

Development of Monitoring System for Scholar Data in the Ministry of Health Timor-Leste

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ABSTRACT

The objective of this study is to develop the monitoring system of scholarship data in the Ministry of Health Timor-Leste to facilitate monitoring activities of the Timorese students within the country or abroad. And also, how to know when the scholars complete their studies and the cost which has been spent each year. The methods used to develop the system are Waterfall Modeling, Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD). The programming language used to build the system are Hypertext Preprocessor (PHP) 5.6.2, My Structured Query Language (MySQL) 5.1.37, and Xamp 3.2.2. The observation and interview are used to collect the data from the Ministry of Health Timor-Leste. The result of the system is able to monitor the scholars who will graduate every year, and also be able to know about the total of scholars studying in every area. The system is also able to monitor the payment data every scholar and the operational cost, producing reports such as field of study in each student, and payment detail each student during the process of the study.

Keywords: Ministry of Health Timor-Leste, monitoring system, DFD, ERD, PHP, MySQL and Xampp.

1. Introduction

The scholarship has become government program which is through the Ministry of Health Timor-Leste in partnership with other countries via Embassy of Cuba, China, Indonesia, Thailand, New Zealand, Australia including Community of Portuguese speaking Countries to offer and support Timorese people to continue their study and increasing capacity and ability to contribute for the development of Timor-Leste in the future.

Information System manages data based on the web which has been implemented in various study cases such as scholarship monitoring system in Diponegoro University (Shodiq et.al., 2013), analysis and development monitoring system Bidikmisi in University Negeri Yogyakarta (Setiawan, 2015), and analysis monitoring scholarship in Jambi (Gusmarni, 2017). The results of those research show that the information system monitoring data scholar is based on the web which is possible to be implemented to facilitate the Human Resource National Department in order to control the scholars who study within the country or overseas.

Based on the interview with Mrs. Auxiliadora Correia in Human Resource Planning Department, Ministry of Health Timor-Leste that every year there are almost twenty domestic and foreign scholars who continue their study. Those numbers are depending on the program which is given by the government to provide scholarships for Timorese people to study in the health area. We also have partners such as Thailand International Cooperation Agency (TICA), the Korean International Cooperation Agency (KOICA) and others which always provide scholarship for the Timorese people every year.

The data scholar increases every year, it is difficult for the Human Resource Planning Department, Ministry of Health Timor-Leste to control for studying process every scholar in every country. And it is difficult to make the structure report because it has incomplete data, do not know the details about the budget issued for each scholar because there is no good

data management causing a lot of lost data. These problems arise because there is no system that can accommodate all scholar data.

Therefore, the objective of this study is to develop the monitoring system scholarship data in the Ministry of Health Timor-Leste to facilitate monitoring activities for Timorese domestic and foreign students. And also, how to know when scholars complete their studies and the cost which has been spent for the scholars each year.

2. Literature Review

2.1. Information System

The information system is a system composed of people and computers that processes or interprets information (Jessup et. al., 2008; Bulgacs and Simon, 2013). The term is also sometimes used in more restricted senses to refer to only the software used to run a computerized database or to refer to only a computer system. Any specific information system aims to support operations, management and decision-making (Alter, 2013). The information system consist of three components such as input, process, and output (Abdul, 2003). These components (Laudon & Laudon, 2010) work together to collect, process, store and disseminate information to support decision making, coordination, control, problem analysis and visualization within an organization. The use of information systems is growing as an example of organizations using information systems to process transactions, reduce costs and generate revenue as one of their products or services, another example is the Bank has now used the information system to process customer checks and make various account statements newspapers and transactions that occur (Jogyanto 2012).

Monitoring information system is a process to collect and analyze the information based on the indicators that have been determined systematically and continuously about an activity or program so that action can be taken as an attempt to perfect

the next activity or program (Hafidz et.al., 2017). The Monitoring system is the process of controlling routine data collection and measuring progress on program objects or systems that can control activities in storing data, especially in controlling the academic achievement and activities of the student (Hermansyah and Paulina, 2013).

2.2. Waterfall Method

The waterfall method is a classic life cycle model, which implies a systematic and sequential approach to software development, which starts with the specification of user needs and continues through the stages of planning (planning), modeling (modeling), construction (construction), as well as the transfer of the system / software to the users which ends with ongoing support for the complete software produced (Pressman et.al., 2012; Casteren, 2017).

2.3. Tools

Xampp is free software, which supports many operating systems, and is a compilation of several programs (Palit et.al., 2015). This program is available under the GNU General Public License and is free, an easy-to-use web server that can serve a dynamic web page, and can be run on many operating systems, such as Windows, Linux, Mac OS, and Solaris (Walia and Gill, 2014; Ayu and Permatasari, 2018).

2.4. Black Box Testing

The Black Box Testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied virtually to every level of software testing: unit, integration, system and acceptance (Jerry et. Al., 2003). The testing design chooses valid and invalid inputs and determines the correct output, without having to know the internal structure of the tested (Simanjuntak, 2010). This method can be applied at all levels of software testing such as unit, functional, integration, system and user acceptance. The Black Box Testing is conducted to find errors in several categories, namely: (1) Missing or incorrect functions; (2) Interface design errors, (3) Errors in data structures or external database access; (4) Performance error; and (5) Initialization and termination errors (Febiharsa et.al., 2018).

3. Research Methods

The data are used to develop the system in this study obtained from the Department of Human Resource Planning, Ministry of Health Timor-Leste. Figure 3.1 such a system architecture to develop information system manages scholarship data. This system consists of Administrator such as the entity which has full access to manage the system. Furthermore, the circulation data about scholarship in the Ministry of Health also access the report to make a decision. The users are such the students who are able to access the system to get the information about the money and able to input their value to the system.

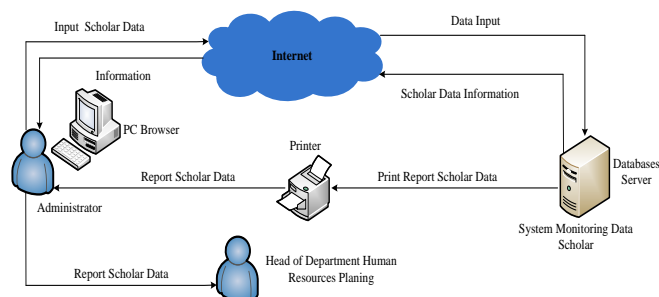


Figure 3.1 Architecture System

Figure 3.2 describes all process of the system to connect the system with all entities. The system consists of admin as the entity that has the highest permissions, department heads have the competence to access information in the system, especially information about scholars and reports used for decision making. The process in this system consists of input data such as step which used to input all data that by the entity Administrator, that will be recorded in master table (1.0), monitoring data is the activity system which will process all data that with the resource from processing (2.0) and the last will making report (3.0) to inform to the entity of Chef Department Human Resource Planning Department to use for decision making.

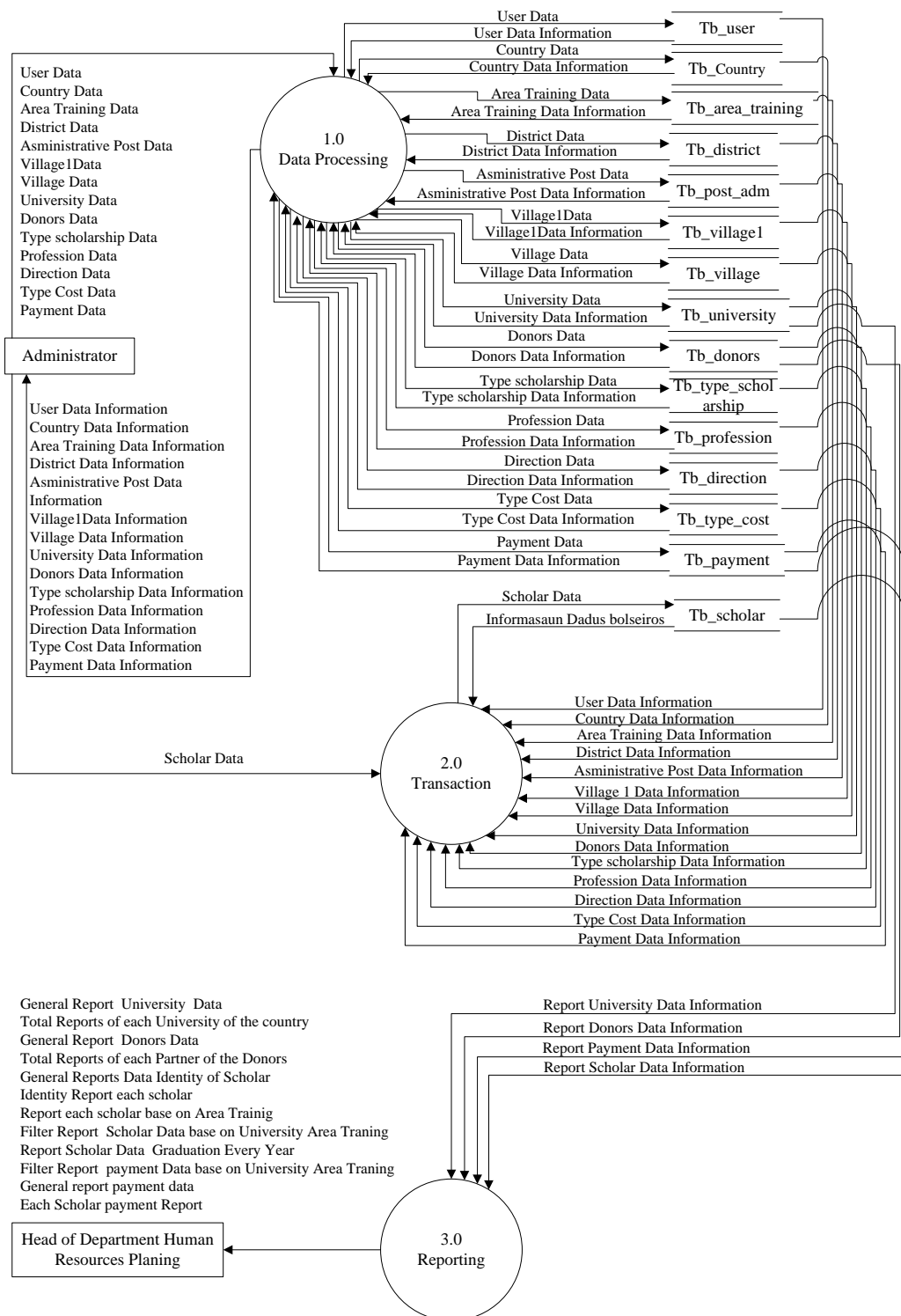


Figure 3.2 Diagram of Monitoring System

Entity Relationship Diagram (ERD) as a model that describes the relationships between entities in the database. Figure 3.3 such as a stepping which describes about relation within entity that includes the system. Example; the relationship between entity scholar and training Area is *one-to-one*

that in each scholar is able to choose one training area. And also the relationship between University and Country is many-to-many that in many universities in each country and entity one university in many training areas.

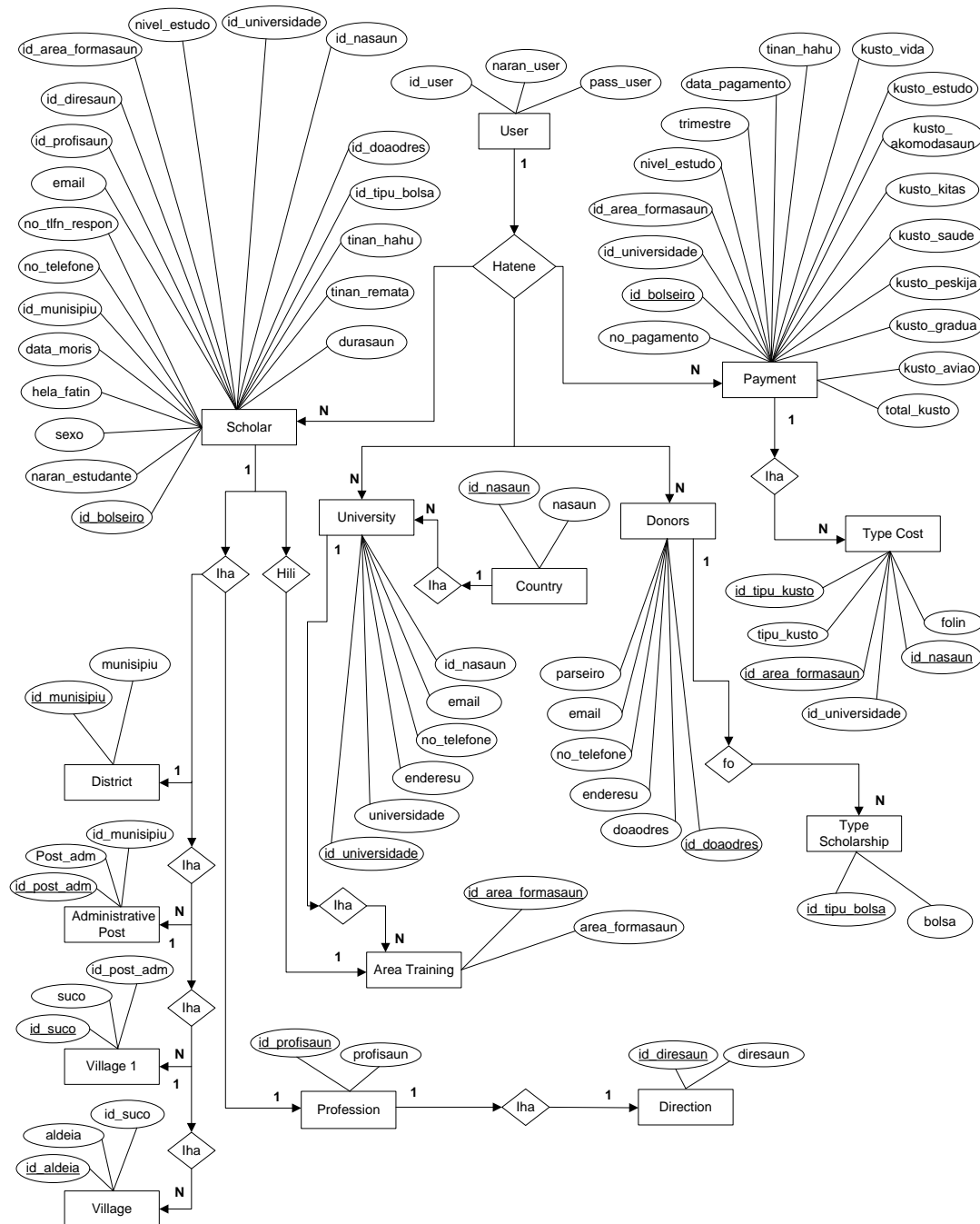


Figure 3.3 Entity Relation Diagram (ERD)

Figure 3.4 describes relations between the table in the information system monitoring scholar in the Ministry of Health Timor-Leste. The system consists of 15 tables, three tables

transaction such as tb_scholar, tb_payment, and tb_type_cost. And twelve table master.

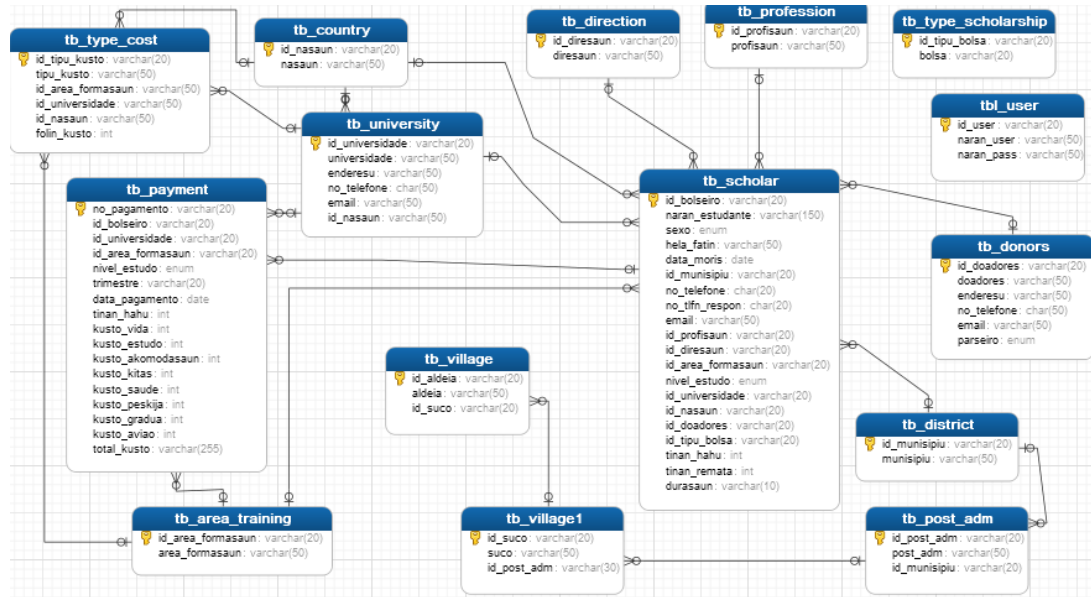


Figure 3.4 Relation of Monitoring System

The Method of Development System in this research is a Waterfall. The purpose of using this method is because it has a detail process and structure such as analysis, system design, testing system, implementation and maintenance (Pressman, 2015). The proposed need to develop a monitoring system are:

- Create a system based on database “db_bolseiru_ms”
- System validation such as log in with three users are administrator, chief of department, and the employees
- The feature for searching data
- The system can monitor students contract, the cost which purchases for the studying process, and also to monitor their studying process via their results of study.
- Produce report based on data which has been processed from the system in anytime.

4. Result

Before going to Dashboard Menu, First the system will make validation to user by login such as Username and Password. Figure 4.1 is a Dashboard information system, monitoring data fellow which consist of Fellow, University, Donors and Payment.

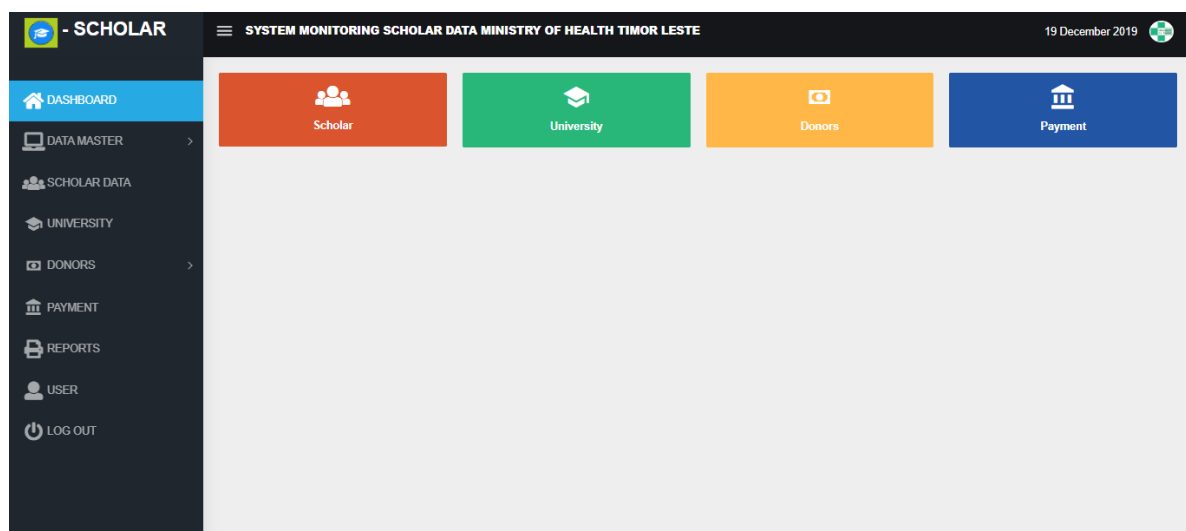


Figure 4.1 Dashboard Menu

Master Menu consists of four sub-menu such as, District, Training Area, Country and Profession. The whole information which has relation with four sub-menu will directly input from Admin in Human Resource National Direction, Ministry of

Health Timor-Leste. Figure 4.2 is an out coming data interface which is consist of data District, Training Area, Country and Profession.

No	Id Munisipio	Naran Munisipio	Aksaun
1	MSP001	Aileu	
2	MSP002	Ainaro	
3	MSP003	Baucau	
4	MSP004	Bobonaro	
5	MSP005	Covalima	
6	MSP006	Dili	

No	Id Area Formasaun	Area Formasaun	Aksaun
1	AFR001	Dermatology and Dermatosurgery	
2	AFR002	Global Health Security	
3	AFR003	Especialista Matan	
4	AFR004	Medicina Jeral	
5	AFR005	Parteira	
6	AFR006	Nutrisaun	

No	Id Nasaun	Nasaun	Aksaun
1	NSA007	China	
2	NSA001	Cuba	
3	NSA004	Indonesia	
4	NSA003	Korea Do Sul	
5	NSA010	Malaysia	
6	NSA009	Papua Nova Guine	

No	No Pagamento	Naran Bolseiro	Universidade	Area Formasaun	Nivel Estudo	Trimestre	Data Pagamento	Tinan Hahu	Kusto vida	Kusto Estudo
1	PGT001	Agosto Adelaide Pereira	Institute of Dermatology	Dermatology and Dermatosurgery	S2	II	2015-05-11	2017	300	500
2	PGT002	Mariana Da Silva Marques	Yonsei University, Seoul Korea	Medicina Jeral	S2	I	2015-09-19	2017	1000	5000
3	PGT003	Francisca Gutierrez	Universitas Undayana Bali	Medicina Jeral	S2	I	2015-10-24	2019	400	500
4	PGT004	Maria Ximenes	Universitas Undayana Bali	Medicina Jeral	S2	I	2015-10-24	2016	400	1000

Figure 4.2 Inerface Data District, Area of Concetration, Country and Profession

Figure 4.3 Shows the form interface which is used to input data scholar. This form is used to save and manage data such as, input data, edit data, and delete data. User will be able to

get information about the identity of scholar, training area, studying in which country and university.

SCHOLAR										
SYSTEM MONITORING SCHOLAR DATA MINISTRY OF HEALTH TIMOR LESTE										
19 December 2019										
Scholar Data										
No	Id Bolseiro	Naran Bolseiro	sexo	Hela Fatin	Data Moris	Munisipio	No Telephone	No Telephone Responsavel	Email	Profissau
1	BLR001	Agosto Adelaide Pereira	Mane	Fatuhada	1992-07-16	Baucau	+86 8888 7777 8964	+670 74122345	tica.scholarship@gmail.com	Doutor HRM
2	BLR002	Mariana Da Silva Marques	Feto	Tasi tolu	1998-07-07	Lautem	+86 8888 7777 8964	+670 78901256	tica.scholarship@gmail.com	Estudante
3	BLR003	Adelia Maria Moriz Barreto	Feto	Santa Cruz	1990-01-23	Baucau	+82 8888 7777 1234	+670 74345678	koika.gov.tl@gmail.com	Doutor Especialista HNGV
4	BLR004	Jessica Maia	Feto	Bairo Pite	1996-11-21	Manufahi	+670 78000033	+670 74122346	untl.timorleste@gmail.com	Estudante

Figure 4.3 Data of Scholar

The result of development system also produces the report which consists of general university data report, university data report in each country, general data donors report, donors report in each partner, the data filter of scholar based on the training area and university in each countries. 6) report of scholar's general data identity 7) report of each scholar's iden-

tity 8) report of training area for each scholar 9) data graduation fellow report in each year 10) data filter payment base on training area and university 11) data filter payment report in each fellow 12) general data payment report. Figure 4.4 such a interface facility which used to produce report.

Figure 4.4 Report Printing Form

Figure 4.5 is the outcome of report which is produced by the system. The produced report consists of university report in each country where the scholars studying at.




<div>  <div> REPULIC DEMOCRATIC OF TIMOR-LESTE MINISTRY OF HEALTH National Direction Human Resources </div>  </div>					
Reports of each University of the country					
No	Naran Universidade	Enderesu Universidade	No Telefone Universidade	Email Universidade	Nasaun
1	Universitas Indonesia	Jakarta	+62 8888 3333 4444	ui.indonesia@gmail.com	Indonesia
2	Universitas Undayana Bali	Denpasar Bali	+62 8888 3333 2222	undayanadenpasarbali@gmail.com	Indonesia
3	Universitas Teknolgi Bandung	Bandung	+82 8888 7777 8964	utb.indonesia@gmail.com	Indonesia
4	Universitas Presiden	Jakarta	+62 1212 3333 0000	u.president.indonesia@gmail.com	Indonesia
5	Undiknas Bali	Denpasar Bali	+82 8888 5555 8964	unidiknas.bali@gmail.com	Indonesia

Figure 4.5 University Report From Each Country Where Scholars Pursue Their Studies.

Figure 4.6 is the result of report which is produced by information system which has been developed. It is producing information such as data filter training area, university and country. All infor-


mation which have been produced by the system is able to help the human Resource Nation Direction to give Decision.



REPBLIC DEMOCRATIC OF TIMOR-LESTE

MINISTRY OF HEALTH

National Direction Human Resources



Report payment Data base on University Area Traning

No	Naran Estudante	Universidade	Area Formacao	Nivel Estudo	Trimestre	Data Pagamento	Uniao Habit	Kusto Vida	Kusto Estudo	Kusto Alimentacao	Kusto Kitao	Kusto Saude	Kusto Pustaka	Kusto Grafia	Kusto Artae	Total Kusto
1	Francisca Guterres	Universitas Udayana Bali	Medicina Jeral	S2	I	2019-10-24	2019	400	300	100	100	1000	2000	2000	3000	9800
2	Maria Ximenes	Universitas Udayana Bali	Medicina Jeral	S2	I	2019-10-24	2018	400	1000	100	100	1000	2000	2000	2000	8800

Figure 4.6 Scholars Data Filter Report of training area at Universities and Countries.

5. Evaluation System

Test of evaluation system in this research used a black box techniques such as :

- Testing the function of system analysis which is designed with DFD
- The truth of the software being tested is only seen based on the output (output) generated from the data or the conditions of the input provided for the existing function without seeing the process of how to get the output. From the output produced, the ability of the program to meet the needs of users can be measured as well as its errors can be identified.
- The test results are declared successful if when given input according to the test plan the system has been able to deliver the output (appearance and function) as expected.

Table 5.1 Black Box Result Testing

Level of Test	Sub Test	Result
Authentication/ Login	Validation of Input	Success
	Account Validation (redirect, menu according to access rights)	Success
Dashboard Menu	Display menu data master	Success
	Data recapitulation of concentration area (add, delete, edit, and update)	Success
	Data recapitulation of university (add, delete, edit, and update)	Success
	Data recapitulation of scholar (add, delete, edit, and update)	Success
	Data recapitulation of country (add, delete, edit, and update)	Success
	Data recapitulation of donors (add, delete, edit, and update)	Success
	Data recapitulation of donors (add, delete, edit, and update)	Success
Scholar Data Monitoring	Display information about financial status for each scholar	Success
	Display information about the status of each scholar on their study in every University	Success
Scholar Data Payment	Admits information about payment for each scholar in every trimester.	Success
Report	Report of University Data in every country	Success
	General report Data of donors	Success
	Donors' Report for each partner	Success
	Scholar's Data Filter according to area of training, university and country	Success
	General Report Data of Scholars' identity	Success
	Report of Identity for each scholar	Success
	Report of each scholar according to area of training	Success
	Report of graduated scholars' data every year	Success
	Filter Data Report of payment for each scholar	Success
	General Report Data Payment	Success

Table 5.2 showed, the functions contained in the Information monitoring system of fellow chest have been running well and according to the design that has been made. That is the main function on the system has been used successfully and does not experience errors, if there are errors or warnings from the system, this is caused by users who do not provide input correctly. Functionally, this system can produce outputs that are as expected by the users.

The weakness in this system is the process of managing the payment status which is still done manually, namely transfers through the Bank by the ministry to each fellow, cannot be done automatically by the system when there is a delay in payment that exceeds the terms and conditions. In addition the system also cannot display notifications of late payments automatically

Table 5.2 Evaluation System

No	Test Case	Result
1	Login Proses	Function goes well
2	Add Data Proses	All Function go well
3	The process of printing the payment timeline	All Function go well
4	The tracking process of data payment every semester	All Function go well
5	The monitoring process of payment status	All Function go well
6	The process of knowing payment details	All Function go well
7	The process of printing report every student in each semester	All Function go well
8	The process of managing payment status	The functions run according to the design, but the limitation in the status changes are still done manually not automatically when there is a delay
9	Payment data update process	The function runs according to the design, the lack of notification of delay that cannot run according to the design
10	Payment data filters based on the school and University	All Function go well
11	The report printing process of general data payment	All Function go well
12	The process of printing Report sources of funds based on students	All Function go well

6. Conclusion and Recommendation

The result of this research has developed a prototype application monitoring system data for scholars at Ministry of Health Timor-Leste based on Web in Human Resource Planning Department. The developed system is able to monitor scholars who have got scholarship from Ministry of Health in overseas or domestic including names of universities or institutions, also to know about what special areas do the scholars study. This system is also able to save data tuition fees, scholars' operational cost and also provides information about what price must be spent by the scholars to conclude their studies based on those who have concluded their studies at university. Easy to make report is the system which is developed with facilities to produce report such as: graduation report in each year, and general payment report for each scholar.

The expectation for researcher is to be able to implement software technique test which is a variation to get an accurate output from the result. In developing the prototype of this information system, it has not yet paid attention to the issue of data security (security), so for that further research can be supplemented by its data security system.

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