

# Payment Information System of Education Cost Based on CodeIgniter Framework

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**Abstract—** The Vocational Education (SMK) X Payment Education Information System (SIPBP) in Magelang district was built to help facilitate the process of paying tuition fees in SMK X. The problems that occur in SMK X are the management of students' education costs. The recording of student tuition payments is still processed manually and with Microsoft Office Excel applications that have not been able to support service flexibility and data security. Data in the form of Microsoft Office Excel files is stored on the school treasurer's computer without any routine data backup. Each transfer of the treasurer school year records the payment data and records the costs that must be billed in the next school year. Non-conformance of nominal fees for each class, school year and department makes the school treasurer prone making mistakes when recapping data on student tuition payments.

System development is done by several methods. System analysis includes the needs analysis, the data analysis, and the process analysis. System modeling uses UML (Unified Modeling Language) as an application development tool. Design and design include database design, tables, and user interface development structure. System coding uses the Code Igniter framework for back-end, Bootstrap framework as a supporting front-end framework, and My SQL relational database. System testing uses alpha test and beta test.

The development of this payment information system results in a system with restrictions on access rights determined based on user roles. Available user roles include Administrators, Treasurers, Operators, Principals and Student Guardians. User role and menu access are dynamic which can be added, changed and deleted. Each user role gets a menu that supports the payment process of tuition fees at SMK X. System testing is done to ensure the system can run well. The alpha test results concluded that respondents 100% agreed that the system could run well. Based on the results of the beta test in each role, the percentage was very agreeable as much as 74.54% and agreed as much as 25.46%. Based on the results of the alpha test and beta test, this system is feasible to be implemented.

**Key words:** Information System, billing, codeigniter, UML

## I. INTRODUCTION

The development of information technology is currently growing rapidly. Various tools and systems are created to

meet human needs. Humans in the broadest sense include commercial organizations and government agencies. Schools as one of the educational institutions need to utilize information technology. The need to manage data in a school requires schools to have a system created specifically to assist data management activities.

The need for a system in a school is very large, along with business processes in complex schools. This business process is distinguished according to the fields or units that manage it, for example academic units, library units, financial units and others. Each unit has general data and special data. General data is data used by all units, while special data is data used only on that unit. The difference in data and business processes in each unit requires each unit to have their own different systems according to their needs.

SMK X was established in 2011. Along with the development of schools, the need for a system that helps the school in managing data is increasingly clear. The need for this system, especially in the financial unit, is the payment of students' tuition fees.

Management of education costs at SMK X still uses Microsoft Office Excel software. Schools do not yet have a system that is made specifically to manage the cost of education, so that the school financial unit is still troubled in managing the cost of education of students. The treasurer of the school as the head of the financial unit cannot be maximized in providing services only with Microsoft Office Excel. Treasurer needs to recap data manually to provide reports to the principal. The treasurer also needs to recap the data of students who have not paid in payment of tuition fees to provide information to student guardians. Information on the lack of education costs is still being conveyed using circulars that are prone to missing. If the circular is lost, then the lack of education costs is also lost.

Data security includes factors that need to be considered in addition to ease of use. Because the treasurer is not always in school, requires someone else to replace the treasurer function. Microsoft Office Excel cannot distinguish users who are accessing data. So that the data will be displayed as is to anyone who accesses it.

Treasurer requires a system that is specifically designed so that it can manage student education costs quickly and accurately, can provide reports to principals without having to

recap payment data, can provide students with a shortage of information to the guardians easily and can share access to financial management. Access sharing in financial management is needed because not only the treasurer manages it.

## II. THEORETICAL FRAMEWORK

### A. Information and Information System

Information is a series of data that has a temporary nature, depending on time, able to give a surprise or surprise to those who receive it (Winarto, 2004).

Kusrini (2007) defines quality information criteria and understanding information systems as follows:

Quality information has the following criteria:

#### 1) Accuracy

Information must be free of errors, not mistaken or even misleading.

#### 2) Timeliness

Information that arrives at the recipient may not be late.

#### 3) Relevance

The information submitted must be related to the problem that will be discussed with that information.

An information system is a system consisting of a series of information subsystems on data management to produce information that is useful in decision making.

In an information system there are components as follows:

1) *Hardware, including various physical devices such as computers and printers.*

2) *Software (software), or programs used to realize the data processing and the desired output generation.*

3) *Procedure, which is a set of rules used to realize data processing and desired output generation.*

4) *People, namely all parties responsible for developing information systems, processing and using information system outputs.*

5) *Database (Database), which is a set of tables, relationships and others related to data storage.*

6) *Computer networks and data communications, namely the connecting system that allows resources to be shared or accessed by a number of actors.*

### B. Financial Information System

Financial Information System is an information system that provides information to people or groups both within the company and outside the company regarding the company's financial problems (Yanuar, 2014)

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Andreas Yanuar (2014) defines the functions and objectives of the Financial Information System as follows:

The functions of the financial information system are:

1) *To determine the results of the implementation of the company's operations.*

2) *To be able to follow the company's assets and debts.*

3) *To facilitate the planning of company activities, follow up on the implementation and improvement of plans.*

The purpose of the financial information system is:

1) *The Financial Information System that is compiled must meet the principles of fast*

2) *The financial information system compiled must have a safe principle*

### C. Financial Information System

Financial Information System is an information system that provides information to people or groups both within the company and outside the company regarding the company's financial problems (Yanuar, 2014)

### D. UML (Unified Modelling Language)

The number of assistive devices that can be used in object-oriented analysis and design leads to the emergence of unclear what tools are the most superior. Users must choose between modeling languages and various modeling tools. To overcome this problem, the Object Management Group (OMG) then issued the UML, where with the existence of the UML it is expected to reduce chaos in the language that has occurred in the software industry (Suhendar, 2002).

#### 1) Use case Diagram

Use case diagrams or use case diagrams are modeling to describe the behavior of the system to be created. The use case diagram describes an interaction between one or more actors with the system to be created (Sugiarti, 2013). Examples of Use Case Diagrams can be seen in Figure 2:

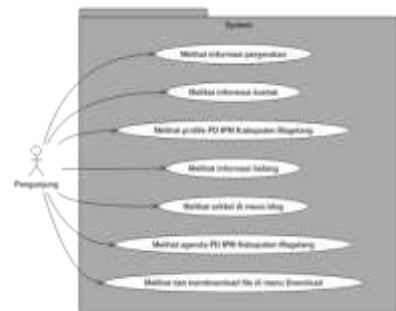


Figure 1. Example of Use Case Diagram

#### 2) Class Diagram

Class Diagrams according to Widodo (2011) are static diagrams, this diagram shows the set of classes, interfaces, collaborations, and relationships. This diagram is commonly found in object oriented system modeling. Although static, class diagrams often contain active classes.

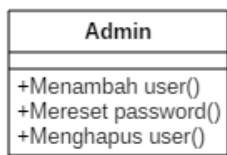


Figure 2. Example of a Class Diagram

### 3) Activity Diagram

Activity Diagrams are special state diagrams, where most states are actions and most of the transitions are triggered by the completion of the previous state (internal processing). Therefore Activity Diagram does not describe the internal behavior of a system (and interaction between subsystems) in an exact manner, but rather describes the processes and pathways of activity from the upper level in general (Sugiarti, 2013).

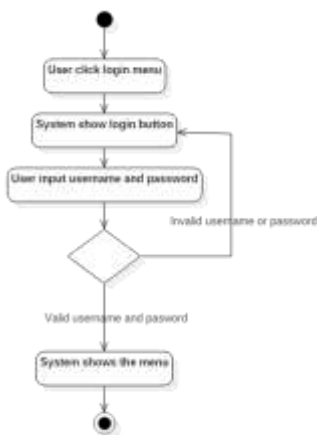


Figure 3. Example of Activity Diagram

### E. CodeIgniter

Code Igniter is a PHP framework. The framework itself is a framework in the form of a collection of folders that contain php files that provide classes, libraries, helpers, plugins and more. Framework provides certain configuration and coding techniques (Sofwan, 2007)

## III. RESEARCH METHODOLOGY

### A. Data Collevtion Method

Data collection methods to support fact finding and analytical material for solving the problems under study. In collecting the data, a series of methods were developed to support the data collection process. These methods include Observation Method, Interview Method, and Literature Review Method.

### B. System Design Method

System design methods used to describe system modeling using UML (Unified Modeling Language). UML diagrams used include use case diagrams, class diagrams and activity diagrams.

### C. System Implementation

After the system design is obtained from the design stage, the system can be implemented to get the appropriate display at the design stage. And so that every function that is desired can run properly, the system will be created so that it can communicate with the database that was previously created. This stage is the stage of implementing an application design into an application system that will be built using the Code Igniter framework.

### D. Testing

Testing is done to find errors in system development that might occur. The system will be tested first using Alpha Testing and Beta Testing.

#### 1) Alpha testing

A program is implemented in an agency, the program must be free of errors or errors. Therefore, the program must be tested first to find possible errors, this test uses the black box testing method.

#### 2) Beta Testing

Beta testing is an objective test. In this test, the system is tested directly by the user concerned. Testing is done by making a questionnaire about user satisfaction, and distributed to some users who use the system.

## IV. RESULT AND DISCUSSION

### A. Identification of Actors

Based on the results of the results of the analysis of data collection in SMK X, several actors can be identified directly related to the system based on who will use and influence the system. The design of UML uses an object-oriented system approach that is by making use case diagrams, activity diagrams and class diagrams.

Table 1. Actor Identification

No	Actor	Description
1	Administrator	Admin of the school that is given the authority to become an operator in the IT field.
2	Treasurer	School treasurer who handles the process of paying tuition fees at SMK X.
3	Operator	The person who replaced the treasurer's duties when the treasurer did not exist.
4	Headmaster	People who have the highest position in SMK X.

5	Student Guardian	Parents of SMK X students
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**B. Class Diagram**

The class diagram describes the classes of objects that make up a system and the relationship between classes of objects that occur in the payment system of education costs. The class is formed by entities and objects that have attributes and operations. From this class can form a table that can be associated with other tables, so as to allow the formation of a database? This class payment system class diagram can be seen in the following figure:



Figure 4. Activity Diagram

**C. Table Relation**

Each table stored in the database is related to one another to produce information. Relationships between tables in the Information System for Payment of Vocational Education Cost in SMK X can be seen in the following figure:



Figure 5. Table Relationships

**D. User Interface Design**

The design of the interface aims to describe the appearance of the system to be built. Interface design only focuses on several core processes of payment data processing, and is generally designed.

The basic display design in the system describes the page layout that displays data and their management in general. Data is displayed using tables that have a data search function to facilitate users in searching data.

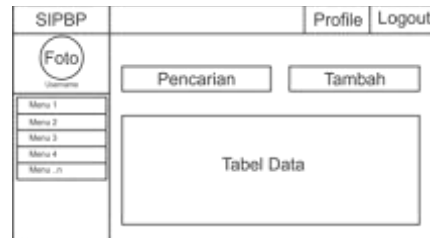


Figure 6. Basic Display Design

**E. System Implementation**

Development of Payment Information Systems Vocational Education Fees X requires designing, designing and coding programs. System coding is a stage to change the design that has been made into a collection of instruction code and interface display so that it can be operated by the user and can be recognized by the computer.



Figure 7. Administrator Dashboard Page

The distribution of access rights to each user role can be managed by the Administrator in the user role management page.



Figure 8. Management of User Role Access Rights

This information system has the function to generate student bills automatically every year. The bill generate function is in the settings page, for Administrator roles. Administrators will set the active school year and generate bills. While the operator processes student grade increases.

The function to generate bills can be seen in the program code below.

```

public function generate_tagihan($ta)
    {
$cek = $this->db->where('tahun_ajaran',$ta)
    ->get('detail_tagihan')->result();
        if (count($cek) >= 1) {
$this->db->where('tahun_ajaran',$ta)
    ->delete('detail_tagihan');
        }
$query = $this->db->select('s. niss, s. nama, jb. jenis_biaya,
    pb. biaya,k. nama_kelas, ta. tahun_ajaran, b. bulan, pb.
        biaya, j. nama_jurusan')
    ->from('penetapan_biaya pb')
->join('jenis_biaya jb','jb. kd_jenis=pb. id_jenis_biaya')
    ->join('kelas k','k. id=pb. id_kelas')
    ->join('tahun_ajaran ta','ta. id=pb. id_ta')
->join('bulan_penetapan bp','bp. id_penetapan=pb. id')
    ->join('bulan b','b. id=bp. id_bulan')
->join('kelas_siswa ks','ks. id_kelas=k. id')
    ->join('siswa s','s. niss=ks. niss')
->join('jurusan j','j. kd_jurusan=s. jurusan')
    ->where('ta. tahun_ajaran',$ta)
        ->get()
        ->result();
        foreach ($query as $tag) {
$data_tagihan = array('niss' => $tag->niss,
            'nama' => $tag->nama,
            'jenis_biaya' => $tag->jenis_biaya,
            'tahun_ajaran' => $tag->tahun_ajaran,
            'bulan'=> $tag->bulan,
            'kelas' => $tag->nama_kelas,
            'jurusan' => $tag->nama_jurusan,
            'tagihan' => $tag->biaya
                );
$this->db->insert('detail_tagihan',$data_tagihan);
$siswa = $this->db->get('siswa')->result();
        foreach ($siswa as $sis) {

```

```

            $niss = $sis->niss;
            $ambil_tagihan = $this->db->select_sum('tagihan')
->select('niss,bulan,tahun_ajaran, sum(tagihan) AS tagihan')
            ->from('detail_tagihan')
            ->where('niss',$niss)
            ->group_by('bulan')
            ->get()
            ->result();
            foreach ($ambil_tagihan as $at) {
$cek_tagihan = $this->db->where('niss',$niss)
            ->where('tahun_ajaran',$ta)
            ->get('tagihan')->result();
            if (count($cek) >= 1) {
$this->db->where('tahun_ajaran',$ta)
            ->where('niss',$niss)
            ->delete('tagihan');
                }
            $stg = array('niss' => $at->niss,
                'bulan'=> $at->bulan,
                'tahun_ajaran' => $at->tahun_ajaran,
                'tagihan' => $at->tagihan,
                'dibayar' => "0",
                'kekurangan' => $at->tagihan,
                'keterangan' => '<i class="btn btn-danger">Belum
                    Lunas</i>'
                );
            $this->db->insert('tagihan',$stg);
            }
        }
    }

```

The program code above is part of the function that is in the billing model. The program code above serves to generate bills for students who have active relationships with the class in the year. If previously generated in the same school year, the data will be deleted first. The process also deletes payment data to anticipate duplication of data on bill payments.

#### F. System Testing

##### 1) Alpha Test

Alpha test is done by the developer. After the developer has tested the system, the developer will fill out the prepared

questionnaire. Tester will test the system in 5 different levels, namely: administrator, treasurer, operator, principal, and student guardian. The results of the Alpha Test can be seen in table 3.

Table 2 Alpha Test Testing Results

No	Questions	Answers	
		Yes	No
1	Does the login and system logout process for each user role run properly?	2	0
2	Is the menu available on the system functioning properly?	2	0
3	Does the password reset feature on the administrator role work properly?	2	0
4	Do profile changing features at each user level run well?	2	0
5	Is the distribution of access rights based on user roles running well?	2	0
6	Does the function of adding, changing, deleting and searching for user data on administrator roles work properly?	2	0
7	Does the function of adding a new user role function properly?	2	0
8	Does the function of adding student data and relationships with student guardians function properly?	2	0
9	Does the function of displaying student data on role administrators based on the school year function properly?	2	0
10	Does the function of displaying student data based on the year of the function function properly?	2	0
11	Does the function of managing the active school year in the role administrator function properly?	2	0
12	Does the function add, change and delete data	2	0

From the results of filling out the questionnaire in the alpha test, the system application has run well.

2) Beta Test

Beta test is carried out by several users in the form of running the program accompanied by the developer directly, and submission of statements that are given responses in the form of choices that have been adjusted, such as: SS (Strongly agree), S (Agree), RR (Doubt) , TS (Disagree), and STS (Strongly disagree). The formula used to calculate the percentage of the results of beta test responses is:

$$\begin{aligned} \text{Total Point Test} &= \sum \text{Question} \times \sum \text{Tester} \\ \text{Percentage} &= \left( \frac{\sum \text{Point}}{\text{Total Point Test}} \right) \times 100\% \end{aligned}$$

Percentage of values from the results of the beta test showed the tester's response to the statement in the beta test for the student's guardian role with SS answer of 83.33%, S of 16.33%, RR of 0.00%, TS of 0.00%, and STS of 0.00%.

G. Discussion of Research Results

The results of research on Education Cost Payment Information System (SIPBP) of SMK X produces an assessment percentage of alpha test validation test which can be concluded that respondents choose to agree as much as 100% that the interface function is designed to run well, and those who choose to disagree as much as 0%. Based on the results of the percentage beta test, the results of the beta test responses on each user role (administrator, treasurer, operator, principal, and student guardian) can be seen in table 4.

Table 4. Percentage of the Beta Test Response

No	Level	Response (%)				
		SS	S	RR	TS	STS
1	Administrator	58,33	41,66	0,00	0,00	0,00
2	Treasurer	85,71	14,28	0,00	0,00	0,00
3	Operator	83,33	16,66	0,00	0,00	0,00
4	Head Master	60	40	0,00	0,00	0,00
5	Student Guardian	83,33	16,66	0,00	0,00	0,00
Total		372,7	129,26	0,00	0,00	0,00
Average		74,54	25,85	0,00	0,00	0,00

Based on table 4 it can be said that the Payment Information System for Vocational High School Education Cost SMK X can be well received by prospective users and deserves to be implemented by SMK X.

V. CONCLUSION

Based on the results of research and discussion, it can be summarized as follows: Information System for Education Fee Payment (SIPBP) of SMK X in Magelang district was successfully built and has been tested by two web application developers and the school. The results of the percentage assessment of the alpha test can be concluded that respondents 100% chose the system to run well. Based on the results of the beta test of all user roles, it was found that the percentage strongly agreed as much and agreed as much. It can be stated that the system can run well.

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