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Improving The Performance of Alumni Achievement Assessment by Integrating Website-Based Tracer Study Information Systems and Telegram API

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Abstract

It is the mission of Vocational High School (SMK) education in Indonesia to produce highly competitive and skilled graduates. One standard for evaluating the success of vocational education is assessing the achievements of alumni. The evaluation process can be carried out with programmed alumni tracking activities or commonly known as tracer studies. However, the implementations of tracer studies that have been carried out by vocational schools in Kediri are still using the manual method. These conditions make the school find many obstacles in the implementation of tracer studies. Some schools have used technology with e-mail applications but have financial constraints. This research aims to improve the performance of assessing the alumni achievement of Vocational Schools in Kediri by integrating the website-based tracer study information system with social media Telegram API. Usability testing that gave 4.83 of 5 scales has shown that the integration can improve the performance and benefits of an application compared to the application before integration.

Keywords*: tracer study; API; social messaging; Telegram; web-based*

1. Introduction

The high growth of vocational high school (SMK) in Indonesia, particularly in the area of Education Office of Kediri Regency, is signified by the proliferation of the opening of the SMK and the increased interest of young people continue their education in the field. The success of its implementation is inseparable from the assessment system conducted by the government (Fitri, 2018). One standard for evaluating the success of vocational education is assessing the achievements of the alumni.

The evaluation includes the relevance to the working world, the number of graduates absorbed, and graduates' competency suitability with the labour market's needs. The evaluation process can be carried out with programmed alumni tracking activities, commonly known as tracer studies (Sa'idah, Andriyani, & Saefudin, 2017). However, the Kediri vocational school tracer studies still use manual methods. Therefore many obstacles faced. Paper-based alumni data collection is inefficient as the paper gets easily damaged and dirty, while it is also challenging to reach graduates who are outside the city. Those who used e-mail face financial constraints. The telephone is also ineffective because not all alumni are willing and have time to be interviewed directly. School also sent questionnaires by mails, but not all graduates gave feedback (Wicaksono, Hartanto, & Azhar, 2017). Tracer study is expected to be the best way to gather alumni feedback to support the evaluation process.

Based on those facts and given the rapid technological developments, a system can be designed to get alumni data by combining website technology with the social media API, namely Telegram (Sajad, Hossein Heidari, & Azizeh, 2019). Using website to collect alumni data, one will gain the benefits of easier access to the website; easier access to the data, more efficient and effective process, inexpensive cost, and easier data management (Astini, Agustini, & Santyadiputra, 2016; Nugroho & Nugroho, 2018). Moreover, the Telegram API feature serves as a reminder through a mobile chat application when alumni have not yet sent a tracer study report.

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Research on tracer study was conducted by Diana and As'ad in 2017, entitled "Web-Based Information Systems and Analysis of the Relevance of Tracer Studies at University of Prof. Dr. Hazairin, SH Bengkulu." The research discussed the process of gathering information on the performance of graduates using website media. They concluded that the relevance of the graduates' education to the work that they are currently engaged in as consideration for improving the education and teaching system (Diana & As'ad, 2017).

Another research was carried out by Nugroho and Nugroho in 2018 entitled "Career Center System and Higher Education Tracer Study." The research discussed the design of systems and career center and tracer studies in tertiary institutions using the System Development Life Cycle (SDLC) to determine the absorption and position of graduates in the industry, compile learning process strategies, and improve the quality of graduates. The results of the study showed the needs of the career center and tracer study system. They were also able to optimize the function of alumni data services for tertiary institutions (Nugroho & Nugroho, 2018).

A research conducted by Wicaksono, Hartanto, and Azhar in 2018 entitled "Alumni Career Information System and Tracer Study Case Studies in Informatics Engineering Study Program, University of Muhammadiyah Malang." The study discussed the design of tracers that engage users through Facebook. However, the system tools used were Google Form; therefore, the system has not been structured and unsystematic. The study results showed that the system accommodated the needs of filling and making alumni search results (Wicaksono et al., 2017).

Based on the previous research discussed, one can conclude that the researches were carried out to serve the need for information technology, particularly for website based-services. A common problem found in the studies was that they applied manual systems, and information were not well distributed. A different approach to the study needs to be done, by designing a system with Telegram API feature. The system is online, making it easier to distribute information. Notification can be delivered to alumni through Telegram application messages.

Based on the description above, the tracer study information system will be implemented at the vocational school in Kediri. The results are expected to help schools independently track alumni with website media and social media chat using the telegram API.

2. Research Method

This research was conducted to create an system. A system is a group of elements that are strictly interconnected and work together to achieve specific goals. Besides, information is generally defined as the result of processing data into a more useful form. Thus, it can be concluded that the information system is a system that provides information to all parties of an organization (Hartono, 2007).

The system was designed for tracer study. Tracer study is a study of graduates from an education unit to dig up information through filling out questionnaires arranged in such a way as to improve curriculum and educational processes in a school (Schomburg, 2003). This system also use Telegram as an important feature.

Telegram is a messaging software program that focuses on speed and security. Telegram can send text messages, pictures, videos, files (doc, zip, mp3). Sketchily, Telegram is described as a combination of SMS and E-mail. One of the unique features that Telegram has is that users can create APIs through bots. This Telegram bot can act like a human telegram account to send and receive messages. A telegram bot can be created by registering it with @botfather on the Telegram (Telegram, 2019a, 2019b).

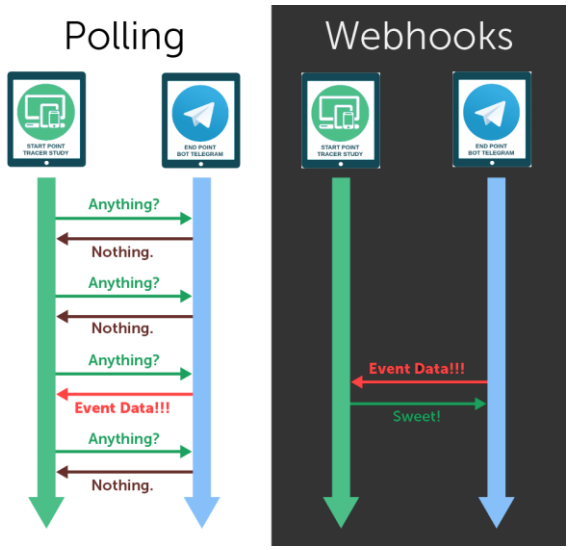

Figure 1. Metode Bot API Telegram

There are two of the most popular bot management methods, as shown in Fig. 1 long-polling and webhooks. The bot management function is to share data efficiently between applications and application users. Both ways have advantages and disadvantages. Long-Polling is the default method of Portable Telegram, which means that the process can be run on various devices, including computers, cellphones, IoT devices, and routers. This method does not require using an online server. The disadvantages of this method include that the process of reading a chat is quite long. The update process is not realtime. Webhook has the advantage of reading conversations faster than long-polling. This method can be run for 24 hours because it

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runs on an online server that has an SSL certificate. This method can update the script in realtime (Hasan, 2016).

The research used the Linear Sequential Model method. This method demonstrates a systematic and sequential approach to software development that starts at the system level and develops through analysis, design, coding, and testing (Dharmawan, Sucipto, & Indriati, 2019). Fig.2 illustrates a linear sequential model for software engineering. System/information engineering and modeling become part of the business system. The steps began by setting requirements for all system elements and then allocating some of these requirements to the software. Software systems must interact with other elements, such as hardware, people and databases. Systems engineering and analysis includes gathering requirements at the system level with a small number of top-level design and analysis. Information techniques include gathering requirements at the strategic business level and the business area level (Pressman, 2010).

On the analysis stage, the process done was gathering requirements intensified and explicitly focused on the software. As for the design stage, the activity conducted was designing software with diagrams. On the coding stage, activities at this stage was creating code. The last stage, testing, focused on the logical internal of the software, ensuring that all statements have been tested and on the functional external.

3. Result and Discussion

This research was conducted following the Linear Sequential Model. This method uses a systematic and sequential approach to software development that starts at the system level and develops through analysis, design, coding, and testing. This research model is illustrated in Fig. 2.

The steps taken are tracer study system analysis. Researchers have collected data on several stakeholders, including sampling to Vocational Schools, ICT Subject Teacher Representatives and MGMP Guidance Counseling (BK) representatives. The next stage is to make an application design information system based on data that has been obtained. The design stage consists of two steps, namely diagram design that will use Data Flow Diagrams (DFD) and interface design for information system interfaces.

The level 0 diagram design scheme in Fig. 3 shows the basic system flow of the tracer study information system products. Entities in the information system consist of 3, including alumni, admin appointed by the school to monitor and manage system reports and bot tracer study which is a robot as a guide to serving every alumni question. In Fig. 3, there are several business processes on each entity. Alumni entities can register independently, log into the system, find out various information such as about job vacancies, fill out alumni tracking forms and alumni will get notifications from bot tracer study.

The admin entity has several business processes including mass registration of alumni, logging into the system, providing information to alumni, viewing alumni data statistics, viewing alumni data, exporting alumni data and logging system control. Telegram bot entities serve as servants for alumni. One of the tasks performed by the bot is for the registration section and to provide various notifications to alumni and admins. Bot ease the burden of admin to serve a wide range of questions put by the alumni.

Fig. 4 is a database relation design in information systems — database design by DFD derivatives. There are six tables connected except the siswa_temp table. The siswa_temp table is used for temporary shelters for alumni import data

The database table design in Fig. 4 consists of two different engines (S. Sucipto, Resti, Andriyanto, Karaman, & Qamaria, 2019; Sucipto Sucipto, 2017). The machines used are InnoDB and MyISAM. Only the siswa_temp table uses the MyISAM engine. The siswa_temp table functions as a temporary student table when uploading data to a web-based system. In addition to siswa_temp tables, all other tables use the InnoDB engine which is used as a database relation on the MariaDB database. The use of the MyISAM type engine can optimise databases with non-relational models (Abadi et al., 2018; Rijati et al., 2015; Sucipto, Indriati, & Hariawaan, 2017). Using the MyISAM Enginedcan determine DML priorities with commands LOW_PRIORITY, DELAYED, and HIGH_PRIORITY (Dyer, 2015).

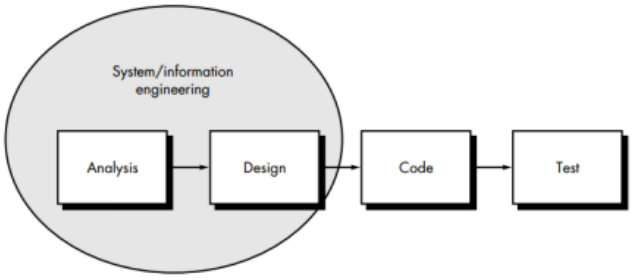

Figure 2. Linear Sequential Model

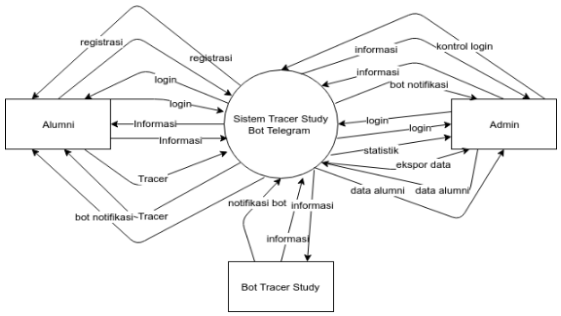

Figure 3. Level 0 DFD

The stage of the tracer study information system design uses the bootstrap framework with the adminLTE template. AdminLTE interface, as shown in Fig. 5. AdminLTE is an opensource admin dashboard intended for information system panels. AdminLTE is built using the Bootstrap framework. AdminLTE provides various components that are responsive, reusable, and commonly used.

The code phase uses sublime text version 3 tools. Sublime Text is an advanced text editor for code, markup, and prose. This tool can be used in a variety of code languages, including those used in making tracer study information systems, namely the PHP and SQL programming languages. The code structure in the tracer study information system consists of various modules that are interrelated. Modules enter the program directory. Display in the program directory is shown in Fig. 5. The module consists of CSS modules, namely jQuery, bootstrap, awesome and ionic fonts. Program modules include PDF, excel and server-side data table modules.

The interfaces in the tracer study information system are divided into two entities: admin and alumni. Some access rights are following the diagram design in Fig. 6. The design is then combined with the PHP and SQL coding process.

There are five admin modules, including: (1) a news module; (2) a control module; (3) an export module; (4) a message module; and (5) a student module. The news module manages information such as job vacancies, whereas the control module manages alumni login management. The export module aims to export alumni data such as alumni tracking data, while the message module sends messages to alumni. The student module manages alumni identity data, including the import of alumni registration, who do not register through the standalone system. One of the telegram API notification features is notification via Telegram to the school manager when the alumni fill in the data. The notification result is shown in Fig. 7.

The alumni module consists of 4 modules, namely: (1) the alumni module located in the alumni directory and alumni2 which functions as an alumni search form module; (2) the results module to display the history of filling alumni searches; (3) the password module to change alumni password data; and (4) the message module to send messages to the admin.

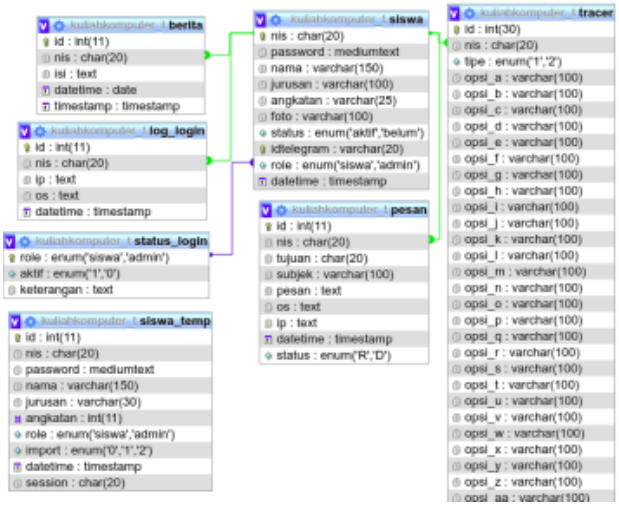

Figure 4. Tracer Study Database

Figure 5. Interface AdminLTE

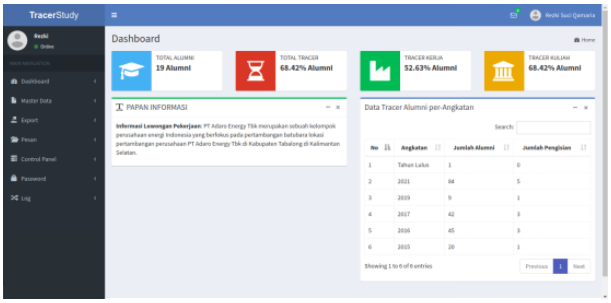

Figure 6. Tracer Study System Page

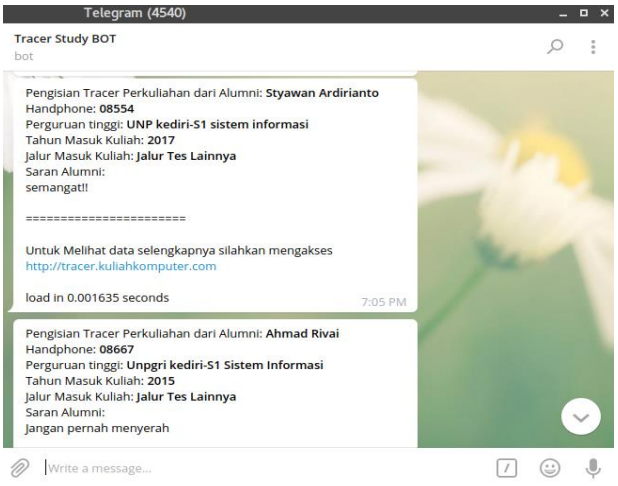

Figure 7. Bot Telegram Notification

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The results obtained after the prototype functionality testing showed that all functions went well because the prototype met the functional and user requirements. System testing uses the usability method to determine the level of effectiveness, efficiency, and satisfaction. The results of the usability testing were shown in Figure 8.

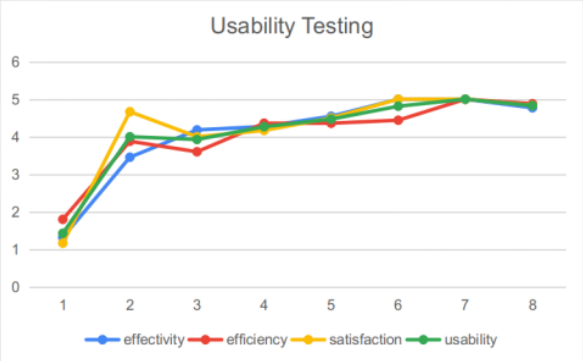

Figure 8. Application Testing

Figure 8 is the result of usability testing. Assessments were based on effectiveness, efficiency, and satisfaction (Sucipto, Hariawan, Nurita, & Tammam, 2018). The test was carried out based on eight trials. The results show an improvement in the quality of the application, which is seen based on the 1st-to-8th trials chart.

The results of Figure 8 show an increase in the quality of application testing. The increasing value shown in Figure 8 was obtained after prototype improvement, making it easier for respondents when re-using the application. Test results indicate that usability tests can improve the performance and benefits of an application.

4. Conclusion

Integration of the website-based tracer study information system with social media API Telegram has been done. Usability testing that gave 4.83 of 5 scales has shown that the integration can improve the performance of assessing the alumni achievement of Vocational Schools in Kediri. It also can improve the benefits of the application compared to the application before integration.

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