



## Web Based Tuition Payment Information System SMS Gateway Based Response Automation (Study at Walisongo Vocational School, Semarang)

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**Abstract:** *At the Walisongo Vocational School Semarang Semarang SPP payment system that is carried out at this time is by manual method where payment of SPP is still conventional where administrative staff must look for student data and record transactions in the ledger containing student data, then fill in the student payment card column. and come as proof that students have paid. However, the payment system is less optimistic. Seeing these situations and conditions, the author makes a web-based response system for spp payment automation based on the SMS gateway at Walisongo Vocational School Semarang by using the Research And Development (R & D) method where this application can help administrative administrators in this institution to facilitate payment and can make notifications directly to parents of students automatically. This application the author uses the HTML and PHP programming language with the MySQL database, where later the data will be entered and stored in the database and the author also uses the SMS gateway hardware as a notification media to the parents of students so that the use can be more easier and optimal.*

**Keywords :** *School Payment System; SMS Gateway; Web; Research and Development; Response Automation .*

### 1 . Introduction ( Time New Roman, 10 Bold)

As time goes by and technological developments are increasingly rapid, computers are a form of technology that is developing very rapidly, even developing in a matter of days. Computers are an electronic medium that plays a very important role in current technological developments, and continues to dominate various work processes so that they can be made easier, more effective and efficient.

Even though the application of information technology continues to develop, in reality there are still institutions that have not been touched by information technology itself, as is the case at Walisongo Vocational School, Semarang. The student tuition payment process is still manual.

Walisongo Vocational School Semarang is one of the vocational high schools in Semarang. Walisongo Semarang Vocational School is located at Jalan Ki Mangunsarkoro No. 17 Semarang and has 2 departments, namely TKJ (Computer Network Engineering) and TSM (Motorcycle Engineering). Based on data that the author obtained from Walisongo

Vocational School student attendance in the 2017/2018 academic year, the number of students from class X to class XII in each department ranged from 377 students. Similar to other schools, Walisongo Vocational School also has a tuition payment mechanism that has been regulated and determined for each student and must be paid every month. The author has attached a list of students as follows:

Table 1. Number of Walisongo Vocational School Students in 2017/2018

No	Class	TKJ 1	TKJ 2	TSM 1	TSM 2	Total
1	X	34	33	37	36	140
2	XI	31	30	27	26	114
3	XII	30	30	32	31	123
Total						377 Students

Source: Walisongo Vocational School Student Attendance List 2017/2018

From the application of computers in this agency, seen from an optimization perspective, it can be said to be very lacking based on the author's observations while conducting observations at the school. Every time the school fees are paid or other student administrative payments, students must be willing to spend their break time queuing to pay tuition fees and other administrative fees because for every payment transaction they have to look for student data in the ledger containing student data, record the transaction in a column. -column in the book, then fill in the column on the student's school payment card and sign as proof of payment. From the payment system that the author explains, the average number of students queuing at due date is around 12 people. Another problem arises when tuition fees which are entrusted by parents to their sons/daughters are to be paid immediately to the school, but the students are not paid immediately and are even used for their own personal needs. There are also parents of students who ask the teacher at the time of accepting new students for information on tuition fee payments, whether the student's parents received notification.

From the description of the problem above, a system is needed that can make it easier to make SPP payments. And the idea that emerged was to use SMS gateway as notification of tuition payments, SMS gateway is an application system that makes it possible to send and receive SMS in large quantities (broadcast). The author uses SMS Gaterway as a notification tool for parents of students to pay tuition fees before the due date arrives and after the tuition fees have been paid by their children, an automatic response is applied when parents and students will receive notification via SMS message as of the 1st before the due date. The due date is the 10th, for payment of SPP which is the content of the notification. Parents can

make SPP payments via transfer to the school account number and confirm 1 x 24 hours with proof of transfer or unique number to the school and when the SPP has been paid by the student, parents as well. You will get a notification that the SPP has been paid.

## **2 . Theoretical Framework ( Time New Roman, 10 Bold)**

### *2.1 . Figures and Tables ( Time New Roman, 10 italics )*

According to Kadir, (2014), a system is a collection of interrelated or integrated elements that are intended to achieve a goal. According to Suharsaputra (2013), tuition payments are a school payment process carried out by students as an obligation to be able to participate in learning activities at school. According to PP no. 48 of 2008, education costs include: unit costs of education, costs of organizing and/or managing education, and students' personal costs. Student personal costs are personal costs which include educational costs that students must pay to be able to take part in the learning process. **(Kadir, 2014)**

According to Kadir, (2014), initially web applications were built using only a language called HTML (HyperText Markup Language). In subsequent developments, a number of scripts and objects were developed to expand HTML capabilities such as PHP and ASP in scripts and Applets in objects. Web applications can be divided into two types, namely static and dynamic web applications. Static web is created using HTML. The disadvantage of an application like this lies in the need to maintain the program continuously to keep up with every development that occurs. This drawback is overcome by the dynamic web application model. In dynamic web applications, changes to information in web pages are carried out without program changes but through data changes. As an implementation, web applications can be connected to a database so that changes to information can be made by the operator and are not the responsibility of the webmaster. **(Kadir, 2014)**

According to Juju, (2007), Macromedia Dreamweaver 8 is a professional HTML editor for designing, coding and developing websites, web pages and web applications. Working in a visual editing environment, Dreamweaver provides a very helpful tool for web creation. The visual editing features in Dreamweaver allow you to quickly create web pages without writing lines of code. Apart from that, Macromedia Dreamweaver 8 is also equipped with site management capabilities, which make it easier for us to manage all the elements on the site. We can also evaluate sites by checking broken links, browser compatibility, and estimated web page download times. **(Juju, 2007)**

According to Putra, (2017), "XAMPP ( Jagat Jembar (World Wide Web). PHPMyAdmin supports various MySQL operations, including (managing databases, tables, fields, relations, indexes, users, permissions, etc.). Basically, managing databases with MySQL this must be done by typing the appropriate command lines for each specific purpose. If one wants to create a database, type the appropriate command line to create the database. If someone deletes a table, type the appropriate command line to delete the table. This is of course very difficult because someone has to memorize and type the commands one by one **(Putra, 2017)**.

According to Putra, (2017) "MySQL is a database software that is among the most popular in the Linux environment. This popularity is supported by the query performance of its database which at that time could be said to be the fastest and rarely had problems" **(Putra, 2017)**.

According to Putratama, (2016), the PHP (Hyper Text Preprocessor) programming language is the most widely used programming language. PHP is a multiplatform language, which means it can run on various machines and operating systems (Linux, Unix, Macintosh, Windows) and can be run runtime via the console and can also run other system commands , for example MySQL queries **(Putratama, 2016)** .

According to Faisal, (2012), SMS gateway is an application system used to send and/or receive SMS, and is usually used in business applications, both for promotional broadcasts, information services to users, distribution of product/service content and so on ( **Faisal, 2012**).

### **3 . Method**

The research carried out aims to create an application for managing village budgets and income on a multi-user basis. Researchers carry out development using the R&D (Research and Development) method according to (Sugiyono, 2011) stating that development research procedures basically consist of 2 main objectives, namely:

- a) Developing products
- b) Testing the effectiveness of the product in achieving goals

The first objective is referred to as the development function while the second objective is referred to as validation. The concept of research is more accurately defined as a development effort which is simultaneously accompanied by validation efforts.

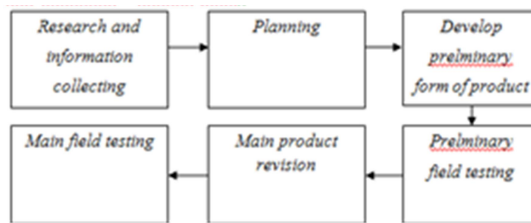


Figure 2. Researcher R&D Development Model

**A. Research and information collecting**

This step is related to the problem being studied and preparation for formulating a research framework. The activities carried out are:

- 1) Conduct interviews with Administration at Walisongo Vocational School Semarang
- 2) Conduct observations or research on the system used to develop the tuition payment system at Walisongo Vocational School, Semarang.
- 3) Conduct literature studies in sub-districts within the Walisongo Vocational School to obtain theories related to the tuition payment information system.
- 4) Create a framework that is developed based on R & D methods to solve problems.

**B. Planning**

Determine the system objectives to be achieved and plan product specifications to be developed and create a research activity schedule. Figure 3. is a framework of thought that will be the design in creating a Web-based Tuition Fee Information System program with SMS Gateway-based response automation.

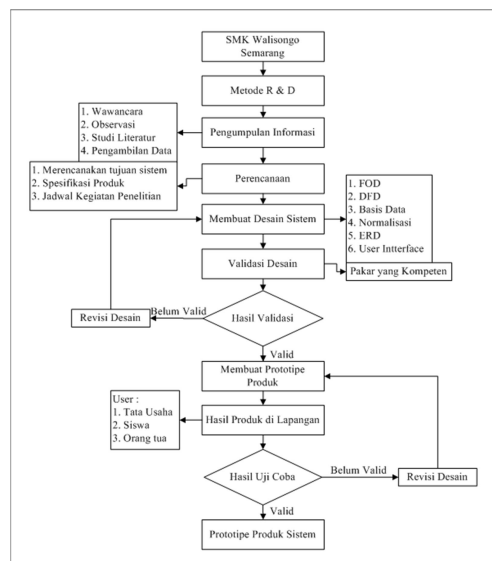


Figure 3. Framework of Thought

Figure 3. The framework explains the problems faced in preparing the Tuition Payment System at Walisongo Vocational School. In the research developed using an R&D approach which consists of 10 stages, the research used only includes 6 stages which consists of: Research and information collecting, Planning, Develop preliminary form of product, Preliminary field testing, Main product revision, Main field testing. At the design stage of the Web-Based Tuition Payment Information System in prototype form. This design includes FOD, UML, Database, Normalization, Class Diagram and User Interface design. This design will produce a prototype product which will be tested by internal and external experts who will assess whether the design is valid or not. If the design is valid, it will produce a prototype product that can be used, but if the product is not yet valid, improvements will be made according to expert instructions until the product is declared valid and can be used. Once declared valid by an expert, a prototype product will be produced that can be used. Users who will test this prototype product are Administrative Officers, School Principals and Students of Walisogno Semarang Vocational School. Users will provide an assessment of this product after testing the resulting program.

**C. Develop preliminary form of product**

Create architectural designs in the form of Flow Of Document (FOD), Unified Modeling Language (UML), Database, Normalization, Class Diagrams and User Interface.

**1) UML**

According to Sugiarti, (2013) UML (Unified Modeling Language) is a language that has become an industry standard for visualizing, designing and documenting software systems. UML offers a standard for designing a system model (Sugiarti, 2013)

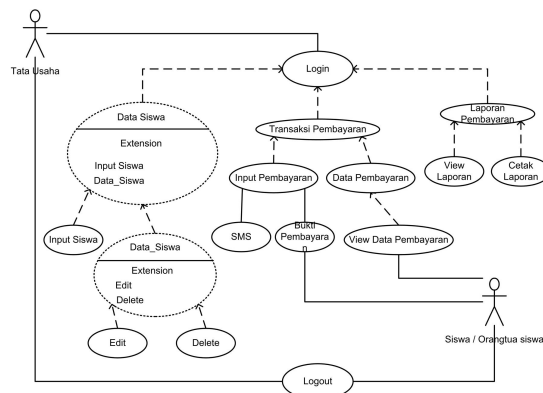


Figure 4. Use Case Diagram

In Figure 4, the use case diagram shows 2 actors who can access the system, namely administration and students. In the system there is student data with extend student input, edit, student data and delete student data, payment transactions extend payment input, SMS, proof of payment, payment data and view payment data, there is also a payment report with extend view report and print report.

2) Activity Diagrams

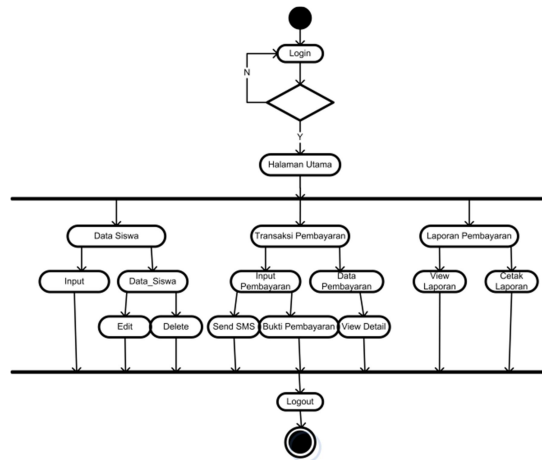


Figure 5. Activity Diagram

In the activity diagram above there is 1 initial node, 17 action states, namely login, main page, student data, input, student data, edit, delete, send SMS, proof of payment, payment data, payment data, detailed view, payment report, view report, print report and log out, 1 decision, and 1 final node.

3) Sequence Diagrams

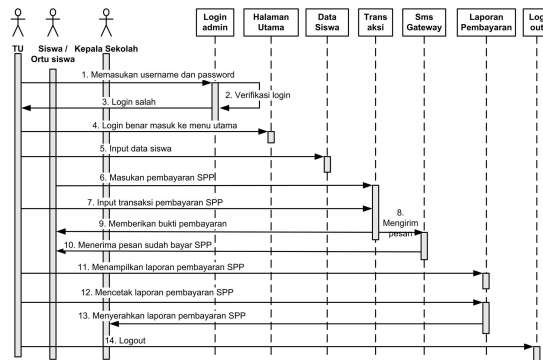


Figure 6. Sequence Diagram

In the sequence diagram above there are 3 actors, namely TU officers, students/parents and the school principal. And there is a life line interface that interacts with each other.

#### 4) Normalization

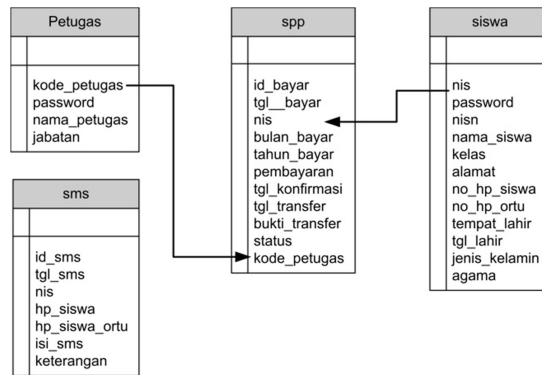


Figure 7. Normalization

#### 5) Class Diagrams

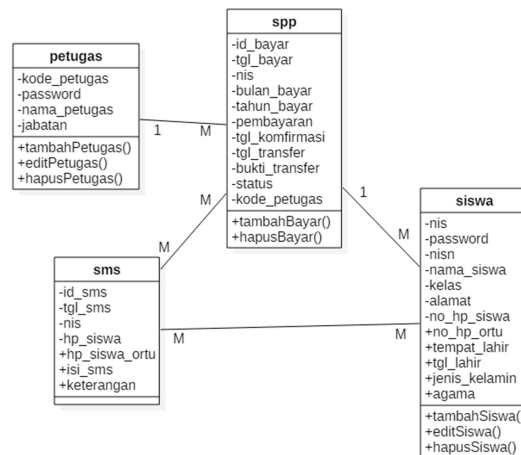


Figure 8. Class Diagram

In the class diagram above there are 4 tables, including the officer table, student table, SMS table and spp table. From the class diagram that was built, the activity continued with building a physical database as a data storage place using MySQL.



**D. Preliminary field testing**

Carrying out design validation activities from internal and external experts. Design validation by internal experts is carried out by experts in the field of accounting information systems, in this case the lecturers from STEKOM are doing it. Meanwhile, external expert validation is carried out by prospective users, namely Administration, Students and the Principal of Walisongo Vocational School, Semarang. Design validation is determining whether it meets the required needs.

**E. Main product revision**

Make improvements to the initial system if deficiencies are still found as stated by experts until it is declared valid and meets needs.

**F. Main field testing**

The valid design is then filled with the source code of the prototype program of the application being developed. The prototype will be tested in the field and the potential users will be the Walisongo Vocational School Administration. The final result must be declared good or expected to be used by potential users.

**4. Results and Discussion**

The system developed produced a prototype of a web-based tuition payment information system with SMS gateway-based response automation at Walisongo Vocational School, Semarang. The prototype that the researcher has created is then consulted with the supervisor (internal expert) before being field tested by prospective users. Assessment and correction based on the application that has been created, whether there are fields from the database that do not match. After correcting the program by the supervising lecturer (internal expert), a prototype of the tuition fee payment information system application can then be carried out by prospective users at the place where the researcher is conducting research. Table 2 is the indicator value that will be used for the Validation Test Assessment.

Table 2. Assessment Indicator Table

SCORE	MARK
$1 < n < 10$	Not good
$11 < n < 20$	Enough
$21 < n < 30$	Good
$31 < n < 40$	Very good

### **A. Internal Expert Validation Trial**

This expert validation test is carried out by people who are experts in computer programming and understand the system, including document flow, UML design , class diagrams , normalization, database tables and user interfaces. The results of this internal expert validation trial can be seen as follows:

Table 3. Table of Internal Expert Validation Test Results

Indicator NO	Indicator Value
1	2
2	2
3	3
4	3
5	3
6	3
7	3
8	3
9	2
10	2
TOTAL	26

From the expert testing results table, a total score of 26 points was obtained. This proves that the information system design being designed is declared good or valid.

### **B. Field Validation Trial (User or User)**

Field trials were carried out at Walisongo Vocational School, Semarang, carried out by TU admin and students. The web-based tuition payment information system product prototype with SMS Gateway-based response automation obtained an average total of 28 points from 2 prospective users. The research used an instrument in the form of a questionnaire containing 10 questions covering 3 aspects, namely operational aspects, aspects of meeting system requirements and appearance. interface.

Table 4. Field Validation Test Results (Users)

Indicator NO	User Admin	Student Users
1	3	2
2	3	2
3	3	2
4	3	3
5	3	3
6	3	3
7	3	3
8	2	2
9	2	3
10	4	3
FINAL	29	26

The average score obtained based on the total scores of the prospective users above is:  
Average score =  $29 + 26 : 2 = 28$  (Good)

From the data above, an average score of 28 is obtained . This is based on the scores given by Administration users and Students at the agency . The product produced based on the average score above is very good and indicates that the product was well received by Walisongo Vocational School, Semarang .

From the results of the achievements and analysis of the design developed, it can be concluded that the system built can assist administrative staff in preparing payments and notifications to students because the system can broadcast directly the reception of both students and parents, guardians of students at the institution because the system is integrated with SMS. Gateways . In the Tuition Payment application system there is a division of access rights or a security system so that the budget management information system is expected to be more secure.

#### **4 . Results and Discussion (Time New Roman, 10 Bold)**

The results and discussion are expressed concisely and clearly within the scientific framework obtained , not as a series of data tables or figures .

## **5 . Conclusion (Time New Roman, 10 Bold)**

After building the Tuition Based Tuition Payment Information System Application Web with SMS Gateway Based Response Automation at Walisongo Vocational School Semarang, which is carried out through validated system design stages by experts and field testing carried out by users, this system produce conclusions:

a. This alternative system can minimize queues when paying tuition fees because of the SPP payment feature via transfer.

b. With the alternative system, it is easy for students' parents to obtain it SPP payment information with notification every time students pay tuition fees directly or via transfer and Parents of students can also access the website to view history tuition payments.

c. The system can automatically send successful notification information make tuition payments directly to parents' current telephone number students pay tuition fees.

## **Thank-you note (Time New Roman, 10 Bold)**

Acknowledgments are a form of appreciation for contributions from individuals and institutions who cannot be included as authors. For example, funders of research related to this publication.

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