E- TRACER STUDY BASED ON EXPERT SYSTEMS (A CASE STUDY AT AMIK INDONESIA)

Rizaldi Akbar[1]*, Mukhtar[2]
*1Department of Information Technology, AMIK Indonesia, Indonesia
2Department of Information Technology, AMIK Indonesia, Indonesia

*Corresponding Author:-
Email: rizaldiakbar@amikindonesia.ac.id

Abstract:-

Tracer Study is one method used by several universities, especially in Indonesia to get feedback from alumni. The feedback obtained from these alumni is needed by the university in their efforts to improve and develop the quality and education system. The aim of this study was to develop an e-tracer study that made it easier for AMIK Indonesia's campuses to monitor their graduates and develop intelligent system-based e-tracer studies. Broadly speaking, this study uses data collection methods through literature studies, interviews and observations. While research design uses experiments because it produces products that are decision support systems. The method used to support this research is the FMADM method using the SAW method calculation and the design method used is the waterfall method, which is a systematic and partial software development approach that starts at the level and progress of the system in all analyzes, designs, codes, tests, and maintenance. From the results of the study, it can be concluded that the tracker study was built with the Codeigniter and NODE framework. JS uses supporting programming languages such as HTML, CSS, Jquery, JavaScript, JSON, AJAX, Bootstrap as media in interface design. Whereas PHP as server-side and MySQL as database. while the method used for testing the application is White Box Testing and the Black Box method.

Keywords:-*"tracer study; expert system, AMIK Indonesia".*

I. INTRODUCTION

Tracer study is an activity that must be carried out by all tertiary institutions in Indonesia [1,2,3], as a form of graduate supervision that has been produced by universities [4,5], where universities can improve in their implementation every certain period [2, 6]. In the process of using e-tracer study, questionnaire data collection about graduates who have worked and not after graduation, and some of the results of the questionnaire are used as curriculum references and further learning improvement [7,8]. Universities need to search for data to pass it, this data can be used for various needs, with the e-tracer study being a more effective alternative media for collecting data [9]. A complete E-tracer study service can also provide information for universities in the interest of knowing the satisfaction of college graduate users [10].

In Indonesia, the number of unemployed according to Indonesian Labor Statistics data in 2016 is 7,024,172 people and 13.4% of them are educated unemployed (graduates of Diploma and S1 programs) [11]. There are several things that cause this high level of unemployment to be highly educated, including the incompatibility between the acquisition of educational competencies and the needs/requirements of available employment, or the imbalance between demand and supply, and the quality of human resources produced [12,13,14]. In addition, the Republic of Indonesia Ministry of Research, Technology and Higher Education has issued a Standard Questionnaire Form Tracer study 2017 as a reference in making alumni tracking questionnaires. But the most interesting thing here is, where Tracer study applications are not provided for free, most universities have complex problems such as lack of funds, facilities to HR in the IT field which makes the application of tracer studies not widely used or spread across various College Websites. Related to this, it is expected that intelligent system-based e-tracer studies can help universities get a decision and e-tracer study is developed in an open source form so that it can be used and developed for free by every university in Indonesia.

E-Tracer can measure and track graduates' performance so that clear indicators of numbers, profiles and so on can be obtained [15]. Tracer study is the study of graduates of higher education institutions. Other commonly used terms are "Pass Survey", "Alumni Researches", and "Follow-up Study", this term refers to the idea that "almost" is the same as a term tracking study that will be used in the mention of Tracer study. For alumni, the E-Tracer System is the right step to overcome existing problems, because the E-Tracer alumni system can be accessed by prospective alumni and stakeholders who want to see alumni database information anywhere and anytime connected to the Internet [16]. Many have conducted research on the development of tracer studies [17,18,19], but the application of tracer studies is also developed with expert systems with various methods so that results can provide appropriate decision support and solutions [15,20,21,22].

Smart Systems is a science that engages in the manufacture of intelligent machines [23]. Intelligent machines can be interpreted as machines that can do certain things that require intelligence when done by humans [23,24,25]. Expert system or intelligent system designation by applying several methods, it will produce a system that can provide recommendations for the best solution [26]. Intelligent systems have been widely applied in various institutions and institutions, with the presentation and development of knowledge-based and the application of rules offered by experts to provide solutions in rapid decision-making [27]. Expert systems can also predict a value from the time series analyzed, using predictive values and inference rules to verify each data and algorithm of expert systems, expert systems also have many methods and algorithms that are adapted to various cases [28]. Various expert system algorithms are widely used as system development such as; K-Means, Neuro-Fuzzy Systems, Black Hole Algorithms, Neural Networks [29]. This study also developed a tracer study application using the simple additive weighting (SAW) method to do ranking by weighting the questionnaire that has been determined later [25].

II. METHOD

Research is the process of collecting and analyzing data carried out systematically and logically to achieve certain goals. The research used is applied research, where testing of existing theories and knowledge for practical purposes is beneficial directly in human life. The purpose of applied research is the type of research that is directed to obtain information that can be used to solve problems.

Broadly speaking, this study uses data collection methods through literature studies, interviews and direct observation at AMIK Indonesia. While the research design uses experimental because it produces a product that is a decision support system. The method used to support this research is the FMADM method using the SAW method calculation. Supporting applications that will be created with the author using web-based programming languages such as; HTML, CSS, Jquery, JSON and MySQL databases with Windows operating systems. On the running analysis and system design that will be created the author is described by Microsoft Visio 2016. The method used to evaluate the system is the black box method where the black box testing focuses on system functions.

In general, in the case of this study, the writer uses a descriptive approach or survey that is collecting as much data as possible about the factors that support the e-tracer study, then analyzing these factors to find their role in the e-tracer study decision support system. The author tries to apply the fuzzy multi-attribute decisionmaking model by representing the classic method of multiple attribute decision making, especially the Simple Additive Weighting (SAW) method into the decision support system in determining the results of AMIK Indonesia's e-tracer study Banda Aceh.

This research will be carried out principally on AMIK Indonesia. In addition, this study will also involve alumni and lecturers to fill in the data and try the application made. The design method used is the waterfall method, which is an approach to the development of systematic and partial software that starts at the level and progress of the system throughout the analysis, design, code, testing, and maintenance [30,31].
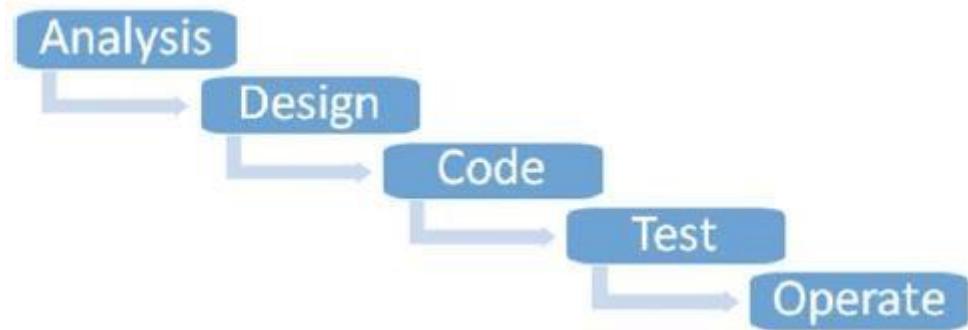
Figure 1. Stages in the Waterfall Model

III.RESULTS AND IMPLEMENTATION

A. Results of System Design

By adjusting the design, the basic design of the Tracer Study application was developed which consisted of input designs such as; Student ID number, department, name, class, gender, graduation status, alumni email, address, and questionnaire. While the output analysis consists of; Recapitulation of Questionnaires, Questionnaire Validation, Questionnaire Data, Graphs and Reports from the results of the analysis using Simple Additive Weighting (SAW) method.

B. Screen Design

The results of the application design tracer study are as follows:
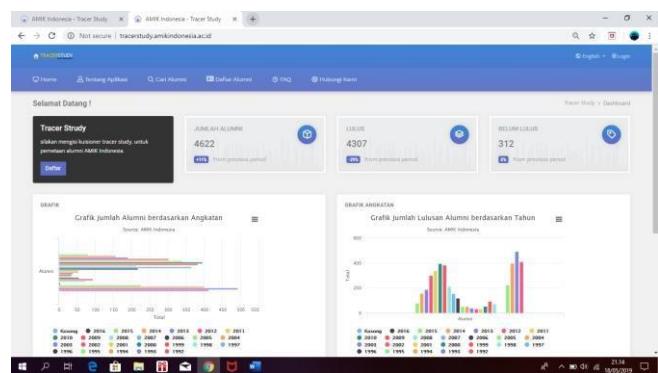
Figure 2. Main page

The first main page when accessed, this page consists of information such as; about the application, alumni search, alumni list, FAQ, and contact us. To register alumni can access the alumni list page and enter the student ID number, as shown in figure 3.
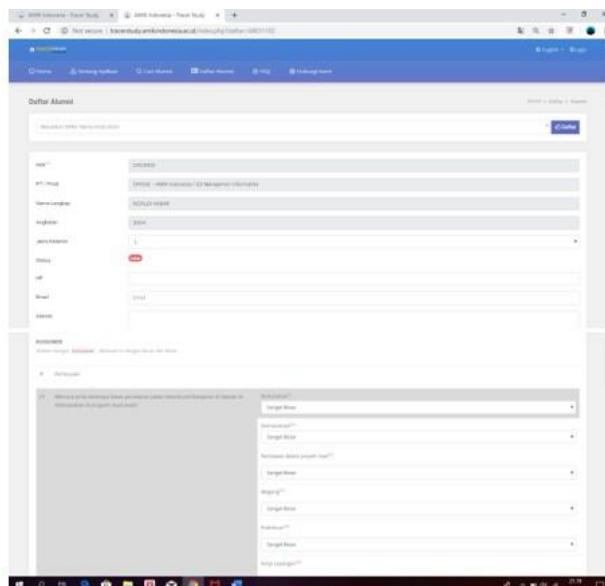
Figure 3. Alumni List Page

On this page, alumni enter a student ID number or full name so that later the registration page will be displayed in full. This page consists of; Student ID number, department, name, class, gender, graduation status, alumni email, address, and questionnaire that has been adjusted according to the 2017 tracer study guideline regulations issued by the Ministry of Higher Education in Indonesia. To access the admin page, the manager of the tracer study logs in and fills in the username and password as shown in Figure 4.
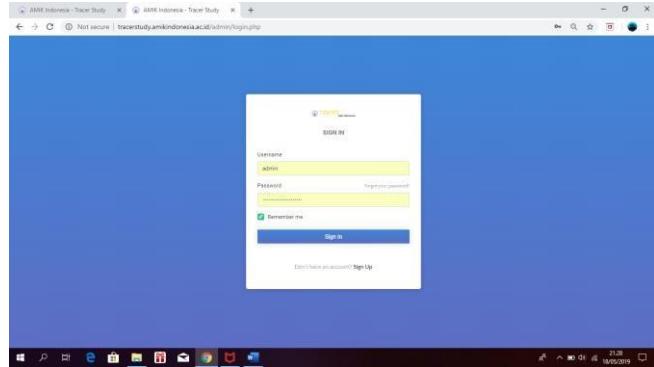
Figure 4. Login page

After logging in, the manager of the tracer study will be directed to the admin page as shown in Figure 5.
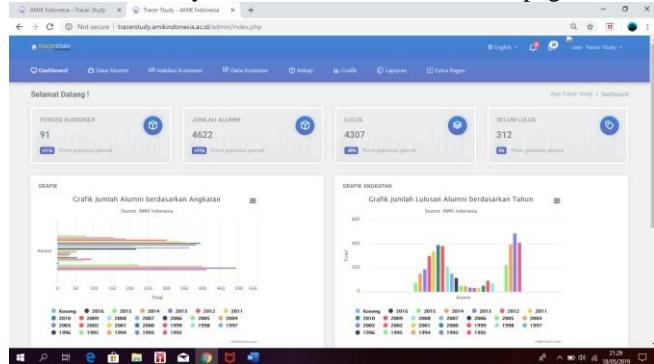

Figure 5. Admin page

This page consists of menu information; dashboard, alumni data, questionnaire validation, questionnaire data, recap, graphics, tracer study report, In the recap menu there is a submenu of categories, questionnaires, questionnaire validation, and questionnaire data while in the graph menu consists of a submenu of the batch and all graduates. On the report menu, the submenu per batch and filling in the questionnaire and results also display a graph of analysis of the use of the simple additive weighting (SAW) method, as shown in figure 6.
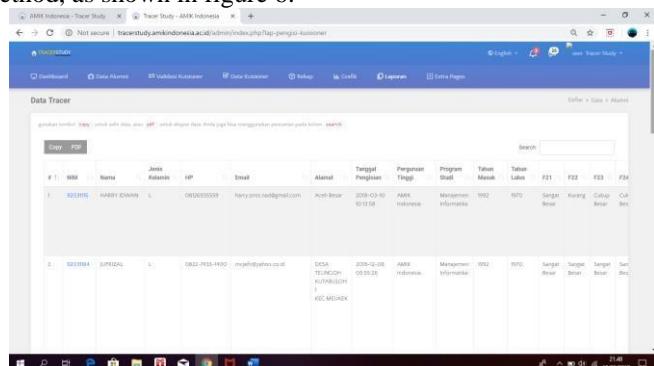
Figure 6. Tracer study report page

C. Testing Method

The method used for testing applications is the White Box Testing and Black Box methods. Where testing includes QA, testing the software/application program tracer study that concerns the security and performance of the program, in this case, includes code testing, implementation design, security, data flow, software failure and carried out along with the stages of software development or testing. While testing with the BlackBox method is carried out by Independent testers, and tests based on what is seen, only focusing on the functionality and output of the application. and testing is more aimed at software design according to standards and reactions if there are bug/vulnerability gaps in the application program after white box testing is done.

IV. CONCLUSION

From the results of the study, it can be concluded that the tracer study was built with framework CodeIgniter and NODE.JS uses supporting programming languages such as HTML, CSS, Jquery, JavaScript, JSON, AJAX, Bootstrap as media in interface design. While PHP as a server-side and MySQL as a database. Whereas for expert system analysis, the simple additive weighting (SAW) method is used to rank the adjusted questions by weighting the predetermined criteria. The tracer study application is capable of tracking and ranking criteria and providing alternatives as decision making efforts at AMIK Indonesia.

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