The SMS Gateway-Based Information System Design of Students Value at SMK Negeri 2 Palopo

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Abstract

These days, all aspects of life have been growing rapidly. Due to the fact that these improvements have turned the development of society from a traditional into a modern society, which is automatically require the society to keep moving towards globalization. Currently this SMS gateway-based informations sharing could greatly controls the informations remotely, especially for parents who are curious about the results achieved by their children. This SMS Gateway-based information system design of students value is expected to maximize the delivery of informations. Parents could easily monitor the activity of their children without having to come to the school. The methods that the researcher used to obtain informations consist of technique of data collection and technique of data analysis. This research was implemented to the vocational high school (SMK) 2 Palopo which is one of the school that intensely apply technology in the provision of information to the public outside. The result of this research is a SMS gateway-based application that can be used by parents/gurdians, students, or people involved in monitoring students' academics information. This application could conveniently help students, teacher, or parents to earn informations needed since the informations will be shared by the server of SMS gateway by sending SMS to the phone who need informations. All this flexibilities surely make the provision of informations easier.

Keywords: *SMS Gateway, academic information, SMK Negeri 2 palopo, value.*

Background

These days, all aspects of life have been growing rapidly. The most rapid development is the informations technology development which is the combination of computer technology and telecommunication. The simplest example is in the traditional society that requires a long time on the long distance information attainment since the people at the time still use messaging as simple as letters. Letters then evolved into fax and then the telephone and now on more modern rate, mobile phones have appeared in a variety of types and advanced features such as SMS (Short Massage Service).

SMS Gateway is an appropriate technology that can easily be applied in society's daily life. For example, by using SMS Gateway can be used:

1. For information dissemination activities or coordination between administrators in an organization.
2. To shared informations such as school activities, school achievements, exam schedule and so on. Thus parents and students can anticipate all of school activities earlier.
3. To conduct a polling on an agenda that mostly talked these days in society.

SMK Negeri 2 Palopo is a vocational high school who has manually academic information system, that is the students' parents or guardians should directly come to school in order to get informations about students' value. This surely often can be an obstacle for the parents who are busy working to monitor their childrens' improvement and achievements in daily school life. Looking at the weaknesses of academic informations delivery method that is currently running now, it is considered to use

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another advance method. Hopefully, by applying this SMS Gateway-based academic information could maximize the process of information provision and parents does not need to come to the school in order to monitor their childrens' activities.

Method

The methods used consist of technique of data collection and technique of data analysis where by using these techniques, the researcher could obtain some informations about how far the process of informations delivered to the students' parents and what obstacles faced by the school, parents, and students. In data collection, the informations could be earned by conducting interview and document, subsequently from these data the researcher managed and analyzed the existing problems, and then manufacturing and implementing the SMS that were designed according to the needs.

Results and Discussion

The result of this research is a SMS Gateway-based application that can be used by parents/guardians, students or people involved in monitoring students' academic informations. In this research, the researcher discuss about some materials related to the design that are made.

a) Planning

The definition of Planning according to Al-Bahra Bin Ladjamudin in research (Jusmiati : 2013) said, " Planning is an activity that has the objective to design a new system that can solve the problems faced by the company which is obtained from the best alternative electoral system." (2005 : 39)

The definition of planning according to Krismiaji in his book with the tittle *Sistem Informasi Akuntansi* said, "Planning consist of logical design which is used to complete the eksternal level schema and translate the data requirements of the user and application program into the conceptual level schema while the physical design is changing the design concept into the physical storage structure." (2002:144).

Based on the definitions above, it can be concluded that the planning is a pattern/goal to solve the problems faced by the company or organization.

b) Information System

  a. System

The system is derived from the Latin (Systema) and Greek (sustēma) is a unit consist of components or elements which are linked together to facilitate the flow of informations, materials or energy.

"A system is a network of procedures that are interconnected, gathered together to perform an activity or to accomplish a certain goal," (Jogiyanto H.M, 2001: 1). The system consist of several components that interact to each other and work together to form a union.

The components of the system are:

1. The system limits is an area that restrict a system to another or to the outside environment.
2. The System Connector is the media connecting a system to the other system that in the system overview is shown by arrows.
3. Input System is the energy put into the system, it can be a program, the data from a keyboard or signal input.
4. Output System is a result of the energy processed and classified into an output in the form of information or data and residu such as heat.

5. Processing System is a part of a system which processes inputs into outputs.
6. Target system is the goal or a objective of the system.

The quality of the system depends on three things, namely:
a. Accurate is that the information should be free from mistakes and not misleading.
b. On time is that the informations coming to the recipient must not be late.
c. Relevant is that the informations has benefits for its' used.

Based on the components:
1) Physical systems, with material and energy components.
2) Non-physical systems or concepts, containing ideas.

b. Information

Information is the most important factor in a system for making a decision. The definition of information is, "the data that is processed into a useful form and more meaningful for those who receive it." (Jogiyanto H.M, 2005: 8). The data itself is a fact or anything that can be used as an input to produce information. Information is the result of processing a model, the formation, organization, or a change in the form of data that has a certain value, and can be used to increase the knowledge of those who receive it.

c. Basic Concepts Website

The website is a collection of interconnected web pages and files that are interrelated. Web consists of a page or pages, and set a page called the home page. The website is a service originally presents information that uses the concept of hyperlink, which allows internet surfer or user performs a search of information on the internet.

1. Internet

The definition of Internet has a wide meaning where the word Internet itself is an acronym for the word of the interconnection-networking, if spelled out in the global system, the internet is a network of computers all over the world who are connected to each other by using the standard Internet Protocol Suite (TCP / IP) so that the computer can access and share informations to each other. Internet covers everything not only computerization but telecommunication as well. While internet scientifically is a huge library where there are millions (even billions) of information or data in it such as texts, graphics, audio and animation, and others in the form of electronic media.

2. The World Wide Web (WWW)

World Wide is a collection of informations in multiple servers computer connected to each other in the Internet network. These informations have links that connect the information to the others in the Internet network. One cause of the World Wide Web's rapid growth is the ease in its utilization. On the web, we can simply click the mouse button on a link to get the information, and the link will automatically take us to the desired information. Working on the web includes two major ways; software web browser and a web server.

3. Web Server

Web server is a software that is placed on any kind of computer in accordance with the minimum technical specifications recommended by the software that is capable of receiving a request HTTP / HTTPS from clien via the media browser (IE,

Firefox, Chrome, etc.) and send it back in the form of web pages, which in generally standard is the Hypertext Markup Language (HTML). Some softwares application for Web Server builder that can be used include Apache, Xitami, PWS, IIS, and so on.

Web server is a computer that is used to store web documents, the computer will serve the needs of web documents from client. Web browsers such as Explorer or Navigator communicates over a network (including the Internet) with the webserver, using HTTP. Browser will send to the server a request about particular documents or other services provided by the server.

4. HTML (Hyper Text Markup Language)

Hyper Text Markup Language (HTML) is the language used to create web pages (Yudhi Purwanto, 2001: 4). HTML document is called a markup language because it contains certain signs that are used to define the appearance of a text and the importance level of the text in a document. By using system hyper text on HTML documents, we do not have to read a document sequencely from the first until the end. We can go to a certain topic directly from the document by using text link. Generally, there are types of HTML editor; the text editor and WYSIWYG Editor.

a. Text Editor

Text Editor usually used by those who are already proficient in using HTML language since by using this type of editor we can directly write HTML codes one by one according to technical procedures applicable. We can use Notepad for this type of editor.

b. WYSIWYG Editor

This type of editor is the solution for those who are not adept at using HTML language. In this type of application, we can create a web page easier because what being displayed on the screen will be the same as the results you get. For this type of editor, we can use Microsoft Front Page or Macromedia Dreamweaver.

c. HTML document structure

The Elements of HTML can be defined as a specific codes that will provide a place to put some codes in it which is different from the TEG which handles only one code.

1) The <HEAD> .... </ HEAD> element

Being a part of the head, it is right to write a description about the web page title, the author's name and the script or small program.

2) The <BODY> .... </ BODY> element

A body part or contents, it is a place to write down the information that will be displayed on the browser. Tag is only a part of the elements, the tag is codes that are used to set the HTML document. Each program starts with a < initial tag> and end with </end tag >.

d. Short Message Service (SMS)

Short Message Service (SMS) is a text communication via a mobile phone. SMS is one of the most widely used media today. It is not only cheap, the process also runs quickly and directly to the destination, however all these times SMS is only used simply to send and receive messages among mobile phone owners (Khang, 2002). The ease of use, variety of services, and the aggressively promotion of mobile operators are enough to make SMS as a service that is very popular in the community, especially among the students (Smith, 2005). Along with the development of technology and creativity of operators and service providers, the SMS services that were initially just to send each

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other messages between subscribers, is now growing and more varied, such as the service polls, ringtones, premium SMS, mobile banking, ticketing and educational services.

SMS became an integral part of the development of information and communication. One concrete example is a Facebook user can change and read the status via SMS (Dewanto, 2007). SMS is a facility to send and receive a short text message via cell phone. One of the advantages of SMS is cost. Besides that, SMS is a store and forward method so when a mobile phone's recipient can not be reached, inactive or outside the service area, the recipient can still receive SMS when the mobile phone is already active again.

e. SMS Gateway

One of reliable model of communication at this time is a short message. The implication is one of data communication models that can be used is SMS (Fikri, 2007). SMS Gateway is a connecting device between the SMS sender and the database. This device comprises a set of PC, phone and application programs. These programs who will continue each request from every incoming SMS by performing queries to the database, then give responses of the query results to the sender (Zahra, 2011). It means that the SMS should be able to conduct transactions with the database. That is why it is necessary to build a system called SMS Gateway. In principle, SMS Gateway is a software that use the computers' help and utilize mobile technology which is integrated to distribute messages generated through the information system via SMS handled by the mobile network (Triyono, 2010).

1. How SMS Gateway Works

The mechanism of SMS sending process is divided into 3 parts, such as:

a) SMS Intra-operator: SMS delivery in a single operator.

SMS sent by the sender will first go into SMS Coperator of senders' number, then the SMSC will directly send it to the destination number. The recipient will then send the delivery report stating that the SMS has been received to the SMSC. SMSC then continue the report to the SMS senders' number, along with the delivery status of the SMS process (Yunianto, 2006).

b) SMS Inter-operator: SMS delivery between different operators.

The difference is in this mechanisms, there are two SMSC, namely the SMSCs' sender and the SMSCs' receiver. SMS sent will go to the SMSCs' sender and forwarded to the SMSCs' receiver, and then the SMS is sent to the phone destination. Likewise the delivery report will initially receive by SMSCs' receiver and then forwarded to the SMSCs' SMS senders. The communication between SMSC will work if there has been a cooperation agreement between the operators, if there is no agreement will lead to an SMS sent to the destination number with a different operators will not arrive at the intended destination number (Yunianto, 2006).

c) International SMS: SMS sender of an operator from one country to another.

International SMS substantially similar to the mechanism of inter-operator, which differed only in the receivers' SMSC who is oversees SMSC operators and the need in country code addition on the number of the SMS recipient.

f. Modem

Modem stands for "Modulator Demodulator". Initially modulator and demodulator has a different meaning. Modulator can be interpreted as a part of the utility to turn the information signal a carrier signal (Carrier) that can be sent. While Demodulator can be interpreted as a part to separate the information signal from the carrier signal received so

the informations obtained can be received well.

From the description above, the modem can be interpreted as the hardware that serves as a two-ways communication. Although basically all communication devices remotely is a two-way communication tool and always use a section called "modem", such as VSAT, Microwave Radio, and others.

a. The Function of Modem

Modem's function is to convert digital signals into sound signals and vice versa. Today modem has developed with various facilities that are quite useful, for example, voice modem. With this voice modem facility, it changes the modem's function not only as a connector to the Internet but more than that, the modem can be a radio channel, audio, phone conversations until the video streaming.

b. The Delivery Flows of Informations via Modem

Data coming from a computer in digital signal is directed to the modem, then the modem converts the signal into an analog signal to be sent. After the digital signal has been turned into an analog signal and then transmitted via telecommunication media such as telephone and radio. On arrival at the destination modem, the analog signals are converted back into the digital signals and transmitted to the receiving computer.

g. Gammu

Gammu serves to connect the computer to the phone. Gammu can be connected to a wide variety of mobile phones such as Nokia, Siemens, etc. Gammu use the C language, which gammu is open source so that the source code can be analyzed how Gammu parse the SMS or give orders to the mobile phones. The commands that is used in gammu such as:

1. Identify

This command is served for the identification of HP which is connected to the PC. Also determines whether the HP connection to the PC is connected properly. The command that usually used is gammu-identify that is written in the command prompt (DOS). If the HP connection and the PC is connected correctly it will display the manufacturer (Type HP), the HP model information (HP version), firmware (the operating system), HP serial numbers comply with the manufacturing (IMEI), International Mobile Subscriber Identify (IMSI).

2. Send SMS

If the identify process is already connected properly, next is the process of sending SMS which is done by gammu is typing the command at a command prompt (DOS) gammu-Send SMS TEXT Destination Number so the SMS can be sent to the destination number.

3. Del SMS

This command is used to delete all SMS in HP inbox. The command used are command gammu-delete all sms and with it then the inbox in HP will be deleted.

4. Getallsms

This command is used to determine the entire contents of SMS in the HP command by using gammu getallsms. Some of the above command is commonly used commands and there are still many commands provided by gammu. Refering to the manual gammu to find out more details about the commands provided by Gammu.

h. Structure Query Language (SQL)

SQL is a language manipulation used to access the data in the database. SQL does not based on a particular programming language, but it can be used in any programming language as a way to update and do a query in the database. Any SQL

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statement can perform an operation on one or more database objects (tables, columns, indexes, and so on). SQL statement consists of two categories, namely the Data Definition Language (DDL) and Data Manipulation Language (DML). DDL is a group of statements that can be used to create database structures such as tables, fields, indexs, and so forth. While DML includes all commands that allow query and modify data in the database, add new records, or delete existing records.

Database Management System (DBMS) is a collection of programs that allow users to create and maintain a database. DBMS already become standard equipment to protect computer users from small parts in the management of secondary storage (hard drive). DBMS is designed to increase the productivity of application programmers and provide easy accessibility to the data by computer. Accessing data within the DBMS can be done in various ways and of course in accessing data there are things that need to be considered such as the efficiency of the implementation of the data itself as well as the processing time.

i. PHP (Hypertext Prepocessor)

PHP stands for "Hypertext Prepocessor". PHP is used as a scripting language that runs on a webserver. The PHP script is inserted into HTML documents for web server processing when there is a request from the user. PHP is also designed to work with most SQL server including open source SQL server, such as MySQL. PHP originally is called PHP / FI, which stands for Personal Home Page / Forms Interface and created by Rasmus Lerdoff in 1994. Originally PHP was created to store the data of people who have visit a website, as well as to find out how many people have visited the website.

However, since this software is distributed as open-source software so that the growth is getting a lot of contribution or input from the user. Basically PHP can do all that can be done by CGI (Common Gateway Interface), such as storing data that is entered through a form on the website, featuring a dynamic website content, and to receive cookies. In addition, the most prominent ability of PHP is give support to many database. The list of databases that can be accessed through PHP scripts, such as: dBase, DBM, FilePro, mSQL, MySQL, ODBC, Oracle, Postgres, Sybase, Velocis (Council, 2005: 72).

j. Server Side and Client Side

The technology used in web programming is divided into two: the server side and client side. On the server side, the programs' commands run on the server and sent to the browser is in the form of HTML. While in the client side, the process will be done in the web browser. The client side is usually used for things that require user interaction, but the data displayed will fixed and similar. Web applications run on the HTTP protocol, and all of internet protocol always involving server and client.

k. XAMPP

XAMPP is a free software that supports many operating systems and it is a compilation of some programs. Its function is as a stand-alone server (localhost), which consists of the Apache HTTP Server, MySQL database, and the language translator which is written in PHP and Perl. XAMPP is stands for X (four operating system), Apache, MySQL, PHP and Perl. This program is available under the GNU (General Public License) and free, an easy-to-use web server that can serve dynamic web page display.

l. Unified Modeling Language (UML)

Unified Modeling Language (UML) is a standard specification language for

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documenting, specifying, and building software systems. UML is a set of structures and techniques for modeling object-oriented program design (OOP) and its application. UML is a methodology to develop the OOP system and a group of devices to support the development of such systems. Firstly, UML was introduced by the Object Management Group, an organization that has developed an OOP model, technology, and standards since the 1980s. UML is now already widely used by practitioners of OOP.

UML is the basis for the device (tool) object-oriented design of IBM. UML is a language used to specify, visualize, construct, and document an information system. UML was developed as a tool for analysis and object-oriented design by Grady Booch, Jim Rumbaugh, and Ivar Jacobson. However, UML can be used to understand and document any information system. The use of UML in the industry continuely increase. It is an open standard that makes it as a commonly modeling language in the industry of software and systems development.

Conclusion

Based on the descriptions that have been explained in previous chapters, it can be concluded as follows:

This application can provide convenience for students, teachers, or students' parents in obtaining the necessary information since by using this system application, the information will be replied through a SMS gateway server with SMS to any mobile phone that requires information. Surely, by using this application, the fleksibility of the one who need the informations will be so much easier.

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