ISSN No:-2456-2165

Development of Material Test and Survey Laboratory Application Systems

Virma Septiani
Palembang Aviation Polytechnic
Airport Engineering Technology
Palembang, South Sumatera, Indonesia

IGAAM Oka
Palembang Aviation Polytechnic
Airport Management
Palembang, South Sumatera, Indonesia

Viktor Suryan
Palembang Aviation Polytechnic
Airport Engineering Technology
Palembang, South Sumatera, Indonesia

Abstract:- The Palembang Aviation Polytechnic is one of the vocational colleges under the Ministry of Transportation that implements the financial management of the public service agency, which has the task of organizing vocational education programs, research and community service in the field of aviation, as stated in the minister of transportation regulation number 24 of 2019. Palembang Aviation Polytechnic is also equipped with educational laboratory facilities to carry out its duties. The research aim is to increase the utility of laboratory facilities and increase added value for the revenue of the Public Service Agency, so the Material Testing and Survey Institute was formed as part of the Laboratory unit at Palembang Aviation Polytechnic in the Future. The method used in this research is to use a qualitative approach method. This study uses a theory based on the E-Registration Application for the Material Testing and Surveying Institute, where researchers make exploration efforts on how to create a Material Testing and Survey Institute Application service system that can simplify the process and make it easier for customers (customers) to carry out laboratory testing and increase laboratory utilizes. It can be facilitated by an electronic E-Registration Application that can be run practically and user-friendly. The data collection technique used was observation. The results showed that the Airport Laboratory Development at Palembang Aviation Polytechnic to design the E-Registration application for the Material Testing and Survey Institute Used a Web-based Information System. This study concludes that developing the E-Registration application service can make it easier for customers (customers) to conduct material testing and surveys. Laboratory development at the Palembang Aviation Polytechnic will be carried out from the above conditions. This research can contribute to the Palembang Aviation Polytechnic and other institutions as an alternative in conducting laboratory testing.

Keywords:- *Laboratory, E-Registration, Web Application.*

I. INTRODUCTION

As one of the vocational colleges under the Ministry of Transportation, Palembang Aviation Polytechnic implements the financial management of the Public Service Agency, which has the task of organizing vocational education programs, research, and community service in aviation as stated in the Minister of Transportation PM. 24 of 2020. Palembang Aviation Polytechnic is also equipped with educational laboratory facilities to carry out its duties. The laboratory is one of the dynamic environments in testing services [1]. Until now, the utility level of laboratory facilities is relatively low. To increase the utility of laboratory facilities and increase added value for the revenue of the Public Service Agency, a material testing and survey institute was formed as part of the laboratory unit [2].

In addition, the material testing and survey institute is an institution that was formed to meet the standards according to the Accreditation Agency by the National Accreditation Committee. One of the requirements of the National Accreditation Committee or ISO 17025 is that procedures are carried out by established documents and by applicable standards [3]. Following the decree concerning establishing a material testing and surveying institute, there are designated personnel, namely the laboratory manager, quality control manager, technical manager, laboratory technician, Administrator and Finance. Each personnel is assigned according to the main task and function, supported by a certificate of skills under their respective field expertise [4].

As time goes on, the system stipulated by the material testing and survey institute in the form of a testing flow or a set procedure is still being carried out manually. In line with advances in information technology, Palembang Polytechnic Aviation survey and material testing institute began to improve services electronically. Improved services include the system for testing requests, registration, payment, issuance of reports and certificates [5].

The laboratory applies the same services standards in providing customers, not differentiating between one customer and another. For a laboratory, customer means an organization of people who receive or are interested in

laboratory products, namely examination reports, including opinions and interpretations of these results [6].

Laboratory testing is only usually done manually where the customer (customer) applies for testing services by visiting the testing laboratory location during operating hours registering manually by visiting the testing laboratory location during operating hours. The customer takes a certificate of material testing results with how to go to the location of the testing laboratory during operating hours [2].

Therefore, to support service activities and make it easier for customers (customers) to carry out testing, it is necessary to develop E-Registration application services. The main objective is to develop Web-based E-Registration Laboratory testing services. Further, the services are not limited to office operating hours. The registration process is carried out in a paperless manner can be easily accessed via the website or email either process application for testing registration, including payment, the printing of test results and taking certificates for customers (users) and service providers [7].

The development of technology towards being completely digital is currently increasing rapidly. Humans generally have a lifestyle that cannot be separated from electronic devices in this digital era. Technology is a tool that can help most human needs. Humans can use technology to make doing any task and job easier. The important role of technology is what brings human civilization into the digital area [5].

The digital era has had a considerable impact on people's lives or service users. The community seems to be forced to migrate from manual to digital application systems in living their lives, one of which is in laboratory testing utilizing E-Registration, which is increasingly being used by the community. If laboratory development is adequate, the application of e-learning can be a resource-efficient learning method. In addition, the application of E-Registration can also make it easier for customers (customers) to carry out tests. During the recent Covid-19 outbreak, implementing activities is carried out online, which is very useful to protect customers to come directly for testing. Moreover, the government has appealed to the public to do activities at home as an effort of physical distancing of maintaining physical distance to suppress the spread of the virus.

The application of a laboratory testing model has one component that needs to be considered so that a testing model can influence its implementation. In this case, E-Registration, the testing and use of information technology is needed in the conditions of the Covid-19 Pandemic. By utilizing E-registration as a laboratory testing medium, it can be used for laboratory testing activities, especially material testing and surveys at the Palembang Aviation Polytechnic.

The Palembang Aviation Polytechnic Institute of material testing and survey E-Registration application developed the main function of the Palembang Aviation Polytechnic Material testing and survey E-Registration Application which will be given to users as well as user characteristics which include the division of user groups such as individuals or partnerships and access rights to the application.

This research was conducted to measure the achievement of the effectiveness of developing the E-Registration laboratory for testing materials and web-based surveys. In this study, researchers tested the Web-based E-Registration application and evaluated testing through responses from customers as users using the E-Registration application.

II. METHODOLOGY

This study used a qualitative approach with descriptive methods, where the researcher made an exploratory effort to test the laboratory materials and survey the E-Registration system [8]. This research is exploratory, so it does not test hypotheses or generalize. The elements of this research design are based on the focus of the problem under study, the suitability of the object of research with theoretical references, informants, instruments, data collection procedures and data analysis [9]. The qualitative research is carried out to understand the phenomena experienced by research subjects through descriptions in the form of words and language in a natural context and utilizing various scientific methods [10]. The validity of the data was done by triangulating the source. The qualitative research requires in-depth study, not just about what and how qualitative research is, but fully understanding so that the scientific work process can produce products that meet objective criteria [11].

Designing software (application programs) is one of the most demanding human expertise and skills jobs. Everything generally starts with a thorough understanding of the problem (analysis), designing the software to be developed (design), then continuing with implementation (writing in program language), and ending with testing so that the software is really according to the needs and expectations of users [12], [13].

TABLE I. INDICATORS OF ACHIEVEMENT

Achievement Indicators	Information
Availability of E-Registration Application for Material Testing and Survey Institutions	- *E-Registration Application*
Achievement of Learning Outcomes	- Increased utility of laboratory utilization - Increased revenue from Public Service Agency Services

III. RESULT AND DISCUSSIONS

The research data for the results of this study were started from June to November 2020. The research stages started from the primary data collection and observation stages, the research work stages, in the research phase by observing and documenting. Researchers explored data review of the material testing system by E-Registration obtained from documents and observations to customers. At the documentation stage, we documented the observations in

ISSN No:-2456-2165

photographs and data relating to implementing the E-Registration Application for Testing Materials and Web-based surveys. To strengthen the observation data. The photo shown is the process of organizing the training. The data obtained is the results of document collection and field observations. In this case, the results of observations are primary data which is very important because they are a major part of data analysis activities, while the results of the notes support data that the researcher makes to be further developed in research. The data collection observations were obtained according to the inside research's indicators.

In this research, the stages of research results go through the following process:
1) Observation of documents and manual testing process. The material testing and survey manager reviews the testing documents and performs.
2) Observations of material laboratory testing and survey application design from field observations created an E-Registration application for testing materials and surveys.

This application uses a Web System with a simple and easy-to-understand display and is used by customers who manage the testing institute. The E-Registration application for material laboratory testing and surveys includes application development [14].

From all observations on all indicators, it can be concluded that the E-Registration application for testing materials and Web-based surveys can be used and implemented for laboratory testing services for the Palembang Polytechnic Aviation Laboratory. The application aims to create a service system for the material testing and survey institute application that can simplify the process and make it easier for customers to carry out laboratory testing to increase laboratory utilities that can be run practically and user friendly.

Implementation stages of E-Registration material laboratory testing and system reviews (review of observations of documents) and customer observations, material testing and survey application development, material testing and survey applications trial, evaluation of material testing and survey trials, repair/refinement of material testing and survey testing, launching of E-Registration application for material testing and survey version 1.0.

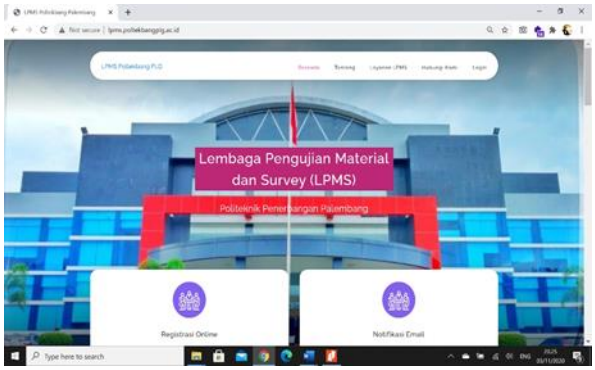

Fig. 1. LPMS E-Registration Application (lpms.poltekbangplg.ac.id)

The material testing and survey E-Registration application have features and a menu, shown in Table 2.

TABLE II. MENU AND FEATURES

Menu	Features
Page homepage	- *Home* - *About* - *Material testing and survey services* - Contact us - Login
Page login	- Login - Registration
Page dashboard customer	- Services - Upload proof of payment - Confirmation (already paid) - Order History

This application has been tested on the concrete compressive strength test of the customer CV-Smart Niaga Internusa on the renovation work of the library building.

With this application, even during the Covid-19 Pandemic, there was an income from the public service agency from concrete pressure test sources, so the utility of the concrete laboratory increased, as can be seen in Table 3.

TABLE III. UTILITIES OF THE CONCRETE TESTING LABORATORY

Service	Originally	Target
Concrete compressive strength testing	0	*2*
Soil testing	0	0
Asphalt testing	0	0

The discussion of the results of this study was carried out employing document observation and field observation. Observations are made by referring to predetermined indicators. From the research results, the assessment of the development of airport laboratories has generally gone well, starting from the preparation, application development, and application implementation. The research results on airport laboratory development at Palembang Aviation Polytechnic were discussed with the Director, head of the Airport Engineering Technology Study Program, and the head of the laboratory.

IV. CONCLUSION

Analysis of research results related to Airport laboratory development at Palembang Aviation Polytechnic is the E-Registration application for material testing and survey services that can be implemented to improve services and revenue for the Palembang Aviation Polytechnic Public Service Agency.

REFERENCES

[1]. N. Anwar, N. H. Nik Mahmood, M. Y. Yusliza, T. Ramayah, J. Noor Faezah, and W. Khalid, "Green Human Resource Management for organisational citizenship behaviour towards the environment and environmental performance on a university campus," Journal of Cleaner Production, vol. 256, May 2020, doi: 10.1016/j.jclepro.2020.120401.
[2]. B. Eller, R. Majid, and S. Fischer, "Laboratory Tests and FE Modeling of the Concrete Canvas, for Infrastructure Applications."
[3]. J. Monteiro Bastos da Silva, J. Chaker, A. Martail, J. Costa Moreira, A. David, and B. le Bot, "Improving Exposure Assessment Using Non-Targeted and Suspect Screening: The ISO/IEC 17025: 2017 Quality Standard as a Guideline," Journal of Xenobiotics, vol. 11, no. 1, pp. 1–15, Jan. 2021, doi: 10.3390/jox11010001.
[4]. Y. Zhang et al., "Assessing the safety risks of civil engineering laboratories based on lab criticity index: A case study in Jiangsu Province," International Journal of Environmental Research and Public Health, vol. 17, no. 17, pp. 1–24, Sep. 2020, doi: 10.3390/ijerph17176244.
[5]. R. J. Stone, A. Cox, and M. Gavin, Human resource management. John Wiley \& Sons, 2020.
[6]. M. R. Islam, Civil Engineering Materials: Introduction and Laboratory Testing. CRC Press, 2020.
[7]. A. Hermanto and Supangat, "Integration of EA and IT service to improve performance at higher education organizations," in MATEC Web of Conferences, Feb. 2018, vol. 154. doi: 10.1051/matecconf/201815403008.
[8]. R. F. Fellows and A. M. Liu, Research methods for construction. John Wiley \& Sons, 2021.
[9]. S. J. Tracy, Qualitative research methods: Collecting evidence, crafting analysis, communicating impact. John Wiley \& Sons, 2019.
[10]. L. J. Moleong, Qualitative Research Methodology Revised Edition. PT Remaja Rosdakarya Offset Publisher, 2013.
[11]. N. Basias and Y. Pollalis, "Quantitative and Qualitative Research in Business & Technology: Justifying a Suitable Research Methodology," Review of Integrative Business and Economics Research, vol. 7, no. 1, 2018, [Online]. Available: http://buscompress.com/journal-home.html
[12]. D. Rosca and L. Domingues, "A systematic comparison of roundtrip software engineering approaches applied to UML class diagram," in Procedia Computer Science, 2021, vol. 181, pp. 861–868. doi: 10.1016/j.procs.2021.01.240.
[13]. U. Sabir, F. Azam, S. U. Haq, M. W. Anwar, W. H. Butt, and A. Amjad, "A Model Driven Reverse Engineering Framework for Generating High Level UML Models from Java Source Code," IEEE Access, vol. 7, pp. 158931–158950, 2019, doi: 10.1109/ACCESS.2019.2950884.
[14]. B. M. Santos, I. García-Rodríguez De Guzmán, V. v de Camargo, M. Piattini, and C. Ebert, "Software Refactoring for System Modernization," IEEE Software, vol. 35, no. 6, pp. 62–67, 2018, [Online]. Available: http://www.omg.org/spec/category