

Integration System of Web Based and SMS Gateway for Information System of Tracer Study

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Abstract — Tracer Study today now required to become an official activity carried out by the entire campus in Indonesia to carry out supervision of all activities of the alumni. Observations on the date of graduation from college, a long wait after getting a job for the first time, information about the location currently occupied jobs, wages earned, as well as the input to the campus about the demands of jobs.

Information systems are made with the integration between the use of web media that can later be used by the Alumni to update the data itself, as well as media use SMS Gateway which will provide another convenience for the Alumni to give her information to the college with the last condition.

Information systems design and integration of web based and sms gateway is started from the analysis of the system to be constructed, database and relational database design that required, the design of interfaces for the integration of the two media are created, and testing sistem to be use, using a blackbox test and alpha test for completeness of the information that will provide.

Login and password on a web media for Alumni will be given after a student to register using SMS Gateway. With the mobile phone-based registration is also ultimately to be a connectivity campus with Alumni, information about the alumni meeting, current information about the college and job information to the alumni who did not get a job or wanting to to move a new job.

Keywords— *Tracer Study Information Systems, SMS Gateway, Web Based, Integrated System, Apache Web Server, PHP, Gammu, MySQL database.*

I. INTRODUCTION

Tracer study is one of the activities to be undertaken by all higher education in Indonesia, as a form of supervision of graduates that have been generated by the higher education, in the sense that any higher education should be able to continue to improve the implementation of education that has been done on the alumnus. In this process of tracer study activity was first actually doing to collection questionnaires on graduates who have worked, to know how long an alumnus able to get a job after graduation, and a few questionnaire for inputs to the campus regarding into his worked to and his study.

The input for the campus, obtained from questionnaires that entered by the alumnus and from where he works, using the sentences are written directly on the free sheet questionnaire in the manual way of questioner.

Web-based information systems development and SMS gateway in this study used to assist the campus in a computerized data information about the alumni. The entire questionnaire can be entered using a web media that directly connected to the Internet, whereas if the desire to use other media as the update information, alumni can use his mobile phone with interactive SMS facility.

The great purpose of presenting the two mediums can make it even easier for alumni to do the update on the status of their work. Update through the Internet media and via SMS from their mobile devices.

Assisted by a web server using PHP programming and software applications that connect to the modem for SMS Gateway using Gammu, this information system was built. To obtain a form of display interface on the media web and interactive question right on this system using the method of Blackbox testing and Alpha testing.

II. THE THEORY

2.1 WebMedia

Web media is a kind of facility provided by a network connection to the Internet using http (hypertext transfer control protocol). The Internet connection is established with the local network interlinked with other local network use media Internet Protocol (IP) which are public access. Internet services provided by the ISP (Internet Service Provider) that has a complete connection media to connect between the local network and public network. Media access to the web service using a browser that serves to translate the HTML document sent by a Web Server on the destination computer users accessed the web service.

2.2 SMS Gateway

SMS stands for Short Messaging Service, is a platform that provides a mechanism for end user form of sending and receiving SMS that runs on mobile devices. Mobile phone users, right now are becoming increasingly large numbers and still counting. With this basic study tracer application was built with support SMS gateway based application.

One SMS message can contain at most 140 bytes (1120 bits), therefore a single SMS message can contain up to 160 characters if using a 7-bit character encoding as the character of english. It is also likely to only one SMS message contains only 70 characters, if using 16-bit Unicode UCS2, just as Chinese characters that require 16-bit character encoding.

SMS Gateway is actually based application is an application that is able to manage the SMS messages sent to and accommodated to particular interests, or to be given further reply, the message sent in connection with, for example, the case is the handling of SMS Gateway for providing information on a company or product.

2.3 Apache Web Server

Web server is a major prerequisite in the development of web-based system. Web server application software is selected to build the information system tracer study is Apache. Apache web server is an open source project that is widely used in the world. Nearly 80% of Internet web servers that use the Linux operating system, using Apache as its Web Server. Ease of installation, excellent ability to use high-demand load on web access, and complete documentation for installation and configuration, making many web administrators chose Apache as a reliable web server. And in this study were also selected as the Apache web server that implements the data collection process tracer study and the web server running PHP programming language.

2.4 PHP

At first, PHP is a web-based programming language, but eventually started to spread to PHP programming console-based and visual-based. PHP is used in this study is a web-based programming that runs on Apache web server.

Selection of the PHP programming language to study, because of its ability to be good enough to handle the tracer study of information systems, in addition to the complete documentation, to maximize the application made in this study. In addition it is also part of the PHP open source project, which is not required a special license for the use and operational research for an educational institution.

2.5 Gammu

Gammu is a software utility that is used for controlling the GSM-based mobile phone or CDMA, which is a form of networking. The software is also part of the open source project (Project Open Source). Control of mobile devices in question here is a review of controls in the form of phone contact list, access the list of calls made, SMS and MMS delivery process, display information about the mobile phone and network, to access the system from the mobile phone such as access to the memory and storage media.

Gammu software package are available for Windows and Linux operating systems. The code is open, providing easy access and in-depth on this application. But even so, not all mobile devices can be controlled by Gammu, a complete list of devices that can be accessed by Gammu <http://wammu.eu/gammu> can be accessed on the site.

Selecting gammu in this application because in addition to having sufficient ability to run processes that are expected in this application, gammu also have access to a lot of support on a variety of mobile phone devices.

2.6 MySQL

MySQL is a database management software is Open Source. Owned by Oracle Corp., MySQL development currently is increasingly becoming the users continue to grow as its use becomes a database solution that is expected by many developers.

Database is a collection of data organized neatly stored in the form of presentation in the tables consist of field to show the form of data that can be stored in it. Database management software is a major requirement that must be used in applications that require data storage. The more complex the data to be stored and managed, it also requires the developer to use a database application software that has a range of facilities owned.

MySQL was chosen in this study as the software because the database manager has the ability to manage data with a very large number. Data type to store the data held is also quite numerous and varied, but it also has a multilevel security system is needed to secure the data because access to the web-based tracer study can be accessed by the public through the medium of the Internet.

2.7 BlackBox Testing

Testing of these applications are made using Alpha Testing and Blackbox Testing. Testing with blackbox testing focuses on functionality built software. Tester can also define the conditions and the output interface of the software is not quite right. The tendency is to use Blackbox testing are :

- observe the functions that are wrong or is not on the application;
- error on the interface;
- errors in data structures and database access;
- errors in performance;
- errors that occur during application initialization and termination.

2.8 Alpha Testing

Testing an application made in this study also use alpha testing. Alpha testing of the method is used as a pre-launch testing of the system to be running on real.

Testers in the process of alpha testing is selected with consideration of their potentiality. Not all users can be a tester on this application. Researchers responsible for the process of selecting the Tracer Study on the campus of the test applications, some of the lecturers who are competent in the application development and some of the alumni to use software that was built.

III. INFORMATION SYSTEM DESIGN

Construction of integration system is initiated from web-based development system first, by starting on the design and relational database that occurs, followed by engineering the appropriate interface for the user to interact in this application. Later in the process is going to happen next in the web-based systems, ranging from data storage, correction of data and update the latest data.

3.1 Database and Table Design

The database that required for integration systems can not be separated from the primary database system is a must-have collection of academic campus before, meaning that the system Tracer Study is not a system that works alone, but at least there should be an academic management system, which previously had been running on campus. There is a minimum of three (3) of the following table is a primary data source system support Tracer Study, likened to the three following tables stored in the database "akademik".

1) Mahasiswa Table: Contains detailed data about students, but is required by this system is the NIM stands for Nomor Induk Mahasiswa or Student Identification Number, Name, Place and Date of Birth, as well as the status of the student in question, status as an active student, non-active, terminal, or pass;

2) TugasAkhir Table: This table is used as a table containing information final project being undertaken by the student. If the student has not made decision in the end of task, then the student will not have the data in this table, whereas if the student has completed and passed the final project, will be presented information about the date of graduation after being passed by a lecturer at the Seminar End Testers.

3) Wisudawan Table: Graduation implementation contains data that once took place on campus. Information about the schedule of graduation and the place in detail, as well as data collection all participants are graduates who participated in these activities, as well as data collection khadirannya. This table is important to provide further information, detailed data relating to Alumni.

The count of three of table is the core table for the implementation of data collection Tracer Study. If all three tables that are the primary does not exist, then the process can not be implemented Tracer Study. It is therefore expected that the academic data collection system has been running previously on campus, so all three tables are properly recorded.

The next database given the name "TracerStd" which is a database as the executor of the data collection process Tracer Study. Properties in the following database tables are auto create, meaning that if the table is not found, the process will automatically create the necessary tables.

If the data is not found in the table, also held the same process, namely auto insert, which means it will be implemented insertion / storage data automatically into the table. Some tables are as follows.

1) Alumni Table: Contains the data of alumni. These tables store the return address information, city and telephone number of alumni, as a form of data collection, if there are changes to the information about them will be compared with the data of alumni while still a student.

2) Pekerjaan Table: Storing data that is currently occupied by the employment. This table has no primary index, as the can store information that practiced the work of more than one data, because the possible change of work compared with previous data (if indeed has worked before).

3) Kuisisioner Table: Contains a detailed list of questions given to related to education ever took, and the work that is currently practiced. This table also contains entries for campus-related education and had taken a job being occupied at this time.

4) Kuisisioner-Jawaban Table: Contains a detailed list of answers entered by the during the process include suggestions made on the data collection process through the web is running and using interactive sms with SMS on mobile media.

5) Pekerjaan Table: contains information about the work that is currently occupied by the . This table has no primary key, or the Primary Key, likely to move because of work, so the data is not discarded old job or be replaced, but continue to be added to the latest data on new jobs.

In this study used Gammu as a software application (software) that handles SMS Gateway. Gammu own operating with one (1) special database that have addressed the management of incoming and outgoing SMS from the modem. The database is a database "smsd" which by default in the operation of Gammu has nine (9) tables, the tables daemons, gammu, inbox, outbox, outbox_multipart, CPB, pbk_groups, phones and sentitems.

Structure of these tables have also been set by default during installation of the Gammu own. Gammu is used in this study is version 1.31.0.

3.2 System Flowchart

Flowchart system is needed on information systems Tracer Study is divided into two (two) parts, the design flowchart in web-based system-based and sms gateway.

3.2.1 Flowchart of Web Based System

On the web-based system, this system works by starting early, and presenting the appearance of your are asked to enter a NIM (Student Identification Number) and Password. After checking the information, the following personal information will be displayed and are asked to update the information domicile.

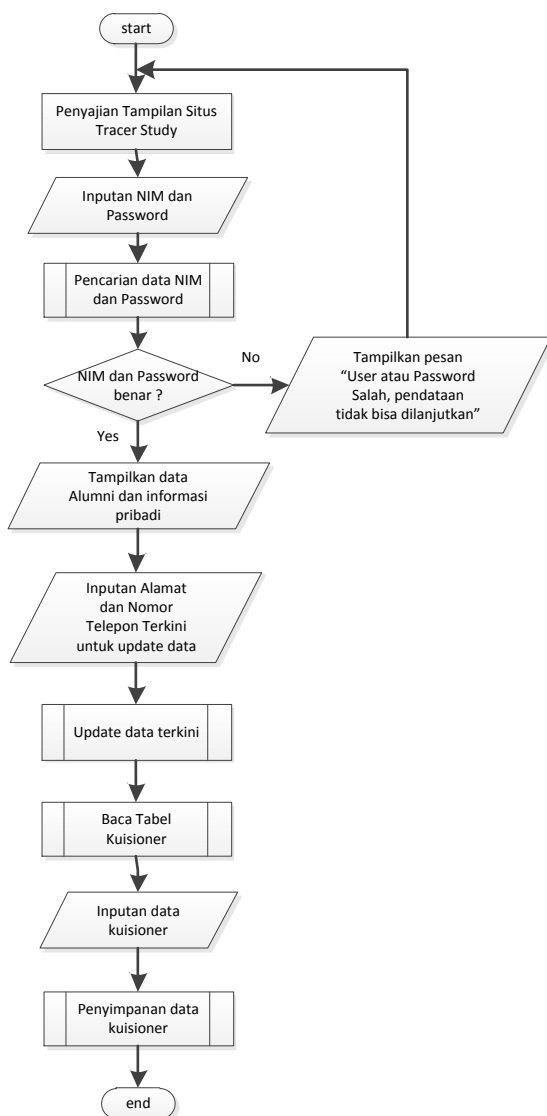


Fig 1. Flowchart of Web Based System

Alumni will enter information in accordance with the current state of residence is where it belongs, with the aim of the college also intends to update its alumni presence information.

Then the system will read the following questionnaire, which aims to obtain information essential inputs in the form of job-related Alumni acquired, so the college can make corrections and improvements of facilities and quality, to get their graduates who have qualified in accordance with the needs of the workforce.

In the final stage, the questionnaire will be stored in the table as the documentation of existing data. The entire process in detail can be observed in Figure 1.

3.2.2 Flowchart of SMS Gateway Based System

Gateway for SMS-based system also had no differences with web-based system. Have the same process, only the presentation of the display does not appear to conditions such beautiful visuals in web-based system, because the system is

based SMS Gateway is a text-based systems. Presentation of the flow system contained in Figure 2.

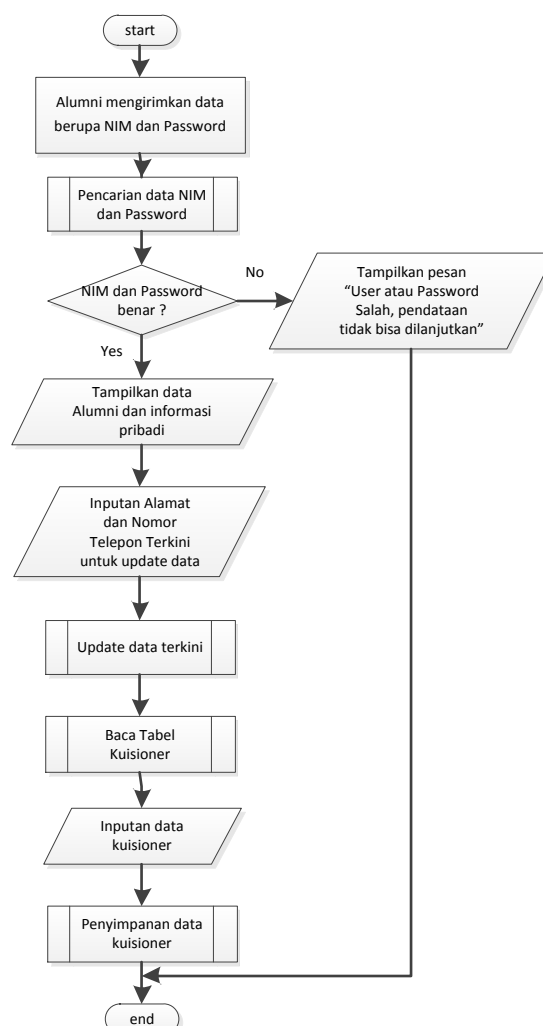


Figure 2. Flowchart of SMS Gateway Based System

3.3 Interface Design

Interface design is presented by programmers as an interface for building application, which is a view of the application, as a channel of communication between applications and the user.

Tracer Study of Information Systems and Web-based SMS Gateway has two (2) the different handling. Although located on two different sides, for the problems of interface design (interface design) are only made on a web-based media, due to SMS Gateway-based systems do not have a specific interface design related to the user, but the SMS Gateway system, the application of this tracer study only will present interactive questions to facilitate communication between applications and users, unlike web-based system that presents a specific view to attract the attention of users in using the application.

Web-based interface design is first prepared the design for data entry alumni, as in figure 1. The design adopts the template on the site's main campus, on site

<http://www.ppkia.ac.id> for tracer study of information systems are located on the "Alumni".

Figure 3. Web Based Interface Design of Tracer Study

In Figure 3, which is the interface design of Information Systems Tracer Study on the initial state, only the information about to whom the information system is intended and early input on the application of NIM or Student Identification Number and Password are never made by the student as manual data collection.

At the beginning of this process will be done the checks on the data entered NIM, matched the data with the student, pass on Final table participants and the data in Table Graduation. If the data does not render correctly on all three tables, then the process can not continue in subsequent data collection.

If the data entered is correct, then the process will continue in the collection of information about living alumni. This information is required if the possibility of the alumni to move the location of residence (domicile). The information from the residence address, city and phone number may also have a replacement. This information is important, if the campus will want to contact the Alumni. Advanced interface design of these processes can be observed in Figure 4.

Figure 4. The Continuing of Interface Design, used for domicile and worked location

Based on advanced interface design in Figure 4, when the data collection process is completed residency, followed by data collection work or air-entrepreneurs. The next process will lead to filling out the questionnaire, after the user performs an emphasis on the "Lanjutan >>> Entri Kuisisioner" to the interface as shown in Figure 5.

Figure 5. Interface Design of Questionnaire Entry on Top Page

In addition to charging personal data, are likely to make a change, the next Alumni are also asked to do some charging that the information is important for the future development of the campus. The questionnaire was also presented that appear in Figure 5. Deliberately separated display image due to the questionnaire are displayed lengthwise in 1 page display.

The list of questions (questionnaire) that appears taken from the table, which is then presented on the web page. This condition is made to question the more dynamic and up-to-date.

With this questionnaire is presented, the college will merndapatkan input from alumni about what action should be taken with a likely corresponding to the work that other alumni will be obtained. Alumni input conditions that make the campus will be continue to improve, to always present a curriculum that link-and-match, in terms of curriculum that is always in tune with the needs of the workforce.

Figure 6. Interface Design of Questionnaire Entry on Bottom Page

On the SMS Gateway to the Tracer Study was also presented questions (questionnaire) is equal to its web version. However, because the appearance is an interactive text, it does not look like there is on the web, just the questions that continue to sequential such as entering data into the alumni web. Initial interface design is presented in Figure 7.



Gambar 7. Desain Interface SMS Gateway Registrasi

The time of registration, the same as the web-based registration, alumni and password required to enter its NIM to do filling in Tracer Study. With this condition can prevent others to enter into the system by claiming to be authorized alumni., But if the alumni will forget a password ever made, may submit an SMS back to the system for its memberitahukan password. Password will be sent to the phone number corresponding to the time of registration alumni beginning to collect data about themselves on the alumni form, while the graduation.

If the NIM and has corresponding password, the next tracer study of this system will reply with full name information to the alumni alumni and asked to enter the current address of the campus used to perform the database update process. Interactive response system can be observed in Figure 6.

Alumni do not need to enter specific parameters to answer questions from the interactive processes that occur. alumni include only the answers of the questions. This condition is made to simplify the existing process and does not highlight the complexity of the system are made, but the convenience and ease of access, because the important information of alumni of the campus is very much needed for future developments.



Figure 8. Interactive System on SMS Gateway Tracer Study

So forth a dynamic system will ask for information interactively to the alumni. Interactive system is running on the SMS Gateway with flexible, and without limit of time, meaning that the question presented by the system can be returned at any time, without being fixated on one particular

time, and automatically the system will provide follow-up questions, without having to repeat the initial question.

IV. SYSTEM TESTING

System integration of tracer study made in this study have undergone repairs and revamping stages repeatedly after going through the process of testing the system. Tests were performed using two (2) methods, namely Alpha Testing and Blackbox Testing, to show that before the system is used, it has been through a series of tests on the sustainability of existing systems.

There are twenty (20) respondents or tester who performed the test on the data collection system, all of which originate from the lecturer and alumni to provide input on tracer study data collection system that is built.

4.1 Using Blackbox Testing Method

Testing with this method aims to focus on software functionality that is built. The tendency of use Blackbox testing is to observe the functions that are not true or is not on the application, the error on the interface, errors in data structures and database access, error in performance, and the likely errors that appeared likely at the time of application initialization and termination.

4.2 Using Alpha Testing Method

Any software that is made before the launch to be used in full must be issued and proceed with the Alpha version of the Beta version, as a form of search that system reliability will be enforced. Potential tester also selected, to determine that this information system software has a good ability in completing the data collection tracer study. Some lecturers and alumni are invited to participate elected to test the continuity of the application before the full version or commonly known as Release Version used.

V. CONCLUSION

Tracer Study of the recent information obtained by the college to improve its quality must be obtained in a precise and easy. Information Systems Integration and Web-based SMS Gateway was chosen in order to provide ease of update information from the alumni to the campus about the latest conditions using web media and using media directly sent from SMS from mobile phone.

Web media likely to be selected by the alumni who does have a tendency to update the information about the work that he could procure, and provide input to the campus by using web media, which can be accessed using a browser that is run through a computer or using a mobile device with Internet access.

SMS Media is also presented in this study tracer information systems because the number of mobile phone users are accustomed to using SMS (Short Messaging Service).

The ease and convenience, became a prime target tracer study of information systems are built. With this condition eventually alumni feel not too heavy and difficult to update

information about his work and that it provides input for the development of the almmater.

REFERENCE

- [1] Veena K.Katankar ; Dr.V.M.Thakare, "Short Message Service using SMS Gateway", *International Journal on Computer Science and Engineering*, 2010, Vol. 2, p.1487
- [2] Ratna Adil, "Information System Via SMS Gateway Between Police and Driver Party", *Telkomnika*, 2009, Vol.07, p.119
- [3] Maher Abdel-qade, "Using Short Message Service (SMS) to Support Business Continuit", 2011, Vol. 1, p. 34
- [4] Wang Tao, "The Design of the Mobile SMS Data Analysis Interaction Platform", *Physics Procedia*, 2012, Vol.25, p.848
- [5] A. Tanadumrongpattana, A. Suethakorn, S. Mitatha, C. Vongchumyen, "SMS Information Display Board", *Procedia Engineering*, 2011, Vol. 8, p.186
- [6] Dong-Hoon Shin, Kyong-Ho Lee, Tatsuya Suda, "Automated generation of composite web services based on functional semantics", *Web Semantics: Science, Services and Agents on the World Wide Web*, 2009, Vol. 7, p.332