THE OPTIMIZATION OF LABORATORIES EFFICIENCY AT PJKR DEPARTMENT THROUGH IAK-01 METHODOLOGY

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ABSTRACT

Borg and Gall (1989) model are used as the model of the research and the development of the laboratory department of PJKR. There are four characteristics in total that mark this model, as follows: (1) doing previous studies and find the gap whereas the product that will be improved. (2) enhance the product based on the finding of the research. (3) implement the finding on the field to ensure the finding of the study is working. (4) commence the revisions that are found during the implementation to fill in the weak part of the research. This research was conducted at State University of Surabaya, East Java - Indonesia. The subjects were 85 students from PJKR study program, consisting of 9 lecturers, 75 students and 1 laboratory technical staff. The results showed that as many as 100% of respondents stated the IAK-01A model is appropriate, useful and practical to use. While Model IAK-01B as much as 98.5% respondents stated appropriate, useful and practical to use. For the IAK-01C Model, there are 97% of respondents who say fit, useful and practical. Thus overall, the IAK-01 Model is said to be appropriate, useful and practical for use in optimizing the utilization of laboratory Department PJKR with a value of 98.5%.

Keywords: Laboratory Efficiency Education, PJKR, Department Specification, Mechanism

INTRODUCTION

Background

Department of Physical, Health and Recreation (Hereinafter refered to as PJKR) faculty of Physics University of Surabaya, in order to create an excellent teacher, it must be provided with excellent facilities in teaching and source of teaching. The vision of this department is to enhance the department program of undergraduate education of physics which is excellent and to develop the physic science in the scale of ASEAN level in 2025 (Forms of PJKR department FIK state University of Surabaya, 2016).

To realize the vision, the missions are as follows: 1) to improve the quality of physical, health, and recreation education teachers to meet the needs of the community / market; 2) to prepare professional teachers and compete in this millennium century; 3) to develop Science and Technologyas well as Believe and Technology) as the basic foundation for improving the total human welfare. Furthermore, in order to ensure the achievement of the missions, the study program strives to facilitate various needs in the learning process. One of the efforts made is the fulfillment of learning resources. The explanation of the Higher Education Act states that "learning resources can take the form of, among others, the universe, legislative, executive, and judiciary, educational hospitals, laboratories, libraries, museums, studios, workshops, stadiums and broadcasting stations" (Constitution No 12, 2012).

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The laboratory is the facilities used by student to experiment and implement their idea during study time. Laboratory is considered as supporting toll to enhance education goal. The laboratory will support academic activity such as teaching, training, and researching. They will try to apply what they have learned in class directly to this building. According to the previous study done by Colleti quoted in Wijaya's paper (2016) stated that there are slight differences on the efficiency and response of the students within: (1) by using a visual aid (75%). (2) by doing a speech in class (12%). (3) to sense (6%), hear (4%), and watch (3%).

According to the previous research, students will be more effective to receive the explanation from the teacher, because students will be provided with thousands of visual aids inside the laboratory. Stated on article 15 year 2016 about job description and organization of state university of Surabaya, paragraph 67 "Laboratory is the supporting tool to enhance the education, research, service to the societies in the environment of the faculty" (Permenristekdikti No. 15, 2016).

In order to use the laboratory, it must take a good management. For example, the schedule that has been prepared by a laboratory Head must not clash hours of use. A laboratory technician is also required to ensure that laboratory operations are in compliance with the quality system. Or even the administrative part of the duty to ensure that the creation and storage administration including documents, certificates, internal / external letters stored properly.

However, in general, some problems that arise encountered during the managerial process of learning laboratory of PJKR Department of Sport Education in FIK Unesa are as follows: 1) low level of resource utilization and bad management; 2) the setting of laboratory space that is less suitable for the needs; 3) poor technical services and equipment maintenance. From the initial observation data, it was found that the laboratory was rarely used because the lecturers were not provided with special time to use the space. The use of space is only incidental so it can happen to fight each other, and in the end the lecturers decided not to use the laboratory space.

With the conditions above, there is a gap that the laboratory that has been provided and is expected to be a source of learning for students and lecturers PJKR, is rarely used. As if lecturers and students feel they do not need a laboratory as a source of learning. So the question arises and needs to find the right solution to solve the problem. How is the development of the model of laboratory learning according to the specification of Prodi PJKR Department of Sports Education FIK Unesa? How is the effectiveness of the use of learning laboratory model according to the specification of Prodi PJKR Department of Sports Education FIK Unesa?

Purposes of the Study

The purpose of this study is to develop one model of laboratory education department of PJKR through IAK-01 model. There are specific purposes of this research as follows:

a. To develop the construction of laboratory education mechanism of PJKR department through IAK-01 model.
b. To examine the proper construction of laboratory education mechanism of PJKR department through IAK-01 model.
c. Conduct the handbook of implementation of laboratory education mechanism of PJKR department.

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LITERATURE REVIEW

There are four literature review included in this research. First, it is development concept model conducted by Borg and Gall, this theory is very basic as it reviews how is the steps of education facilities, it will measure the laboratory within several steps. Next, is the definition of laboratory by several experts. This theory is needed as it must be clear that the objective of the study meets the requirements for a building to be a laboratory. Then, to classify its function and types, the laboratory in PJKR department must be identified clearly. At last, physical education theory by some researcher must be put to classify of what exercise and the importance of physical education in the environment of education.

Development Concept Model

Research and Development by Borg & Gall (1983: 772) is a process used to develop and validate educational products. Ezir (2008: 3) says that research is a systematic activity or process to solve problems that are done with (Sugiyono, 2008: 407) that the research method used to produce a particular product, and test the effectiveness of the product is the method of Research and Development (R & D). Research development can simply be defined as a method of research that intentionally, systematically, have the objective of discovering, formulating, improving, developing, producing, testing the effectiveness of new, new, effective, efficient, productive and meaningful product, models, methods / services, methods, services, certain (Putra, 2011: 133).

Based on the description, it can be concluded that the research development model is a process or steps that begins from the existence of a need and requires solving by using the process of translation of design specifications into physical form and produce products in the form of procedural models, conceptual models or theoretical models but very taking into account the utility and its use is likely to be accepted in the market and the existence of technological support. In this case the research will be developed is a learning laboratory learning program PJKR as a learning resource for prospective teachers of PJOK.

Definition of Laboratory

According to regulation ministry of research, Technology, and education number 44 year 2015 about National Standard of University, on the 7th part, stated that "the standard of education medium and media are the characteristics of the media based on the contents need in order to achieve the goal of educating graduate".

The sentence above explains that standard facilities and infrastructure are important and must be considered in fulfilling the achievement of graduate learning. Laboratory is one of the minimum infrastructure standards that must be provided by the providers of higher education to support teaching and learning activities. In simple terms, laboratory is usually defined as: (1) a place to experiment, observe, or practice in science or field of study, and for testing and analysis; or (2) the academic period is set aside for laboratory work (Jaya, 2012: 84). Meanwhile, according to Sidharta A, et al., The laboratory is a place to (1) find or solve problems, (2) deepen the true meaning of a fact, (3) find various understandings or facts; (4) practice scientific habits and skills; educate children to be meticulous, critical and dexterous (Subamia, et al., 2014: 447).

According to several definitions above, the conclusion could be taken that laboratory as the source of the learning process is a building whether outdoor or indoor such as park which its function is to do an experiment, research, or training based on each department of the students.

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Functions and types of Laboratory

There are several main functions of the laboratory, as follows:

1. Balance and unity between the theory used directly in the field of study and the result of finding in the field that will stringent the theory itself. Thus, both aspects will complete each other.
2. To give soft skills of scientific writingfor the researchers.
3. To trigger the curiosity of researcher. So, it will always enhance the motivations of them to find the truth of its scientific finding by examination, research method, or experiments.
4. The laboratory will improve the self-confidence of the researchers.
5. The laboratory will be media among academics to solve any problems during the lab work section.

There is any difference with the arguments compiled by Mustaji (2009: 3) about the function of the laboratory, as follows: to improve the theoretical education and practical education of universities, to give scientific competence, gather self-confidence, skilled in using visual media, trigger curiosity, and to improve the courageous. According to his opinion, generally, the functions of laboratoryare as learning media, source of learning, which balance between theory and practical exercise. Thus, both theory and practice are not two separate stuff. It also triggers the curiosity to prepare the next generation of researcher.

According Decaprio (2013: 24), based on the types, there are several types of laboratory. Based on the way how it operates and develops, there are two kinds of laboratory:

a. Educational laboratory is a laboratory used by students of elementary, junior, high school, and university only. The purpose of this laboratory is focusing on the goal of the learning process. The research done in this kind of laboratory is mostly coming from teacher, lecturer, and tutor.

b. Research Laboratory is kind of laboratory which play its role on pure or applied experiments. Pure research laboratory is commonly funded by private sector, government, or universities (Siregar and Hendrayana, 2005: 4). Applied research laboratory is an unique place, it is funded by industries sector which its purpose is to develop the factory.

Physical Education

Physical education, on its basic, is a branch of education tree. But, it has unique way that differs from others, it uses ‘movement’ as the media in learning process for students. The objective of this education is not merely on its physical exercise, but also, it develops the whole students potentials i cognitive and affective field. As a branch of educational tree, physical education plays important role to achieve the national vision. Moreover, some people may have a thought that education tree is not taste the same without physical education branch.

According to Thomas (2008: 10), physical education, one of eight elements of Health Development Program: a) health education, b)health service, c) nutrition service, d) health promotion staff, e) counseling and psychological services, f) healthy school environment, g) parent and community involvement.

If we look closely, physical education is educational process which is done consciously and systematically through varieties of activity, in order to achieve physical competence,

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development, diligence, emotional, and character growth (Juliantine, 2013:2). Similar opinion also stated by Husdarta (2011:8), stated that physical education is educational playground which gives children a chance to learn important things. Thus, the rank of physical education is as important as other branches such as Math, Language, Social Science, and etc.

RESEARCH METHODOLOGY

The research of the development of educational laboratory at PJKR department uses research and development method of Borg and Gall (1983:775) which consists of ten steps:

(1) Potentials and problems (preliminary study) (2) Conducting research and information gathering (library review, subject observation, preparation of the main report) (3) Developing initial product design forms (preparing laboratory materials, modeling teaching styles and equipment evaluation) (4) Design validation (early preliminary evaluation) (5) Design Revision (according to the results in the field at the early trial phase (6)). Product Trial (6-12 subjects) (7) Revising the product (based on main field trial and outcome suggestions). (8) Trial usage within 30-100 subjects (9) Revising final product (10) Mass production (Creating a report on products in a journal, working with a distribution publisher.)

The approaches used in this article are both qualitative and quantitative method, which are approaches to reveal the answer of research problem which is already stated before. It is the model of the ideal educational laboratory at PJKR department.

Stages of Model Development

The model development of this research is based on stages of model development conducted by Borg and Gall, those stages include:

1. Analysis Necessity

Along with the preliminary study, this early stages covers of reading the previous studies or any other related literature, observation process, Research problem identifications found during learning process at educational laboratory of PJKR department as the source of learning of students. This is to expect the observe and examine whether this facility will be used or not by the subjects. According to preliminary study, 90% of subjects stated that the facility does not possess operational procedure, 100% of them agreed that they are not always use the facility, 90% of them assumed that the facility does not meet the minimum requirement of their need (to improve and develop their competence).

2. Model Development Plan

The next stage is to create the plot of early product. Thus, the operational procedure will be more enlighten. This early product will be applied on educational laboratory model of PJKR. The development of educational laboratory is expected to be logical and systematic. Thus, students can use this facility within its full function.

The structure or the mechanism of the development of PJKR educational laboratory is separated into three phases, as follows:

a) Conducting the schedule of whom can use the laboratory systematically. It started with conducting this schedule by head of department. Then, the schedule will be handed to every lecturers. This model is called IAK-01A.
b) The arrangement of this laboratory usage must be started on the first day of a new semester preceded by head of the department. As the order is forwarded to head of laboratory, the laborat man will conduct the ideal schedule and handed it to lecturers

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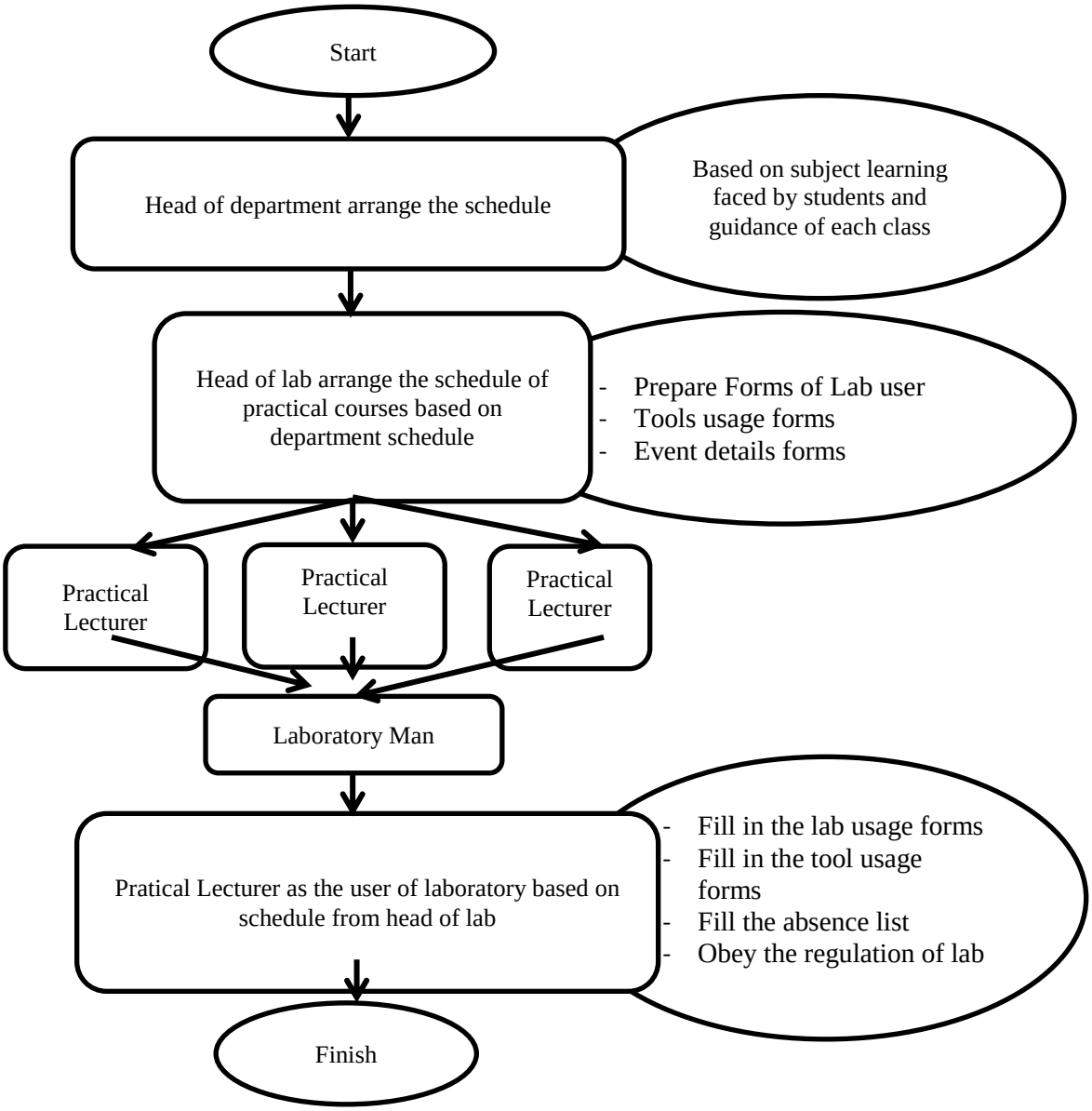
for their agreement, it must be shown to head of department for legal agreement. As the schedule is approved by head of department, the schedule must be directly followed by students. This model is called IAK-01B.

c) If there is any special request of a lecturer which will use the lab, the schedule must be revised and arrange the new one to be used as handbook for the students. Then, the lab will be at full function of its usage in the whole week.

In order to simplify the ideal construction development of educational laboratory learning model at PJKR department, the idea will be served in visualmodel through some pictures. Picture 1 represents the first variation, picture 2 depict the second model, while the last picture represent the last variation.



Picture 1. Mechanism of Laboratory Use of Learning Model PJKR department IAK-01A

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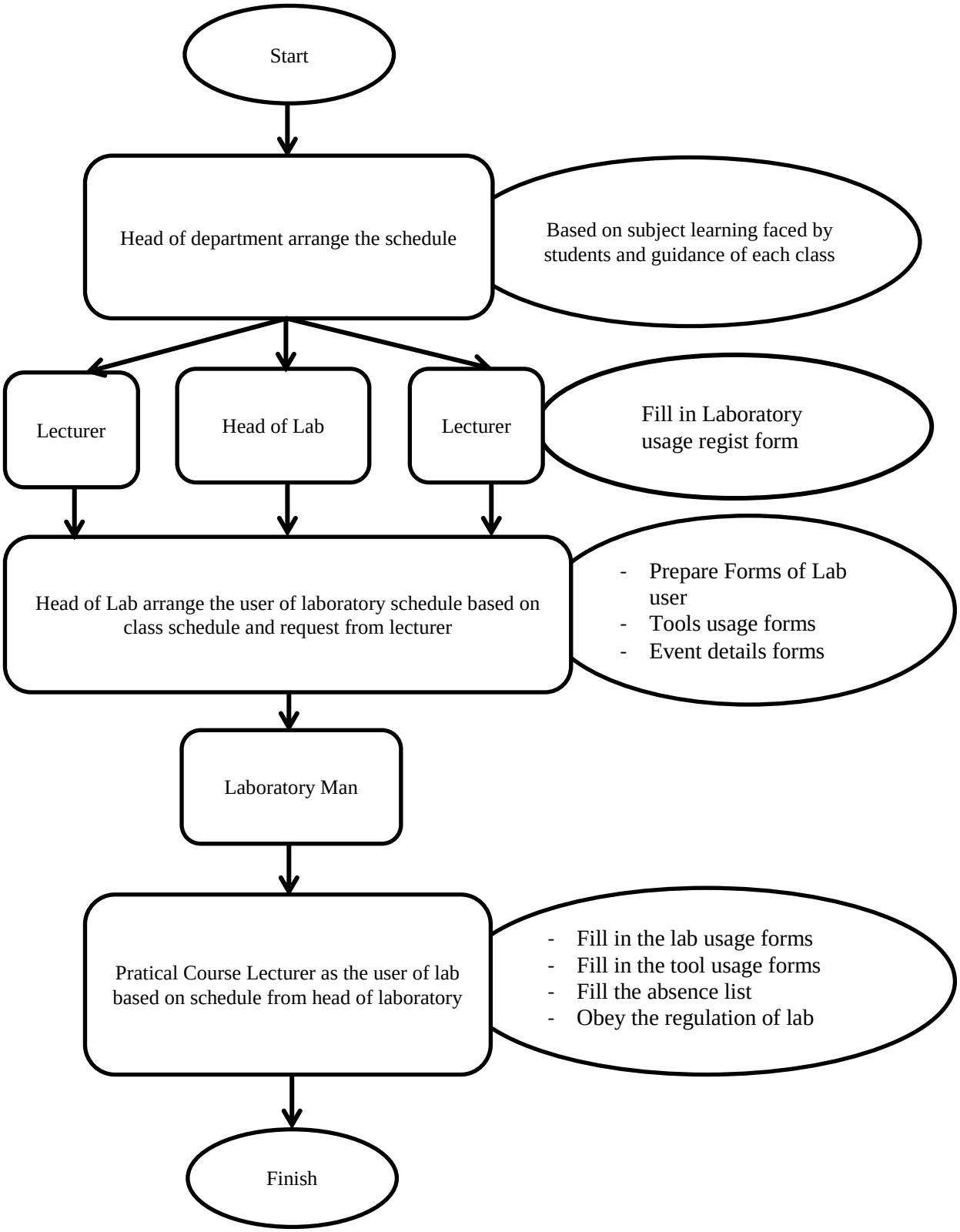
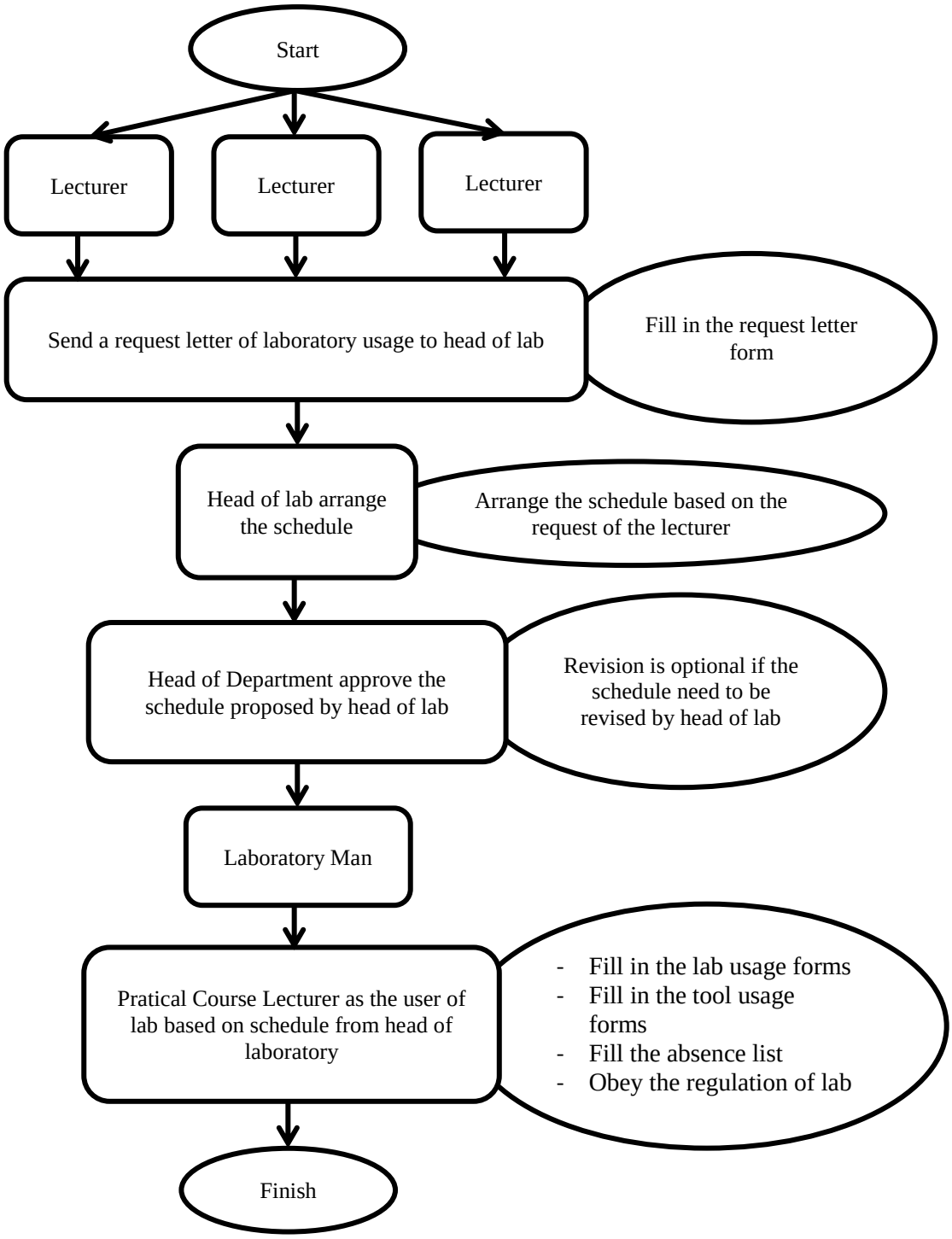


Picture 2. Mechanism of Laboratory Use of Learning Model PJKR department IAK-01B



Picture 3. Mechanism of Laboratory Use of Learning Model PJKR department IAK-01C

3. Design Validation

The next step in this research in the development of educational laboratory model is to validate the design of the laboratory. The previous finding of the expert in examining the laboratory model could be used as revision reference of the broken or missing part of the model later. This revision could be completed by using the arrangement of Visual-Writing or the specification of the model. The expert included in this R & D research is Prof. Dr. M.E.

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Winarno, M.Pd as an expert auditor of physical education advisor. The next expert is a professional on physical education. He is Prof. Dr. Mulyana, M.Pd., and also the expert of laboratory of sports, Prof. Dr. Hari Setijono, M.Pd. the conclusion made by these experts will be submitted as a suggestion to complete the model of educational laboratory before the lab is tested by small group of students.

4. Experiment on Small Groups

This small experiment contains of 15 undergraduate students and 3 practical course lecturers. The result of this small experiment will be a reference for the present model of laboratory in order to improve the weak or missing part. This result will also be reference before the next stages within wider respondents and heterogenic samples. This result become the 2nd evaluation after the first evaluation by the expert.

5. Product Revision

In order to gain the revision version of the model, the small details earned within previous test will be included. It does also include the result of the questioners. This stage is applied in order to find the small details of the missing/invalid part based on what have the subject experience during the test.

6. Experiment on Large Samples

The next step is to test the revised model into larger group of samples in the real laboratory/field experiments. In this bigger test, it differs from previous test, this bigger test will not use questioner anymore, it will use field observation in the laboratory. This test will try to apply the model that has been revised. This big experiment contains of 60 students within 6 lecturers, and 1 laboratory technician.

7. Product Revision

The result of the previous assessment will be the final result that become the basic of the last model in this research. The response from technician, students, and the lecturers will be directly archived as the reference of this last revision model for the development of the laoratory.

The evaluation of this last revision is final decision of the educational laboratory at PJKR department. As the revision finally meet the suggestion from the last experiment, the product of the last test is considered as suitable to be used in academic environment.

8. Feasibility Test

The feasibility test is used to measure the proper limit of the model whether it meet the requirement of the characteristics PJKR department or not. In order to reveal the result of feasibility test, qualitative and quantitative approach will be used to lecturers and students as the subject.

RESULTS

According to the early elements of research above, it is concluded that there must be renewing model that need revision of the construction of the efficiency of the educational laboratory at PJKR department. The, according to the result of literature review, there will be a new structure of laboratory usage within its user manual handbook. This guidance book must be approved by the experts, these experts include teaching advisor expert, physical education expert, and laboratory technician expert. Based on Guttman scale analysis, it is concluded that the educational laboratory of PJKR department within IAK-01 model meet the

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ideal requirement of educational laboratory, it is useable and efficient. Here are some of the results in the form of table as follows:

Table 1. *The result of Small Group Test*

Model Variations	Feasibility	Efficiency	Practically
Model IAK-01A	100%	88,9%	83,3%
Model IAK-01B	77,8%	88,9%	66,7%
Model IAK-01C	88,9%	88,9%	88,9%

Table 2. *The result of Large Group Test*

Model Variations	Feasibility	Efficiency	Practically
Model IAK-01A	100%	100%	100%
Model IAK-01B	98,5%	98,5%	98,5%
Model IAK-01C	97%	97%	97%

CONCLUSION

Based on the finding, there are three conclusions of the research, as follow:

1. By using the multimedia teaching whereas the development of educational laboratory at PJKR department, students and lecturers can use the facilities and improve the efficiency of the building into optimum level.
2. Within this educational laboratory of PJKR department, the facilities can operate by guidance that have been conducted by the department as the standard operation procedure.
3. According to the experts (Evaluator Physical Education Expert, Physical Education Expert, and Laboratory Technician Expert), they stated that the laboratory has met the minimum requirement for an ideal lab of students in learning process

SUGGESTION

Within the developed model and the reference from the experts, the suggestion of this research will be as follows:

1. The mechanism of using this educational laboratory should be based and adapted on the condition of necessity for each semester. So that, the mechanism would not be monotone. It is strongly recommended to use the IAK-01C model as the time flows, thus all lecturers and students will give a try to all model within full efficiency as source of learning process. At the end, the practical lecturer could send a request letter to the head of lab to use the facility before the new semester starts.
2. For the arranged mechanism/schedule, it is better for the schedule to be uploaded to the department's website for the efficiency of time.
3. This developing model of learning process could be improved by any other researcher that share same interest in educational laboratory. It could be improved in the design structures based on specification of PJKR department.

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