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Analysis of Design Strategy of Science Laboratory Room Model (Study at Junior High School in Kendari City)

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ABSTRACT

The purpose of this study was to analyze the design strategy of the social studies laboratory space model in a junior high school in Kendari City. Stages of the science laboratory model design in junior high schools (SMP). The design of the science laboratory room goes through several steps: 1) Creating a title. 2) Determine the administrative room and preparation of tools and materials 3) Determine the head of the laboratory table 4) Determine the storage space for tools and materials 5) Determine the tool preparation table 6) Determine the storage cabinet for tools and materials 7) Determine the practicum implementation space 8) Determine the table for the bag /student books 9) Determine the storage cabinet for tools and materials 10) Determine the design of the student practice table 11) Determine the location of the blackboard. The data analysis technique used in this research is quantitative and qualitative data analysis. Quantitative data in the form of numbers derived from questionnaire validation and descriptive qualitative data in the form of information from validators. The results of the design of a science laboratory space at a junior high school in Kendari City, which consists of 20 aspects, have been effective in their use. That is, twenty aspects have been practical but not optimal. The obstacles are: (a) the still low capacity of human resources where the laboratory manager is a science teacher who is not a special appointment for laboratory assistants; (b) the low frequency of laboratory utilization; (c) the laboratory management is not yet optimal. The results of the design of the Science Laboratory for SMP Model 6-2-1 in Kendari City are a unique design, reliable, simple in application, and used as a patent model to be applied in all SMP science laboratory practicum rooms. The application of this model will improve the quality of the implementation of practical activities.

Keywords: *Strategy. Model Design, Laboratory Room*

I. INTRODUCTION

Government Regulation of the Republic of Indonesia, Number 19 of 2005, which regulates National Education Standards Article 42 paragraph (2), states that "Every education unit is required to have infrastructure which includes land, classrooms, education unit leadership rooms, educator rooms, administrative rooms, library rooms. , laboratory room, workshop space, production unit room, canteen room, power and service installation, a place for exercise, place of worship, a place to play, a place to be creative, and other spaces/places needed to support an orderly and continuous learning process". Article 43 paragraph (1) states that "Standards for the diversity of types of laboratory equipment for Natural Sciences (IPA), language laboratories, computer laboratories, and other learning equipment in educational units are stated in a list containing the minimum types of equipment that must be available."

A laboratory is a place where practical activities take place. As a means of supporting learning activities, laboratories in schools are significant because laboratory equipment and other supporting infrastructure are in them. According to Ketut in Salam (2010), a laboratory is a place for students to conduct experiments from the classroom oven. The function of the investigation itself is to support learning to increase students' understanding of the material that has been studied. According to Susilowati (2012), the laboratory is where experiments and research are carried out. This place can be enclosed, a room, or an open space. In a limited sense, the laboratory is a closed room where experiments and research are carried out. A laboratory function is a place for practical science learning activities requiring special equipment that is not easily presented in the classroom.

The Ministry of National Education (2002) argues that: The laboratory is a place to apply scientific theory, theoretical testing, experimental evidence, research, and so on by using tools that are completeness of facilities with adequate quantity and quality. Novianti (2011) suggests that laboratories and their types of equipment are essential facilities and infrastructure to support the learning process in schools. Meanwhile, Hudha (2011) indicates that: The

laboratory is built based on full awareness that learning in the laboratory is essential because adequate learning strategies are needed to achieve multi-dimensional learning goals. One of the learning strategies that are considered to cover three domains at once is learning in the laboratory.

According to Arifin & Barnawi (2012), the laboratory serves as a place to solve problems, explore facts, train scientific abilities and skills, and develop scientific attitudes. Jauhar & Hamiyah (2015) explain, in general, the function of the school laboratory is as a source of learning and teaching, as an observation method and experimental method, as an educational infrastructure, or as a forum in the teaching and learning process. Meanwhile, the specific functions of the laboratory are as follows: 1) a place to strengthen or provide information certainty; 2) a place to determine cause-and-effect relationships; 3) a place to prove whether or not certain factors or symptoms are actual; 4) a place to practice what is known; 5) a place to develop skills; 6) a place to give practice; 7) a place to form students to learn to use scientific methods in solving problems, and 8) a place to continue or carry out individual or group research.

The provisions for science laboratory space according to the Regulation of the Minister of National Education No. 24 of 2007 are the minimum ratio of science laboratory space, 4 m2/student, for study groups of less than 20 people, the minimum area of laboratory space is 48 m2 including storage and preparation area of 18 m2. 2. The minimum width of the science laboratory space is m 2. (Arifin & Barnawi, 2012)

Based on the manual for the management of the Ministry of Education and Culture, the Directorate of Primary and Secondary Education, and the Directorate of Junior High School Development (2017), the design plan for the science laboratory can be seen in the image below.

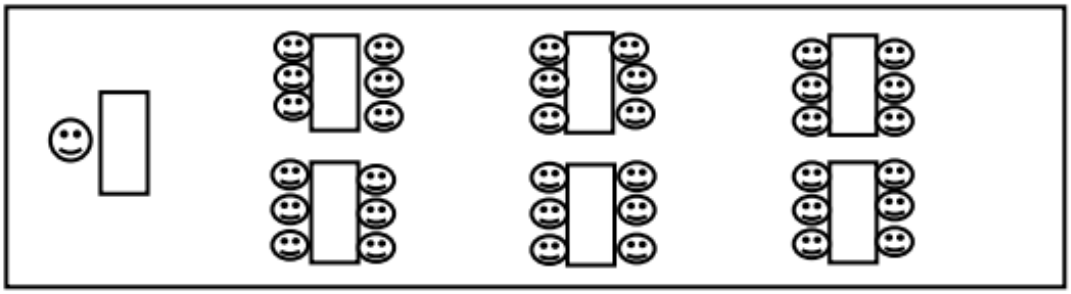

Figure: 1. Classical Type Junior High School Science Laboratory Design (Ministry of Education and Culture 2017)

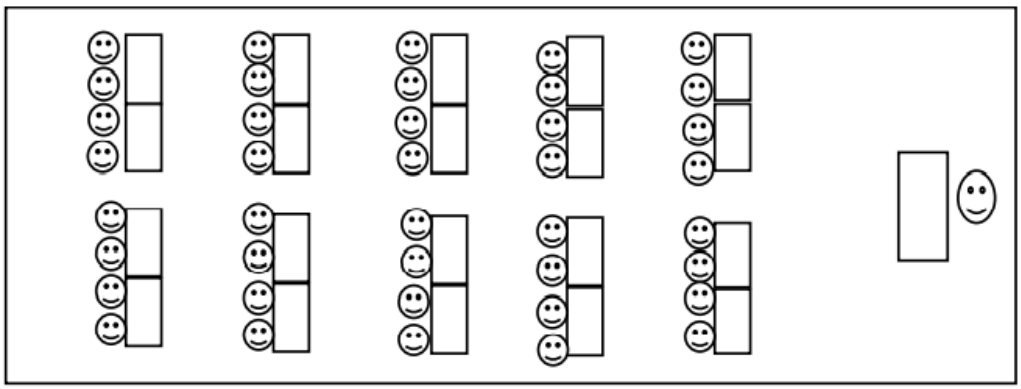

Figure: 2. Classical Type Junior High School Science Laboratory Design (Ministry of Education and Culture 2017)

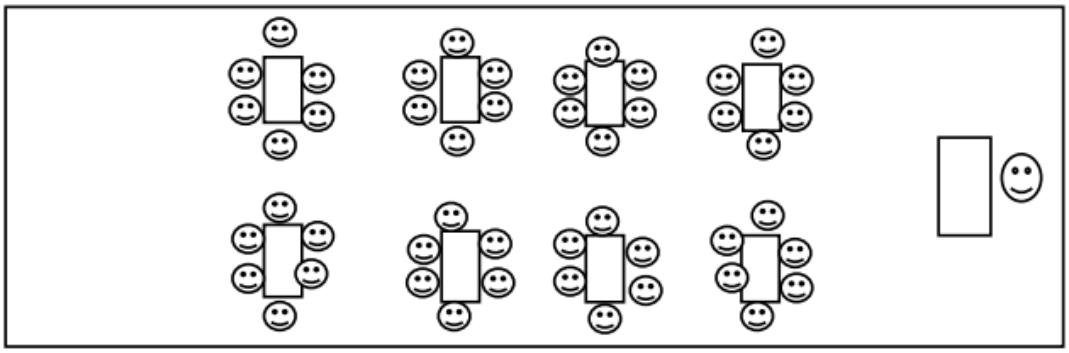

Figure: 3. Design of a Group Type Junior High School Science Laboratory (Ministry of Education and Culture 2017)

Koesmadji et al. (2004) explained that laboratory users should have a layout or layout of the laboratory building. Laboratory buildings are not the same as classroom buildings. The construction of the laboratory requires careful planning and consideration, especially in the suitability of its location to other rooms.

Based on today's phenomena, junior high school science laboratories still have minimal facilities. This condition requires the creativity of science teachers to find and apply innovative methods and strategies that support the implementation of laboratory practicum learning activities with these minimal facilities.

The highest percentage of inappropriateness in the design of the practicum implementation room, the location of the table where the sink is, and the location of the teacher/instructor's desk are 40% each. The following less feasible is 35% on the site of the tool preparation table, the location of the tool and material storage table, and the design of student table and chair placement in carrying out practicum. In the laboratory equipment preparation room, the area of the laboratory head's desk, the site of the bookcase, the table where the student's bags/books are, and the location of the fume hood, the percentages are less than 30% each. The rate is less than 25% in the laboratory material storage room and the location of the first aid kit. Twenty percent less appropriate at the entrance and exit positions, and 15% less proper on the site of the desk where the computer and the door of the administrative room and science laboratory at the junior high school in Kendari City are poorly maintained, and the lack of creativity in designing and making appropriate laboratory management models.

II. LITERATURE REVIEW

The laboratory is a place for practicum activities to take place. A school laboratory is significant because it contains laboratory equipment and other supporting infrastructure to support learning activities. Ketut in Regards (2010) stated that a laboratory is a place for students to carry out experiments from the theory given in class. The function of the investigation itself is to support learning to increase students' understanding of the material that has been studied.

According to Susilowati (2012), a laboratory is a place for experiments and research. This place can be a closed room, room, or open space. In a limited sense, a laboratory is a secure room where experiments and research are carried out. The laboratory functions as a place for practical science learning activities that requirespecial equipment that is not easily presented in the classroom.

The Ministry of National Education (2002) argues that: The laboratory is a place to apply scientific theory, theoretical testing, proof of trials, research, and so on by using tools complementary to facilitieswith adequate quantity and quality. Novianti (2011) suggests that laboratories and the types of equipment are essential facilities and infrastructure to support the learning process in schools.

III. METHOD OF RESEARCH

The location of the implementation of this research is the science laboratory of a junior high school and university. There are 19 private schools in Kendari City: 16 junior high schools and three junior high schools private. However, the target of this research location only consists of 5 junior high schools and one private junior high school; with rational considerations, the determination of the six junior high school laboratories are schools that have IPA laboratory room which is equipped with appropriate tools and materials

3.1 Science Laboratory Model Design Research Procedures

Stages of the science laboratory model design in junior high schools (SMP). The design of the science laboratory room goes through several steps: 1) Creating a title. 2) Determine the administrative room and preparation of tools and materials 3) Determine the head of the laboratory table 4) Determine the storage space for tools and materials 5) Determine the tool preparation table 6) Determine the storage cabinet for tools and materials 7) Determine the practicum implementation space 8) Determine the table for the bag /student books 9) Determine the storage cabinet for tools and materials 10) Determine the design of the student practice table 11) Determine the location of the blackboard

3.2 Data analysis technique

The data analysis technique used in this research is quantitative and qualitative data analysis. Quantitative data in the form of numbers derived from questionnaire validation and descriptive qualitative data in the form of information from validators.

IV. RESULTS AND DISCUSSION

The results of the design of the laboratory practicum room that has been developed in this study which is named MODEL 6-2-1, are as follows:

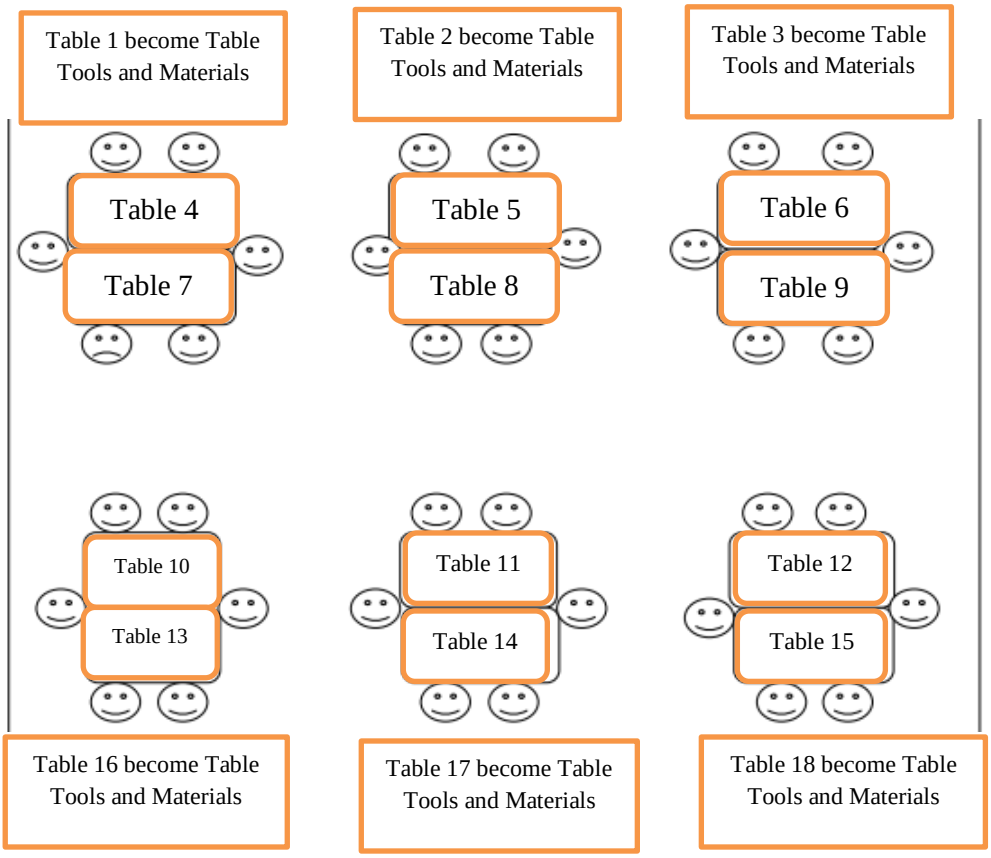

Figure: 4. Model 6-2-1 The sitting position of students at each table after development

4.1 Trial Design of Science Laboratory Practice Room Model 6-2-1 Junior High School in Kendari City

This science laboratory practicum room model design uses a plan that includes two stages of testing. The principal carried out phase 1 trials, and Deputy Principal for Facilities and Infrastructure continued with phase 2 trials by science teachers and laboratory assistants. After the product has passed the validation stage, revisions are made from input and suggestions from the Principal, Deputy Principal for Facilities and Infrastructure, Science Teachers, and Laboratory Assistants. After being revised, draft II was obtained, which would be tested on students.

The trial phase in developing the science laboratory room design is to determine the effectiveness of implementing practical activities. After evaluating and testing the product, input and suggestions were obtained from the Principal, Deputy Head of the Facilities Sector, Science Teachers, and Laboratory Assistants. Revisions were made to produce a Science Laboratory Practicum Room Design model 6-2-1. The results of interviews with the four informants about the design trial of the Science Laboratory Practicum at SMP in Kendari City, both at stage 1 and stage 2, the four informants revealed in detail as follows:

1) Regarding the effectiveness of practicum activities from the results of the Laboratory Room Design with the 6-2-1 model. The four informants revealed in detail as follows: Informant 1 stated that the results of the Laboratory Room Design Model 6-2-1 showed that practicum activities with the application of this model were carried out and functioned well; almost no failures were obtained starting from the use of the table of tools and materials as well as the group table. Students can work according to the 6-2-1 model, namely forming six working groups, two tables for one group, and 1 table for tools and materials. This shows that the three groups of desks functioned well to the instructions for implementing practical activities directed by the science teacher. Informant 2 stated that the Practicum Activity from the results of the Laboratory Room Design with the 6-2-1 model carried out by the researcher was very effective because the students participated happily, were very enthusiastic because the location of the tables and chairs was very strategic, very free to move and discuss with the group. as well as following the instructions given by the science teacher. The implementation of the practicum went well without any problems. Informant 3 stated that as a science teacher, researchers carried out the application of the 6-2-1 model; when doing training, students seemed very enthusiastic about doing practical learning in the laboratory, students were active and followed the directions of the science teacher (researcher). Informant 4 stated that the results of the Laboratory Room Design with the 6-2-1 model applied by researchers in the laboratory were very effective because students were very enthusiastic about

participating in the practicum and also very helpful for my task as a laboratory assistant because there was already a table of material preparation tools prepared in the model.

2) About Reliable (reliability) of the results of Laboratory Room Design with model 6 2 1. The four informants explained in detail as follows: Informant 1 stated that the results of Laboratory Room Design Model 6-2-1 indicated that practicum activities with the application of this model were carried out and functioning correctly. Almost no failures were obtained starting from the tool and material table and the group table. Students can work according to the 6-2-1 model, groups, with two tables for one group and one for tools and materials. This shows that the three groups of desks functioned well in instructions meeting practical activities directed by the science teacher. Informant 2 stated that the Practicum Activity from the results of the Laboratory Room Design with the 6-2-1 model carried out by the researcher, in my opinion, is very reliable and can be used as a model that can be utilized zed laboratories high school level throughout Indonesia because when doing practicum there are no failures made by students. Informant 3 stated that the results of the Laboratory Room Design with the 6-2-1 model carried out by researchers in the laboratory were excellent lures in its implementation. Carry out very carefully using tools and materials so that the practicum is successful. Informant 4 stated that the Laboratory Room Design results with the 6-2-1 model were very reliable. In training with this model, there are no failures obtained by students and teachers.
3) About Maintainable (can be easily maintained/managed) from the results of Laboratory Room Design with model 6-2-1. The four informants revealed in detail as follows: Informant 1 stated that by watching researchers design the 6-2-1 model in the laboratory, students carried out practical activities well and effectively; this model can be managed efficiently by science teachers because it is efficient to use it, as well as when forming groups. Students stand together and push table 1 and table two so that they merge into 1 table; the arrangement of this table can be appropriately maintained because it is made of solid teak wood, making it easier for managers to maintain. Informant 2 stated that the results of the Laboratory Room Design with the 6-2-1 model carried out by researchers could be managed efficiently and well because the tables and chairs are made in such a way and have instructions for use that are conveyed to students. Informant 3 stated that the results of the Laboratory Room Design with the 6-2-1 model carried out by researchers could be managed efficiently and well because they have instructions for use that are conveyed to students. Informant 4 stated that by looking at researchers in Laboratory Room Design with the 6-2-1 model in the laboratory, I, as a science teacher. This model straightforwardly manages the tools and materials stored on the preparation table to collect, order, and central. So, it is not easy to damage both tools and functional materials. Informant 4 stated that the results of the Laboratory Room Design with the 6-2-1 model carried out by researchers straight causes itsy cause its own uniqueness from this model and has a design that makes it easier for students and teachers to carry out practicum in the laboratory.
4) About Usability (easy to use and simple in operation) Activities from the results of Laboratory Room Design with the 6-2-1 model. The four informants revealed in detail as follows: Informant 1 stated that the application of this design is straightforward to use by teachers, making it easier to control the accuracy of conducting experiments in the laboratory. This model is specific because it has instructions for use when doing practicals in the laboratory. Informant 2 stated that the results of the Laboratory Room Design with the 6-2-1 model are very straightforward for teachers in carrying out practicals in the laboratory; even very specific, it is not complicated in its implementation. Informant 3 stated that the Laboratory Room Design with the 6-2-1 model is clear because it has instructions for use that the science teacher reads out when doing the practicum. This model uses straightforward operation because a science teacher guides it. Informant 4 stated that the activities from the results of the Laboratory Room Design with the 6-2-1 model carried out by researchers when carrying out practical work in the laboratory elementary easy to operate, did not use long lengthy long preparations, and this straightforward it consisted of 18 tables and Study Ables. Study groups are designed in such a way as to make it easier for managers to carry out practicum in the laboratory.
5) Regarding the accuracy of the selection of Laboratory Room Design with the 6-2-1 model. The four informants revealed in detail as follows: Informant 1 stated that the application of the 6-2-1 model by the researcher is very appropriate because it has a table and chairs that are by the size of the laboratory, students carry and practical work effectively, making it easier to manage both in terms of group formation, placement of tools and materials and how to use them so that Sodel can be used as a patent model for all laboratories at the junior high school level. Informant 2 stated the results of the Laboratory Room Design with the 6-2-1 model, which was app an app and, in the laboratory, which was very appropriate because the number of tables and chairs was by the waste of the laboratory and the number of students in each class. This model can be used as the best motto r a high school level laboratory. Informant 3 stated that the Laboratory Room Design with the 6-2-1 model applied by researchers in the laboratory is an exact present model so that students are free to move to practice effectively. This model can be used for all science laboratories at the junior high school level because it is complicated.

Informant 4 stated that the model developed by the researcher, namely the 6-2-1 model, is very appropriate and contributes to facilitating science teachers in terms of laboratory management so that it can be used as a reference for all laboratories at the junior high school level throughout Indonesia.

V. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusion

1. The results of the design of a science laboratory space at a junior high school in Kendari City, which consists of 20 aspects, have been effective in their use. That is, of twenty elements optimal. The obstacles are: (a) the still low capacity of human resources where the laboratory manager is a science teacher who is not a special appointment for laboratory assistants; (b) the low frequency of laboratory utilization; (c) the laboratory management is not yet optimal.
2. The results of the design of the Science Laboratory for SMP Model 6-2-1 in Kendari City are a unique design, reliable, simple in application, and used as a patent model to be applied in all SMP science laboratory practicum rooms. The application of this model will improve the quality of the implementation of practical activities.

5.2 Suggestion

1. In terms of developing the design of the science laboratory space at the junior high school in Kendari City carried out by the principal and the Kendari City government, it is necessary to provide education and training to laboratory managers to be able to increase their competence in carrying out the development of the science laboratory room design at the junior high school in Kendari City which is by the expectations of the participants. Students so as students to learning outcomes
2. Further researchers should conduct research at the SMA/SMK level in the city of Kendari and the Regency/City in the Southeast Sulawesi Province to research the science laboratory management strategy and the 6-2-1 model to test its effectiveness.

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