

Studies ICT Laboratory Management of Vocational Education of Computer Network Engineering (CNE) Skills Program

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Abstract— Skills program of Computer Network Engineering (CNE) Vocational High School (SMK) at Malang is a program that includes favorite category because stringency entry level skills program is quite high. This study was a descriptive study by the sample is limited as it aims to describe the facts in the field of the management of the laboratory and its supporting infrastructure such as the availability of program practices expertise Computer Engineering and Networks (CNE). Mean that the data obtained, the completeness of laboratory facilities for software, hardware and computer networks was 58.4%, which illustrates that the category of appropriateness are at levels that still needs to be improved, thus requiring the attention of the school for the improvement of facilities management and laboratory management CNE.

Keywords— CNE; infrastructure; management; laboratory; ICT; vocational education

I. INTRODUCTION

National Education System must be able to guarantee equal educational opportunities, improving the quality and relevance and efficiency of education management to meet the challenges in accordance with the demands for changes in local, national, and global so it is necessary to reform education in a planned, directed and continuous, it is accordance with the written in the law of the Republic of Indonesia Number 20 Year 2003 concerning National Education System [1].

Vocational Education has a role to prepare students to be ready to work, both working independently (entrepreneur) and fill vacancies. Therefore, the direction of development of vocational education oriented towards the fulfillment of the labor market demand. Vocational High School (SMK) as one of the institutions that prepare the workforce, supposedly able to produce graduates as expected by the world of work. Labor needed is a human resource competence in accordance with the field work, have adaptability and high competitiveness (Curriculum 2004) [2].

In neither curriculum 2004 nor curriculum 2003 for vocational education, the program has duration of learning its

expertise package considerable emphasis on learning and practice. Thus, to support the success of the learning process in vocational practice, it is necessary that adequate infrastructure to support the successful achievement of competence [3].

The success of the learning process in the workshop practice is influenced by several factors: (1) rugged input factors like student; (2) vehicle input factors like the curriculum, staff, funds, facilities and infrastructure, and management; and (3) environmental input factors. If all three factors of quality, it is expected that the practice of teaching and learning in the workshop will also be qualified so as to create students who are competent in their field [4].

Role completeness of facilities and infrastructure with proper management also determine the quality of teaching and learning processes in schools. It can be seen from the results of studies that have been conducted by [5], which showed that the facilities and infrastructure of learning is positively associated with student achievement. Thus, it means that the teacher's coaching ability is necessary in order to improve the quality of education in schools, but in order that also at school need for professional services in the field of infrastructure [4].

In the reality, facilities and infrastructure for practice in vocational education lot that does not comply with the standards, as in said the Chairman of the Association of Education and Vocational Technology Indonesia (Aptekindo) that the availability of facilities or equipment for working practices and materials both at SMK-SMK most are still cause for concern. Only a few of Vocational High School which has working practice facilities that comply the standards, tools and old-fashioned limited practice that complicate the implementation of vocational education objectives to deliver graduates who are competent in their respective fields [6].

A study ever conducted by [7] at the electrical engineering department workshop SMK Negeri 3 Gorontalo indicate that the equipment and materials not complying the demands of practice in meeting the demands in realizing the continuity operation of the practice.

Basic interest in this study sample, (1) By Surya Online [8] Ministry of National Education in Malang was agreed to use the curriculum 2013, so assuming an implementation of the curriculum in all schools homogeneous. (2) Vocational High School 4 Malang is a measure of SMK in Malang superior because it has long been based RSBI, as well as other unique SMK is established since 1937 and has six majors, namely Graphics Production, Graphics Preparation, Multimedia, Software Engineering, animation, and Computer Network Engineering. The number of students in this school around 3300 students with the details of each class consisting of 1100 students.

Noticed on the problems and the reality, it is necessary to do a study of laboratory management and their supporting facilities and infrastructure in the form of completeness practice in Computer Network Engineering (TKJ) skills program at Vocational High School 4 Malang.

Based described above, the formula that will be used as the basis of this study are: (1) how is the ideal management system for laboratory management at Vocational High School 4 Malang ; (2) how the completeness of the practice of computer and network facilities are generally available on Computer Network Engineering skills program at Vocational High School 4 Malang; (3) how completeness number of existing practice room furniture in Computer Network Engineering skills program t at Vocational High School 4 Malang.

With the description of the background issues and the formulation of the problems above, this study has the following objectives: (1) describe the ideal management system for laboratory management at Vocational High School 4 Malang; (2) to describe the completeness of facilities existing practices in Computer Network Engineering skills program at Vocational High School 4 Malang; (3) describe the completeness of infrastructure in quantity and quality practices that exist in Computer Network Engineering skills program at Vocational High School 4 Malang.

II. METHODS

This study was a limited descriptive study by the limited sample because it aims to illustrate the reality on the laboratory management and its supporting infrastructure such as the availability of facilities and infrastructure in practices Computer Network Engineering (TKJ) skills program at Vocational High School 4 Malang. [9] says that the descriptive study aimed to describe anything that is currently in effect. In it, there is the attempt to describe, record, analyze and interpret the conditions that now happens or there. In other words, this study is a descriptive study aimed to obtain information about the current state and the links between the variables exist.

The method used for the development of the questionnaire is Method of Summated Ratings. This method is more popular with the model name Likert [10]. This method uses the distribution of responses as the basis for determining the value

scale. In this approach does not provide any judging group due to the scale value of each statement will not be determined by the degree in each favorable respectively, but is determined by the distribution of responses to agree or disagree on the group of respondents who acted as a pilot study.

After the items of statement written by the rules of writing statements and are based on the draft scale which has been set, the respondents were asked to express agreement or disagreement of the contents of the statement in five types of response categories, namely "Strongly Disagree" (SD), "Disagree" (D), "I do not know" (IDK), "Agree" (A), and "Strongly Agree" (SA). For more details, the results of the development of the questionnaire items completeness about practice space infrastructure at Computer Network Engineering skills program.

The research instrument is a tool used by researchers to collect data so that job become easier and the results is better [11]. In this study use the instruments, there are three types, namely grating interview questions about laboratory management model, the questionnaire about completeness of facilities and infrastructure in Computer Network Engineering skills program with practices and questionnaire completeness of infrastructure quality practices in Department of Computer Network Engineering, grille interview questions about the management model used for photographing laboratory management model that exists today at Vocational High School 4 Malang, questionnaires about completeness of facilities and infrastructure practice in Computer Network Engineering skills program used to measure the completeness of infrastructure, furniture and equipment space program practices in Computer Network Engineering skills program. While the questionnaire completeness of quality infrastructure in Computer Network Engineering department skill programs practice used to measure the completeness of standard quality buildings of Computer Network Engineering skills program in practice.

Data were analyzed with the steps, as follows: (1) input data, (2) classifying the data, (3) provide data, and (4) results of the study concluded that the problem was formulated. Analysis of laboratory model development program management in Computer Network Engineering department using qualitative methods using lattice question refers to laboratory management module from *Dirjen Dikdasmen* in 2004.

Quantitative analysis is used to describe the level of completeness of the infrastructure network computer laboratory practices used three levels of categorization, which is complete, simply complete and incomplete. The formula for determining the range of scores in each category according to [11], where the length class interval is (the highest score minus the lowest score) divided by the number of class intervals.

III. RESULT AND DISCUSSION

Management is a process of utilization of resources to effectively and efficiently to achieve the expected goals optimally. Henri Fayol is an expert management stated that the management should be carried out related to the elements or functions of the manager, the planning, organizing, commanding, coordinating, and controlling with the acronym as known as POCCC.

Based on interviews is known the structure of laboratory management organizational at Vocational High School 4 Malang seems simple as the following chart in Figure 1.

The organizational structure above seems quite brief, but from the observation appears to be ineffective for the development of the laboratory, proved as the primary task of managing the laboratory related to the management and personnel is not running properly. Department of Information Technology has 2 skills program that is 5 class of Computer Network Engineering skills program and 3 class of Multimedia skills program, each class maximum capacity of 36 students. In addition students who get practice, do not see the job description clearly written. This 8 class use of 3 laboratory classes together, this makes 2 skills program will be effective if merged into one so that the care and supervision can be well controlled.

Completeness of practice tools in general means describing the totality of completeness (in general) across vocational education. While completeness of practice specifically describe the completeness which is divided into two parts, namely: (1) the completeness of furniture in the amount of laboratory space and (2) Completeness amount of equipment in the laboratory.

Table 1 represents the range of scores about completeness practice means computers and networks in general at Vocational High School 4 Malang from questionnaires filled out by the laboratory obtained a score of 96. It is clear enough that the classification of laboratory facilities and infrastructure expertise in Vocational High School 4 Malang quite complete.

To uncover the completeness amount of furniture practice room in laboratories Computer Network Engineering skills program there should be a review of (a) the completeness of the amount of furniture's office for software, (b) completeness amount of furniture's office for hardware, and (c) completeness of the amount of furniture's office for network. But earlier need to be revealed about completeness in Computer Network Engineering skills program about the amount of furniture in general practice. In summary, the results of completeness analysis of the amount of furniture in Computer Network Engineering skills program practices presented in Table 2.

Table 2 presents data on the percentage of completeness number of existing practice room furniture in Computer Network Engineering skills program on average is 58.4% or by category is complete. The highest percentage (71.4%) in laboratory software has a fairly complete furnishings, this is

because the laboratory is usually permanent placement of the devices. A laboratory which is said to have furnished if it reaches range of scores from 10-14. Vocational education in Computer Network Engineering practice is said to have furnished a fairly complete if it reaches a score of at least 5 and a maximum of 9 points. While CMS is said to have furnished Computer Network Engineering skills program practices incomplete if only achieve a maximum score of 4.

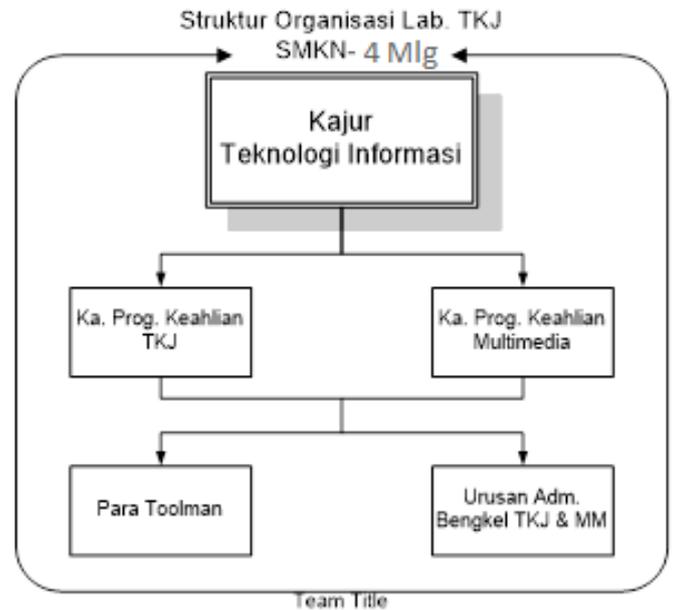


Fig. 1. The Organizational Structure of Interview Results

TABLE I. RANGE OF SCORES ABOUT COMPLETENESS OF GENERAL PRACTICE FACILITY IN COMPUTER NETWORK ENGINEERING

Skills Program	
Range of Scores	Classification
110 – 164	Complete
55 - 109	Complete Enough
0 - 54	Incomplete

TABLE II. PERCENTAGE OF COMPLETION TOTAL PRACTICE ROOM FURNITURE FOR COMPUTER NETWORK ENGINEERING SKILLS PROGRAM

No.	Laboratory	Classification	Percentage
1	Software	Complete Enough	71,4
2	Hardware	Complete Enough	71,4
3	Network	Complete Enough	71,4
Average			58,4

Management is a process of resources utilization to effectively and efficiently to achieve the expected goals optimally. **Henri Fayol** an expert management stated that the management should be carried out related to the elements or management functions, namely planning, organizing, commanding, coordinating, and controlling the acronym as known as POCCC. While **Luther M. Gulick** stated that management functions is important is the planning, organizing, staffing, directing, coordinating, reporting, and budgeting with the famous acronym POSDCoRB. Means that management of the laboratory involves several aspects such as planning, organization, administration, security, maintenance, and supervision. Broadly speaking, the management of the laboratory with regard to managers and personnel, laboratory facilities (buildings, general laboratory equipment, laboratory instruments (equipment), laboratory material, and activities carried out in the laboratory [12].

Basically the laboratory management is a shared responsibility of all personnel, both managers and users. Therefore, each personnel involved should have an awareness and felt compelled to equally set up, maintain and seek safety. Organize and maintain laboratory meant doing all kinds of efforts so that the laboratory always remains functioning properly. While efforts to maintain the safety of the work includes efforts to always prevent the possibility of an accident while working in a laboratory. The manager of the laboratory personnel should have the skills and understanding of the laboratories and facilities. Knowing and able to work according to their duties and responsibilities, follow the rules and carry out tasks assigned by the institution. Laboratory personnel managers generally consists of the Head of Laboratory, Chairman of Laboratory, Head / Supervisor laboratory, technicians and analysts as well as the labor force spokesman Assistant or laboratory.

To reinforce the duty and responsibility of each laboratory personnel manager, usually the institution concerned to formulate a job description. Thus, to maintain safety and maintaining laboratory facilities are usually formulated order to work in the laboratory as known as laboratory rulers.

Figure 2 is a proposed organizational structure needs to be developed for the optimization and development; job description can be seen in management outlined model.

While, facilities is defined as something that is used as a tool to facilitate the work, purpose, and goals. A facility is defined as a condition or effort [13]. Similarly, according to Arikunto that educational facilities are all things that are directly related to teaching and learning processes such as furniture, books, stationery and so on. Stated again by Dimiyati and Mudjiono[14] that the learning tools include text books, reading books, school laboratory facilities and equipment, and various other teaching aids.

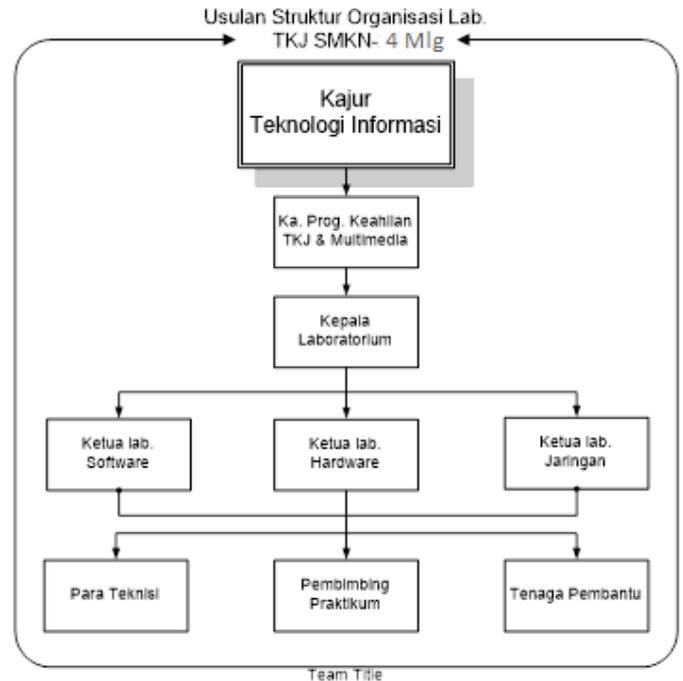


Fig. 2. Development of Organizational Structure Laboratory

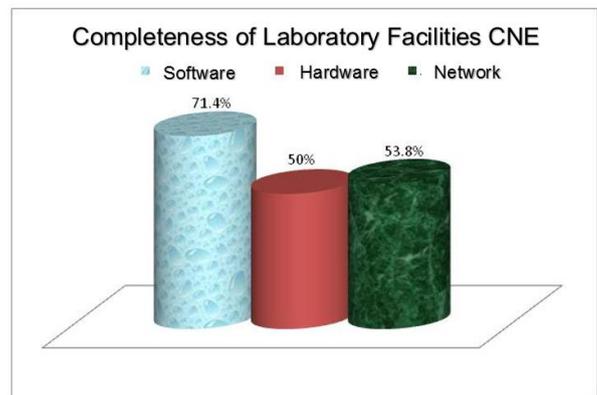


Fig. 3. Facilities Completeness Condition in Computer Network Engineering Skills Program

Role completeness of facilities and infrastructure practice for determining the quality of teaching and learning in vocational education to create students who have the skills and competence in the field of their skills program that include attitudes, knowledge, and skills. Boediono (1997) explains that the success of educational programs through teaching and learning in school is strongly influenced by the major factors which input factors coarse form students, a factor inputs a facilities in the form of curriculum, staff, funds, facilities and infrastructure, as well as the management and input factors environment. If all three factors are qualified, it is expected that the learning process in schools will also be qualified.

Based on the facilities completeness condition in Computer Network Engineering skills program at Vocational High School 2 Yogyakarta, show that it is known that the condition of laboratory facilities and computer network hardware approach the lower limit of the category enough. This is particularly relevant to the findings of [15] argues that the means of practice is anything that is directly related to teaching and learning practices such as indoor facilities, furniture, equipment practice (measuring tools and hand tools), materials practices, media learn to achieving the learning objectives.

IV. CONCLUSION

From the description of the discussion, it can be concluded as follows:

- Although Vocational High School 4 Malang has implemented ISO-9001: 2000, based on this study Computer Network Engineering skills program laboratory management have not seen optimize the functions of management. That is, the portrait appears successful in view of the study on the infrastructure of completeness laboratory practice that has not been in accordance with ISO 9001: 2000.
- Facilities Completeness of Computer Network Engineering skills program practice in Vocational High School 4 Malang still has not reached the level categories that could be said to be ideal is "complete". So we need to increase the completeness of facilities for Computer Network Engineering skills program with reference to the completeness of facilities and infrastructure standard practice for Computer Network Engineering skills program from Ministry of National Education 2004.
- Completeness of facilities based on the quality infrastructure for Computer Network Engineering skills program at Vocational High School 4 Malang is meeting quality fittings or has completed. This is a good condition, so it is suggested that these conditions can be maintained by managing the use and maintenance of infrastructure in the practice for Computer Network Engineering skills program.

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