The subjects appointed in this research are people who are expected to be able to provide information that is as complete as possible and relevant to the research objectives.

The data collection technique used in this research is 1) Interview. The interview technique is used to reveal about the Laboratory management process. This interview is used as a data collection technique to know exactly what information will be obtained. Data collection through interviews has prepared detailed guidelines regarding planning, organizing or organizing, recording and monitoring. Interview guidelines were used so that the direction of the interview was focused and there were no deviations regarding the laboratory management system. Interview questions were asked to the informants, namely the laboratory management lecturer, one lecturer and three students. 2) Documentation, documentation in this research is intended to obtain data that is available in the form of archives or books that support research. Researchers searched and directly reviewed existing documents in the form of archives or books, such as: organizational structure, laboratory use regulations.

The data analysis technique used in this research is descriptive analysis. Descriptive means that the data obtained from the researcher is presented as it is and then analyzed descriptively to get an idea of the facts in the field. Three steps in data analysis, namely: 1) Data reduction. Data reduction is carried out by summarizing, selecting the main things, focusing on the important things, looking for themes and patterns, and removing what is not necessary. 2) Presentation of data. The data that has been compiled from the results of data reduction is then presented in the form of a descriptive narrative. The data presented is then selected, then simplified by taking the basic data needed to answer the problem being studied. 3) Drawing conclusions is done after the data has been collected and presented, then the researcher connects and compares one data with another so that it is easy to draw conclusions as an answer to the problem being studied.

DISCUSSION RESULT

The first element in laboratory management is planning. Laboratory management without a plan will run without a clear vision and mission. For this reason, laboratory planning is aimed at several things, namely regulate all activities carried out in the laboratory consisting of research, trials (experimentation), application of theory in the laboratory, theory testing and so on as well as determining indicators of success in each stage of the planned activities as well as planning related to laboratory management carried out at the beginning of the year lesson. The plan to use the physics laboratory in UHAMKA Physics Education is in accordance with the curriculum set by the Minister of Education and Culture which is used in the Indonesian National Curriculum Framework (KKNI), then it is also adjusted to the practicum time allocation. In the 2023-2024 academic year, the practicum time allocation for the first semester of basic physics courses is 3 lesson hours, for semester 3 of electronics courses 2 lesson hours. And for the fifth semester, the modern physics course is 3 hours of lessons. Then for the first semester of biology education, the basic physics course is 2 hours of lessons. Then the practicum time allocation is adjusted to the course schedule for each semester. Based on the results of research in the UHAMKA physics laboratory, the laboratory layout is not fully in accordance with established standards.

The second element in Arrangement or Organizing is an effort to realize the activities to be carried out in the laboratory. Arrangement or organizing plays an important role because in organizing there is a structure of forms of working relationships between laboratory managers. Arrangement or organizing as part of managing the organizational structure, authority and responsibilities of laboratory officers. Good organization includes several managers, including the laboratory head, laboratory coordinator, and laboratory assistants. Organization is carried out well so that the laboratory runs in accordance with its function and benefits in an effort to support the teaching and learning process or lectures. Setting up or organizing a laboratory includes two main things, namely physical setting and regulating (a setting of activity schedules and preparation of software for the implementation of order and safety at work in the laboratory). Setting is an activity of arranging or organizing the layout and arrangement of a laboratory, which includes the placement of laboratory equipment and materials. Laboratory settings should be able to provide optimal support for the continuity of research activities, theory testing, experimentation, practicum, etc. The principle that laboratory managers must pay attention to when carrying out and determining laboratory settings is safety, which means that

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the placement of laboratory equipment and laboratory materials is kept as small as possible and there is a risk of accidents occurring. Next, namely efficiency and effectiveness related to the use of laboratory equipment. Based on research at the UHAMKA physics laboratory, Jakarta, the procedure for organizing a laboratory according to Mr. SG is "the laboratory management lecturer collaborates with the TIH lecturer, specifically there is no administration yet." Course managers and lecturers result in overlapping duties and responsibilities so that management cannot be said to be optimal.

The third element in laboratory management is recording. This process includes the activity of registering all existing facilities, tools and materials based on certain categories (or in accordance with applicable regulations). Record keeping is very much needed in laboratory management and must be included in laboratory management. Recording in laboratory management can be done on all things related to the laboratory, starting from laboratory equipment, laboratory activities, laboratory teaching staff / lecturers. Apart from that, recording the users of laboratory equipment and the history of the equipment used in the laboratory is also very important. Required. These notes are usually made in the form of tool cards. The tool card is data on tool specifications, usage procedures, usage records, and history of service or damage repairs, as well as the existence of spare parts or consumable parts. Tool cards are usually placed near or hung on laboratory equipment. The benefit of having a laboratory equipment card is to make the monitoring process easier. Based on research at the Uhamka physics laboratory, maintenance of practical equipment cannot be separated from obstacles to equipment repair. The obstacle in laboratory maintenance is that equipment is damaged more than twice, but the campus only has a budget for repairs once. The solution to overcome this obstacle is to reuse spare parts or recycled items that can still be used to minimize expenditure on repair funds.

The fourth or final element in laboratory management is supervision, which is an action or activity process to find out the results of implementation, errors, failures, then make improvements and prevent the recurrence of these errors, as well as ensuring that implementation does not differ from the established plan. Supervision aims to monitor and control laboratory management from various aspects, whether it is supervision of equipment and materials, laboratory users or supervision of human resources or management officers. According to supervision is one of the functions of management in the form of conducting assessments. If necessary, corrections can be made regarding what subordinates have done so that they can then be directed to a path that is in line with the aim of achieving the goals outlined previously.(7) Meanwhile, according to supervision is a management activity carried out to see the implementation of the work program that has been carried out so that it can be used as a guideline for subsequent activities.(8) By monitoring deficiencies felt during implementation, they can be identified. In addition to monitoring facilities and infrastructure, supervision also includes evaluating the laboratory's performance in running the program for one semester which can be used as a benchmark for the success of monitoring indicators in laboratory management. If there are deficiencies during the evaluation, it is hoped that improvements will be made immediately for the continuity of activities in the laboratory. Laboratory. Based on research at the Uhamka physics laboratory, according to a similar statement also expressed by Mr. SG that supervision is carried out by making reports. Supervision is carried out by looking at the results when the laboratory is running according to its function, meaning that supervision is carried out well.

The results of this research are quite different from research conducted by which obtained good management results in laboratory management, which will create a safe and comfortable laboratory atmosphere.(9) That there is a relationship between management and good governance with a safe atmosphere. And comfortable for users, users and laboratory managers, the research uses quantitative research based on literature studies (meta-analysis). Another research by Muarif Islamiah et al, (2023) which obtained results that good laboratory management must include the four management functions of planning, organizing, actuating and controlling facilities and infrastructure are very important parts.(10) , the research uses quantitative descriptive data analysis techniques which utilize descriptive analysis data or descriptive statistics.

CONCLUSION

The results of this research show that there are several stages in physics laboratory management to improve the quality of lectures at UHAMKA Physics Education. The laboratory planning stage is aimed at several things, namely organizing all activities carried out in the laboratory consisting of research, trials (experimentation), application of theory in the laboratory, theory testing and so on as well as determining indicators of success in each stage of the planned activities and planning related to laboratory management is carried out at the beginning of the academic year. The Arrangement or Organizing Stage plays an important role because in organizing there is a structure of forms of working relationships between laboratory managers. The recording stage is very much needed in laboratory management and must be present in laboratory management, while the supervision stage is to monitor and control laboratory management from various aspects, be it supervision of equipment and materials, laboratory users or supervision of human resources or management officers.

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REFERENCES

- 1) Hamdani. A. D. & Kurniatanty. I. (2008). *Laboratory Management & Engineering*. Yogyakarta.
- 2) Nina Adriani, (2016), *Management Analysis of State High School Chemistry Laboratories in Tanjungpinang to Improve the Competency of Teachers and Students*, *Zarah Journal*, 4 (1), 1-8, e-ISSN: 2549-2217, p-ISSN: 2354-7162. <https://ojs.umrah.ac.id/index.php/zarah/issue/view/7>
- 3) Jahari, J., & Syarbini, A. (2013). *Madrasah Management: Theory, Strategy and Implementation*. Alfabeta
- 4) Sitorus Marham, 2013, *Management and Chemistry Laboratory*, Graha Ilmu, Yogyakarta
- 5) Musdalifah, & Faridah. (2021). *Laboratory Management at SMP Negeri 7 Enrekang*. *Journal of Educational Administration, Policy and Leadership (JAK2P)*, 2 (1), 104-117.
- 6) Neng Gustini, (2020). *Science Laboratory Management to Improve the Quality of Learning*, *Journal of Islamic Education Management*, 5 (2) (2020) 231-244, DOI:10.15575/isema.v5i2.9308 <http://journal.uinsgd.ac.id/index.php/isema>
- 7) Nahdiyaturrahmah, et al. (2020), *Management of the Natural Sciences (Science) Laboratory at Smp Negeri 2 Singaraja*, *Indonesian Journal of Science Education and Learning (JPPSI)*, 3 (2), 118-129. <https://ejournal.undiksha.ac.id/index.php/JPPSI/issue/view/1730>
- 8) Elseria. 2016. *Effectiveness of Science Laboratory Management*. Jakarta: Rineka Cipta
- 9) Indra Gunawan, (2019), *Management of Tools and Materials in the Microbiology Laboratory*, *Journal of Educational Laboratory Management*, 1 (1) 2019,19-2 <https://ejournal2.undip.ac.id/index.php/jplp>
- 10) Muarif Islamiah, et al, (2023), *High School Science Laboratory Management in Dompu Regency*, *BASA (SCIENCE BAROMETER)*, *Journal of Science Learning Innovation*, 19-24. <https://unimuda.e-journal.id/basa/index>
- 11) Jahari, J., & Syarbini, A. (2013). *Madrasah Management: Theory, Strategy and Implementation*. Alfabeta
- 12) Sitorus Marham, 2013, *Management and Chemistry Laboratory*, Graha Ilmu, Yogyakarta
- 13) Muarif Islamiah, et al, (2023), *High School Science Laboratory Management in Dompu Regency*, *BASA (SCIENCE BAROMETER)*, *Journal of Science Learning Innovation*, 19-24. <https://unimuda.e-journal.id/basa/index>
- 14) Musdalifah, & Faridah. (2021). *Laboratory Management at SMP Negeri 7 Enrekang*. *Journal of Educational Administration, Policy and Leadership (JAK2P)*, 2 (1), 104-117.
- 15) Nina Adriani, (2016), *Management Analysis of State High School Chemistry Laboratories in Tanjungpinang to Improve the Competency of Teachers and Students*, *Zarah Journal*, 4 (1), 1-8, e-ISSN: 2549-2217, p-ISSN: 2354-7162. <https://ojs.umrah.ac.id/index.php/zarah/issue/view/7>
- 16) Neng Gustini, (2020). *Science Laboratory Management to Improve the Quality of Learning*, *Journal of Islamic Education Management*, 5 (2) (2020) 231-244, DOI:10.15575/isema.v5i2.9308 <http://journal.uinsgd.ac.id/index.php/isema>



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