Design of Management Information System At Bersama Maju Clinic, Web-Based

Melda Agnes Manuhutu, Lulu Jola Uktolseja, Tagor Manurung, Sherly Gaspersz, Abraham Manuhutu

Abstract: ***Bersama Maju Clinic, located in Basuki Rahmat is one of the clinics with a lot of public interest. In the patient registration, management process, patient data are still recorded in the archives or paper documents, so that if the archive is lost, there is no replacement. Data accumulation often occurs, so it is relatively long in the data search process and the process of making the report. Data redundancy often occurs, data recording that repeatedly causes duplication of data so that the capacity needed to swell and service becomes slow, heaps of filing so that it requires a large filing area. Then there was also an irregular patient registration due to human error, the admin forgot that the patient had registered beforehand so that he was given a new queue number. This research was conducted to design and implement an information system that can provide comfort, speed and ease of service to patients who come to the clinic. The system development model used is the prototype model. The design of system models used unified modeling language diagrams (UML) including use case diagrams. The flowchart drawn by the Visio 2010. By building interfaces using Adobe Dreamweaver CS6. The database is stored using PHP and displayed via XAMMP. This system is also built with a system framework that is bootstrap.***

Keyword: ***Bootstrap, Clinic, Information, Management, PHP, System, Unified Modeling Language***

I. INTRODUCTION

Clinics, as one of the institutions of public health care, will serve patients' transactions of their daily lives. Providing services and actions in many ways will affect the condition and comfort of patients. Seeing this situation, it is very appropriate if the Clinic uses the advancement side of computers, both software and hardware to help people manage management before has done manually. Information technology is used to aid improving the work performance and organization, business processes [1].

The increasing development of information technology today and the demands of humans who want effectiveness in their work are increasingly expanding the use of computers as a data processing tool. The progress of computer technology, both in the field of software and hardware is growing very rapidly, on the other hand is also developing towards a very easy in terms of application and low-cost. The rapid development of information technology becomes a big challenge for all parties. Implementation of information system is a form of development information technology [2].

Bersama Maju Clinic, located in Basuki Rahmat. It is one clinic with a lot of public interest. In the patient registration, management process, patient data are still recorded in the archives or paper documents, so that if the file is lost, there is no substitute. Data accumulation often occurs, so it is relatively long in the data search process and the report making process. Data redundancy often occurs, recording data repeatedly cause duplication of data so that the required capacity swells and services become slow, piles of filing so that it requires a large filing place. Then, there was an irregular patient registration because of human error, the admin forgot that the patient had registered before, so that he was given a new queue number.

Computer based system is one type of information system that very often to use in this era. It touches over all the sides of life today. It can avoid errors caused by user or staff at the organization itself besides of easy and fast access to deliver new information [3]. Any specific information system aims to support operations, management and decision-making [4]. Based on the background of the problem, the researcher wrote a study entitled Design of Management Information System (MIS) at *Bersama Maju Clinic*, Web-Based". This study proposed to design and make the MIS in *Bersama Maju Clinic.*

II. REVIEW OF LITERATURE

2.1 Related Works

Candra [5] wrote a study entitled "Designing a Web-based Posyandu Service Information System in Singabangsa Village, Tenjo District". The researcher proposed a web-based posyandu service, using the PIECES method and the method of developing the System Development Life Cycle (SDLC). System design uses Sublime for Text editors and programming languages using PHP language. In this study Posyandu participants were registered to the system by Posyandu cadres.

Arazgul [6] wrote a study entitled "Patient Registration Information System at Mitra Kita Clinic Semarang". The purpose of this study was to produce a patient registration information system design at the Mitra Kita Clinic in Semarang. The type of research used is descriptive, researchers observe research sources to see an overview of the problem objectively, while the method used is an observational method where data is obtained when the study was conducted.

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Melda Agnes Manuhutu, Information System Study Program, Victory University Sorong, West Papua, Indonesia.
Lulu Jola Uktolseja, English Study Program, Victory University Sorong, West Papua, Indonesia.
Tagor Manurung Management Study Program, Victory University Sorong, West Papua, Indonesia.
Sherly Gaspersz, English Study Program, Victory University Sorong, West Papua, Indonesia.
Abraham Manuhutu, Electronic Study Program, State Polytechnic Ambon, Maluku, Indonesia.

The research instrument uses interview guidelines and observation guidelines.

Patient registration information system that is made can facilitate recording and reporting. The system development model used is SDLC and interface design using Microsoft Visual Basic 6.0. The equation of the research with this research is to do the same research, the end result of which is an information system. However, research that currently has several differences which is also an advantage is aided, this system is made using Adobe Dreamweaver CS6 to build interfaces and use bootstrap as a framework that makes the system look more responsive and comfortable to use.

This system also does not only involve the admin to access the system but the participants of the Clinic, where participants can register themselves through the website and can come directly to the Clinic at the appointed time by bringing a print out the queue number or showing the system directly or screens the queue number from the system . The development model used in this study is also different from the two studies, namely the prototype model where this model is used because it is simpler and spends a relatively short time according to the time of the research.

2.2 Definition of Terms

A. Information System Components

An Information System is an organized way to collect, enter and process data that stores, manages, controls and reports it so that it can support the company or organization to achieve its goals [7]. Information systems are a regular combination of people, hardware, software, communication networks, and data resources that collect, change, and disseminate information in an organization [8].

From the two quotes, it can be concluded that information systems are a group of interconnected elements to complete a goal.

B. Information System Components

According to Wahyono [9], information systems have components that are mutually integrated to form a unity in achieving the system goals are as follows:

1. Block Input (Input Block)
   The input block in an information system includes methods and the media to capture the data to be entered, can be basic documents.
2. Block Model (Block Model)
   This block model consists of a combination of procedures, logic and mathematical models that function to manipulate data for certain outputs.
3. Output Block (Output Block)
   In the form of output data such as output documents and quality information.
4. Block Technology (Technology Block)
   Used to receive input, run models, store and access data, generate and send output and help control the system as a whole.
5. Block Database (Database Block)
   A collection of data related to one another, stored in a hard computer and software to manipulate it.
6. Control Block (Control Block)
   Control of operational systems that function to prevent and handle system errors / failures.

C. Information System Devices

A complete information system has the following systems [9]:

1. Hardware
   This section is the hardware part of the information system. Modern information systems have hardware such as computers, printers, and others.
2. Software
   Software is information system software. Modern information systems have software to instruct computers to carry out tasks that must be done. Software can be grouped into several groups, namely:
   a. Operating system
   b. Application
   c. Utilities
   d. Programming language
3. Data
   Data is a basic component of information that will be processed further to produce information, such as notes, receipts.
4. Procedure
   Procedure is a part that contains documentation of procedures or processes that occur in the system. Can be exemplified by guide books such as manual books running computer programs.
5. Human
   Humans are a major part of an information system. Those involved in human components include:
   a. First Level Manager, to manage data processing is supported by planning, scheduling, identifying the situation of output of control and decision making in the lower middle level.
   b. Specialist staff, used for planning and reporting analysis.
   c. Management, for making periodic reports, special requests, special analyzes.

III. METHOD

3.1 Objects and Locations of Research

This research was carried out at the *Bersama MajuClinic* located in Basuki Rahmat Sorong City, West Papua Province, Indonesia. The object of this study is the Clinical MIS which has been running manually without a computerized system.

3.2 Data Collection Technique

In developing an Information System there is a need for preparation and planning, which requires results to support the implementation of research. This research in general is a research that aims to produce a product of MIS in *Bersama Maju Clinic*. The system development model used in this study is the prototype model. The method used at the stage of data and information collected is observation and interview as primary data; and literature study and documentation study as secondary data.

1. Primary Data Sources
   Primary Data Sources are data obtained directly from agencies either through observation or recording of research objects, including:

a. Observation
Data collection through observation and recording of the symptoms or events investigated on the object of research directly, such as observing documents at the clinic.
b. Interview
Data collection through face-to-face and question and answer directly with data sources or interested parties related to research, such as question and answer about clinic staff data, drug data, patient data and clinical payment data.
2. Secondary Data Sources
Secondary data sources are data taken indirectly from the object of research. Secondary data sources were obtained from library studies. Collecting data from books that are in accordance with the theme of the problem, for example, collecting theories about MIS and design of this system. And the documentation data such as picture of this clinic.

3.3 System Requirements Analysis

The current system obstacle is in the patient registration, management process, patient data are still recorded in the archives or paper documents, so that if the archive is lost, there is no substitute. Data accumulation often occurs, so it is relatively long in the data search process and the report making process. Analysis of the needs obtained after the data collection process, are: 1) Registration of patients more easily and efficiently; 2) Registration of patient checks become clearer and easier; 3) Data collection on disease history and drugs becomes more presentable.

3.4 System Development Method

The system development method is using the prototype method. Prototyping models begin with collect needs. Developers and customers meet and define the overall goal of the system (software) to be created, find all known needs, and outline areas where further definition is a necessity and then "quick design" is carried out. Lightning design focuses on the presentation of software aspects that will seem to the customer/user (such as the input approach and output format). Lightning design leads to a construction prototype. The prototype is evaluated by the customer / user and used to filter software development needs. Iteration occurs when the prototype is set to meet customer needs, and at the same time allows developers to better understand what is he must do. Here's a picture of prototype model [10]:

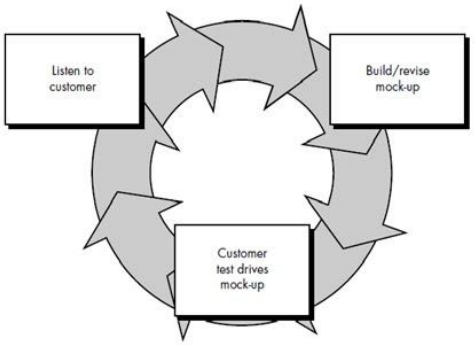

Figure 1 Prototype Method

1. Listen to the Customer
   a. Collection of needs
      Customers and developers together define the format of all software, find all needs, and outline the system that will be created. In this stage, the developer conducts observations and interviews with the admin of *Bersama Maju Clinic*.
2. Build/Revise Mock Up
   a. Build prototyping
      Build prototyping by creating a temporary design that focuses on presenting to customers.
   b. Evaluation of prototyping.
      This evaluation is carried out by the customer, whether the prototyping that has been built is in accordance with the customer's desires. If it is proper, step 4 will be taken. Otherwise prototyping is revised by repeating steps 1, 2, and 3.
   c. Encoding the system
      In this stage the agreed prototyping is translated into the proper programming language.
3. Customer Test Drives Mock-Up
   a. Test the system
      After the system has become a software that is ready to use, it must be tested before use. The test in this study is Black box testing.
   b. System Evaluation
      Customers check whether the finished system is as expected. If yes, step 7 is done; if not, repeat steps 4.
   c. Using the system
      Software that has been tested and accepted by customers is ready to use.

3.5 Flow Chart

The flow chart is a chart that explains in detail the steps of the program process [11], [12]. The following is a flowchart of the *Bersama Maju Clinic* MIS:

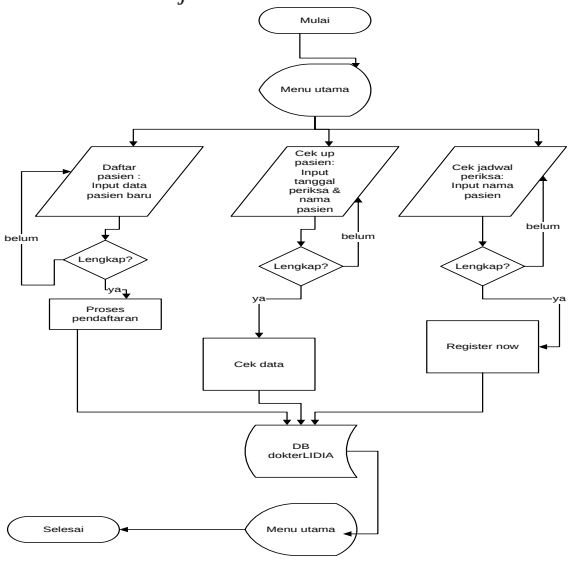

Figure 2 MIS Flow Chart

Figure 2 is the flow chart on the MIS of *Bersama Maju Clinic*. It describes the main menu will appear after opening the system, the user can register as the patient, then register for the check by entering the check date and name, and the checking schedule. If these three processes are incomplete, they will return to their respective forms to complete the data, but if complete data will be saved to the database. After doing the required process, you can return to the main menu and finish.

3.6 Unified Modeling Language (UML)

UML is a visual modeling method to design and or make software. UML is a visual language for object-oriented language modeling, so all elements and diagrams are based on object oriented. One of the diagrams used in modeling this system is the use case diagram, which is described for the admin as well as the patient. The use case diagram system will explain who is involved in the system (actor) and what is done by the system (use case) [13], [14].

1. Admin Use case Diagram

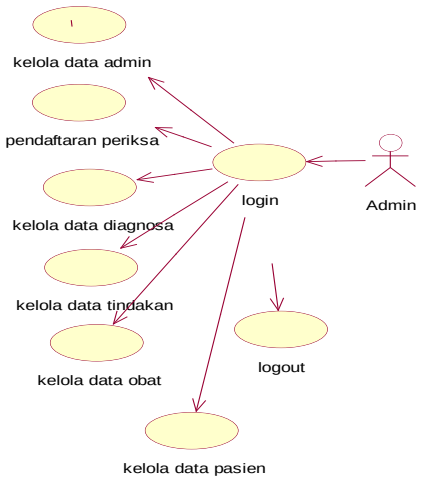

Figure 3 Admin Use case Diagram

Figure 3 is a use case diagram from the admin. Admin accesses the system by entering the correct username and password. After entering the system admin can manage admin data, register patients, manage action data, manage drug data and manage patient data. After finishing, managing, the admin logs out from the system.

2. Patient Use Case Diagram

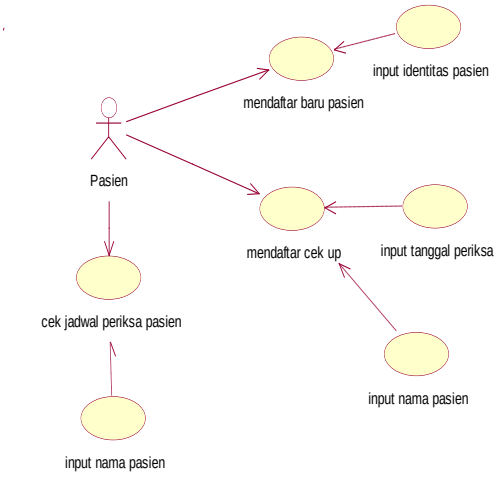

Figure 4 Patient Use Case Diagram

Figure 4 describes the system model when the patient is a user. Patients can make a new list by entering the patient's identity. Then patients can register for a check-up by entering the check date and name, and check the check schedule.

IV. RESULT AND DISSCUSION

4.1 Implementation

The results of this study is the implementation of a data MIS of *Bersama Maju Clinic*. Implementation is the stage of the implementation and testing of the results of the design of the *Bersama Maju Clinic* MIS [15]. Implementation is one stage in the development of software systems. At this stage the implementation of the results of the warfare will be carried out in the lines of program code that can be understood by the computer. This program is implemented using the PHP programming language, for display using Adobe Dreamweaver CS6 software, local server devices and databases using XAMPP. Implementation and testing of programs using PC (Personal Computer) hardware with black box testing.

```php
<?php
$server = "localhost";
$username = "root";
$password = "";
$database = "BM";


//Membuka koneksi ke server database MySQL
mysql_connect($server,$username,$password) or die("Koneksi
 gagal");

//Memilih database di server
mysql_select_db($database) or die("Database tidak bisa
dibuka");
?>
```

Figure 5 System Program Code of Database Connection

4.2 System Interface Discussion

Implementation of the system interface is the appearance of the application that has been made. The following is an implementation of the user interface of the *Bersama Maju Clinic* MIS design as follows:

1. System Main Page

Figure 6 System Main Page

Figure 6 is the start page of the system, there is a header that reads the Name and Address of the Clinic. There is also a new list column, the patient check, the schedule, check-up list and admin area.

2. Patient List Page

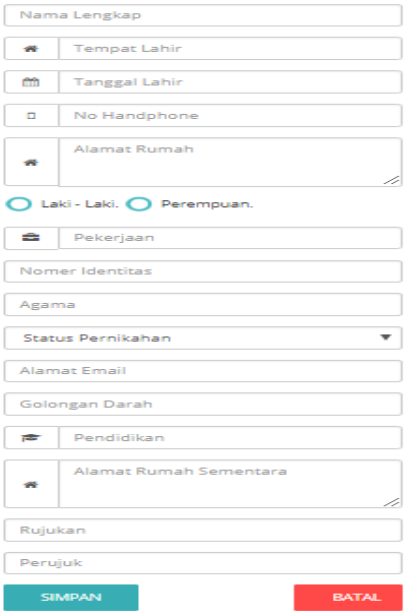

Figure 7 Patient List Page

Figure 7 is a patient list page. Patients must enter their full name, place and date of birth, mobile number, home address, gender, occupation, identity number, religion, marital status, email address, blood type, referring and referrer.

3. Schedule Registration Check

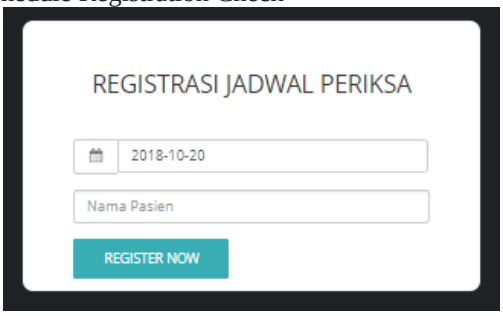

Figure 8 Schedule Registration Check

Figure 8 shows the registration page. There is a check schedule header, then the check date column, the patient's name and the 'register now' button.

4. Check Schedule

Figure 9 Check Schedule

Figure 9 shows the schedule, check page. There is a check schedule header. The patient's name column, then the 'check' button.

5. Admin Login Page

Figure 10 Admin Login Page

Figure 10 is a draft of the registration data page. There is a side bar contains the menu on the system. Then on the registration data sheet there is a report date column, then table of the patient's name, queue number and date.

6. Admin Data Page

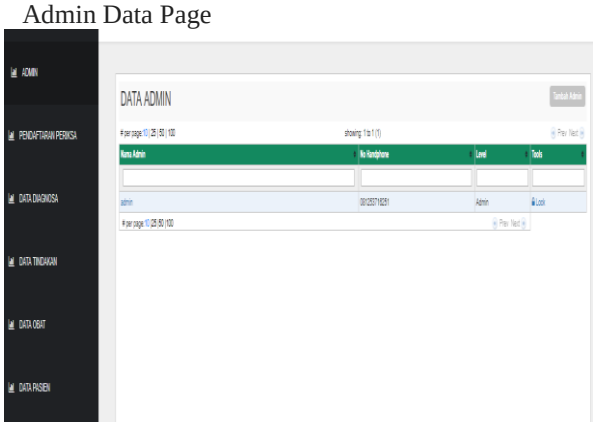

Figure 11 Admin Data Page

Figure 11 is a data admin page. On this page there is a side bar menu. Where admin can add, change and delete admin data.

7. Inspection Registration Data Page

Figure 12 Inspection Registration Data Page

Figure 12 is a draft of inspection, registration data page. There is a side bar contains the menu on the system. Then in the inspection, registration data sheet there is a report date column, then table of the patient's name, queue number and date.

8. Page of Add Action Data

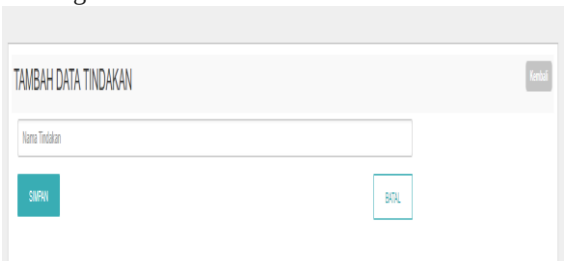

Figure 13 Page Add Action Data

Figure 13 is a draft page to add action data. There is an active data added header. Then the action name column and the save and cancel buttons.

4.3 System Testing

System testing is a test result in the *Bersama Maju Clinic* MIS using the black box testing method. Black box testing is testing carried out by observing features in the new work process that has been made [16]. The trial of this system involves physician and patient assistants.

1. Login Testing

Login testing is done by users who have access rights, namely a doctor's assistant. For the security of user data, the login account password is encrypted using the MD5 algorithm. The login menu feature can be seen in figure 14 with the wrong password results that give rise to a notification like in figure 15. The results of testing the login feature can be seen in table 1.

Figure 14 Login Testing

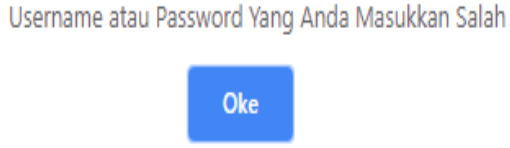

Figure 15 The Notification of Wrong Password Included

Tabel 1. Login Testing

No	Feature	Input	Output	Match	Doesn't Match
1.	Login to the system	Username and password doesn't match	There is a wrong login notification	√	-

2. Testing Schedule Registration Check

In this system participants can register the check schedule as shown in Figure 16. After registering with the right data, the check queue card will appear as shown in Figure 17.

Figure 16 Schedule Registration Check

Figure 17 The Card of Registration Check

Tabel 2 Testing Schedule Registration Check

No	Features	Input	Output	Match	Doesn't Match
1.	Input the checking schedule	Enter data with participant data that has been done before	The queue card shown successfully	√	-

V. CONCLUSIONS AND FUTURE WORK

At the end of this research, there are conclusions that can be made with the design and implementation of the *Bersama Maju Clinic* MIS. The work process becomes more effective and efficient in recording patients, diagnoses, doctor's actions, and drug data. This system also helps doctors through a doctor's assistant to see the history of the disease, actions and medications for each patient. This system also helps patients to register online, namely through the internet network. Patients can print their own queuing cards or just screens the participant cards. Testing this information system developed using the black box testing method shows that the system is able to display error notification information on the form, by testing normal and abnormal data.

This shows that the program has run well in accordance with the expected results. For further system development, it can be proposed for consideration, namely:

1. Development of features that can analyze what medical actions are given based on patient complaints

2. Development of consultation features online so that they can have a positive impact on the advancement of Indonesian technology, especially health and the improvement of good health services.

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REFERENCES

1. Manuhutu, Melda. Dkk "SOMA Method in Modeling Business Process Automation of Thesis Proposal Submissions (case study: SWCU – Psychology Faculty)", *Journal of Theoretical and Applied Information Technology* . ISSN: 1992-8645, Vol 58, No.2 pp.327-335
2. Manuhutu,Melda. Uktolseja Lulu, Gaspersz,Sherly. "Academic Information System for Student (Case Study: Victory University of Sorong)". International Journal of Computer Applications (0975 – 8887) Volume 180 – No.43, May 2018.pp.26-33
3. Manuhutu, Melda, Uktolseja, Lulu. "Design and Implementation of Online Students' Complaint (Case Study of English Study Program at Victory University, Sorong*)", International Journal of Computer Sciences and Engineering*. Volume-6, Issue-1, E-ISSN:2347-2693. pp.228-232. 2018.
4. Bulgacs, Simon, "The first phase of creating a standardised international technological implementation framework/software application". Int. *J. Business and Systems Research*. Vol.7, No.3, pp.250 – 265, 2013.
5. Candra Pratama. 2017. *Perancangan Sistem Informasi Pelayanan Posyandu Berbasis Web Pada Desa Singa Bangsa Kecamatan Tenjo*. https://Widuri.Raharja.Info/Index.Php/Si1311476648. Diakses pada Tanggal 12 September 2018.
6. Arazgul Gurbanova. 2016. *Sistem Informasi Pendaftaran Pasien Di Klinik Mitra Kita Semarang.* http://Eprints.Undip.Ac.Id/59677/1/Laporan_J2f909002_1.Pdf Diakses pada Tanggal 12 September 2018.
7. Tantra, R. 2012. *Manajemen Proyek Sistem Informasi*. Yogyakarta: ANDI.
8. Yakub. 2012. *Pengantar Sistem Informasi*. Yogyakarta : Graha Ilmu.
9. *Wahyono*, Teguh. 2004. *Sistem Informasi (Konsep Dasar, Analisis, Desain dan. Implementasi*., Yogyakarta: Graha Ilmu.
10. *Pressman Roger.S.Ph.D.* Rekayasa Perangkat Lunak Jilid 1. Yogyakarta: ANDI. 2002.
11. Wardatul Jannah, et al. Rancang Bangun Sistem Informasi Bimbingan Belajar Berbasis Web (Studi Kasus: Lembaga Bimbingan Belajar Tadica). *Jurnal Informatika Mulawarman*. Vol. 10 No. 1 Edisi Februari 2015 47.
12. Lasminiasih, et al. Perancangan Sistem Informasi Kredit Mikro Mahasiswa Berbasis Web. *Jurnal Sistem Informasi (JSI)*, VOL. 8, NO. 1, April 2016, ISSN Print : 2085-1588 ISSN Online : 2355-4614.
13. Gata, Windu dan Gata, Grace. (2013). Sukses Membangun Aplikasi Penjualan dengan Java. Jakarta : Elex Media Komputindo.
14. Ade Hendini. Pemodelan Uml Sistem Informasi Monitoring Penjualan Dan Stok Barang (Studi Kasus: Distro Zhezha Pontianak). Jurnal Khatulistiwa Informatika, Vol. Iv, No. 2 Desember 2016 107.
15. Komarudin. Implementasi Sistem Informasi Pengolahan Data Piutang. *Jurnal Computech & Bisnis*. Vol. 9, No. 2, Desember 2015, 84-94 ISSN 2442-4943.
16. M. Sidi Mustaqbal, et al. Pengujian Aplikasi Menggunakan Black Box Testing Boundary Value Analysis (Studi Kasus : Aplikasi Prediksi Kelulusan Snmptn). *Jurnal Ilmiah Teknologi Informasi Terapan*. Volume I, No 3, 10 Agustus 2015. ISSN : 2407 – 3911.

AUTHORS PROFILE

Melda Agnes Manuhutu is the lecturer of Information System Study Program at Victory University, Sorong. She finished both her bachelor and master degrees in Satya Wacana Christian University, Salatiga. She passionate in the software making to help and even change the manual system that has not efficient yet.

Lulu Jola Uktolseja is the lecturer of English Study Program at Victory University, Sorong. She is an active volunteer in several social works that help things about education. She is also active in giving her thought about the importance of electronic application in teaching English process.

Tagor Manurung is the 1st Vice Rector at Victory University, Sorong. His education background is economic management. He is active to contribute in software management to help the work process.

Sherly Gaspersz is the lecturer of English Study Program at Victory University, Sorong. She graduated from Victory University in 2014 for the bachelor degree and finished her master degree in 2016 at Cendrawasih University, Jayapura.

Abraham Manuhutu is the 3rd Vice Director at State Polytechnic, Ambon. His education background is technical engineering program and active in giving his thought on software making.