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# The Need for Supervision Model Development to Improve The Competence and Performance of Laboratory Personnel

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**Abstract.** The purpose of this study is to obtain information and an overview of the administrative competence of laboratory personnel and the need to develop a supervision model that will be used by school principals to improve the competence and performance of laboratory staff in Vocational High Schools (SMK). This research uses the Research & Development method with research and development design at the preliminary study stage as needs and content analysis; a data source is a working group of 30 school principals in Sinjai District. The analysis results show that: (1) the competence of laboratory staff in vocational high schools (SMK) based on the analysis of performance appraisal documents in the category is not good. (2) The results of the principal's questionnaire require the development of a supervision model for laboratory personnel. Therefore, this research contributes to and benefits the principal to supervise laboratory staff to improve their competence and performance.

**Keywords:** Model Development; Supervision; Manpower Personnel; Competencies; Performance

## INTRODUCTION

The development of the supervision model of laboratory personnel is believed to be an innovative model. It can be applied in the supervision process because it can adapt to changes in the current era and can help the principal to guide the theory and practice of laboratory personnel and convey direction and discussion through the help of supervision results with agreed results. Laboratory personnel assist and are responsible for providing various equipment for laboratory activities. The principal to education personnel related to the management and administration of education to support the educational process in schools. (van Vendeloo et al., 2018; Zulfikar et al., 2022). Control of education personnel is carried out by the principal education personnel related to the management and administration of education to support the educational process in schools. (Anridzo et al., 2022). Education personnel are members of the community who devote themselves and are appointed to support the implementation of education. (Bearman et al., 2017). The principal of education and the superintendent in the area are responsible for conducting instructional supervision in the school. They conduct regular supervisory visits to schools and monitor performance and other issues related to implementing good quality education. (Moswela, 2010). Although the theoretical framework for supervision and the development of skills in using techniques or tools during management is necessary, the relationship between the supervisor and the supervisor is essential. Therefore control aims to create a positive space for learning and provide a reflection on the results of supervision that has been done. (Harvey et al., 2020).

Permendiknas Number 26 of 2008 concerning Standards for School/Madrasah Laboratory Personnel. Education personnel are in charge of planning and implementing administration, management, development, supervision, and technical services to support the educational process in academic units. The types of academic personnel in question include School Administration Personnel / TAS (head of TAS, affairs executor, special service personnel), Library personnel (Head of Library, library staff), and laboratory personnel (Head of the laboratory, laboratory technician, laboratory).

Given the availability of equipment and workload that laboratories must be carried out, a management system (including operation and maintenance) of laboratory equipment and all laboratory activities is needed. This management includes organizational structure, division of labour, and the composition of the laboratory's team. In addition to the Head and Secretary of the

laboratory, a laboratory is also needed. Supervision of laboratory staff is supervision carried out by the principal laboratory staff related to the management of laboratory workers so that it will support the educational process at school. Education staff, in this case, laboratory staff, are members of the community who devote themselves and are appointed to support the implementation of education. Supervision is a supervision activity carried out by the principal in order to assist teachers and other education personnel in improving the quality and effectiveness of education and learning implementation. Supervision carried out by the principal is aimed at providing services to teachers and education staff in carrying out institutional management effectively and efficiently and developing the quality of educational institutions. (Zuldesiah et al., 2021).

The dimensions that need attention in governance and laboratory management include: planning, structuring, administrating, securing, maintaining, and supervising. Development of standard operating procedures (SOPs) for laboratory governance and governance that are patterned, structured, practical and effective.SOP for laboratory governance can optimize human resources and supporting resources in schools. Laboratory management is adjusted as much as possible to the context of the environment, student needs, and school conditions. (Putu Subamia, 2015) To support the learning process, school laboratory staff must have competence, complete equipment, and good management. Laboratory personnel need to have laboratory management competence. Have knowledge and experience from laboratory personnel. (Padmaningrum, 2013). Education personnel in specific academic units, such as school supervisors, principals, heads of administration (administration), vice principals in charge of some issues, librarians, laboratories, guards and members of school cleaning. (Sholihuddin Planning et al., 2021).

Principals at SMK in Takalar Regency, Gowa Regency and Sinjai Regency, South Sulawesi Indonesia, for lack of supervision of laboratory personnel at school because they do not have standard supervision instruments and do not understand the procedures for supervising laboratory personnel. The educational qualifications of laboratory staff in schools are not up to standard, so in carrying out their duties and responsibilities are still not good. Therefore, it is necessary to supervise to assess performance to increase the potential of laboratory personnel who can support daily activities to be able to answer the challenges of the development of a growing era and increase competitiveness. Based on the qualifications and results of supervising laboratory staff in vocational high schools, showing the ability of laboratory staff that has not met the expected standards, that laboratory staff have not worked optimally because of lack of supervision regularly, and performance appraisal in carrying out tasks according to job description or job, therefore it is essential to study the extent of the competence of laboratory staff and the performance of laboratory staff in schools medium cheese. (Sunardiyo, 2014). Some previous studies have found three themes: 1) qualification standards, 2) laboratory competence, and 3) laboratory management. At each level of education in the school, there are two types of laboratory staff: (1) educators who carry out the function of *teaching and learning*; (2) education personnel who carry out supporting functions for *school administration.* (Cammarota et al., 2019; Mak et al., 2021; Putu Subamia, 2015; Suryana et al., 2018). The development of the ability of laboratory personnel in schools can be done by providing various pieces of training in terms of laboratory management so as to develop the performance and skills of laboratory staff so that they can help improve the ability of laboratory managers. (Lestari et al., 2017).

Previous research focused on qualification standards, laboratory competence and laboratory management, and this research offers the development of a supervision model for laboratory personnel to be able to improve the competence of laboratory personnel through the development of a supervision model that will be carried out to enhance the performance of laboratory personnel. Given the importance of the role of laboratory staff in supporting laboratory activities, the ability and competence of laboratory staff are essential to improve, considering technological advances and scientific developments continue to grow so that the knowledge and skills of laboratory staff are needed in responding to these developments. The presence of laboratory staff helps students in the laboratory carry out learning and research activities. In performing his duties, a laboratory worker is responsible for providing equipment Needed for practicum activities (work practice) or research and returning the equipment to its original place, tidying up and cleaning the work area after the training is completed.

Based on this phenomenon, research was embraced by analyzing the need for developing supervision models for laboratory workers in vocational schools and making supervision models following the essentials, especially for laboratory workers in schools so that they can carry out their duties and functions appropriately to meet the standards of educational personnel in schools. The purpose of this study is to obtain information on the competence and development needs of laboratory workers' supervision model to improve the competence and performance of laboratory staff in vocational schools. A supervision model for laboratory personnel can be developed by referring to the work guidelines of school laboratory personnel.

## METHODS

This research uses a procedural model (R&D) research and development design. The design of the Borg and Gall model was modified into three research and development steps; the research stages developed were: (1) the preliminary study stage as *needs and content analysis;* it is hoped that this stage can function as research, development and validation functions. The focus of development lies in the development of supervision models and instruments of supervision of laboratory staff which the principal follows the primary duties and functions of each educational team (Head of TAS, Head of Laboratory, Head of Study Program, and Head of Library). In developing supervision models and supervision instruments, laboratory workers refer to the work guidelines of school laboratory workers.

The development of the supervision model for laboratory staff in this school is designed with workshop and training activities that require the extraction process of participants and instructors using supporting models and packages following the objectives of workshops and training. The procedure for developing a supervision model for school laboratory staff by the principal will be carried out with preliminary steps, including This primary stage is carried out with field study activities of the supervision process carried out by the principal so far, Analyzing the sub-subject matter of developing an educational personnel supervision model; Analyze source books and review the library development needs of laboratory staff supervision in schools. Reviewing the literature is carried out by activities (1) analyzing the supervision process of laboratory staff that has been carried out; (2) analyzing the sub-sub-subject matter for the development of supervision material for school laboratory personnel; (3) analyzing the sourcebook to find the basis for the concept of developing supervision of laboratory workers in vocational schools.

The location of research on the development of the supervision model of laboratory workers in vocational schools was carried out in Sinjai Regency, South Sulawesi. The subject of the preliminary study was the working group of SMK principals totalling 30 people. The field of expertise that is the subject of primary research is the supervision of laboratory personnel. The *topics of the study were carried out purposively* by considering that the issues were principals, staff, vocational teachers with educational backgrounds in all disciplines, length of service, and the results of the supervision assessment of education staff. The data collection techniques and instruments used in this study are: Questionnaires were given to teachers, supervisors, and principals. Documentation. The documentation in this study was used to determine the results of the supervision of laboratory personnel carried out in schools.

Qualitative and quantitative descriptive analysis is used at the preliminary stage, among others, to explain the results of questionnaires describing competencies and the need for developing laboratory staff supervision models. Descriptive analysis is also used to define the data of the analysis results, such as percentages, frequency distribution tables, graphs, deviation standards, and or other data calculated results narratively. Data in the form of comments and suggestions are described qualitatively. At the same time, the accuracy, clarity and usefulness of the development of supervision of educational personnel are analyzed by percentage descriptive statistical statistics. Quantitative descriptive data analysis techniques are carried out to analyze data on The need to supervise the development of laboratory staff in vocational schools. The analysis technique used is quantitative descriptive analysis obtained from the percentage of Likert scale questionnaire answers to the needs as a numerical score. The data from the open questionnaire will be analyzed using quantitative descriptive analysis techniques. The criteria for the average value of the results of the development needs questionnaire are (1) 3.20-.5.00 very good or very need, (2) 2.20, -3.19 good or need, (3) 1.20-2.19 less good or less need, (4)

0.00-1.19 not good or need not need.

## RESULTS AND DISCUSSION

The results of this study found two main findings, namely: (1) an Overview of the competence of laboratory workers in vocational high schools; (2) An overview of the need for the development of a supervised model of laboratory personnel needed in vocational high schools. Each finding can be seen in the following description.

### Competence of Vocational High School (SMK) Laboratory Staff

The types of competencies of lab personnel referred to in this study include (1) professional competence; (2) administrative competence. Each finding can be followed in the following description.

**Table 1.** Average description of the competence of laboratory staff in SMK

| Indicator | Average | Category |
|---|---|---|
| Professional Competence | 2.15 | Not good |
| Administrative Competence | 2.19 | Not good |
| Rata-rata n=30 | 2.14 | Not good |

Based on Table 1 above, the sub-indicators of professional competence are: (1) maintaining the security of laboratory space and equipment; (2) serving the use of space, equipment needs and practical materials for students and educators; (3) inventory and document all equipment, materials, documents including instructions for the use of laboratory equipment, and facilities; (4) detect and repair laboratory equipment with minor damage; (5) maintain the cleanliness of laboratory equipment and environment; (6) store and maintain practice tools and materials; (7) handle laboratory waste following safety and health procedures, average 2.15 or less good category.

Based on the administrative competency sub-indicators, namely: (1) Make a list of materials, equipment, and spare parts needed by the laboratory; (2) Plan the needs of materials and tools for the maintenance and repair of laboratory equipment; (3) Plan the maintenance and repair schedule of laboratory equipment. With 30 respondents, an average of 2.19 poor category assessments. Based on the overall assessment of respondents on the professional competence and administrative competence of laboratory personnel, the respondent's assessment averaged 2.14 categories of unfavourable. The results of this study provide an overview of the competence of laboratory workers in SMK, finding that the average professional competence and administrative competence of laboratory workers in SMK have an average score of 2.14 in the poor category. The results of this study align with opinions that the existence of laboratory staff is fundamental in determining the academic success of teachers and students. Therefore laboratory staff need to have adequate hard skills and *soft* skills such as Initiative, perseverance, creativity, talents and skills and knowledge mastered by laboratory staff to achieve efficiency and effectiveness. To realize and implement 21st-century education in schools, process skills in learning in the laboratory, which is very important to be carried out so that students can train their thinking skills and can foster scientific attitudes in students. (Selamet et al., 2020). These results reinforce that the presence of laboratory staff in a laboratory is significant in determining student success in school. For this reason, laboratory staff should have adequate hard skills and soft skills, such as Initiative, perseverance, creativity, talents and abilities, as well as knowledge mastered by the Laboratory Laboran, helping the laboratory. (Mojokerto et al., 2021; Nulngafan &; Khoiri, 2021; Nunung et al., 2023).The utilization of science laboratories will be maximal if supported by a management system or management following the standards that have been regulated in the Permendiknas. (Meita, 2018).

The indicator regulates the storage of materials, equipment, tools, and labour parts with an average score of 2.19 in the poor category. This indicates that the competence possessed by laboratory staff has not met expectations. Where to get effective learning activities should be supported by adequate facilities and infrastructure. One of the facilities that can help students' skills is the availability of laboratories. A laboratory is a place for students to conduct trials, observations, practice, and prove the theories learned in the classroom. (Lestari et al., 2017). Therefore to carry out the storage of materials, equipment, tools, and laboratory parts. It is necessary to arrange laboratory activity planning with the preparation of annual programs, laboratory activity schedules, human resource management, and preparation of SOPs (use of equipment and materials). In designing the practice of laboratory work programs which

include the procurement of tools and materials, scheduling, and the maintenance of tools and materials. (Selamet et al., 2020). Therefore, the purpose of laboratory use: (1) to improve student competence, cognitive, psychomotor, and affective aspects; (2) to improve students' social competence; (3) to develop students' skills on observation, data recording, and use of tools; (4) to train students to work meticulously and disciplined; (5) to develop students' thinking power through analysis and interpretation of experimental results; (6) develop honesty and cooperation as well as a sense of responsibility. (Putu Subamia, 2015). Jam professional competence. The performance of laboratory workers and technicians is influenced by supporting factors, namely internal (personal) factors: professional ability, educational background, and experience. For external factors (environment): a good leader (head of the laboratory), in this case, coordinates the duties of laboratory personnel/technicians. (Nugraha et al., 2021; Sunardiyo, 2014).

**Overview of the need for the development of supervising models of laboratory personnel needed in vocational high schools**

Table 2. Average description of the need for the development of laboratory personnel supervision models

| Sub Indicator | Related | Category |
|---|---|---|
| Supervise professional competence | 4.19 | Desperately need |
| Supervise Personality competencies | 3.12 | need |
| Supervise social competence | 3.27 | Desperately need |
| Supervise administrative competence | 4.10 | Desperately need |
| Average n=30 | 3,67 | Desperately need |

Based on Table 2 above, indicators of the need to develop a supervision model for laboratory personnel with sub-indicators: Supervise professional competencies; Supervise Personality competencies; Supervise social competence; Supervise administrative competencies. Based on the results of average needs with 30 respondents, the average assessment of 3.67 categories is in urgent need. These results show that to do a job or explore a specific job requires strengthening skills and understanding competencies to achieve good performance. The results showed an overview of the need to develop a supervision model for laboratory workers that is urgently needed in State Vocational Schools in Sinjai Regency. Based on the analysis of the market for devolving a supervision model for laboratory personnel needed in vocational schools in Sinjai Regency, the average of 30 respondents with an average criterion of 3.67 categories is very necessary. These results show that to do a job or explore a specific job requires strengthening the understanding of competencies to achieve good performance.

Supervision is also a supervisory activity, but it is more humane. Semmaticly, educational supervision is a type of guidance that improves the educational situation and quality (Arifah Nur, Aini, 2021; Nasir &; Masek, 2015). Improvement of competence or marker is the relationship between theoretical knowledge and practical application essential for developing professional abilities and competencies. Competency enhancement provides an opportunity to develop and improve technical skills, skills in solving complex problems, time management skills and documentation. (Ford et al., 2016; Kotirde &; Yunos, 2015; Merlin & Brendel, 2017; Watkins, 2020).

Developing a supervision model for laboratory staff is needed to improve their competence. These needs include; supervising Personality competencies, supervising social competence, and Supervising administrative competencies. These results show how important the supporting dimensions of laboratory governance and governance include: planning, structuring, administrating, securing, maintaining, and supervising. (Budget &; Based, n.d.; Putu Subamia, 2015). The purpose of developing an educational supervision model is to produce an educational supervision model that can develop competencies with the help of supervisors so that they can find out the shortcomings and make improvements. (Arifah Nur, Aini, 2021; Basic, 2019).

## CONCLUSION

The qualifications of laboratory workers in vocational high schools (SMK) in South Sulawesi still require competency development because they are not up to the expected standards, so laboratory workers need supervision with the first

period of January to June and the second period of July to December, to improve performance in carrying out tasks according to the job description or job. The development of supervision models and supervision instruments for laboratory staff is needed and needed by the principal because supervision is carried out for coaching, staffing, and guidance on aspects of school management and administration that function as support for the implementation of learning. Therefore, the results of this study can be used as a reference and information material for school principals and the City and Provincial Education Offices in supervising the improvement of the competence and performance of laboratory personnel in vocational high schools (SMK) and as a reference to other researchers who will research for other laboratory personnel.

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