

# Development of Service Information System in the Use of Practicum Tools and Materials in Physics Department Laboratory of State University of Medan

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**Abstract**— This study aims to determine the process of theoretical service in the utilization of laboratory tools and materials and to produce an information system design that can improve the utilization service of laboratory tools and materials in Physics Laboratory of State University of Medan. This type of study is Research and Development (R & D). The procedures of this study were needs analysis, design, development and implementation. The sample which is used in this study were lectures and students of Physics Department. Product testing is divided into 4 stages : validator test, individual test, small group test, and field test. The instruments used in this study was a questionnaire in the form of responses and ratings from Physics lectures and students which is about the design of graphic and software, information system, and the service of tools and materials used. Average percentage of design testing by expert is 97,85%, information system by expert 97,7%, tools and materials management by expert 85%, individual testing 97,4%, small group testing 97,2%, and field testing 98%. The conclusion of this study is the product be in the form of Information System Application is categorized as “Very Good” with average percentage of all testing 95,53% and be worthy of being used as an information system for the utilization of tools and materials at the Physics laboratory of the State University of Medan.

**Keywords**— *application; development; laboratory; service*

## I. INTRODUCTION

The laboratory is a room that has an important role in the advancement of educational institutions such as schools and colleges as supporting facilities to carry out education, teaching, and research in one or part of a branch of science, technology, or certain fields in accordance with the field of

study. All activities in the laboratory require regular and organized administration, including data collection on lab tools and materials so that the laboratory can be arranged and function optimally. Laboratory management is very influential on the quality of a laboratory, such as planning laboratory activities, laboratory arrangement, inventory and laboratory documentation, operation of equipment and use of materials, maintenance of equipment and materials, evaluation of laboratory work systems, and development of laboratory activities[1].

One very important activity in order to achieve productivity is to make an inventory of all the tools and materials of practice, for which data collection of all tools and materials needed by vocational education institutions is needed so that the data can be used to make it easier to find maintenance data, plan maintenance programs, and look for data on tools and materials that can support the training education process in the laboratory [2]. Information systems are needed so as to improve service for laboratory users and managers in controlling, scheduling and developing laboratories.

The main activity in the Unimed Physics laboratory is doing practicum based on subjects in the Department of Physics and research for students and lecturers. Management of lab tools and materials, recording of equipment and damaged inventory and practicum materials that are used up, making a letter of procurement of tools and lab materials, managing borrowing and returning practicum tools and materials are still done manually by filling out forms on paper and filing in ledgers. Based on the service process that has been carried out in the Physics laboratory at this time, various problems have arisen faced by lecturers, students, laboratory

heads, laboratory staff, and facilities and infrastructure staff. The problem is the difficulty of obtaining data information regarding the existence of tools and materials including the number, specifications, conditions and location of storage of tools and materials, fulfilling practical needs requires a lot of time because the available data is difficult to obtain, and sometimes laboratory supplies do not know exhausted and the presence of a damaged lab instrument so that it must look for each laboratory room [3].

Currently the Unimed Physics Laboratory does not yet have an integrated database system to control all laboratory-related needs. The concept of a good Management Information System (SIM) must be able to support the process of planning, controlling, and making decisions. Along with the development of technology today, it is necessary to develop a laboratory management information system so that administrative services will be faster and can become supporters of decision-making processes. Equipment inventory lists can be made simply, but all aspects such as equipment specifications, equipment characteristics should be included so that they are easy to understand [4].

Based on inventory theory, a level of control is needed to achieve optimal efficiency and effectiveness in material supply [5]. The development of Software-based information technology is needed to support work and services in the laboratory, especially in the provision of lab tools and materials. The focus of the problem in this research is the development of a service information system using lab tools and materials with the aim of knowing the theoretical service process, the form of algorithm design, and the implementation of information systems for the use of lab tools and materials in the Unimed Physics laboratory [6].

## II. RESEARCH METHOD

This research was conducted at the Unimed Physics Laboratory. The research sample is lecturers and students of Class A 2016. Physics Study Program. This type of research is Research and Development (R & D). Following are the research procedures

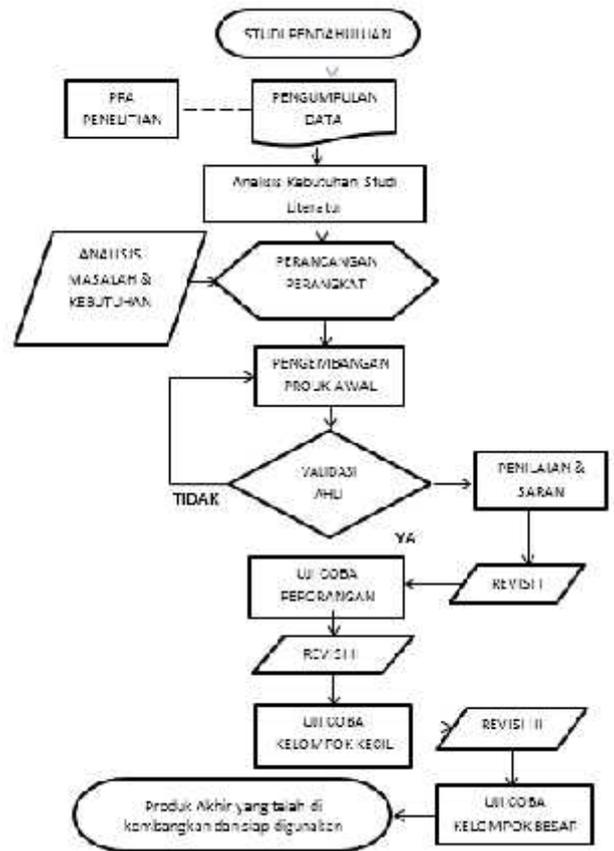


Fig. 1. Research Procedure

The instruments in this study were observation, interviews, and questionnaires. The hypothesis of this research is that Information System Products are appropriate to be used in the service of utilizing practicum tools and materials at the Unimed Physics Laboratory. The subject of expert validation assessment is the design of information and software, information systems, and management of laboratory tools and materials.

## III. RESULT AND DISCUSSION

The process of implementing an information system development service utilization of laboratory equipment and materials is carried out in stages starting from the needs analysis, validator test, individual test, small group test, to field testing. All tests were conducted by distributing questionnaires to lecturers and students. Needs analysis was conducted by distributing questionnaires to 26 students, 6 lecturers, and 3 laboratory assistants in the Physics laboratory by describing the definition of software-based information systems in the questionnaires submitted. Based on the analysis that has been done, 11.43% of lecturers, laboratory staff, and students stated that they were familiar with this application program inventory of laboratory equipment and materials and 88.57% of lecturers, laboratory staff, and students stated that they were not familiar with application programs for laboratory equipment and materials. 5.71 lecturers, laboratory staff, and students stated that they had used the application

database of laboratory equipment and materials database, and 94.29% of lecturers, laboratory staff, and students stated that they had not used the application database of laboratory equipment and materials, as many as 2.86% were lecturers, laboratory staff, and students do not need an application database system for laboratory equipment and materials information, and 97.14% of lecturers, laboratory staff, and students need a database system application for laboratory equipment and material information. Then it can be concluded that the development of information systems service utilization of laboratory equipment and materials is very necessary to support the information service process of practicum and research [7].

The initial product of the information system is the use of tools and materials that are made in the form of application software which generally covers the Home Menu, Profile, Goods, Transactions, Report, User, and Logout. The initial product trial was conducted to validate the software as a product revision material. The stages of validation are started by validation by graphic design and software experts, validation by information system experts, and validation by experts in laboratory equipment and material management.

Validation testing by graphic design and software experts was carried out on two aspects, namely the aspect of content feasibility and graphic aspects. The average percentage of the assessment of the feasibility aspects of the application content is 99% and the graphic aspect is 96.7%. So that the average percentage of the results of the assessment of the information system application using tools and materials by graphic design and software experts is 97.85% with the criteria of "Very Good". There are some drawbacks to the image of tools and materials, the appearance of the Home, and coding so that it is repaired [8].

The validation test by the information system expert was carried out on three aspects, namely the aspect of content feasibility, aspects of presenting information systems and aspects of service. The average percentage of assessment of the appropriateness aspect of the application content is 98%, the information system presentation aspect is 97.5%, and the service aspect is 97.5%. So that the average percentage of the results of the assessment of the application of information systems using tools and materials by information system experts is 97.7% with the criteria of "Very Good". There are some shortcomings in the data and images of tools and materials, and limits on the amount of borrowing tools and materials so that repairs are made.

Validation tests by experts in laboratory equipment and materials management were carried out on two aspects, namely aspects of information systems and aspects of content eligibility. The average percentage of assessment of aspects of the application information system is 82.5% and the feasibility aspect is 87.5%. So that the average percentage of the results of the assessment of the information system application of the use of tools and materials by experts in laboratory equipment and materials management is 85% with the criteria of "Very Good". There are some shortcomings in the additional menus for tools per room, back and forward menus, code descriptions, tool conditions and pop-up menus so that repairs are made. After repairs to all deficiencies, the Application results of improvement 1 are obtained.

The next trial is an individual trial conducted on 3 students to identify deficiencies in information system services products using lab tools and materials after being reviewed by experts. The aspects assessed in this test are aspects of the feasibility of the contents and aspects of laboratory services, complete with tools and materials. The average percentage of the trial results on the aspect of content eligibility is 98.8% and 96% of the service aspects of the laboratory. So the average percentage of the results of the assessment of the application on individual trials is 97.4% with the criteria of "Very Good". There are shortcomings in extension terms and procedures so repairs are made

The next trial was a small group trial by distributing questionnaires to 9 students. The aspects assessed in this trial are aspects of the feasibility of content and graphics. The average percentage of the assessment results on the aspect of content eligibility is 97.1% and the graphic aspect is 97.2%. Then the average percentage of the test results on the application in the small group trial is 97.2% with the criteria of "Very Good".

The last test was a field trial conducted on the aspects of the feasibility of the contents and aspects of laboratory services, complete with tools and materials contained in the application by distributing questionnaires to 27 students. The average percentage of the assessment results of the content feasibility aspect is 98.1% and the laboratory service aspects of equipment and materials are 97.9%. So the average percentage of the results of the assessment of the two aspects of the application in the field trial is 98% with the criteria of "Very Good".

After four tests, the average percentage of the results of the assessment of the information system software product is produced, the service for the use of tools and lab materials for four tests is 95.53%. With the criteria of "Very Good". The benefits and usefulness of making a database system application service product utilization of lab tools and materials in the Physics laboratory FMIPA Unimed is an application that is easy to use as a medium for information on the availability of tools and materials in the laboratory, facilitating the laboratory administrator in inventory of tools and materials, assisting in laboratory services and as a reference in making decisions for the management of tools and materials in the next period, and improving practicum services especially in the FMIPA Physics laboratory.

#### IV. CONCLUSION

After conducting research and testing on the development of service information systems using lab tools and materials and tested through 4 stages, it can be concluded that the application of information systems made "feasible" is used as a means of laboratory services.

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