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Our gratitude to all the participants who has take a part in this conference, I hope we can take the advantage of academic research findings, to have better insight about the importance of IT and business application, to the country's economic development

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INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY AND
ENGINEERING APPLICATION 2016

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 Penerbit :
PPP-UBD Press

Published by:

Pusat Penerbitan dan Percetakan Universitas Bina Darma Press (PPP-UBD Press) Palembang

Proceeding International Conference on Information Technology and Engineering Application

Published by:



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Printed in Palembang, Indonesia, Febuari 2016

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INFORMATION TECHNOLOGY

Application of 36 Cell Zachman Framework for Integrated Spatial Planning Tax On Dinas Pendapatan Daerah Kota Palembang

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Abstract

Dinas Pendapatan Daerah Kota Palembang is a government agency engaged in taxes that want to develop spatial taxes integrated the manual be computerized, with the application of this control arrangement of the location of a region into a strategy for the utilization of resources and the protection and prevention of negative impact on a region to optimize the performance of these fields and to improve process control and increase the speed, capability, monitoring in real-time, so expect all the needs of both data, human resources and infrastructure that supports the passage of the information system can be obtained for planned. In the application of this Framework Zachman researchers describe in detail the columns and rows that are in the matrix by filling the Zachman Framework cell 36 which is in the Zachman Framework with an ordered matrix where each cell will be charging cell reference. The strategy is expected by the Dinas Pendapatan Daerah Kota Palembang can implement plans as expected.

Keywords : *Spatial, Taxes, Zachman Framework*

1 INTRODUCTION

Information and communication technologies are growing at this time gives a lot of options and convenience for companies and institutions pemerintahan in improving their performance and provide the best service for the community. Of the many benefits to be provided by technology is a business process that runs in real time. One technology that can realize maximum business processes in terms of services and quality products with efficient use of an information system. With this information system the company can carry out its activities effectively and efficiently [1].

Dinas Pendapatan Daerah Kota Palembang far in regulating the control of a region on setting the tax still done conventionally perceived to be effective and optimal where the community and the Dinas Pendapatan Daerah Kota Palembang trouble knowing restriction area, as well as the specifications of the information structuring of local taxes the city of Palembang in uptodate. In the search for tax information society should go directly to the

Department of Revenue Palembang, then part of the information will be looking for a big book of lists and data regarding the restriction area and specifications regarding tax rates and regulations concerning taxes.

With this shortage of researchers interested in applying a method that can facilitate in an architectural planning Zachman Framework is a method in which these methods can provide enterprise architecture planning to portray the development plan of a system or set of systems [2][2]. Zachman Framework is used to create the structure, classification and documentation of artifacts (models, diagrams, documents) relating to the management and development of enterprise information systems, serves as a tool for understanding of enterprise architecture [3][3].

Zachman framework is structured logic for classifying and organizing the types of documents, design or model that represents a company [4][4]. Zachman Framework provides a framework for thinking about the direction, goals, objectives and requirements of the electric company's business described in perspective Planner (contextual level) [5][5]. In application of the Zachman Framework should describe in detail the columns and rows that are in Zachman matrix by filling the existing cells in the matrix Zachman with sequences where each cell will become a reference charging the cell next viewpoint [6][6]. By applying the method Zachman Framework is expected to make a profit for designing a enterprise architecture optimally as supporting the exchange of data and information, which improves the performance of the organization in the achievement of organizational goals [7][7], Analysis and design can be used as a basis for the development of the information system [8][8] which can later be used in the implementation phase system of spatial taxes on Dinas Pendapatan Daerah Kota Palembang, so as to increase and decrease the time in the area of tax limitation memanaajemen in Palembang more effectively.

Based on the above background and the authors make a draft of the spatial mapping of tax entitled Implementation of 36 Cell Zachman Framework for Integrated Spatial Planning Tax On Revenue Service Palembang.

The aim of the research at the Dinas Pendapatan Daerah Kota Palembang is to make spatial planning draft unified tax on Dinas Pendapatan Daerah Kota Palembang using Zachman Framework which will produce a structured system design architecture.

The benefits of this research are as follows : 1) Designing the structure of a system, database , network , and hardware that can be used to facilitate the spatial planning of integrated tax in Dinas Pendapatan Daerah Kota Palembang, 2) Meimplementasikan Zachman Framework for designing and modeling spatial integrated tax in Dinas Pendapatan Daerah Kota Palembang, 3) Can be used as a reference in the development of an integrated spatial planning tax for Dinas Pendapatan Daerah Kota Palembang.

2 RESEARCH METHODOLOGY

The research method used in the study is the methodology of Enterprise Architecture Planning (EAP) is a method used to build an information architecture [12], EAP is a method of data quality planning approach oriented to business needs and how the implementation of the architecture is done in such a way in an attempt to support the rotation of the wheel business and the achievement of the content and organization of information systems: 1) Initiation Planning. Things to do at this stage is defining the scope and objectives of planning, 2) Business Modeling. Things to do at this stage is the identification of targets and strategy

achievement, 3) Systems and Technology Today. Things to do at this stage is to conduct assessment of the systems and technology, 4) Data Architecture. Things are done at this stage of the business object identification, object definition through review of support materials, relation definition using the ERD, 5) Application Architecture. To define the applications to be built and described in the form of application architecture, 6) Architecture Technology. The definition of technology architecture is the definition of the technology, and 7) Migration Implementation Plan. This stage is intended to define the steps of application development and the estimated resources required.

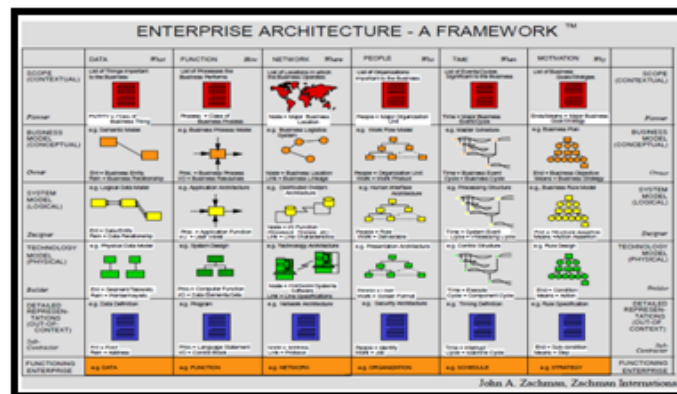


Figure 1: The Zachman Enterprise Architecture

Zachman framework issued by the Institute Zachman Framework For Advancement (ZIFA) in 1987 as the brainchild of John Zachman. John Zachman publishes different approaches to system development [6]. Zachman is an architectural framework with six levels that start with a conceptual level to the detail design and construction of a system [13]. Another important aspect is the clear definition and distinction of the three architectures, namely: data architecture, architecture processes (applications), and network architecture (technology). Here is part of the Zachman Framework: 1) Perspective Planning (Objective / Scope) : establish the context, background, and destination, 2) Perspective owner (Business Models / Owner's View) : set non-perceptual models of enterprise, 3) Perspective Designers (System Model / Designer's View) : set the system information model and bridge owners' desirable and things that can be realized technically and physically, 4) Perspective builder (Technology Model / Builder's View) : sets used in overseeing the technical and physical implementation, 5) Perspectives subcontractors (Detailed Representations / Out of Context View): assign roles and reference for the responsible parties to undertake the construction of information systems, and 6) Functional Perspective (Functioning Enterprise / Functioning System) : represents the user's perspective and a concrete manifestation of implementation results.

3 RESULTS AND DISCUSSION

After analyzing and designing the system, the results achieved by the authors is a Modeling Spatial Integrated Tax On Revenue Service to facilitate Palembang City Regional Revenue Office in the conduct of tax data processing.

<i>Abstraksi/ Perspektif</i>	<i>Data What</i>	<i>Function How</i>	<i>Network Where</i>	<i>People Who</i>	<i>Time When</i>	<i>Motivation Why</i>
<i>Planner / conceptual (scope)</i>	Data Land and Building Tax Taxpayer data IT space Service Room HR data	The process of tax assessment, tax payment, data archiving taxpayer	Part determination, information and services, billing, filing, Secretary of the Head of Department and Head of Department	Head of Department, Determination, information, billing, archiving, Secretary Head of Department and Society	Data Input Tax Determination, Billing Data Validation, Data Input taxpayer, Archiving and Taxpayers	Vision and mission
<i>Owner / conceptual (Business Model)</i>	Flowmap and Usecase System	Physical and Flow Activity Diagram	Network design Determination Section, Information and Services, Billing and Archiving	Programmer, Designer, Administrator, Operator	Time Schedule Project Development	Reason Procurement Information System
<i>Designer / (System Model)</i>	Entity Relation Diagram Bisnis (ERD)	Sequence, detailed, Use case	Network Design Proposed Regional Revenue Office of Palembang	Application Interface Design Manual	Details System Model Design Schedule	Rules In Making Model
<i>Builder (Technology Model)</i>	Relationships Between Tables	Process Application Usage	Location and Technology That Built	Application Interface overview	Details Schedule Application Design	Rules in Making Design
<i>Detailed Representation (Sub-Contractor)</i>	Table Algorithm Development	Algorithms Reporting Process	Network Router Configuration Settings	Each algorithm Configuring Application Access Users	Coding Process Schedule details required	Rules - seal the document in the process of coding
<i>Functioning System (Perspektif Pengguna)</i>	Sample Data Data Land and Building Tax Taxpayer data IT space Service Room HR data	Data processing Data Determination of Tax Billing Data Validation, Data Input taxpayer, Archiving and Taxpayers	Computer browser Internet Network	Head of Department, Determination, information, billing, archiving, Secretary Head of Department and Society	Time and implementasi Schedule design process, design	SOP Use of Information Systems Applications

Figure 2: Results Matrix Spatial Integrated Tax With Zachaman Framework Framework

4 CONCLUSION

Based on the results of the study authors conducted at the Dinas Pendapatan Daerah Kota Palembang and discussions conducted by the authors, it can be concluded that: The preparation of the document which defines the organization as full a useful thing, which the organization defining the data obtained from interviews and analysis organization. Document Enterprise Architecture can be used by system developers to develop a computerized system required by the Dinas Pendapatan Daerah Kota Palembang to improve the effectiveness and efficiency of its performance. In the column that has not been implemented is related to the Components and Functioning systems that exist throughout the column Zachman Framework. The columns associated with system implementation / creation of applications that can be used by the Department of Revenue Palembang as a system that covers all activities of the Dinas Pendapatan Daerah Kota Palembang in full as business flow described in column How section Enterprise Model. From the conclusions that have been raised, then the author would like to give you some suggestions that will serve as a useful input for all of us, especially for the Dinas Pendapatan Daerah Kota Palembang. To support the success of the new system, the authors suggest the following: 1) To produce quality as expected of the company, all parties concerned in Palembang City Regional Revenue Office shall cooperate with the follow of the system has been made of Enterprise Architecture Zachman Framework, 2) Improving the security in terms of security systems to prevent misuse of data in the Dinas Pendapatan Daerah Kota Palembang, and 3) It is expected that further employees or staff Revenue Service Palembang were trained to run these systems make it easier to use.

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□

Design of Security Systems Cabin Car From Danger Gas CO (Carbon Monoxide) With SMS Gateway Information and Data Logger

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Abstract

Carbon Monoxide is the result of incomplete combustion motor vehicles. CO gas is formed when there is a lack of oxygen in the combustion process. Such conditions pose a danger to human life for those who inhale hinga result in acute respiratory disease cause of death. It often happens is causing a person dies in a private car in an engine and AC (Air Conditioner) life due to leakage of CO gas from the rest of the engine exhaust into the car cabin. With the phenomenon takes detector gas leak poisonous CO which can automatically detect a gas leak CO, the tool works by activating the gas sensors detector, opening the car window to neutralize the air inside the cabin of the car, the alarm system will sound with the information SMS Gateway sent to car owners with information on the data records in the internal memory microcontroller data logger when air conditions approaching danger, danger, and very dangerous. This tool is controlled using microcontroller ATmega32 using Gas sensor TGS 2442 and TGS 2600, equipped with a Buzzer, LCD (Liquid Crystal Display), the DC motor driver circuit, and powersupply as a power generator and a voltage range of tools.

Keywords : Carbon Monoxide, Microcontroller ATmega32, SMS Gateway, Data Logger

1 INTRODUCTION

The growth of the automotive industry in the world, especially Indonesia is very fast. Indonesia is the biggest consumer of motor vehicles, namely two wheels and four wheels. According to the statistical center in 2013 the number of motor vehicles amounted to 104 118 969 (one hundred four million one hundred eighteen thousand nine hundred and sixty nine) [1]. The continued development of motor vehicle very rapidly, so there are many who will come out the exhaust gases from combustion vehicles. Exhaust gas in vehicles is the rest of the products of combustion such as carbon monoxide (CO). Gas CO (carbon monoxide) is very dangerous for those who inhale it continuously because the CO gas will follow the blood circulation and will prevent the entry of oxygen that will be required by the body and can cause acute respiratory illness and even death.

1.1 The Phenomenon of the Occurrence of Carbon Monoxide Poisoning

Many cases of death when the victim rest in the car, and gas poisoning CO (carbon monoxide). Usually leaks are coming from the AC line. Each owner must be alert to the condition of AC, to prevent leakage. Owner and technicians spesiaslis car air conditioner repair shop in Umara Auto Car Market Kemayoran, Abu, explains, CO leaks usually occur at air conditioner hose. The reason for the lack of attention and care of the owners on the condition of the car. "Usually the leak because it rarely cared for and the owners still feel cold air-conditioning [2].

1.2 Car

Cars is a very important means of transportation that is widely used by humans and produce exhaust CO. Today many car equipped with several facilities as well as AC (Air Conditioner), Power Windows, which can provide comfort to the car. Of the facility does not mean the technology is without error. Especially is AC (Air Conditioner). If the engine combustion is not perfect and will generate CO gas, gas will enter through the hole AC (Air Conditioner) in the event of a leak in hole AC (Air Conditioner). This gas is very dangerous because it is colorless, odorless, and tasteless. This condition is very dangerous to humans because it can cause people poisoning weak to cause death. Carbon monoxide, chemical formula CO, is a gas that is colorless, odorless, and tasteless. It consists of one carbon atom is covalently bonded to an oxygen atom. In this bond, there are two covalent bonds and coordinate covalent bonds between the carbon and oxygen atoms. Carbon monoxide is produced from the incomplete combustion of carbon compounds, often occur in combustion engines. Carbon monoxide is formed when there is a lack of oxygen in the combustion process. Carbon monoxide is highly flammable and produces a blue flame, producing carbon dioxide [3].

1.3 Microcontroller ATmega32

8-bit microcontrollers of the family Atmel AVR output. This microcontroller is designed based on the AVR RISC architecture (Reduced Instruction Set Computer) which executes one instruction in one clock cycle so as to achieve the execution of instructions by 1 MIPS (Million Instructions Per Second) every 1 MHz clock frequency of the microcontroller used. Used clock frequency can be set via the fuse bits and crystals used. If a crystal is used by 16 MHZ so that its clock frequency of 16 MHz, the execution reached 16 MIPS instructions [4].

1.4 Gas sensor TGS 2600

The Taguchi Gas Sensor (TGS) 2600 (Figaro Engineering Inc., Osaka, Japan) is a low-power consumption highsensitivity gas sensor for the detection of air contaminants such as those typical for cigarette smoke [5]. TGS 2600 sensor is used to detect the contaminated air, gas sensors feature uses a low voltage (low power consumption), has a high sensitivity to contaminated air, and small size. These sensors are included in the class of analog sensors, this means that the gas sensor has a value varied figaro. This sensor has a value of Rs will change when exposed to the gas, and also has a heater (heater) which is used to clean the room sensor of contamination outside air. In order to detect the CO gas sensor connected to ADC microcontroller in port A with a voltage of 5 volts DC the ADC range 0-1023. For the

detection of CO gas is determined that the maximum value of the sensor for detecting CO gas is 30 ppm [6]. The provisions of the CO gas obtained membership function for the value of the membership function with a range of 0-30 ppm. So in order to scale the membership function in accordance with 30 ppm then the ADC value must be divided by 34 which can be searched by the following equation.

$$ADC \text{ divider value} = \frac{1023}{30 \text{ ppm}} \quad (1)$$

Description:

- ADC divider value = 34
- ADC value: 1023
- Gas CO (ppm): The maximum

2 RESEARCH METHODOLOGY

2.1 Planning and Design

Steps being taken in this research is the method of planning and design. The planning stage is to establish a system that will be made and know the working principles to facilitate the process of making tools. The next step is to create a block diagram of the system itself so that it can describe the processes that will be done in the design tool. Here is the design tool of CO gas detection using ATmega microcontroller 32 [7].

CO gas leak detector will work using TGS sensor is a sensor that detects the exhaust gas in the air in the form of CO gas. If the CO gas has been detected, the sensor TGS will give input (insert) to the microcontroller, then from the microcontroller has three outputs namely LCD, buzzer (alarm) and a DC motor for moving the windshield automatically. By using two sensors, namely TGS 2442 and TGS 2600. Both these sensors have different sensitivity. TGS 2442 sensor is used to detect air pollution comes from vehicle exhaust, such as a car or motorcycle exhaust fumes. While TGS 2600 sensor is used to detect the level of air pollution by gases CO (carbon monoxide). If the polluted air around the sensor then the second sensor will immediately react to detect the air disekitanya [3]. In determining the air condition then used the data logger to record the condition of the value of the levels of CO gas reading in ppm with the size stored in the EEPROM memory. If the LCD displays the words "Safe status", it means that the content of CO gas in the car is in a safe condition. However, if the LCD displays the words "danger Status" then the air inside the car has gas contains CO which is very dangerous because it has exceeded the maximum threshold of air that has been set. Then the buzzer will sound indicating that a dangerous gas leak CO followed by a windshield that opens automatically. When the air inside the car slowly started to be counteracted, it will automatically be buzzer will die, then other output will adjust, such as the display on the LCD will change to "safe status". Motor driver serves as a link or an additional device for connecting between microcontroller with a DC motor which is driving an automatic car windows open.

Driver serves as an additional liaison to connect between microcontroller with a buzzer and a fan. Explanation of the flow diagram of CO gas detection equipment in the car with the SMS Gateway and Data Logger Figure 1 below:

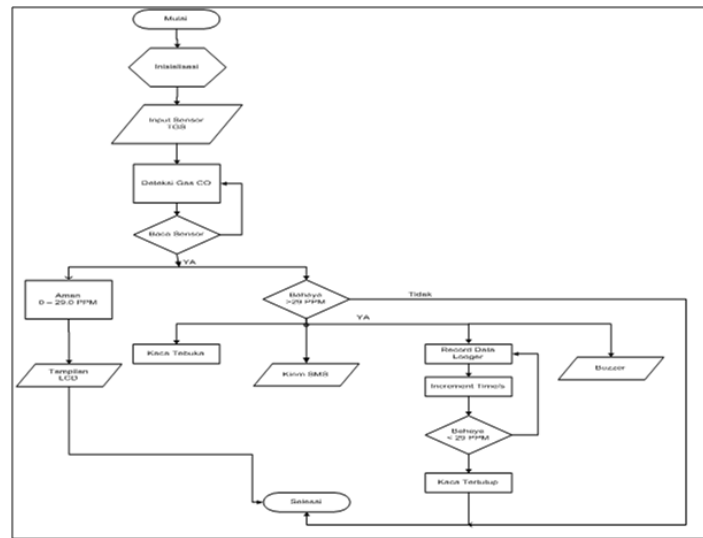


Figure 1: Flowchart Systems CO Gas Detection Equipment

As for the plot and the workings of the flow chart is first initializing serial input was last seen on the CO gas sensor, which will appear in gas levels. Then the sensor will work based falutan smoke is detected by the sensor and sensor TGS 2442 TGS 2600. If CO gas from 0 to 29.0 ppm, the LCD will display "safe status", the buzzer is off, and the windshield does not open automatically. If the CO gas is greater than 29.0 ppm, the LCD displays "Status danger", active buzzer, followed by active DC motor automatically open car windows, the system will send an sms conditions approaching danger, danger and very dangerous to the user manual vehicle car. Where all work towards palutan smoke sensor CO gas will be stored in the internal memory EEPOM Data Logger. Once this is done then the working flowchart of a microcontroller system back repeated from the beginning of the program.

To detect CO gas sensor connected to ADC microcontroller port D with a voltage of 5 volts DC with ADC range 0-1023 for its ADC value. For the detection of CO gas is determined that the maximum value of the sensor for detecting CO gas is 30 ppm [6]. The provisions of the CO gas obtained membership function for the value of the membership function with a range of 0-30 ppm. So in order to scale the membership function in accordance with 30 ppm then ADC value is divided by 34:

$$ADC \text{ divider value} = \frac{ADC \text{ value}}{CO \text{ (ppm)}} \quad (2)$$

Description:

- CO (ppm) levels of CO gas = maximum desired
- ADC value = 1023, then ADC divider value = 34

3 RESULTS AND DISCUSSION

3.1 Measurement and Testing Results Work Sensors Gas Co and Data Logger

Here is a table of test results using the CO gas sensor readings TGS 2600 is to detect pollutants smoke in a car with a data logger for data storage that can be measured in ppm as much as 20 times the measurement in a safe condition:

Table 1: In circumstances Approaching Danger Allocation Recording EEPROM

No	Data Eeprom to	The reading of CO concentration value (ppm) in a state approaching danger	Value readings V out Sensor (Volt)
1	1	10.89	0.87
2	2	13.45	1.075
3	3	13.53	1.081
4	4	13.24	1.058
5	5	14.12	1.128
6	6	14.23	1.137
7	7	14.81	1.183
8	8	14.29	1.142
9	9	14.96	1.195
10	10	15.87	1.268
11	11	16.27	1.3
12	12	18.35	1.466
13	13	18.34	1.465
14	14	18.92	1.512
15	15	19.58	1.565
16	16	19.34	1.545
17	17	19.29	1.541
18	18	19.78	1.581
19	19	19.76	1.579
20	20	19.23	1.537
		328.25	
Average		16.4125	

The following Figure 2. Graph Results The CO gas concentration readings In Danger Approaching the following circumstances:

Figure 2. The graph of test results using the CO gas sensor readings TGS 2600 is to detect pollutants smoke in a car with a data logger for data storage that can be measured in ppm as much as 20 times the measurement in conditions approaching danger shows that the value of sensor readings reach close to 20 ppm. From the test results using a CO gas sensor readings TGS 2600 is to detect pollutants smoke in a car with a data logger for data storage that can be measured in ppm as much as 20 times the measurement in conditions of Danger:

The following Figure 3 Graph Results The CO gas concentration readings In a State of

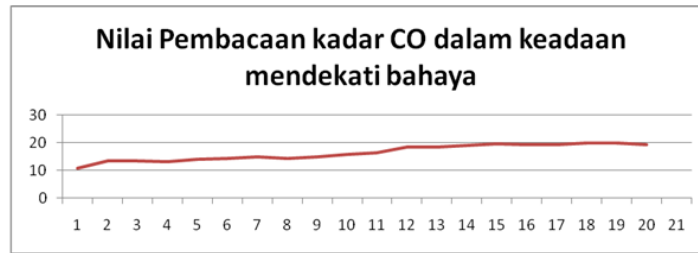


Figure 2: Graph CO gas concentration readings Value In circumstances Approaching Danger

Table 2: In the State of Emergency Allocation Recording EEPROM

No	Data Eeprom to	The The reading of CO concentration value (ppm) in danger	Value readings V out Sensor (Volt)
1	24	21.21	1.695
2	25	21.34	1.705
3	26	21.34	1.705
4	27	21.43	1.712
5	28	21.46	1.715
6	29	21.89	1.749
7	31	22.45	1.794
8	32	22.57	1.804
10	34	23.56	1.883
11	35	23.56	1.883
12	36	24.58	1.964
13	37	24.92	1.991
14	38	24.89	1.989
15	39	24.99	1.997
16	40	25.45	2.034
17	41	25.65	2.05
18	42	24.65	1.97
19	43	24.56	1.963
20	44	25.11	2.007
		469.07	
	Average	23.4535	

Emergency following:

Here are the results of testing the CO gas sensor readings using TGS 2600 is to detect pollutants smoke in a car with a data logger for data storage that can be measured in ppm of 20 times measurements in extremely dangerous conditions:

The following Figure 4. Graph Results The CO gas concentration readings In Case It Danger below:

Figure 4. The graph of the test results using a CO gas sensor readings TGS 2600 is to

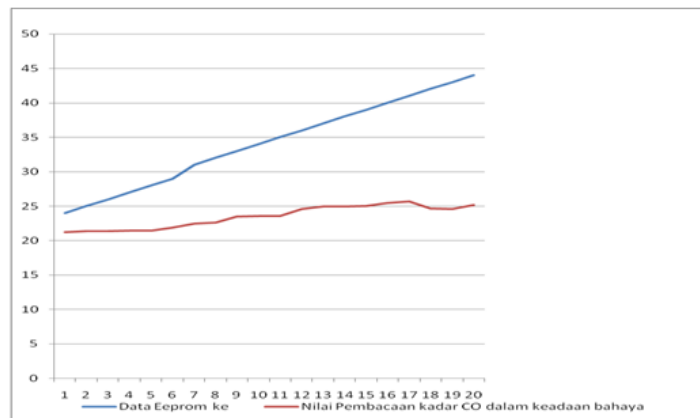


Figure 3: Graph Value CO gas concentration readings In a State of Emergency

Table 3: In the circumstances Highly Danger Allocation Recording EEPROM

No	Data Eeprom to	The reading of CO concentration value (ppm) in a state of very dangerous	Sensor reading out the value of V (volt)
1	51	25.54	2.041
2	52	25.38	2.028
3	53	25.67	2.051
4	54	25.98	2.076
5	55	26.67	2.131
6	56	26.73	2.136
7	57	26.79	2.141
8	58	26.58	2.124
9	59	27.52	2.199
10	60	27.54	2.201
11	61	27.56	2.202
12	62	27.54	2.201
13	63	27.54	2.201
14	64	27.69	2.213
15	65	27.68	2.212
16	66	29.45	2.353
17	67	29.54	2.361
18	68	29.48	2.356
19	69	29.47	2.355
20	70	29.45	2.353
		549.8	
Average		27.49	

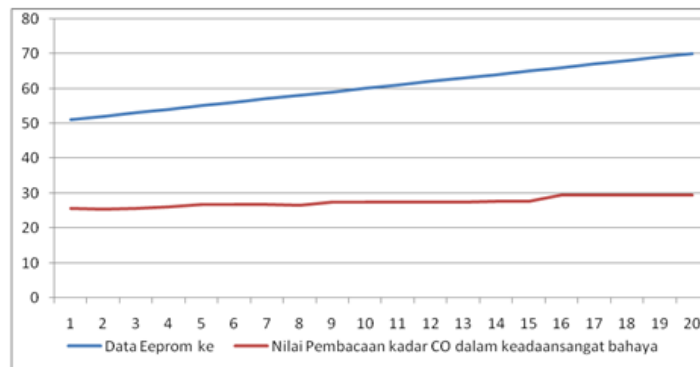


Figure 4: Graph Value CO gas concentration readings In a State of Emergency

detect pollutants smoke in a car with a data logger for data storage that can be measured in ppm of 20 times measurements in extremely dangerous conditions indicate that the value of sensor readings reach close to 30 ppm and storage of data logger showed 70 ppm.

3.2 Discussions

In the measurement value sensor work against palutan CO gas can be seen that under the terms that have been made in controlling the levels of CO gas in a closed car is seen that the greater the level of gas that can be detected by the sensor, the greater the value of the voltage generated by each sensor , Based on test results by conducting 20 trials in reading EEPROM Data Logger is the importance of the value of the average measurement of gas detected by the CO gas safety is an average value of 4.3265 ppm. Approaching conditions Danger average value 16.4125 ppm, Danger condition average value 23.4535 ppm and very dangerous conditions with an average value of 27.49 ppm. As for the output voltage of each gas is a CO gas sensor safe condition average value of 0.34535 V, 1.3114 V condition of approaching danger, Danger Conditions 1.87425 V, and a very dangerous condition 2.188526 V.

4 CONCLUSIONS AND RECOMMENDATIONS

Based on the formulation of the problem, the results of research and discussion presented earlier can be concluded as follows:

1. The results based on testing that was done on the leak detector toxic gases CO in cars using SMS Gateway and Data Logger, the authors conclude with the obtained condition when active sensor levels of CO gas is detected indicates output ;29.0 ppm, the LCD will display "clear status" and if the levels of CO gas is detected achieve; 29.0 ppm, the LCD displays "status danger" and the buzzer lit followed by a DC motor that drives down the windshield automatically.
2. For the average margin of error gas output obtained when a value of 4.3265 ppm and 27.49 ppm safe condition when hazardous conditions.

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Implementation Felder Silverman Learning Style Model for Content Support based on Ontology in Indonesia Learning Management System

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Abstract

Use existing LMS as an extension of classroom learning without involving their own learning. LMS emphasizes the availability of content and delivery to students uniformly to the user. Activity LMS ignores its personalization aspect to be adaptive and interactive. In this research, the development of the LMS. Implementation model of learning styles Felder-Silverman (FSLSM) was conducted to determine the content of learning support materials in online. Ontology used as an important part to represent the personalization of e-Learning as well as the realization of semantic knowledge resources. Ontology implemented to organize content according guidelines principal teaching, relate to the learning style of content support. In testing with varied learning styles of students, the system successfully developed in this study to accommodate FSLSM in presenting content in the style of learning support materials based on ontology.

Keywords : *Felder-Silverman, Learning Styles, Ontology.*

1 INTRODUCTION

Each student (learner) have individual personal needs and characteristics such as different prior knowledge, cognitive abilities, learning styles, motivation, and so on. These differences affect the learning process and be a reason why some students find it easier to learn in a particular case, while others have difficulty. Students have different ways of learning [1, 2]. Students with preference (preferred) Strong for specific learning styles may have difficulties in learning if the teaching does not suit their learning styles, learning styles so that students who are not supported by the learning environment may have problems in the learning process. Ideally, every student gets a different treatment according to the learning style of each. But certainly not easy for teachers to adjust their teaching to the needs of different students. How to teach each teacher may be suitable for the majority of students with specific learning style. but not suitable for students with other learning styles. It cannot be enforced because it is associated with the ability of each faculty itself [3].

Availability of learning content that exists today is not adaptive to ignore individual differences of students and treat all students equally regardless of their needs and personal characteristics, or so-called personalization [4]. Based learning with personalization (personalized learning) is a personal learning that adapts to any strengths, needs and interests of students [5]. To explain the basic concepts in a domain in this case is the subject matter content as well as defining relationships in use ontology [6]. Ontology can be used to support a knowledge management system and opens the possibility to move from document-oriented view toward knowledge are interrelated, can be combined, and can be reused in a more flexible and dynamic. Ontology is a way of representing knowledge of the meaning of objects, properties of an object, and the object relations that may occur on the domain knowledge [7-9].

Course content is based on the guidelines principal teaching in accordance with the curriculum used. Problems arise concerning how to provide personalized content subjects with attention to student learning styles. This study modeling the appropriate personalized learning styles of students to course content based on ontology. This research is to develop a Learning Management System based on Moodle by implementing Felder Silverman learning style model to obtain personalize the content that is used to support online learning. Learning style model developed by Felder and Silverman (1988) combines a four-dimensional, two-dimensional replication of the model is a Myers-Briggs and Kolb. Dimensions Perception (sensing / intuitive) analogous to Perception on the Myers-Briggs and Kolb; Dimensions Processing (active / reflective) are also found in the model Kolb. Felder-Silverman using Input dimension (visual / verbal), and Understanding (sequential / global), details the dimensions of the Felder-Silverman learning styles shown in table 1.

Table 1: In circumstances Approaching Danger Allocation Recording EEPROM

Dimension	Learning Style	Description
Processing	Active Reflexive	How students process information
Perception	Sensitive Intuitive	Related to how students perform perceptual information
Input	Visual Verbal	Types of input information such as what is accepted students
Understanding	Sequential Global	How students understand the information

Felder-Silverman learning style is model used as the basis of adaptive teaching because it is based on the following research: 1) It has been successfully implemented so that a lot of people (students) can adapt on the study material well [3, 10-12], 2) It has been approved by experts in their field / specialist pedagogy [13-15], 3) Very user-friendly and easy to interpret the results of the analysis [16], 4) The dimensions are controlled (controlled) and can actually be implemented [11], dan 5) Focus on Engineering Student implementation [8].

2 RESEARCH METHODOLOGY

The method used in this research is to perform design ontology model and the identification of learning styles through ILS instrument. Ontology is a formal explicit specification of a conceptualization [17]. Conceptualization is an abstract picture of something in the world that wants to be represented. Ontology provides a shared vocabulary that can be used to model a domain, which is the type of an object and / or concepts that exist, and property

and their relationships [12]. Determining the Felder-Silverman learning style model is done using an instrument based psychometric assessment questionnaire called the Index of Learning Style (ILS). ILS is a summary of the question of the fourth dimension FSLSM learning style model that consists of 44 questions and has a value range from +11 to -11 for each dimension. Each question has two options that will determine the strength / inclination one learning style. The answers of the ILS will be accommodated in the ILS Scoring Sheet is then determined its position by placing in the ILS Report Form. ILS value scale is divided into 3 ranges of values 1-3 means that learning styles balanced (balanced) in a dimension of learning styles, grades 5-7 means that the student comfortable with the style of learning at a dimension of learning, and the value of 9-11 means that students can only learn one style of learning at a dimension of learning.

2.1 Design Ontology Model

Making the stages of ontology based on organizational methods of information by establishing and implementing formal ontology [18-20]. Here is an iterative step in the formation of ontology : 1) Determination of the domain and scope of the ontology, 2) Consider reusing existing ontology, 3) Identification of important terms in the ontology, 4) The definition of class and hierarchy, 5) Defining Property, and 6) Making Instance.

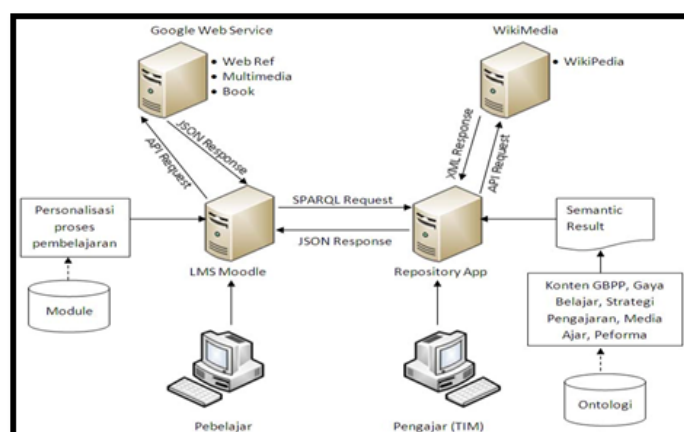


Figure 1: Architecture Design

2.2 Design Ontology Model

Learning resources is a source of additional learning support is given to students as an extension of the material being learning. So that the material learned to be more dynamic [21, 22]. Supporting the content source is obtained by utilizing the Google and Wikipedia API service whose architecture corresponding figure 1. Learning resources come from outside the system supporting learning through API Google and Wikipedia, kind, namely: web ref, multimedia, book and mind map.

Web ref is a source of learning support in the form of a text link or a link to a web page with the same context with the material being studied by the students. Web ref used to have

a dominant learning style text, and liked the detail information, then the appropriate style of learning is active, sensitive, verbal and globally.

Multimedia is a source of learning support in the form of video the same context with the material being studied by the students. Multimedia has a dominant image sequence and applied the appropriate learning style is reflexive, sensitive, visual and sequential.

Book a learning resource in the form of books or literature in accordance with the content and context of the material presented in accordance sequences being studied by the students. Learning styles appropriate for the content of this support is have good analytical skills and dominant in the media text, so that the appropriate is reflexive, intuitive, verbal, and sequential.

Mind map is a learning resource that is presented in the form of mind maps that are interrelated. Mind maps are present in accordance with the context of the material being studied students. Good learning styles to support the use of learning resources are actively like things that are realistic and dominant in visual media, so that the corresponding is active, intuitive, visual and globally.

Results relation to the characteristics of learning resources supporting learning styles Felder Silverman attention to each dimension Felder Silverman learning styles can be found in detail in table 2.

Table 2. Relation Support Content with Felder Silverman Learning Styles.

	Active	Reflective	Sensitif	Intuitive	Visual	Verbal	Sequential	Global
Web Ref	X		X			X		X
Multimedia		X	X		X		X	
Book		X		X		X	X	
MindMap	X			X	X			X

To obtain support content personalization is done by order of the steps as follows: 1) Identify the learning styles of students through ILS instruments at the beginning of online learning, and 2) Perform relation between the characteristics of learning styles with the content source support in order to obtain support content corresponding to the learning styles of students.

3 RESULTS AND DISCUSSION

The final goal of this research is the result showed the content of the courses according to the student's learning style. The case studies used in the test was a course web programming with code IF404 in Information Engineering study program. Tests carried out using SPARQL against Reflexive learning styles, Intuitive, Visual, Global. Here are some test results to obtain content on the topics taught courses on the subject of web programming:

Known learning styles: Reflexive, Intuitive, Visual, Global. The selected topic is the topic of the 5, title JavaScript. Results of content for the selected topic :

Known learning styles: Reflexive, Intuitive, Visual, Global. The selected topic is the topic of the 9, title Manipulasi XML dengan Javascript. Results of content for the selected topic :

konten	penjelasan	filependukung
Do While	<p>Sintaksnya while. . .	_F404_5_7_while.mp4
Method String	<p>Sebagian method yang dapat di . . .	_F404_5_4_string_method.mp4
Method Object Date	<p>Date Object Methods Date . . .	_F404_5_11_objectdate_method.mp4
Penulisan Javascript	<p>Script JavaScript dapat ditempati . . .	_F404_5_1_javascript_intro.mp4
Method Object Math	<p>Math Object Methods Math . . .	_F404_5_12_objectmath_method.mp4
Property Object History	<p>Berikut adalah property yang seri . . .	_F404_5_10_objecthistory_property.mp4
Operator Assignment	<p>Operator atau penandaan assign . . .	_F404_5_3_operator_assignment.mp4
While	<p>Sintaksnya while. . .	_F404_5_7_while.mp4
Property Object Document	<p>Berikut adalah property yang seri . . .	_F404_5_8_objectdoc_property.mp4
Switch	<p>Switch digunakan untuk mengali . . .	_F404_5_6_switch.mp4
Operator Comparison	<p>Operator atau penandaan compa . . .	_F404_5_2_operator_comparison.mp4
Operator Arithmetic	<p>Pada saat anda membuat sebuah . . .	_F404_5_3_operator_arithmetic.mp4

Figure 2: Testing and Results for topics Javascript

konten	penjelasan	filependukung
Menggunakan Parameters	<p>XSLT Processor memungkirkan p . . .	_F404_9_3_xml_xslt_parameter.mp4
Manipulasi Node Value	<p>Ada 2 cara untuk melakukan mani . . .	_F404_9_1_xml_dom_manipulasi.mp4
XSLT pada Internet Explorer	<p>XSLT digunakan untuk mentrans . . .	_F404_9_3_xml_xslt_ie.mp4
Copy Node XML DOM	<p>Melakukan duplikasi node XML di . . .	_F404_9_1_xml_dom_copy.mp4
Menghapus Node	<p>Sebuah node dalam XML DOM di . . .	_F404_9_1_xml_dom_remove.mp4
Dukungan XPath pada Mozilla, Firefox, . . .	<p>Dalam web browser Mozilla, Fire . . .	_F404_9_2_xml_xpath_firefox.mp4
Dukungan XPath pada Internet Explorer	<p>Dalam web browser Internet Expl . . .	_F404_9_2_xml_xpath_ie.mp4
Menambah Node	<p>Berikut adalah node yang akan di . . .	_F404_9_1_xml_dom_add.mp4
Menampilkan Node XML DOM	<p>Untuk menampilkan data XML DO . . .	_F404_9_1_xml_dom_node.mp4
XSLT pada Mozilla, Firefox, Opera, Chro . . .	<p>Sedikit berbeda saat XSLT proce . . .	_F404_9_3_xml_xslt_node.mp4
Menghapus Node	<p>Menghapus node XML dapat dilak . . .	_F404_9_1_xml_remove.mp4
Akses XML DOM	<p>Pada saat menggunakan javascri . . .	_F404_9_1_xml_dom_access.mp4

Figure 3: Testing and Results for topics Manipulasi XML dengan Javascript

Results of the implementation of the supporting content for testing learning styles Reflexive / Sensitive / Visual / Sequential form of a book (book) and a mind map (mind map) is shown in Figure 4. Mind map produced has the appropriate context to the subject being studied.



Figure 4: Implementation Support Content for Reflexive Learning Styles/Sensitive/Visual/Sequential

4 CONCLUSIONS

Model ontology to support content-based subjects Felder Silverman learning styles have been successfully made and tested. Ontology are implemented to organize content according guidelines principal teaching knowledge and learning styles of students. This study does not involve ergonomic aspects so that in future studies it may be included.

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Steganography Application Bitwise Method of Encrypted Message with Vigenere Cipher

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Abstract

Computer security has become a very serious problem. It has been reported that according to the United States Department of Defense (DoD) in 1996 has been estimated there are 250 thousand per year attacks on computer systems and this had increased 100% each year. Boulanger [16]. Cryptography can be defined as an art and knowledge in preparing a secret message. Plaintext message to be encoded into a cipher text through a process of enciphering or encryption and the plaintext message will be returned from the cipher text through the process of deciphering or decryption. Research done is to calculate the Euclidean distance to the insertion of a message that has been encrypted using Vigenere Polyalphabetic to an image. The results obtained are encrypted message using Vigenere Polyalphabetic can be well done on the image. Has successfully decrypted the ciphertext back after being separated from the image so back to plaintext. The message can not be decrypted back when there is a change in the image stegano.

Keywords : *Vigenere cipher, Bitwise, Ciphertext, Euclidean.*

1 INTRODUCTION

With the development of internet access is needed good security such as banking transactions , the risk of transaction data is also growing. To protect data from unauthorized access or loss of data should the necessary encryption to the data at any time. Currently there are several encryption methods like AES and DES. However, the limitations of 56bits key length for DES increasingly make such methods less secure. On the other hand AES newly discovered and untested. This leads to many things in the AES should be retested such as DES. Kasiski method can be used to predict the length of a cipher key words and search for the period of polyalphabetic cipher [1],[2]. Merging Playfair and Vigenere method can produce a layer of security that baik [3]. Polyalphabetic cipher used in each letter on the Caesar cipher key to determine which one will be used . After all the letters on the keys are already in use then subsequently re-used letters in the beginning. Illustration of the use of the key KEY is as follows in Table 1 :

Table 1: Encryption

Kunci	Pesan	Chipertext
KEYKEYK	MESSAGE	WIRCEEO

The cipher form based methodology confusion to form the ciphertext. Repetition of key follow the message or plaintext diffusion is not done just a camouflage against Caesar shift. The longer the keyword the more difficult to break the encryption. If the key length is along the plaintext, the ciphertext have immunity from attack cipher. At the time this condition is met then also called a block cipher. By adding specific bit to the message before it is encrypted then it will increase the security methods polyalphabetical [4].

In general there are two types of an encryption: symmetric and asymmetric. Symmetric encryption uses the same key to encrypt and decrypt a message. Asymmetric encryption is often also referred to as public key or two-key encryption uses one key for encryption and another for decryption of the keys. Another method in polyalphabetical is a permutation/transposition different methods of substitution and called Playfair Cipher. Ciphertext will be formed by reading a column in the order by the key. Place the message to be encrypted into a matrix as in Table 2, then fill the matrix with an extra character. Keywords identify how many times the columns will be used and how the order when the column is used. The order of the columns used is determined by the order of the alphabet contained on keywords.

Table 2: Matrix Transpotion

S	A	M	P	A	I
B	E	R	T	E	M
U	K	E	M	B	A
L	I	E	S	O	K
H	A	R	I	D	I
S	I	N	I	Y	Y

For example if a keyword is SEPATU, then the alphabetical order of the word is 423 156 where A is the first, the second E, P the third and so on. The order placed on the top of the matrix as shown in Table 3.

Table 3: Matrix Based on Seuencc Key

4	2	3	1	5	6
S	A	M	P	A	I
B	E	R	T	E	M
U	K	E	M	B	A
L	I	E	S	O	K
H	A	R	I	D	I
S	I	N	I	Y	Y

Readings are decreased in the order numbers to perform encryption. The first column will contain sequentially PTMSII and overall message will be PTMSII AEKIAI MREERN SBULHS AEBODX IMAKIY. This method can also be referred to as a column transposition in general . With the addition of the transposition cipher Vigenere method can be more complex to solved [5].Vigenere Encryption can also be done by applying the following formula Algebra as the encryption process :

$$Ci = EK(Pi) = (Pi + Ki)mod26 \quad (1)$$

Decryption process can use the formula :

$$Pi = DK(Ci) = (Ci - Ki)mod26 \quad (2)$$

P is the message or plaintext, C is encrypted or ciphertext , and K is the key. To increase the security Vigenere Algebra then be calculated by Alpha Qwerty by the formula :

$$Ci = EK(Pi) = (Pi + Ki)mod92 \quad (3)$$

Decryption by the formula :

$$Pi = DK(Ci) = (Ci - Ki)mod92 \quad (4)$$

The result is Vigenere with Alpha Qwerty safer [6]. Vigenere substitution calculations can also use modulo 64 taking into account the ASCII code [7]. The formula also known as shift cipher [8].There are some crypto systems such as the use of formulas such as the following to encipher :

$$f(x) = 3x \text{ mod } 26 \quad (5)$$

The formula for performing decipher is :

$$f^{-1}(x) = a^{-1} x \text{ mod } |R| = 9x \text{ mod } 92 \quad (6)$$

By using the algebraic formula such as the security in cryptography can be done to prevent any unauthorized access to information [9]. The least significant bit (LSB) is a common method used for the insertion of the merger process messages with pictures. The ability to hide a message called steganography [10]. Bitwise method can provide an effective and efficient performance of the safety factor data [11]. Without the key description of the message is pasted with LSB can not understand the meaning [12]. Bitwise method can perform calculations of data in the form of bits, but for the simpler the better used in binary computation [13]. The best approach when making steganography using bitwise LSB is a method where the message can be hidden in an object [14]. Euclidean distance can be used to seek a common particular state or environmental similarity [15].

The research objective is to analyze the data encryption using the polyalphabetical Vigenere cipher using process developed by Rahmani.et.al.[6], the level of success in the overall process, including the process of LSB bitwise stegano. Measurements were performed by calculating the Euclidean distance between the inserted image and the original image.

2 RESEARCH METHODOLOGY

Encryption is the process by which a message (plaintext) is transformed into another form of message (ciphertext) using a mathematical function and a special password encryption key that is known by the term. Decryption is the reverse process of this which ciphertext is transformed back into plaintext with mathematical method and using a key. Substitution cipher is a condition in which each letter of a plaintext is replaced by another symbol and is usually used in the replacement of these symbols are the letters of the alphabet series. The study design is shown in Figure 1.



Figure 1: Design of the study

Message encryption using polyalphabetical without transposition process. Vigenere Cipher calculations can use Table 4 as a reference shift. Polyalphabetical algorithm used to perform the encryption is shown in Figure 2.

```
function ciphertext = encrypt(plaintext, key)
v = vigenere;

% Squeeze out everything except letters and the space character
exclude = regexp(plaintext, '[^a-zA-Z ]');
plaintext(exclude) = [];

% Make the key and the plaintext lower case, and convert to
% numeric values.
key = lower(key) - double('a') + 1;
key(key < 0) = 26;
plaintext = lower(plaintext) - double('a') + 1;
plaintext(plaintext < 0) = 26;

% Replicate the key so that it is as long as the plaintext.
keyIndex = mod(0:(numel(plaintext)-1), numel(key))+1;
k = key(keyIndex);

% Encrypt: C(m,n) = V(k(j), plaintext(j))
ciphertext = arrayfun(@(m,n) v(m,n), k, plaintext) - 1;
ciphertext(ciphertext == 25) = double(' ') - double('a');
ciphertext = upper(char(ciphertext + double('a')));
```

Figure 2: Encryption Polyalphabetical

After the encryption process with the shift cipher polyalphabet done then the next process is inserting a message into the picture. The flow of the process used is bitwise LSB which transpose into a message in binary form and then pasted into the picture with a particular

pixel location as shown in Figure 3. In a similar algorithm message is retrieved from the image.

```

for i = 1 : height
    for j = 1 : width
        LSB = mod(double(c(i,j)), 2);

        if (k>m || LSB == b(k))
            s(i,j) = c(i,j);
        else
            if(LSB == 1)
                s(i,j) = c(i,j) - 1;
            else
                s(i,j) = c(i,j) + 1;
            end
            k = k + 1;
        end
    end
end
end

```

Figure 3: Algorithm LSB Stegano.

With the algorithm shown in Figure 4. The message is retrieved from the image to be ready to be decrypted. Sampling was done by random that way provide an opportunity or an equal chance of each element in the population to be selected as a sample. Measurements in this study using accidental sampling, where sampling can be done by chance along the information or represents necessary [16].

In conducting the study used computer with i5 series processor with Windows 7 operating system and applications MatLab 2013a.

3 RESULTS AND DISCUSSION

To calculate the distance of Euclidean the characteristics used are Mean, Standard deviation, contrast, homogeneity, Entropy, Correlation and Energy. The complete results of the calculation of distance Euledian of the original image with the image polyalphabetical is shown in Table 5.

Results of this research is the conclusion of the testing that has been done. The test results based on specifications of the application indicates that this application be successful for each factor testing. Factors to be examined include the suitability factors, the suitability of data, and image quality stegano. In the conformance testing process, the application can perform encryption and decryption process text message properly.

Results obtained after several trials are as shown in Table 5 and Table 6. All plaintext encryption can be done well and can be inserted into the image well too. Euclidean distance

```

function plaintext = decrypt(ciphertext, key)
v = vigenere;

% Convert the key and the ciphertext to one-based numeric values:
% A=1, B=2, etc. SPACE=27
key = lower(key) - double('a') + 1;
key(key < 0) = 26;
ciphertext = lower(ciphertext) - double('a') + 1;
ciphertext(ciphertext < 0) = 26;

% Replicate the key so that it is as long as the ciphertext.
keyIndex = mod(0:(numel(ciphertext)-1), numel(key))+1;
k = key(keyIndex);

% Decrypt. Each letter of the key determines a row in the Vigenere
% square. In that row, find the column index of the corresponding
% ciphertext letter. Convert the index back to a letter to determine
% the decrypted character (1=A, 2=B, etc.).
plaintext = arrayfun(@(m,n) find(v(m,:) == n), k, ciphertext) - 1;
plaintext(plaintext == 25) = double(' ') - double('a');
plaintext = upper(char(plaintext + double('a')));

```

Figure 4: Algorithm decryption.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y

Figure 5: Matrix Vigenere.

calculations used indicates that the resulting values vary according to the ciphertext inserted. EU1 value indicates also that there is a change in the value of LSB particular pixel in the image. This is evidenced by Euclidean distance greater than zero and no zeroes. As we know that if Euclidean value is zero then there is no change in the structure of the pixels of an image before and after the process stegano.

As shown in Table 6 by using the key word length of 10 and 20, the resulting time encryption and decryption are quite stable. A big change from small to large files has implications

Table 4: Research result

No	Plaintext	Key	Chipertext	Eu1
1	VIGENERE CIPHER	RAHMANI	MINQNR V JUPUMI	0.0277855
2	ALGEBRA CIPHER	Kabachinski	KLHEDYIMUSXRES	0.147195
3	Bitwise	Kasiski	LILEACM	0.210274
4	Euclidean	Klaus	OFCFWNPAH	0.0649331
5	STEGANOGRAFI	WILSON	OBPYOAKOCSTV	0.129141
6	good morning	Diposumarto	JWDRRGAREBBJ	0.0334618
7	tehnik komputasi	Liss	EM FTSRC UHMEIKA	0.0670482
8	polyalphabetical	Ahmed	PVXCDLWTEEEAUGDL	0.0234007
9	security ciphers	Mollin	ESNF VFMKNQCTSCD	0.368105
10	accidental random	Klima	KNKUDOYBMLICIDYX	0.390709

Table 6. Elapse time result.

	Test	Filename	File Size (bytes)	Encryption (millisec)		Decryption (millisec)	
				Enc	Dec	Enc	Dec
1	tes1.txt	1,370	41,165	19,740			
2	tes2.txt	4,026	60,078	79,788			
3	tes3.txt	11,765	103,028	138,001			
4	tes4.txt	35,477	223,663	294,650			
5	tes5.txt	50,831	316,540	409,685			
6	tes6.txt	203,324	1,090,959	395,867			
7	tes7.txt	406,648	2,220,333	397,942			
8	tes8.txt	609,972	3,278,398	423,814			
9	tes9.txt	813,296	4,273,272	438,266			
10	tes10.txt	1,219,944	6,771,573	398,032			

	Test	Filename	File Size (bytes)	Encryption (millisec)		Decryption (millisec)	
				Enc	Dec	Enc	Dec
1	tes1.txt	1,370	27,235	38,099			
2	tes2.txt	4,026	60,353	58,879			
3	tes3.txt	11,765	105,285	133,705			
4	tes4.txt	35,477	224,609	308,607			
5	tes5.txt	50,831	315,420	394,019			
6	tes6.txt	203,324	1,108,263	377,548			
7	tes7.txt	406,648	2,169,558	402,453			
8	tes8.txt	609,972	3,227,332	397,868			
9	tes9.txt	813,296	4,342,471	367,058			
10	tes10.txt	1,219,944	6,495,980	360,670			

linearly with time is used for encryption, but not with the decryption process. Decryption process looks fairly stable at an average of 280k millisecond . It can be clearly seen in Figure 5.

In testing the suitability of data, text messages are decrypted in accordance with the pasted text messages. Suitability in terms of the content of the text message. Image quality testing showed that the insertion of the bits of text messages into an image does not affect the picture quality. This is because changes in the first bit is very difficult to be detected by the human eye. And this is also shown by the images before and after the insertion is practically invisible difference. In testing the durability of data to image manipulation stega, all the

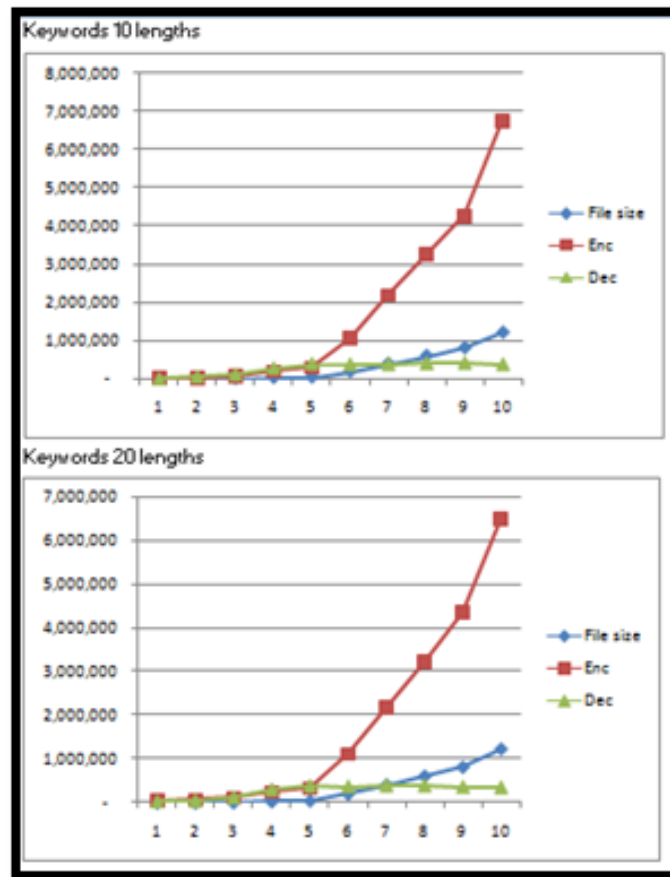


Figure 6: Cipher Result in millisecond.

test results indicate that a text message can not be decrypted. Stegano image manipulation process causes changes in the random bit image stegano. Where the random bit is a place to insert text messages. And based on the test results, it can be concluded that the image stega results vigenere cipher encryption and steganography bitwise operations cannot tolerate the manipulation of images. The results can be seen in Table 7.

4 CONCLUSIONS

From the test results based on the application specifications, with vigenere cipher encryption method and operation of LSB steganography, encryption and decryption can be done well. For the suitability of data, text messages and the decryption result is the same as the original message. Insertion of the message also does not affect the picture quality because it is difficult to detect by the human eye, but there is a change in the distance calculation Euclidean.

From the test results based on resistance data, it can be concluded that the image file stegano not resistant to factor image manipulation. The message can not be decrypted after stegano manipulated images. This is caused by the insertion of the ciphertext message on

Table 7. Durability test.

	Test	Filename	File Size (bytes)	Encryption (millisec)		Decryption (millisec)	
				Enc	Dec	Enc	Dec
Keywords 10 lengths	1	tes1.txt	1,370	41,165	19,740		
	2	tes2.txt	4,026	60,078	79,788		
	3	tes3.txt	11,765	103,028	138,001		
	4	tes4.txt	35,477	223,663	294,650		
	5	tes5.txt	50,831	316,540	409,685		
	6	tes6.txt	203,324	1,090,959	395,867		
	7	tes7.txt	406,648	2,220,333	397,942		
	8	tes8.txt	609,972	3,278,398	423,814		
	9	tes9.txt	813,296	4,273,272	438,266		
	10	tes10.txt	1,219,944	6,771,573	398,032		

	Test	Filename	File Size (bytes)	Encryption (millisec)		Decryption (millisec)	
				Enc	Dec	Enc	Dec
Keywords 20 lengths	1	tes1.txt	1,370	27,235	38,099		
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	4	tes4.txt	35,477	224,609	308,607		
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	7	tes7.txt	406,648	2,169,558	402,453		
	8	tes8.txt	609,972	3,227,332	397,868		
	9	tes9.txt	813,296	4,342,471	367,058		
	10	tes10.txt	1,219,944	6,495,980	360,670		

the image placed on the location of the image pixels are spread out so if there is the slightest change in the pixel image that is inserted then the message can not be restored to perfection.

Future studies could analyze the use of media other than the image to accommodate the encryption and stegano . Other media that can be considered is the MIDI file or an MP3 file. The application of this research is to use a .txt file that stores messages. Future studies could attempt to use other than the file .txt file. In this study tested the Euclidean distance between distegano pictures before and after. There are several methods such as Manhattan and/or Mahalanobis that can be applied to test whether the image has a distance analysis.

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Vector Machine Learning Method for Text Mining Indonesian Social Media Named Entity Recognition

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Abstract

Social media named entity recognition (SMNER) is one of the important tasks in social media information extraction, which involves the identification and classification of words or sequences of words denoting a concept or entity. With the extension of named entity recognition to new information areas, the task of identifying meaningful entities has become more complex as categories are more specific to a given domain. SMNER solutions that achieve a high level of accuracy in some language or domain may perform much poorly in a different context. Support Vector Machine (SVM) is rapidly emerging as a promising pattern recognition methodology due to its generalization capability and its ability to handle high-dimensional input. However, SVM is known to suffer from slow training especially with large input data size. In this paper, we explore the scalability issues for Indonesian social media named entity recognition using high-dimensional features and support vector machines.

Keywords : *Support Vector Machine, Machine Learning, Text Mining, Indonesian Social Media, Named Entity Recognition*

1 INTRODUCTION

Social development of the Indonesian media is very influential on the various joints public life of the nation Indonesia. Based on the classification of the influence of social media can be seen from all sides of life ideologies, social, cultural, political [1, 2], defense and security of the state (IPOLEKSUBUDHANKAM) [3].

Social media named entity recognition (SMNER) is one of the important tasks in Indonesian social media information extraction, which involves the identification and classification of words or sequences of words denoting a concept or entity. Examples of such information units are names of persons, organizations, or locations in the general context of social media, and the names of facebook and genes in the social media context. With the extension of named entity recognition to new information areas, the task of identifying meaningful entities has become more complex as categories are more specific to a given domain. SMNER solutions that achieve a high level of accuracy in some language or domain may perform much poorly in a different context [4].



Figure 1: Perspective Social Media Indonesia

From a technical perspective, social media analytics research faces several unique challenges. First, social media contains an enriched set of data or metadata, which have not been treated systematically in data- and text-mining literature. Examples include tags (annotations or labels using free-form keywords); user-expressed subjective opinions, insights, evaluation, and perspectives; ratings; user profiles; and both explicit and implicit social networks. Second, social media applications are a prominent example of human-centered computing with their own unique emphasis on social interactions among users. Hence, issues such as context-dependent user profiling and needs elicitation as well as various kinds of human computer interaction considerations must be reexamined. Third, although social media promises a new approach to tackling the noise and information-overload problem with Web-based information processing, issues such as semantic inconsistency, conflicting evidence, lack of structure, inaccuracies, and difficulty in integrating different kinds of signals abound in social media. Fourth, social media data are dynamic streams, with their volume rapidly increasing. The dynamic nature of such data and their sheer size pose significant challenges to computing in general and to semantic computing in particular [5].

Different approaches are used for carry out the identification and classification of entities. Statistical, probabilistic, rule-based, memory-based, and machine learning methods are developed. The extension of SMNER to specialized domains raise the importance of devising solutions that require less human intervention in the annotation of examples or the development of specific rules. Machine learning techniques are therefore experiencing an increased adoption and much research activity is taking place in order to make such solutions more feasible. Support Vector Machine (SVM) is rapidly emerging as a promising pattern recognition methodology due to its generalization capability and its ability to handle high-dimensional input. However, SVM is known to suffer from slow training especially with large input data size.

In this paper, we explore the scalability issues for Indonesian social media named entity recognition using high-dimensional features and support vector machines. We present the results of experiments using large Indonesia social media datasets and propose a plan to improve SVM scalability using new database-supported algorithms.

2 RESEARCH METHODOLOGY

2.1 Social Media Machine Learning Architecture

Constructing a social media named entity recognition solution using a machine learning approach requires many computational steps including preprocessing, learning, classification, and post-processing [6]. The specific components included in a given solution vary but they may be viewed as making part of the following groups summarized in Figure 2.

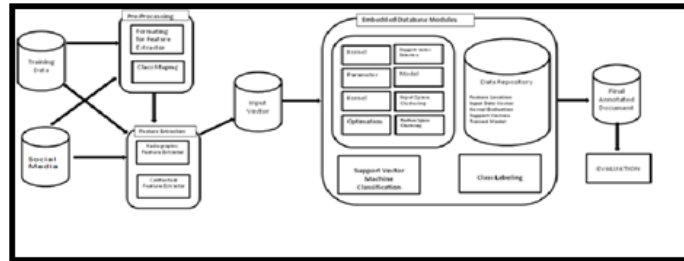


Figure 2: Social Media Machine Learning Architecture

2.2 Preprocessing Modules

Using a supervised machine learning technique relies on the existence of annotated training data. Such data is usually created manually by humans or experts in the relevant field. The training data needs to be put in a format that is suitable to the solution of choice. New data to be classified also requires the same formatting. Depending on the needs of the solution, the textual data may need to be tokenized, normalized, scaled, mapped to numeric classes, prior to being fed to a feature extraction module. To reduce the training time with large training data, some techniques such as chunking or instance pruning (filtering) may need to be applied.

2.3 Feature Extraction

In the feature extraction phase, training and new data is processed by one or more pieces of software in order to extract the descriptive information about it. The choice of feature extraction modules depends on the solution design and may include the extraction of orthographic and morphological features, contextual information about how tokens appear in the documents, linguistic information such as part-of-speech or syntactic indicators, and domain-specific knowledge such as the inclusion of specialized dictionaries or gazetteers (reference lists). Some types of information may require the use of other machine learning steps to generate it, for example, part-of-speech tagging is usually performed by a separate machine learning and classification software which may or may not exist for a particular language.

Preparing the data for use by the feature extractor may require special formatting to suit the input format of the software. Also, depending on the choice of machine learning software, one may need to reformat the output of the feature extraction to be compatible with what's expected by the machine learning module(s). Due to the lack of standardization in this area

and because no integrated solutions exist for named entity recognition, several compatibilities exist between the many tools one may use to build the overall architecture. In addition, one may also need to build customized interfacing modules to fit all the pieces of the solution together.

2.4 Learning and Classification

Most of the publicly available machine learning software use a two-phased approach where learning is first performed to generate a trained machine followed by a classification step. The trained model for a given problem can be reused for many classifications as long as there is no need to change the learning parameters or the training data.

2.5 Post-Processing Modules

The post-processing phase prepares the classified output for use by other applications and/or for evaluation. The classified output may need to be reformatted, regrouped into one large chunk if the input data was broken down into smaller pieces prior to being processed, remapped to reflect the string class names, and tested for accuracy by evaluation tools. The final collection of annotated documents may be reviewed by human experts prior to being used for other needs.

Social media application method named entity recognition for text mining interpretation and extracting information from social media web can use the web extract text mining method to build domain models and rules of social media interpretation of named entity recognition dictionary. Extended the application of social media named entity recognition in the new domain lead to more adoption of supervised machine learning techniques that include Support Vector Machine (SVM) [7, 8].

With the growing adoption of machine learning techniques for SMNER, especially for specialized domains, the need for developing semi-supervised or unsupervised solutions. Supervised learning methods rely on the existence of manually annotated training data, which is very expensive in terms of labor and time and a hindering factor for many complex domains with growing nomenclature. However, using unannotated training data or a mixture of labeled and unlabeled data requires the development of new SMNER machine learning solutions based on clustering and inference techniques.

2.6 Multi-class Support Vector Classification

For classification problems with multiple classes, different approaches are developed in order to decide whether a given data point belongs to one of the classes or not. The most common approaches are those that combine several binary classifiers and use a voting technique to make the final classification decision. These include: One-Against-All, One-Against-One, Directed Acyclic Graph (DAG), and Half-against-half method [9, 10]. A more complex approach is one that attempts to build one Support Vector Machine that separates all classes at the same time. In this section we will briefly introduce these multi-class SVM approaches. Figure 4 compares the decision boundaries for three classes using a One-Against-All SVM, a One-Against-One SVM, and an All-Together SVM. The interpretation of these decision boundaries will be discussed as we define the training and classification techniques using each approach.

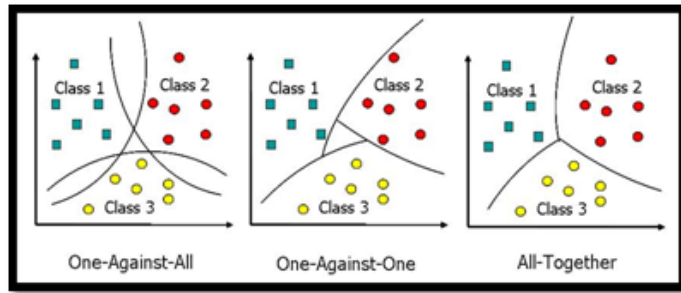


Figure 3: Comparison of Multi-Class Boundaries

3 SOCIAL MEDIA MULTI-CLASS SUPPORT VECTOR MACHINE RESULTS

The multi-class performance results are summarized in table 3.1.. The overall recall measure achieved is ideologies (65.27%), social (56.19%, cultural (55.56%), political (61.99%), economic (48.15%) and Defence and Security (63.03%). These results are compared to those obtained by the social media participating systems which used support vector machines either in isolation or in combination with other models using the same task data. The performance comparison results are reported in table 1. The language-independent approach used in this experiment performed very close than which both used Support Vector Machine as the only learning model. In this experiment used character n-grams, orthographic information, word shapes, gene sequences prior knowledge, word variations, part-of-speech tags, noun phrase tags, and word triggers.

Table 1: Multi-Class SVM Results 1998-2001 Set

Named entity	Complete match	Right boundary match	Left boundary match
Ideologies (3186)	2271 (71.28 / 60.19 / 65.27)	2666 (83.68 / 70.66 / 76.62)	2526 (79.28 / 66.95 / 72.60)
Social (588)	277 (47.11 / 69.60 / 56.19)	386 (65.65 / 96.98 / 78.30)	312 (53.06 / 78.39 / 63.29)
Cultural (70)	35 (50.00 / 62.50 / 55.56)	53 (75.71 / 94.64 / 84.13)	36 (51.43 / 64.29 / 57.14)
Political (1138)	570 (50.09 / 81.31 / 61.99)	802 (70.47 / 114.41 / 87.22)	612 (53.78 / 87.30 / 66.56)

4 CONCLUSIONS

The historical development of support vector machine learning method and its applications in Indonesian social media shows that from simple and straight forward to use algorithms, systems and methodology have emerged that enable advanced and sophisticated data analysis. In the future, social media intelligent data analysis will play even a more important role, due to the huge amount of information produced and stored by modern technology.

Current machine learning algorithms provide tools that can significantly help social media practitioners to reveal interesting relationships in their data. Our experiments show that in social media domains various classifiers perform roughly the same. So one of the important

factors when choosing which classifier to apply is its explanation ability.

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Software Quality Assurance of Learning Game Using Deutsch and Willis Method

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Abstract

Computer-based learning is an instructional program that is used in the learning process by using software that contains the payload of learning. One software application that can be used is a learning game. Many examples of products that are used as learning practices, including the game can get the products sold in the market or through a virtual world that can be downloaded via the internet. Basically, there are many similarities in the products developed. But to note is the quality of the product. in this case must be assessed whether a product meets the needs of users and how easy to learn and use the product.

Keywords : *Learning games, Software quality assurance, Deutsch and Willis*

1 INTRODUCTION

Adult learning is still widely used method of expository felt inadequate. Of the various conditions and potentials, efforts can be made with regard to improving the quality of schools is to develop a learning-oriented learners (children center) and facilitate the learning needs of active, creative, effective and fun to develop and implement a computer-based learning.

One software application that can be used is the medium of learning. Learning media is a tool or form of stimulus that serves to convey a message of learning. Many examples of products that are used as learning practices, including the game can get the products sold in the market or through a virtual world that can be downloaded via the internet. Basically, there are many similarities in the products developed. But to note is the quality of the product, in this case should be assessed a product if it meets the needs of users in which there are the supporting component of the purpose or results consistent content including components related to each other. And how easy to learn and use the product.

1.1 Software Quality Assurance

According to Galin [1] Quality assurance software is a pattern of planned and systematic of all actions necessary to provide adequate confidence that a product or a product is established in accordance with the technical requirements and a set of activities designed to evaluate the process of how the products developed or manufactured. Contrast with quality control.

1.2 Learning Games

Game very significant role in improving the effectiveness of the learning process. According to Rusman [2] Instructional games or games is one of the methods in computer-based learning. Furthermore, according to Azhar [3] "instructional games are well-designed game can motivate students and improve their knowledge and skills. Instructional game that successfully combines action video games and skill use the keyboard on the computer".

1.3 Deutsch and Willis Method

According to Galin [1], method of Deutsch and Willis is the method used for the assessment of software quality assurance. This model is an alternative model that emerged after the model McCall, then Evans and Marciniak, see figure 1.

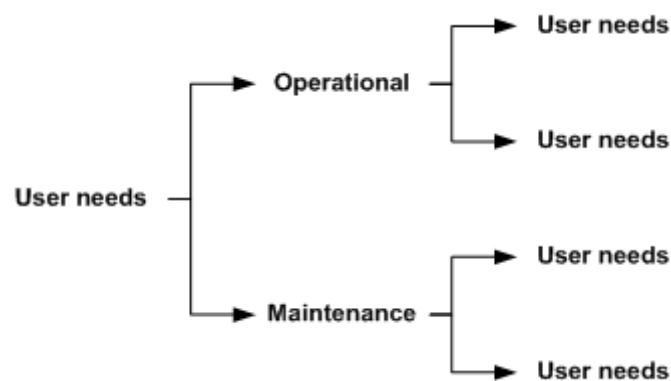


Figure 1: User need deutsch and willis

Table 1 stated comparison of the contents of factor models, it was found that two of the five additional factors, Expandability and Survivability, really-really resemble the factors that are included in the model factor McCall, although different names, Flexibilitas and Reliability. In addition, testability factor is the ability of a software product that allows the modification of the software for validation, as well as the effort required separately test the program, ensuring the software performs the function expected. Testability factors considered as one element in the maintenance factors or treatments on the model of Deutsch and Willis. Testability McCall used in the model has sub-factor is user used in Usability Testing, testing maintenance failures included in Survavibility and Traceability included in Verifibility in Deutsch models and Willis.

2 RESEARCH METHODOLOGY

The method used is qualitative research methods in preparation of the interview guide and questionnaire. The method used in this research is the method Duetsch and Willis with variables tested, namely functional and performance with aspects of the correctness, reliability, efficiency, integrity, usability. Subjects of this study is the application of mathematics classroom learning games two. respondents who used as many as 5 people engaged in the field

Table 1: Factors and Willis Deutsch

No	Software Quality Factor	McCalls classic model	Alternative factor models	
			Evans and Marciniak model	Deutsch and Willis method
1	Correctness	+	+	+
2	Reliability	+	+	+
3	Efficiency	+	+	+
4	Integrity	+	+	+
5	Usability	+	+	+
6	Maintainability	+	+	+
7	Flexibility	+	+	+
8	Testability	+		
9	Portability	+	+	+
10	Reusability	+	+	+
11	Interoperability	+	+	+
12	Verifiability		+	+
13	Expandability		+	+
14	Safety			+
15	Manageability			+
16	Survivability			+

of software engineering. This is done to assess or guarantee the level of quality of a software used will provide certainty and confidence that the quality can meet the targets adopted in learning. Step carried begins with data collection, data analysis using a Likert scale. The frame of this study, as shown in the figure below:

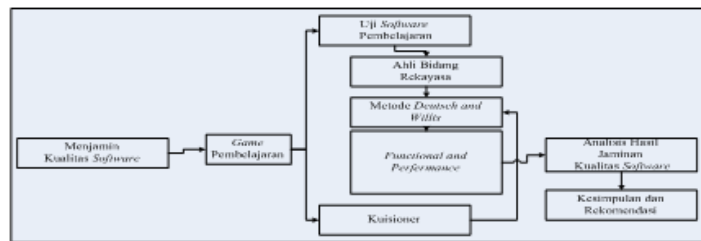


Figure 2: Worldview Quality Assurance

3 RESULTS OF DATA ANALYSIS

Methods Deutsch and Willis on functional and performance of products in which there are 5 components (correctness, reliability, efficiency, integrity, and usability) that must be met by using software quality metrics and then select some indicators as needed. Here are presented the results of an evaluation of the 5 components of Duetsch and Willis on mathematics

learning games 2nd class.

3.1 Correctness

To get the final category, the calculation to obtain the total score, as shown below:

Table 2: Results of the total score on correctness

Respondents	Aspect Correctness							
	Accuracy			Completeness			Up to Date	
	1	2	3	4	5	6	7	8
R1	4	4	5	4	4	5	4	4
R2	5	5	5	5	4	5	4	4
R3	5	4	4	4	4	4	4	3
R4	5	4	4	4	4	4	5	5
R5	4	5	4	4	4	4	5	5
Amount	23	22	22	21	20	22	22	21

Table 3: Continued score on the total results of correctness

Respondents	Aspect Correctness								Score
	Avalability		Coding and documentation guidelines			Compliance/ Consistency			
	9	10	11	12	13	14	15		
R1	5	4	4	5	4	5	4	65	
R2	4	5	5	5	4	4	5	69	
R3	4	4	4	4	5	4	4	61	
R4	4	4	5	5	5	5	4	67	
R5	3	4	4	4	5	4	4	63	
Amount	20	21	22	23	23	22	21	325	

After getting a total score then determines the maximum value of the two respondents as shown below: $\text{Max} = \text{Top Value} \times \text{Much about the } 5 \times 15 = 75$, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

3.2 Aspect Reliability

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the two respondents as shown below: $\text{Max} = \text{Top Value} \times \text{Much about the } 5 \times 7 = 35$, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

Table 4: Percentage Feasibility Aspects Correctness

Respondent	Score	Max Value	Precentage	Category
R1	65	75	86,66	Very Worthy
R2	69	75	92	Very Worthy
R3	61	75	81,33	Very Worthy
R4	67	75	89,33	Very Worthy
R5	63	75	84	Very Worthy
Amount	325	375	86,66	Very Worthy

Table 5: Results Total Score On Reliability

Respondents	Aspect Reliability							Score
	System Reliability			Computational Failure				
	1	2	3	4	5	6	7	
R1	5	5	4	5	4	4	4	31
R2	5	4	4	4	4	5	5	31
R3	5	4	4	4	4	5	4	30
R4	4	4	5	4	5	4	5	31
R5	4	5	4	4	5	4	4	30
Amount	23	22	21	21	22	22	22	153

Table 6: Percentage Feasibility Aspects Reliability

Respondent	Score	Max Value	Precentage	Category
R1	31	35	88,57	Very Worthy
R2	31	35	88,57	Very Worthy
R3	30	35	85,71	Very Worthy
R4	31	35	88,57	Very Worthy
R5	30	35	85,71	Very Worthy
Amount	153	175	87,43	Very Worthy

3.3 Aspect Efficiency

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the two respondents as shown below: $\text{Max} = \text{Top Value} \times \text{Much about the } 5 \times 6 = 30$, then calculated the percentage of feasibility that $\text{percentage} = \text{number of scores obtained} / \text{maximum total score} \times 100$.

3.3.1 Aspect Integrity

To get the final category, the calculation to obtain the total score, as shown in the table below:

Table 7: Results Total Score On Efficiency

Respondents	Aspect Efficiency						Score
	Efficiency of Processing			Efficiency of Communication			
	1	2	3	4	5	6	
R1	4	3	4	4	4	3	22
R2	5	4	4	4	4	4	25
R3	4	4	5	5	4	4	26
R4	4	5	5	4	5	5	28
R5	3	4	5	4	3	4	23
Amount	20	20	23	21	20	20	124

Table 8: Percentage Feasibility Aspects Efficiency

Respondent	Score	Max Value	Percentage	Category
R1	22	30	73,3	Worthy
R2	25	30	83,3	Very Worthy
R3	26	30	86,7	Very Worthy
R4	28	30	93,3	Very Worthy
R5	23	30	76,7	Worthy
Amount	124	150	82,7	Very Worthy

Table 9: Results Total Score On Integrity

Respondents	Aspect Integrity					Score
	Access Control			Access Audit		
	1	2	3	4	5	
R1	5	5	5	5	4	24
R2	4	4	5	4	4	21
R3	4	3	4	3	3	17
R4	4	5	5	4	4	22
R5	5	4	4	1	4	18
Amount	22	21	23	17	19	102

After getting a total score then determines the maximum value of the two respondents as shown below: $\text{Max} = \text{Top Value} \times \text{Much about the } 5 \times 6 = 30$, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

3.4 Aspect Usability

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the five respondents as

Table 10: Percentage Feasibility Aspects Integrity

Respondent	Score	Max Value	Precentage	Category
R1	24	25	96	Very Worthy
R2	21	25	84	Very Worthy
R3	17	25	68	Worthy
R4	22	25	88	Very Worthy
R5	18	25	72	Worthy
Amount	102	125	81,6	Very Worthy

Table 11: Results Total Score On Usabilityh

Respondents	Aspect Usability					Score
	1	2	3	4	5	
R1	4	5	5	5	4	23
R2	5	4	4	4	4	21
R3	4	4	4	4	4	20
R4	5	5	5	5	5	25
R5	3	4	4	3	4	18
Amount	21	22	22	21	21	107

Table 12: Percentage Feasibility Aspects Usability

Respondent	Score	Max Value	Precentage	Category
R1	23	25	92	Very Worthy
R2	21	25	84	Very Worthy
R3	20	25	80	Worthy
R4	25	25	100	Very Worthy
R5	18	25	72	Worthy
Amount	107	125	85,6	Very Worthy

Table 13: Percentage of the Feasibility All Aspects of Software Engineering Inspection

Respondent	Score	Max Value	Precentage	Category
R1	165	190	86,84	Very Worthy
R2	167	190	87,89	Very Worthy
R3	154	190	81,05	Very Worthy
R4	173	190	91,05	Very Worthy
R5	152	190	80	Worthy
Amount	811	950	85,36	Very Worthy

shown below: $\text{Max} = \text{Top Value} \times \text{Much about the } 5 \times 5 = 25$, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score $\times 100$.

Based on data from the above table it on the fifth inspection categorized software engineering is very decent. So it can be concluded that the majority of software engineering experts stated this learning game is very decent.

4 CONCLUSIONS

Evaluation conducted by the researchers of the Mathematics learning games for children using the method of Deutsch and Willis then it can be concluded that:

1. From the results of research involving the respondent, the didapatlah assessment of mathematics learning games on the correctness with 86.66 value, for reliability with a value of 87, for the efficiency with 82.67 value, for integrity with a value of 81.6 as well as for usability with value 85.6. The fifth aspect of the results was obtained value of 85 and this can be inferred already meet very feasible to be used.
2. The results of this study also concluded that the presence of these learning games can help the school or the community generally older people to improve the teaching and learning process better.

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Implementation Felder Silverman Learning Style Model for Content Support based on Ontology in Indonesia Learning Management System

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Abstract

PalComTech Student Portal, is a web-based application used by STMIK PalComTech as a form of web-based services to the entire academic community. PalComTech Student Portal provides a variety of information and services for the academic lecturer, students, staff, and alumni. Diversity of Student Portal PalComTech users, demands the usability ability for each user, especially the lectures and students for the purpose of the existence of the Student Portal can be achieved optimally. This study aimed to evaluate the Student Portal PalComTech. Usability models used in evaluating the Student Portal is Nielsens usability model. Usability criterias used adopt the Nielsens model namely Learnability, Efficiency, Memorability, Few Errors and Satisfaction. Survey is done by distributing questionnaires to students and lecturers of STMIK PalComTech, as the largest user of the Student Portal PalComTech. The results of this study will produce a matrix and tabulate scaling based on the criteria of usability model that can be recommended on the usability of the Student Portal PalComTech.

Keywords : *Nielsens Model, Web based application, Usability*

1 INTRODUCTION

The development of the World Wide Web, or commonly abbreviated Web has given a very significant impact in the process of access to the information available on the internet. The need for information, encourage the rapid growth of websites on the internet. The web application has been developed into a highly complex and sophisticated. Web-based applications has touched many fields, through the provision of a wide range of access to information and services required by users with diverse backgrounds and different characteristics.

Background and characteristics of web visitors are different, causing power acceptance or acceptability be different also on the information provided. This will determine whether a visitor will come back to the website or to switch to another website. The ability of a website to provide information required, ease of access and navigation with a structured layout that

can guarantee a visitor to stay at home visit website but. In other words, the acceptability of the user to a web application that relies on web usability.

Usability is an attribute of a product which has the effect or influence on the quality of the website or software. Modeling usability is a conceptual modeling and not just stated characteristics, but also indicates how each of these characteristics are interrelated. There are some usability modeling such as Model Eason, Shackel Model, Nielsen Model, Preece Model, ISO 9241-11, ISO 9126 and Quim Model [1].

Usability according to Nielsen [2] is a quality attribute that shows how easily an interface is used. Usability is defined by five quality components which include: learnability, efficiency, memorability, errors, and satisfaction. According to Preece [3], usability is a key concept of Human Computer Interaction (HCI), which focuses on making the system easy to learn and use. Usability is very important in interaction design, which includes: efficiency (efficiency), effectiveness (effectivity), safety (safety), utility (utility), easy to learn (learnability), and easy to remember (memorability). So it can be stated that according to Nielsen usability and Preece means an application or system should be easy to learn and easy to use.

1.1 Usability

Usability is a key theme in the human-computer interaction (HCI). Research related to HCI have long asserted that the human factor is crucial to the success of the design and implementation of device technology. Overall goal of HCI is to determine the techniques, methods, and guidelines for designing artifacts that better and more usable. The depiction of the cognitive framework of human-computer interaction, psychology is based on previous research to develop a model based on the cognitive structure of the the users driving user behavior (driving user behavior) [4].

Usability is one of the important characters in in making a website or piece of software that is useful and of high quality. Shackel [5] States that usability is the ability of the system to be easily and effectively used by specific users, based on the functional capabilities of humans, that provide support and specific training, to meet the specific tasks, in a specific environment. Preece [3] States usability as a measure of the ease of the system to be studied or used, level of safety, effectiveness and efficiency as well as the attitude of the users. Krug [6] argues that usability is making sure that something works well, where people with the ability and experience of the average or even below average could use the object for a specific purpose without feeling despair. Jakob Nielsen and Ben Shneiderman [7] identifies five key usability attributes that apply to all aspects of the system where human beings interact. The specified attribute is learnability, efficiency, memorability, error rate low, and subjective satisfaction. Some attribute is used for setting the goal of usability.

Based on the above description then usability is defined as a measure of the ease of a system to be used or it can be referred to as a quality of the usability of a system to achieve a particular goal. The size or quality of the usefulness of a system can be expressed with some attributes i.e. learnability, efficiency, memorability, errors, few satisfaction, safety, efficiency and utility.

1.2 Nielsens Usability Model

Nielsens Model is developed by Jacob Nielson (see figure 1). In Figure 1 the main models that are system acceptability, while usability is part of the usefulness (usefulness). Other

attributes that contribute to the main model is the utility, usability, acceptability of practical and social acceptability. Below there are 5 (five) usability attribute that is easy to learn (learnability), efficient to use (efficiency), easy to remember (memorability), little errors (a few errors) and subjective satisfaction (satisfaction).

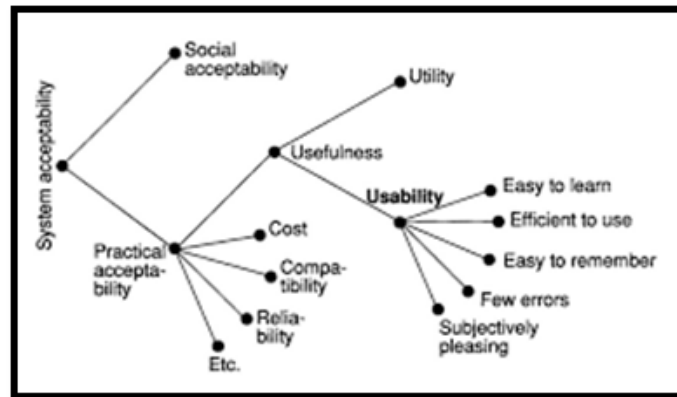


Figure 1: Nielsen's Acceptance Model

Usability according to Nielsen [8] is a quality attribute that indicates how easy an interface to use. Usability is defined through the five components of quality which include: 1) Learnability, how easy is it for users to accomplish basic tasks (basic tasks) when first using the interface? Learnability, according to Nielsen [2] is a system to ease level studied, measured through the time it takes to learn the use of the system to achieve a certain proficiency level, 2) Efficiency, once the user learn interface, how quickly can users accomplish his duties? Efficiency is the efficiency with regard to the need for resources such as effort, time and cost are used to achieve the purpose of use of the system, 3) Memorability: when users return again after some period of time does not use the interface, how easy users can rebuild the ability to use interface? Nielsen [2] argues that memorability is associated with the process of recalling (remember) how to use the system once the user does not interact with the system for a few (a period of) time, 4) Errors: how many user-generated errors, how severe the error, and how easy users can fix errors in using the interface? The frequency error is high at a time when the use of a system is an indication of poor usability of the system, and 5) Satisfaction: how pleasant to use interface? The satisfaction of users of the system who used the system to indicate that it deserves.

1.3 Characteristics of Web Application

According to Riyanto [9] web is a hypertext-facilities that are able to display data in the form of text, images, sounds, animations and other multimedia, where among the data intertwined and relate to one another. The website is a repository of data and information based on a specific topic. To be able to access the website needed a web browser.

The website has a large assortment of functions, namely, media promotions, media marketing, media information, media education and media communications. Technology website is constantly evolving to popping the kinds of diverse websites, namely, portals, blogs, forums,

multimedia, news, Gallery, e-commerce, e-learning, social media and more.

Website as an interactive medium, in the process of development need to heed the values related to user interaction, i.e., usability, navigation, writing, simplicity concept, acceptability, coloring, graphics and new technology. Usability (usability) is a very important thing in designing websites, due to the orientation of the user in the website is obtaining the information needed quickly despite the look of its website. As for the characteristics that affect the usability of the web application according to Bruno [10] are: 1) Users. The characteristics of web users may vary based on the level of interest of the user, the necessity of loyalty level, the level of qualifications that identifies the user, the factors that motivate and appeal as well as the cultural aspects that determine the aribut-usability attributes. The interests of the users of a web application can be categorized based on competencies, i.e. the level of beginner, intermediate, and expert levels. The competency in question can be seen from three sides, namely, knowledge of science, computer skills and experience in menggunakan web applications. If a novice user is one of the main parts of a web user, then this aspect of learnability is an important usability attributes for a note, whereas aspects of efficiency would be the main focus for user level expert, 2) Tasks. Usability is affected by the type of the task and the level of sophistication, the type of interaction that is used in performing the task, as well as the design of the interface of the web application. All these characteristics will effect directly against the attributes of usability learnability, efficiency and user satisfaction, 3) Technology. Technology characteristics of a web application has the greatest influence against the attributes of usability when compared to conventional applications. The architecture of a web application is more distributed and can rely on a variety of existing technologies, and 4) Context. Contextual property, full featured and categorization (classification) industry presents the characteristics of a web application that allows a user with a customized application environments, tasks and supporting technology. With this contextual characteristics, then the attributes of usability can be more focused.

The following Table 1. describes the relationship between the criteria of usability with the characteristics of the website.

2 RESEARCH METHODOLOGY

This research is a case study which is a systematic way of looking at an event, collecting data, analyzing information, and reporting the results. The method used is qualitative research methods in preparation of the interview guide and questions questionnaire. In terms of evaluation of web-based applications with Nielsens Model, this study also uses quantitative research methods to perform statistical calculations.

Types of data used in this research is the primary data and secondary data. The form of secondary Data is data that is blueprint Student Portal. Blueprint is a detailed framework as a foundation in policy making, including the setting of goals and objectives, the preparation of the strategy, the implementation of the program, and the focus of the activities and measures or implementation that must be implemented by every unit in the work environment. Primary Data obtained by means of observation, interviews, and questionnaires. Respondents who do a questionnaire consisting of lecturers and students.

The framework of the research could be seen in figure 2.

Table 1: Factors and Willis Deutsch

Criteria	Efficiency	Effectiveness	Satisfaction	Learnability	Accessibility
Characteristics					
Time behaviour	✓				
Resource utilization	✓				
Attractiveness			✓		
Likeability			✓		
Flexibility		✓	✓		✓
Minimal action	✓		✓		✓
Minimal memory load				✓	✓
Operability			✓	✓	
User guidance			✓	✓	✓
Consistency		✓		✓	✓
Self-descriptiveness				✓	✓
Feedback	✓	✓			
Accuracy		✓			
Completeness		✓			
Readability					✓
Controllability					✓
Navigability	✓	✓			✓
Simplicity				✓	✓
Familiarity				✓	
Loading time	✓				✓
Effectiveness of hel web site		✓			
Effectiveness of the user documentation		✓			
Respond time	✓				✓
Completeness of description		✓		✓	✓

3 RESULTS AND DISCUSSIONS

3.1 Respondents Description

Respondents of this study amounted to 128 people, consisting of 100 students and 32 lecturers. The number of valid questionnaires as many are 128 of the 132 questionnaires distributed. Characteristics of respondents by gender are: Men as many as 58 people, women as much as 70 people.

3.2 Validity and Realibility Test

The result of validity test can be seen in table 2 below

Based on Table 2.it can be seen that the statement item questionnaire are all valid, because it has a value $r > 0.1900$. Reliability test performed using a statistical test Cronbach alpha of each item questionnaire statement. Reliability testing results can be seen in table 3. following:

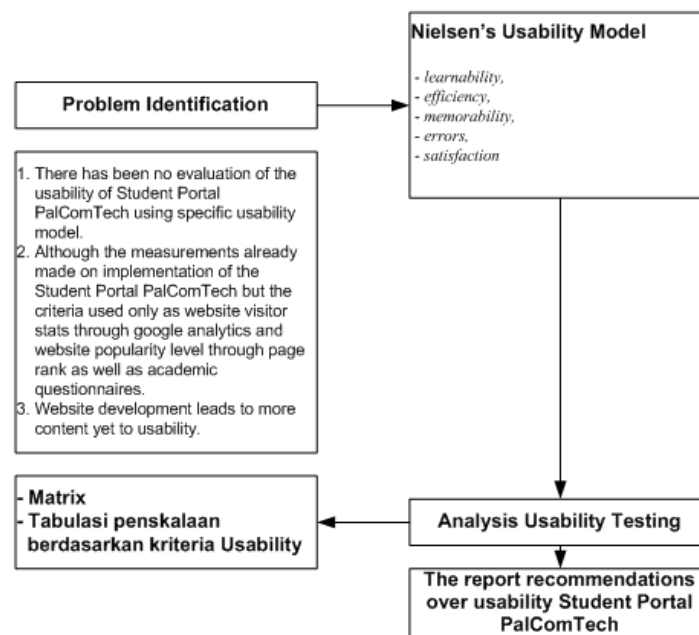


Figure 2: The framework of the research

On the table shows that the internal consistency reliability test Cronbach Alpha coefficients for all variables are at an acceptable level is above 0.60 [11].

3.3 Multiple Regression Result

Results of multiple regression test usability Student Portal PalComTech with Nielsen model can be seen in Table 4. below.

Based on the results of usability testing regression analysis Student Portal PalComTech with Nielsen Model in Table 4. shows that five variables are supposed to influence the usability Student Portal declared meaningful, because it has significance value less than p (Sig. $< p$). Based on these allegations regression line then: 1) Constant coefficient of 2.184 means that if there is no variable learnability, efficiency, memorability, fewerror and satisfaction, then Nielsen's usability of the Student Portal PalComTech will amounted to 2,184, 2) If there is an increase in variable reliability of 0.210 or 21.0% while other independent variables constant, the Student Portal Usability based Model Nielsen will increase by 21.0% and vice versa, 3) If there is an increase in the variable efficiency of 0.213 or 21.3% while other independent variables constant, the usability Student Portal based Model Nielsen will increase by 21.3% and vice versa, 4) If thereis an increase in variable memorability of 0.226 or 22.6% while other independent variables constant, the usability Student Portal based Model Nielsen will increase by 22.6% and vice versa, 5) If there is an increase in the variable view error of 0.20 or 22.0% while other independent variables constant, the usability Student Portal based Model Nielsen will increase by 22.0% and vice versa, and 6) If there is an increase in the variable satisfaction of 0.190 or 19.0% while other independent variables constant, the usability Student Portal based Model Nielsen will increase by 19.0% and vice versa.

Table 2: Validity Test Result

Variables	Dimensions	Corrected Item-Total Correlation	Descriptions
Learnability	L1	0.427	Valid
	L2	0.754	Valid
	L3	0.706	Valid
	L4	0.612	Valid
Efficiency	EF11	0.758	Valid
	EF12	0.692	Valid
	EF13	0.846	Valid
	EF14	0.846	Valid
Memorability	ME1	0.572	Valid
	ME2	0.58	Valid
	ME3	0.791	Valid
	ME4	0.711	Valid
Few Error	ER1	0.39	Valid
	ER2	0.703	Valid
	ER3	0.694	Valid
	ER4	0.489	Valid
Satisfaction	ST1	0.605	Valid
	ST2	0.664	Valid
	ST3	0.68	Valid
	ST4	0.562	Valid
Usability	US1	0.4	Valid
	US2	0.439	Valid
	US3	0.336	Valid
	US4	0.567	Valid
	US5	0.754	Valid

Table 3: Reliability Test Results

Variabel	Cronbachs Alpha	Keterangan
Learnability	0, 799	Reliable
Efficiency	0, 921	Reliable
Memorability	0, 883	Reliable
Errors	0, 724	Reliable
Satisfaction	0, 880	Reliable
Effectivity	0, 767	Reliable
Safety	0, 767	Reliable
Utility	0, 877	Reliable
Usability	0,856	Reliable

Table 4: Results of Multiple Regression Analysis Model Nielsen's Usability

Variables	Coefficients	T	p (sig)	sig. confirmations
Variable Learnability(X1)	0,210	2,991	0,003	Bermakna
Variable Efficiency(X2)	0,213	3,104	0,002	Bermakna
Variable Memorability(X3)	0,226	2,899	0,004	Bermakna
Variable FewError (X4)	0,220	3,338	0,001	Bermakna
Variable Satisfaction (X5)	0,190	3,766	0,000	Bermakna
R Square = 0,809; F= 103,617p (sig) = 0,000; constants = 2,184				
Y = 2,184 + 0,210X1 + 0,213X2 + 0,226X3 + 0,220X4 + 0,190X5				

3.4 F Test Result

Model Summary Student Portal usability can be seen in Table 5.

Table 5: Model Summary Usability Student Portal

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,900a	,809	,802	,75688	1,567

a. Predictors: (Constant), SATISFACTION, EFFICIENCY, FEWERROR, LEARNABILITY, MEMORABILITY

b. Dependent Variable: N_USAB

Based on the table 5., The coefficient R of 0,900 means that the independent variables (learnability, efficiency, memorability, fewerror and satisfaction) have a close relationship with the usability model of Nielsen. While R² (coefficient) is approximately 0.809 or 80.9%. This means, the fifth independent variable (X1-X5) can explain the usability model Nielsen on Student Portal Palcomtech with a contribution of 80.9%, while the remaining 19.1% is influenced by other factors not included in this study.

Table 6: Result of F Simultaneous Test Student Portal Palcomtech

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	296,791	5	59,358	103,617	,000b
	Residual	69,889	122	,573		
	Total	366,680	127			

a. Dependent Variable: N_USAB

b. Predictors: (Constant), SATISFACTION, EFFICIENCY, FEWERROR, LEARNABILITY, MEMORABILITY

From Anova or F test obtained F count equal to 103.617 with a significant level of 0.000. These results indicate the probability value is much smaller than alpha 0.05, it can be said that the learnability variable, the variable efficiency, memorability variable, the variable few-

error and satisfaction variables together significantly affect the Usability of Student Portal Palcomtech using NiensensModelling.

4 CONCLUSIONS

Based on results of the research, the researcher could conclude that:

1. Student Portal STMIK PalComTech meets all the criteria of usability Nielsen model.
2. Nielsen model Variables that most affect usability domain Student Portal PalComTech is the variable satisfaction, while small, their influence is variable memorability.

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Characteristics of Users Website Kopertis II Palembang

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Abstract

Kopertis Region II Palembang has a website address: <http://www.kopertis2.or.id/>. The website is used to display information about Kopertis Region II Palembang which can be accessed by the lecturer or an interested party. This study aims to determine the characteristics of users Website Kopertis Region II Palembang using the usability and quality information. The factors of usability consist of Learnability, Efficiency, Memorability, Errors, Satisfaction, and quality information. The study was conducted using a questionnaire consisting of 263 respondents distributed via facebook and email.

Keywords : Website, Usability, Quality Information

1 INTRODUCTION

The breadth of information available and the increase is continuing, information providers should be able to provide constant and continuous information by utilizing information technology support for the deployment, tracking, and access to information. Dissemination of information can be done to improve access and transfer of knowledge by using the media, one of them to build a website. Advance in the field of information technology into one of the prime movers birth of a website. The website as the one of example the usefulness of technology.

Coordinating Education Higher Private is a government agency within the Ministry of National Education and the extension of the Directorate General of Higher Education Ministry of National Education in a particular area in order to carry out the supervision, control and guidance of the Private Universities (PTS) in the region. To expedite the process of communication and information between Colleges particularly in Southern Sumatra, Kopertis Region II has a website address: <http://www.kopertis2.or.id/>.

The website is used to display information about Kopertis Region II Palembang which can be accessed by the lecturer or interested parties. Website Kopertis Region II Palembang have a link that consists of home page, profile, index, directory PTS, guest book, webmail, contact us, and the main page there is a speech from the coordinator Kopertis Region II Palembang. This study was conducted to determine the characteristics users of website Kopertis Region II Palembang by research method of usability and quality information. Usability is composed of five factors: learnability, efficiency, memorability, error and satisfaction. While the quality of the information consists only of the quality of the information.

2 RESEARCH METHODOLOGY

Population is the generalization region consisting of the object/objects that have certain qualities and characteristics that set the researcher to learn and then be deduced [1]. He number of respondents involved in this study were 263 respondents from population lecturer in Kopertis Region II Palembang. Method of primary data collection was conducted by questionnaire/questionnaire. Distributing questionnaires conducted for one month, starting from 5 November 2015 until December 5, 2015 conducted by directly to the user by using social media such as facebook and email.

According to Sugiyono [1] scale like used to measure attitudes, opinions and perceptions of a person or a group of social phenomenon which is a bipolar continuum scale, on the far left (lower figure) represents a negative answer. Being the tip of the right side (high numbers) represents a positive answer. Data on the dimensions of variables analyzed in this study were addressed to the respondents using a scale of 1 to 4 to obtain data that is ordinal and were scored as follows:

PK	STS	TS	S	ST
Value	1	2	3	4

Description:

PK = Question Questionnaire

STS = Strongly Disagree

TS = Disagree

S = Agree

ST = Strongly agree

Web is a hypertext facility that is capable of displaying data in the form of text, images, sound, animation and other multimedia, which among these data are related and connected to one another. The website is a repository of data and information based on specific topics. To access the website needs a web browser [2]. The website has various functions, namely the promotion of media, media marketing, media information, media education and media communication. Technology website continues to grow until popping the types of websites that diverse, namely portals, blogs, forums, multimedia, news, galleries, e-commerce, e-learning, social media and others. Website Kopertis Region II Palembang serves to provide information about Kopertis Region II, which can be accessed by lecturers and interested parties.

Usability is a quality attribute that shows how easily an interface is used. Consists of five components of quality, is a Learnability, Efficiency, Memorability, Error, Satisfaction [3]. From the definition already described, the testing in the study using the five aspects of usability or five attributes as proposed by [3].

The explanation of the five aspects are a: 1) Learnability. Explaining the size for the user in understanding a habit of visiting, knowing and identifying the reason access is sought. Indicators that affect this component are: easy to study the website of a system, quick to master the system to become proficient, the ease of using the system, it is easy to remember how to use the system and not get difficulty in its use, 2) Efficiency. Explaining that site

can efficiently provide information quickly. Indicators that influence is: How fast a task is done, do not take a long time to find the necessary, always succeeded in doing the task, can quickly improve if there is an error in its use, ease of access and quick in finding the desired information, 3) Memorability. Explaining the size for the user, the website will be easy to remember. If the website is changed, so visitors will need time to adjust and relearned. The component of indicator, namely: easy considering the process that has been done, can return to repeat the process that has been done, do not repeat the mistakes in the process, users can predict the outcome of a menu he chose, 4) Errors. Avoid links that do not work (broken link) or web pages that are still in the process of making. Indicators that affect namely: how many errors there are, there is a link that error, there is a clear message to the error link, there is a menu that does not respond and the system does not respond in accordance with what the user wants, 5) Satisfaction. How is a thing most desired by each user. Visitors of the site wants can be easily used and studied. In addition they want to find what they need quickly, knowing where they are and can go anywhere within a site. Indicators of this component are: The desire to re-visit the website, satisfaction with the available information, the system gives the user an appropriate response to the desire, the desire to recommend use web site to others and satisfaction with the system, and 6) Quality of Information. Quality is a dynamic condition related to products, services, people, processes and environments that meet or exceed expectations. Indicators of these components, namely: the accuracy of an information, information updates, relevant information, detailed information, and information that is simple and easy to understand Kanishka dan Hepu [4]. Given these premises, the authors create a framework as follows:

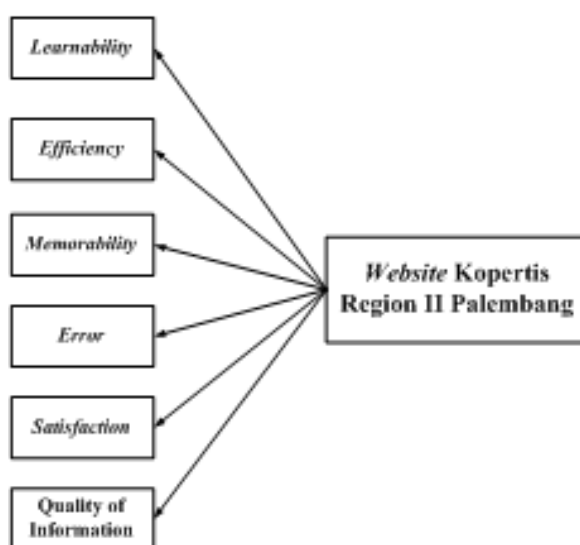


Figure 1: Framework

3 RESULTS AND DISCUSSIONS

3.1 Respondents Description

Data from the study conducted on 263 respondents can be stated characteristics of respondents by sex can be seen in Figure 2.

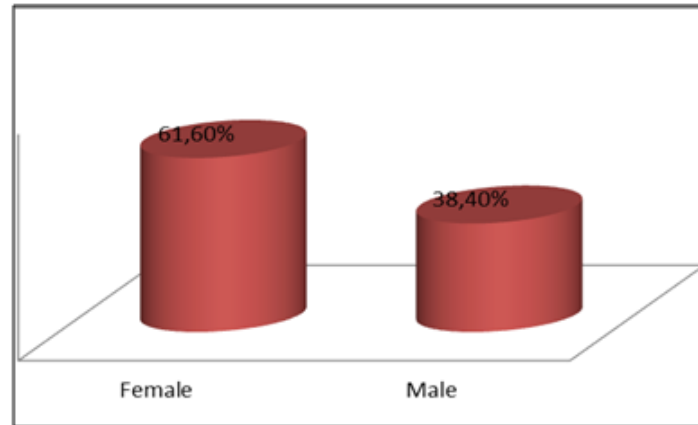


Figure 2: Characteristics of respondents by gender of respondents.

Characteristics of respondents by gender shows, gender of the largest to the questionnaires were men as much as 61.60% and the smallest with female sex as much as 38.40%.

Characteristics of respondents by level of education can be seen in Figure 3.

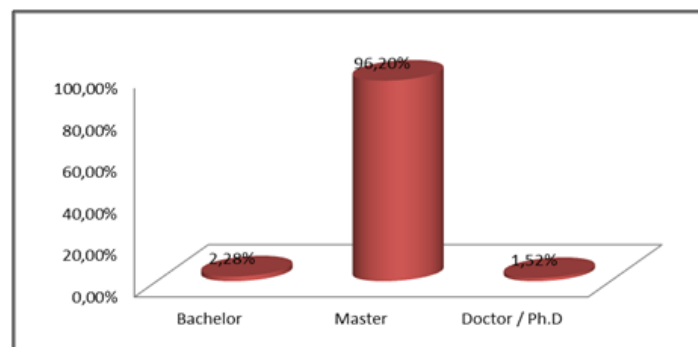


Figure 3: Characteristics of respondents by education level of respondents

Characteristics of respondents by level of education determines the level of education the largest for filling out the questionnaire is the Master as much as 96.20% and the smallest level of education Doctor / P.hD as much as 1.52%.

Characteristics of respondents by faculty origin can be seen in Figure 4.

Characteristics of respondents by faculty shows the origin, the origin of the largest faculty for filling out the questionnaire is the faculty of the computer as much as 64% and the smallest with non computer faculty as much as 36%.

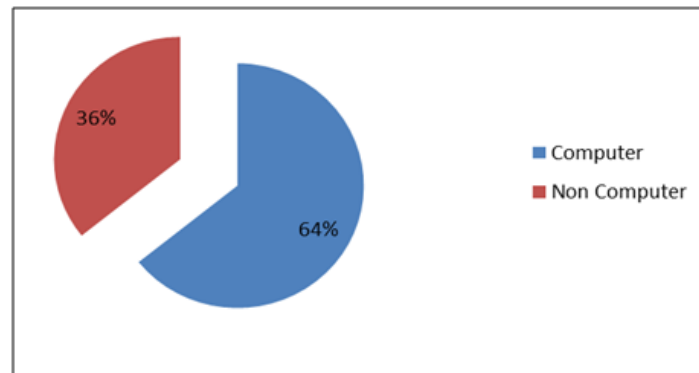


Figure 4: Characteristics of respondents based on the origin of the faculty respondents

Based on the findings of the data that has been obtained through questionnaires to 263 respondents, the results obtained aspects of usability and quality of information in Table 2 as follows:

Table 2: Results Aspects of Usability and Quality Information

No	Variable	Criteria			
		Strongly Disagree	Disagree	Agree	Strongly agree
1	Learnability	0,38%	10,65%	43,16%	45,82%
2	Efficiency	0,00%	7,03%	35,17%	57,79%
3	Memorability	0,19%	21,20%	52,00%	26,62%
4	Error	6,75%	37,45%	23,48%	32,32%
5	Satisfaction	0,19%	9,89%	53,80%	36,12%
6	Quality Information	0,00%	2,95%	40,30%	56,75%

Table 2 show the results of usability aspects and quality of information which can be explained as follows: 1) In the variable learnability most respondents chose not agree at 45.82%, it indicates the user's perception of the website Kopertis Region II could not agree to be ease of use, 2) In the variable efficiency respondents most choose not agree at 57.79%, it indicates the user's perception of the website Kopertis Region II strongly agreed the website will be efficient in use, 3) In the variable memorability most respondents voted in favor of 52.00%, this shows the user's perception of the website Kopertis Region II agreed to ease given the processes in use, 4) In the error variables most respondents chose not agree at 37.45%, it indicates the user's perception of the website Kopertis Region II disagree on the website still has an error in the website, 5) In the variable most satisfaction of respondents voted in favor of 53.80%, this will show disapproval of the website user satisfaction Kopertis Region II, and 6) In the variable quality of information most respondents chose not agree at 56.75%, it indicates the user's perception of the website Kopertis Region II strongly agree will the website still has the quality of information in the website.

4 CONCLUSIONS

Based on the research that has been done, it can be concluded that:

1. Characteristics of the website Kopertis II Palembang region consists of lecturers, the gender male, education level and the master comes from faculty computers.
2. The results of the usability aspects and the quality of the information indicates that the user of the website Kopertis Region II Palembang agreed to ease of use, efficient, easy to remember processes in use, satisfaction in the use and quality information and do not agree on such websites still have errors in in the website.

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Analysis of Factors Affecting the Use of Google Classroom to Support Lectures

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Abstract

The rapid development of information technology in recent years has changed the paradigm of society. One field that is getting a significant impact is the field of education, where education is a process of communication and information from teachers to students that contains the information education, that sparked the birth of the idea of e-learning. The use of any e-learning system is always followed by a push factors, as well as e-learning launched by Google, the Google Classrooms that currently used by the majority of students in STT Musi. TAM (Technology Acceptance Model) is a model of user acceptance of information systems and information technology assume that there are two individual beliefs, they are perception of benefit (Perceived Usefulness abbreviated as PU) and ease of use (perceived ease of use, abbreviated as PEOU). Therefore, this study was developed by adopting the model of TAM to see from both the perception in the TAM that affect the use of Google Classroom by some students STT Musi. Population of this research is the students who are already using Google Classroom in the lecture. Data obtained as much as 90 questionnaires distributed by using purposive sampling technique to all students active in the odd academic year 2014-2015. Results from this study showed that the perception of perceived Easy of Use and perceptions of perceived usefulness positively affect the use of Google Classroom. And both these perceptions also jointly affect the use of Google Classroom.

Keywords : Google classroom, TAM, PU.

1 INTRODUCTION

The development of information technology in recent years has changed the paradigm of society in the search for and obtain information, which is no longer limited to information on newspapers, audio-visual and electronic, but also other information sources, one of them is through the internet network. One field that is getting a significant impact in the development of this technology is the field of education, where education is essentially a process

of communication and information from educators to students that contain educational information, which has elements of educators as a source of information, media as a means of presenting ideas, ideas and educational materials as well as learners themselves [1].

New technologies, especially in the field of ICT has an increasingly important role in learning. Many people believe that multimedia will be able to bring us to the learning situation in which "learning with effort" would be replaced with "learning with fun". e-Learning means learning with the help of the electronic services, particularly computer software [2]. Because of that e-learning is often referred to as the on-line course. IT offers many benefits to learning systems. It has changed the way of learning styles and approaches. IT dominantly uses to support IT based university. Some technology to support IT learning environment are e-Learning and blogs [3]. The growth of various types of applications of e-learning at the moment is getting a lot, recently, Google launches e-learning application named Google Classroom. Classroom use of Google is expected to improve quality and providing assistance in education.

STT Musi is one of the colleges that already use e-learning, especially Google Classroom in the learning process. Use of Google Classroom has been applied starting from the beginning of the first semester of 2014/2015 in early September 2014. Google Classroom have not been fully used, therefore to provide a policy to fully using Google Classroom for lecturers and students, it takes the right reasons to produce the right decision as well. In making of decision to use these applications, a research need to be conducted to examine some of the reasons and factors that affecting it. Therefore to determine the factors that affecting the use of Google to support lectures in STT MUSI, the author intends to conduct research using TAM (Technology Acceptance Model). TAM was first introduced by Davis in 1986 [4] is an adaptation of the TRA (Theory Of Reason Action) made specifically for modeling acceptance of information systems and information technology. TAM initially made specifically for modeling the information system user adoption. Davis [4] explains that the main objective of TAM is to establish the basic tracking the influence of external factors on beliefs, attitudes (personalization), and the destination computer users. TAM assume that two individual beliefs are perceived benefit (Perceived Usefulness abbreviated PU) is defined as the level at which a person believes that using a particular system can improve its performance, and ease of use (perceived ease of use, abbreviated PEOU) is defined as the degree to which a person believes that using the system is not required any effort is the main factor affecting the behavior of the reception computer. According to Venkatesh and Morris [5], perceived easy of use can be defined as the level of trust people that use a technology would be free of effort. According to Davis [4] as quoted by Wijaya [6] perceived usefulness as a predictor of usage behavior, will be influential in the development of the system because the user believes in the existence of Use Performance relationship.

This study aims to find empirical evidence that there is a positive influence factors of TAM, the usefulness and ease of use to use Google Classroom to support lectures on STT Musi. Research Benefits of this study are : 1) This study is expected to contribute to the development of science and technology, particularly in terms of research using variables derived from TAM to be able to prove empirically the behavior of the use of an IS and IT especially IS/IT used in the world of education, and 2) In addition, the results of this study are also expected to provide information for STT Musi regarding the positive factors on the use of Google Classroom lectures. The information generated from this study can be used as

decision support in terms of policy implementation to use Google Classroom in all lectures.

2 RESEARCH METHODOLOGY

2.1 Sampling Method

In this study, student of STT Musi used as the population. STT Musi has four majors (Architectural Engineering, Industrial Engineering, Computer Science and Information Systems). Sample selection using purposive sampling techniques with the requirement that the samples have been using Google Classroom and active in the 2014-2015 semester. After the population selection was done, the number of samples included in the requirements and can be used as samples are 96 students consisting of three majors namely Industrial Engineering, Computer Science and Information System. The number of samples of each study program can be seen in Table 1 below:

Table 1: Reliability Test Results.

Major	Total Sample
Teknik Industri	26 Mahasiswa
Teknik Informatika	21 Mahasiswa
Sistem Informasi	43 Mahasiswa

2.2 Data Collection Method

In studies using primary data which is data obtained directly from the source of the information. The data is obtained by using a questionnaire given to respondents were included in the study sample. Questionnaires used were consisted of three parts where each part represents a research variables. The first part contains six questions relating to the variable perceived usefulness, the second part deals with variable perceived ease of use, and the third part deals with variable use of Google Classroom.

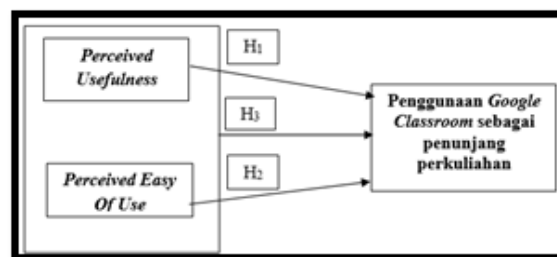


Figure 1: The framework of the research

2.3 Research Variables

There are two variables in this research : 1) Dependent Variable: The dependent variable in this study is the use of Google Classroom (PGC). These include the attitudes, interests

and behaviors and measured with three questions (Likert scale) were adopted from Agustinus [7] which have adjusted to the topic of this study, and 2) Independent Variable: There are two independent variables namely the perceived usefulness (PU) and perceived ease of use (PEOU). Questions used were adopted from research conducted Agustinus [7] who have adjusted to the topic of this study.

2.4 Research Variables

The framework forming hypotheses of this study, they are : 1) H1 : Google Classroom expediency causes a significant effect on the use of Google to support lectures, 2) H2 : Google Classroom ease of use factor causes a significant effect on the use of Google to support lectures, and 3) H3 : Both of Google Classroom expediency and ease of use causes a significant effect on the use of Google to support lectures. Figure 1 is a hypothetical framework adopted from the TAM framework.

3 RESULTS AND DISCUSSIONS

3.1 Validity and Reliability Testing

Measurement instrument in this study is a questionnaire, there are variables in the questionnaire which are represented by a couple of questions for each variable. The quality of research data depends on the measuring instruments used. Thus the validity test is performed to determine whether the measuring instruments used are totally valid to measure the variables studied. Measuring tool measurement in this study using Correlated Item-Total Correlation. Santoso (2004) [8] states that if the value of r count (Correlated Item-Total Correlation (CI-CT) on SPSS output) is positive and greater than the value of r table, than the question in the questionnaire is said to be valid. Reliability test is performed to measure the stability and consistency of measuring devices, measuring instruments used are reliable and consistent if the measurement is repeated and the extent to which the results of a measurement can be trusted. While the questionnaire said to be reliable if the answers of respondents to the question is consistent or stable over time. In this study the reliability test using Cronbach's Alpha method. Reliability test measuring instrument can be seen from the Cronbach alpha values for each variable. Cronbach's alpha is used to determine the consistency reliability interitem or to test the consistency of the respondents in response to the whole item. Inconsistencies can occur because of differences in the perception of respondents, or lack of understanding of the respondents in answering the question items. Sekaran (2006) [9] argued that if the alpha value of less than 0.6 is said poor reliability of measuring instruments, around the 0.7 range measuring instrument reliability is still acceptable, and if the value is more than 0.8 alpha reliability of measuring instruments said to be good. Validity and reliability of test results in this study can be seen in Table 2.

Summary of validity and reliability test result shown in table 2 using SPSS version 22.0 statistical application. To test the validity of the value of r table in accordance with a sample of 90 respondents to the formula $df-2 = 88$. So for the value of r table is 0, 2072. On validity and reliability of the 13 questions given to respondents, 2 (two) of them is invalid, they are the 4th question on PEOU variables and the 3rd questions on PGC variables. So the question that can be used as many as 11 questions. Based on Table II Alpha values of all variables have a good level of reliability.

Table 2: Factors and Willis Deutsch

Variabel	Kode Item	CI-CL	Alpha Croanbachs
Perceived Usefulness (PU)	PU1	0,419	0,772
	PU2	0,598	
	PU3	0,574	
	PU4	0,553	
	PU5	0,564	
	PU6	0,422	
Perceived of Use (PEOU)	PUOU1	0,608	0,701
	PUOU2	0,561	
	PUOU3	0,398	
Penggunaan Google Classroom (PGC)	PGC1	0,490	0,647
	PGC2	0,490	

Table 3. Result Of Correlation Between Variables

		Total PGC	Total PEOU	Total PU
Pearson Correlation	Total PGC	1,000	,326	,582
	Total PEOU	,326	1,000	,326
	Total PU	,582	,326	1,000
Sig. (1-tailed)	Total PGC	.	,001	,000
	Total PEOU	,001	.	,001
	Total PU	,000	,001	.
N	Total PGC	90	90	90
	Total PEOU	90	90	90
	Total PU	90	90	90

3.2 Data Analysis

Normality testing is intended to test whether the regression model, the residue variable having a normal distribution or not. On testing normality in this study using a test for normality with the Kolmogorov-Smirnov approach (KS). The basic of decision making of the normality test with this approach is assuming the normal distribution of data if a significant value (Sig) $KS Z_j > 0.05$, and vice versa if the data were not normally distributed then the value Significant (Sig) $KS Z_j < 0.05$. Based on the normality test with the Kolmogorov-Smirnov (KS) results obtained Asymp.Sig value of 0.56 is greater than 0.05, it can be concluded the data were normally distributed. See the results in Table 3 and Table 4.

Results of correlation analysis to demonstrate the value of influence of each independent variable on the dependent variable. In Table 3 shows the correlation matrix between the variables ease of use on the use of Google Classroom to demonstrate the value of $r = 0.326$ with probability = 0.001 less than 0.05 while for the variable benefit to the use of Google Classroom to demonstrate the value of $r = 0.582$ with probability = 0.000 less than 0.05. In

Table 4. Multiple Regression Test Result

Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	67,298	2	33,649	24,458	,000 ^a
Residual	119,691	87	1,376		
Total	186,989	89			

Table 4 above to clarify whether there is any real effect (significant) and PEOU PU variables simultaneously (together) against the PGC. Of output in the second model shows that the Fhitung 24.458 with a significant level or probability of 0.000 smaller than 0.05, then the regression can be used to predict the PGC (Use Google Classroom). Based on the analysis and the testing of the hypothesis testing results can be seen in Table V below.

Table 3: Hypothesis Test Result

Result Hypothesis	Result
H1 : Google Classroom expediency causes a significant effect on the use of Google to support lectures	Accepted
H2 : Google Classroom ease of use factor causes a significant effect on the use of Google to support lectures	Accepted
H3 : Both of Google Classroom expediency and ease of use causes a significant effect on the use of Google to support lectures	Accepted

3.3 Discussions

Discussion of the results of the analysis of the testing that has been done and look at the literature on previous studies with similar variables and methods that can be described as follows:

1. Perceived Easy Of Use. Variable Perceived Easy Of Use (PEOU) has positive effect on the use of Google as supporting Classroom lectures. The results have largely supported by many studies [10-12] It can be interpreted that the students as Classroom Google users can feel that all the facilities and features provided is easy to use, easily accessible so as to ease in completing tasks lectures. The statement was supported also by Davis [4] and Wahid [13] which says that the perception of the ease of use of an information technology is defined as a measure of where one believes that computers can be easily understood and used. Other research conducted by Augustinus [7] precisely obtain opposite results. The study was conducted in the same context that e-learning. However the authors have not found an adequate explanation of these findings.
2. Perceived Usefulness. Perceived usefulness variables also affect the use of Google as supporting Classroom lectures. In this study, these variables have the greatest influence on the variables previously. This finding is in line with the findings made by some

previous authors [10-12]. This variable has a great influence with the explanation probably most users are accustomed to using information technology, especially e-learning so that they are already feeling the benefits provided by the e-learning itself. And also means that students benefit when using Google Classroom. Respondents also said that Google Classroom can also increase the effectiveness in completing the tasks assigned faculty. It also saves time and money because it can be accessed anywhere desktop and mobile. The statement is also in accordance with the opinion of Davis (1989) [4] and Wahid (2007) [13] which says that the perceived usefulness is defined as a measure of where the use of a trustworthy technology will bring benefits to those who use it.

3. Perceived Easy Of USe dan Perceived Usefulness together affect the use of google classroom. This study found that both variables jointly affect the use of google as supporting classroom lectures. These findings as well as research conducted by Augustinus [7] and Yulianto [12] they declared the result that the perception of ease of use and perceived usefulness jointly influence user behavior in the use of information technology. And may mean that users can feel the ease google classroom and benefit in using and assist them in completing tasks and communication with teachers.
4. As presented in the results of research conducted by Molnar [14] who say Besides classic forms of learning, because today's changing the way of life and society, atypical forms of learning has an increasing role. It represents the progressive forms of learning are not necessarily linked to the institution and not in the traditional sense of the lessons, lectures and seminars. In atypical learning individuals learn choose an academic environment in accordance with the purpose and motivation. So this is a good platform for students who wish to continue to update their knowledge, attitudes most characteristic for studying non-formal and informal. Thus the variable perceived easy of use and perceived usefulness was instrumental to alter the characteristics of the students to a better one.

4 CONCLUSIONS

Several conclusions that can be generated from this study are:

1. Perception perceived Easy of Use positively affect the use of google classroom by some students in STT Musi who already use it.
2. Perception positively perceived usefulness also affect the use of google classroom by some students in STT Musi who already use it.
3. Perception perceived Easy of Use and Perceptions perceived usefulness jointly affect the use of google some students in the classroom.

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Enterprise Architecture Planning Design of Information Systems Technology at PT Kreasi Utama Mandiri Using Zachman Framework

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Abstract

This research aims to design Enterprise Architecture Planning information technology systems in PT. Kreasi Utama Mandiri to petrify company business processes in support of the vision and mission of the company and can provide answers to permasalahan at PT. Kreasi Utama Mandiri The data used in this research using primary and secondary data obtained from the results of observations, interviews, literature and document using qualitative data analysis techniques. The method used in this penlitian is Methodologies Enterprise Architecture Planning (EAP) Using Zachman Architecture Framework. that will be examined is the data architecture, application and technology resulting in Enterprise Architecture Planning (EAP) using Zachman Framework.

Keywords : EAP, Zachman Framework.

1 INTRODUCTION

Welcoming the free market that will apply in ASEAN, the information system technology plays an important role in helping the obtained information up to date, in addition to the technology information system also plays an important role in business strategy and cost savings as well as improving the quality of products produced. PT. Kreasi Utama Mandiri which is the official distributor of Avira antivirus products have implemented the use of technology in the information system architecture of the data, process/application, and technology/network. but the use of information systems technology has not yet been integrated into a centralized system that often goes wrong or lack validan data in a business process company, this is when on leave of course will affect consumer confidence and the performance of the company, so it takes a plan of preparation of information systems technology which will help align business processes that can be run effectively and efficiently. one way in improving business processes that run is to use Enterprize Architecture.

By looking at existing conditions, then the research conducted will make the design of the enterprise architecture information system technology as a strategic plan for the development of an information system that includes data architecture, application architecture and

technology architecture. Enterprise architecture is a set of principles, methods, and models that are plausible used to design and realize an enterprise organizational structure, business processes, information systems and infrastructure [1]. Enterprise architecture is of significant importance to the organization because one result is the realization of alignment between information technology and business needs. Adaptive enterprise architecture can support the organization/company in the delivery of information and deliver effective and timely, will also support enhanced functionality and business organizations.

The usual method for modeling information systems technology architecture is the EAP (Enterprise Architecture Planning), wherein the method is a method that is used as a planning approach to data quality by referring to the business needs of companies and organizations. In the EAP will be described on the data architecture, application architecture and technology architecture. The steps in the EAP provides practical guidance in making the architecture of two rows and three columns first Zachman framework [2]. Zachman framework is a framework for mapping the relationship between the components of the enterprise architecture level components of concern to interested parties with Enterprise Architecture. Zachman Framework is one method to design enterprise model architecture [3]. Zachman Framework see a system of six main aspects, namely Data, Function, Network, People, Motivation, and Time as well as six different perspective, namely Planner, Owner, Designer, Contractor, subcontractor, and Function in Enterprise [4]. then the different aspects and perspectives will be drawn into a 6x6 matrix in which columns to describe aspects while rows depict perspective.

With some of the reasons that the author has described the state that the need for a design that can be used as guidelines to build a design Enterprise Architecture Planning that can be petrified berjalanya business processes the company in support of the vision and mission of the company and can provide answers to permasalahan at PT. Mandiri Utama creations. Therefore, on the basis of the description taken a study entitled "Enterprise Architecture Planning Design of Information Systems Technology at PT. Kreasi Utama Mandiri using the Zachman Framework".

Follow up the matter contained in the background, then the identification of the issues raised in this study are: 1) The integration of applications supporting business processes in PT.Kreasi Utama Mandiri, 2) Investigate the infrastructure that supports the business process at PT.Kreasi Utama Mandiri, and 3) Knowing the needs of information technology systems in PT.Kreasi Utama Mandiri in order to support the vision and mission of the company.

Based on the above, the authors formulate the problem in this research is "How to build Enterprise Arcitecture Planning information technology systems in PT. Kreasi Utama Mandiri so easy to understand and support the business peroses sehingan improve the effectiveness and performance of the company?"

This research aims to design Enterprise Architecture Planning information technology systems in PT. Kreasi Utama Mandiri.

The benefits of this research are taken by the author in this study are: 1) Can provide design Enterpriese Arcitecture Planning at PT. Kreasi Utama Mandiri, and 2) Can support the company's business processes so as to improve the effectiveness and performance of the company and support the realization of the vision and mission of the company.

In this thesis, the author will limit the scope of the research focuses on issues to be discussed, using the methodology of Enterprise Architecture Planning (EAP) by clicking using Zachman Framework as a tool for the documentation process with the object of research PT.

Kreasi Utama Mandiri.

2 RESEARCH METHODOLOGY

Enterprise Architecture Planning (Enterprise Architecture Planning) is a collection of architectural and strategic field which includes information, business systems, and architectural engineering. EAP is a modern approach to the planning of the quality of the data in order to achieve the mission of information systems technology. EAP is also a process of defining a number of architectures, namely: data architecture, application architecture, and technology architecture in using information to support the business. EAP has associated with how to align business strategy with IT strategy in which the organization's business development strategy will be the starting point for determining the next IT strategy. EAP will provide a map of the enterprise is planning to track changes in business and technology. The linkage between the existing architecture is essential for the EAP. It is therefore not developed in isolation EAP, EAP should be looked at in the perspective of enterprise-wide. World-class IT infrastructure according to Kern et al. (1998) [5] is an infrastructure that has the characteristics: 1) High customer satisfaction, 2) Cost effective, 3) Data Integrity, 4) Effective process, 5) Good communication (internal and external IT), 6) Metrics are already well, 7) Practiced the process of disaster recovery, 8) Cost of services is well documented, 9) The ability to compare services, and 10) Reliability, Availability, and Serviceability high. In its development, the EAP will be better and easier if you follow a certain frame of mind called EA framework.



Figure 1: The Zachman Enterprise Architecture.

Examples include: Zachman Framework, Federal Enterprise Architecture Framework (FEAF), DoD Architecture Framework (DoDAF), Treasury Enterprise Architecture Framework (TEAF), The Open Group Architectural Framework (TOGAF), and Garter [6]. Because EA Framework provides the only frame of mind, then for technical product development or management of enterprise architecture can adopt a process / specific methodology, which can be adopted. His example among others: DODAF Six Step Process, EAP by Steven Spewak based on the Zachman Framework, Building Enterprise Information Architecture:

Reengineering Information System by Melissa A Cook who is also based on the Zachman Framework, The Practical Guide to Federal Enterprise Architecture based on FEAF, and TOGAF Architectural Development Method (ADM) [7].

In the figure 1 is explained that the Zachman Framework is a 6 x 6 matrix that represents the intersection of two classification scheme two-dimensional system architecture. In the first dimension, Zachman described it as a line consisting of six perspectives: 1) The Planner Perspective (Scope Context): List the scope of the business element explanation recognized by strategists as a theorist, 2) The Owner Perspective (Business Concept): Model semantic business linkages between components of a business defined by the chief executive as the owner, 3) The Designer Perspective (System Logic): a more detailed logic models that contain the system requirements and design constraints represented by the architects as a designer, 4) The Builder Perspective (Technology Physics): physical model that optimizes the design for specific needs within the constraints of specific technologies, people, costs and scope of time specified by the engineer as a builder, 5) The Implementer Perspective (Component Assemblies): The special technology, about how components are assembled and operated, configured by technicians as the implementer, and 6) The Participant Perspective (Operation Classes): The events of the real functioning system used by the technicians as a participant.

3 RESULTS AND DISCUSSIONS

After analyzing and designing the system, the results achieved by the authors is shown in table 1.

Table 1. Results Matrix Spatial Integrated Tax With Zachman Framework Framework

	Data (What)	Fungsi (How)	Jaringan (Where)	Orang (Who)	Waktu (When)	Motivasi (Why)
Tujuan Cakupan (Perspektif Perencanaan)	Daftar hal-hal yang penting bagi enterprise	Daftar proses-proses yang dilakukan oleh enterprise	Daftar lokasi operasional enterprise	Daftar unit organisasi	Daftar waktu siklus bisnis	Daftar tujuan dan strategi bisnis
Modal Bisnis (Perspektif Pemilik)	Entity relationship diagram (mencakup m.m.n. ray, relasi-relasi berartibut)	Model proses bisnis (diagram aliran data fisik)	Jaringan logistic (node dan link)	Struktur organisasi, dengan peranan, kumpulan keahlian, isu keamanan	Jadwal bisnis induk	Aturan bisnis
Model Sistem (Perspektif Arsitek)	Model data (ritas valid, normalisasi sepemuhnya)	Diagram aliran data spesifik; Arsitektur aplikasi	Arsitektur system yang didistribusikan	Arsitektur antar muka manusia (peranan, data, akses)	Diagram keberagaman, sejarah hidup entitas (struktur proses)	Model aturan bisnis
Model Teknologi (Perspektif Builder)	Arsitektur data table dan kolom; peta data baru terhad data lama	Rancangan system; structure chart, pseudo-code	Arsitektur system (perangkat keras, tipe perangkat lunak)	Antarmuka pengguna (bagaimana perilaku system); rancangan keamanan	Diagram aliran kendali (struktur kendali)	Rancangan aturan bisnis
Detailed Representation (Perspektif sub-kontraktor)	Rancangan data demormalisasi; rancangan penyajian fisik	Rancangan program detail	Arsitektur jaringan	Layar, arsitektur keamanan (siapa dapat melihat apa)	Definisi waktu	Spesifikasi aturan dalam program lois
Functioning system (Perspektif pengguna)	Data yang dikonveksi	Program yang dapat dieksekusi	Fasilitas komunikasi	Orang yang sudah dilatih	Kejadian bisnis	Aturan yang memaksa

4 CONCLUSIONS

The conclusion that can be taken by the authors in this research Enterprise Architecture Planning and Design of Information Systems Technology at PT. Kreasi Utama Mandiri using the Zachman Framework is to apply its integrated system and data processing that constantly updates it will support the business processes that lead to profit for the company so that the consistent use of EAP in the systems and networks that exist on the PT. Creation of Mandiri give several points that support the company's performance.

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Determining The Quality of Lecturer using Fuzzy Simple Additive Weighting (SAW)

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Abstract

This research aims to Determining the quality of lecturer at the private university. Based on in Determining the quality of lecturer, it takes a decision support system with the Multiple Attribute Decission Making (MADM) method. MADM method is the method that can find a best alternative from Several alternatives based on criteria - criteria that have been determined. The point is that the method determines the weight on each criterion. This method uses Fuzzy Simple Additive Weighting (SAW) to perform the calculation method MADM. The best alternative in question is eligible to determining the quality of lecturer based on established criteria. Research done by finding the value of weight for each criterion, and then made the process of ranking that will Determine the optimal alternative. The result in this study are affectively this method Determining the quality of lecturer, and the best lecturer will be Considered by decision makers based on this method.

Keywords : *Fuzzy, MADM, Simple Additive Weighting (SAW)*

1 INTRODUCTION

Human Resources (HRD) is the most important factor in a company or organization, almost all aspects contained in an organization, almost all aspects contained in a company requires the involvement of human resources. Mistakes in handling the HRD will lead to serious problems within the company. Needs improving the quality of human resources is the biggest challenge in the era of globalization which is full of competition. In line with the development of quality human resources as Teachers power is preferred, so that the lecturer who will need to be selected based on the ability and the quality is there. Determination of the quality of faculty in each college currently varies and is very competitive to know the quality of the lecturers, the criteria generally used for the assessment is from the last school attended, and the index value perestasi cumulative, it allows'll get lecturers only academically excellent but the lecturer is not capable of transferring knowlage he has so competencies expected of students is not reached, for the researchers mancoba develop the criteria of assessment of

the quality of lecturers private where lecturers are expected to have a higher education, have good value, integrity appropriate and ultimately capable of transferring knowledge that owned to students.

The criteria for determining faculty quality that exists today in which : 1) Index Performance Lecturer, 2) the latest education, 3) Teaching, and 4) personality, but the criteria are apparently not able to represent the quality of the lecturers there. The determination of the quality of lecturers is still possible to assess the relative subjective, so in the end have not been able to determine with certainty the quality of lecturers. Thus, to determine the quality of the lecturers are objectively necessary the determination of the quality criteria of lecturers capable of being used as a measurement to determine the quality of lecturers or as a reference, which in turn is able to produce quality graduates.

In recent years, the development of problem-solving techniques with soft computing which uses an innovative approach to building highly developed computational intelligent systems. In contrast to conventional hard computing, soft computing utilizing tolerance for inaccuracy, uncertainty, and partial trust to achieve tractability (ease of control) robustness, low cost solution, and a better relationship with reality [1]. Terdapat fundamental differences of both the conventional hard computing "thinking time" to get a solution that optimal. One of solution to the problem is to use a soft computing techniques Fuzzy Multiple Attribute Decision Making.

To determine which professors who have the best kualitas, using criteria that is able to represent the quality of the lecturers will require methods Multiple Attribute Decision Making (MADM). MADM which is a method used to find the optimal alternative of a number of alternatives to certain criteria. The essence of MADM is determining the weight value for each attribute, and then continue with the process selection alternatives already given [2] and the researchers will be using FSAW (Fuzzy Simple Additive Waighting) which form part of a method of MADM used to manyeleksi weighting of the criteria of which has determined that the value of the weight is then made to rank.

From the description on the background it can be a formulation of the problem can be resolved, namely What criteria are used in determining the performance of lecturers, and how to rank qualified faculty using FSAW (Fuzzy Simple Additive Fuzzy Waighting).

This study was designed to investigate and me s i stem measuring performance (quality) on lecturers using the concept MADM using Fuzzy SAW method approach, a case study in this research is University X. Questions on this research in the have three parts: 1) How to design and sub criteria of measuring the performance criteria of the faculty?, 2) How big the weigting for each criteria of and sub criteria of, so that in can be a priority of each kariteria and sub criteria of?, and 3) How evaluation of performance measurement models that have been customized priority level are sorted from the most important to lowest for each perspective?

1.1 Decision Support Systems (DSS)

DSS as a computer-based system that helps in the decision making process. DSS as a computer-based information system that is adaptive, interactive, flexible, specifically developed to support the solution of unstructured permasalahan management to improve the quality of decision making. Thus it can be a definition of DSS is a computer-based system that is adaptive, flexible, interactive and used to solve unstructured problems thereby increasing the

value of the decisions taken [3].

According to Mat and Watson, Decision Support System (DSS) is an interactive system that helps decision making through the use of data and decision models to solve problems that are semi-structured and unstructured. Meanwhile, according to Moore and Chang, DSS is a system that can be developed, capable of supporting data analysis and decision modeling, future-oriented planning, and can not be planned intervals (period) of time of use [4]. Bonezek, Hosapple and Whinston defines DSS as a computer-based system that consists of three components that interact with each other [5]: 1) Language system, is a mechanism to bridge (interface) users and other components, 2) Knowledge system, is a repository of knowledge related to specific issues in the form of data and procedures, and 3) Problem processing system, is a second connecting other components, contains one or more manipulation capabilities or provide a general problem, which is required in decision making.

Turban, in his book Decision support system and Intelligent System, Decision Support System applications can be composed by the following subsystems [2]:

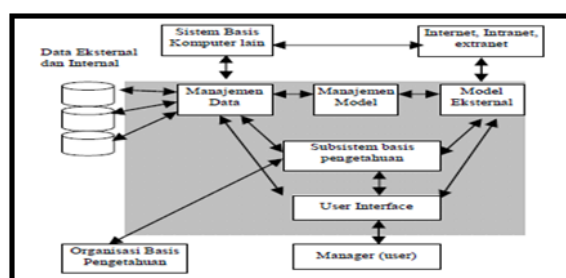


Figure 1: DSS Components

1.2 Fuzzy Multi-Attribute Decision Making (FMADM)

Fuzzy Multiple Attribute Decision Making is a method used to find the optimal alternative of a number of alternatives to certain criteria. The essence of FMADM is determining weights for each attribute value, then proceed with the ranking process that will select an alternative that has been given. Basically, there are three approaches to find the value weights of attributes, namely subjective approach, objective approach and an integrated approach between subjectively and objectively. Each approach has its advantages and disadvantages. In the subjective approach, the weight value is determined based on par subjectivity of decision-makers, so that some of the factors in the ranking process can be determined freely alternative. While on an objective approach, the weight value is calculated mathematically so that ignores the subjectivity of decision-makers [6].

2 RESEARCH METHODOLOGY

2.1 Research Design

This design research that describes a path or steps undertaken by researchers in conducting research from beginning to end.

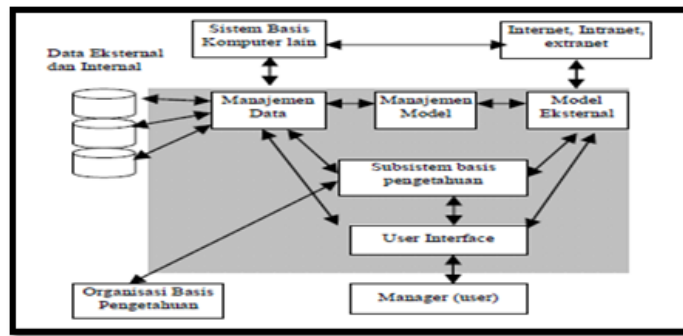


Figure 2: Research Design

2.2 Population

Population in this study is active students and staff in University X which consist from two programs, there Department Information Systems and Computer and Departmen Management Information and Computer. In The study authors take samples taken at random (Random sampling) as measure to determine samples according to [6] a large se 100 respondents or more could taken 10% - 15% or 20% -25%.

3 RESULTS AND DISCUSSIONS

Here are the criteria needed for decision-making, based on the requirements of quality faculty in general. Criteria obtained from a questionnaire given to respondents, the lecturer University X in determining the criteria used in determining the fuzzy method. As for the criteria of predetermined namely Index Performance Lecturer (C1), work Ilmia Lecturer (C2), Social Service (C3), competence Lecturer (C4). From the criteria of these, then created a level of importance criteria of based on the weight of predetermined into fuzzy.rating numbers match any alternatives at every criteria of the following: 1) Very low (sr) = 0, 2) Low (r) = 0.2, 3) Medium (s) = 0.4, 4) Central (t1) = 0.6, 5) High (t2) = 0.8, and 6) Very high (st) = 1. The weight value is made in a graph so more clearly as below.

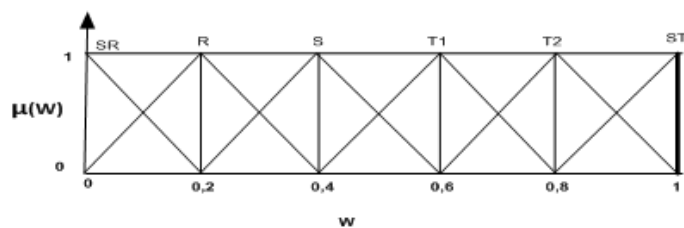


Figure 3: Graph Weight

From this research obtained molded decision matrix X that has been converted with fuzzy numbers, as follows

Table 1: Converted fuzzy numbers

Alternative	Criteria of			
	C1	C2	C3	C4
A1	0:50	0.75	1	0:50
A2	0:25	0:25	0.75	0:25
A3	0.75	0:25	0:50	1

Providing decision-making weight, based on the level of importance of each criteria of the required as follows:

Vector Weight : $W = [0.4, 0.8, 0.6, 1 : 00]$

Make a decision matrix X, made from a match the following table:

$$X = \begin{pmatrix} 0.50 & 0.75 & 1 & 0.5 \\ 0.25 & 0.25 & 0.75 & 0.25 \\ 0.75 & 0.25 & 0.50 & 1 \end{pmatrix}$$

make the normalization matrix R, which is obtained from the decision matrix X with the following results:

$$X = \begin{pmatrix} 1 & 0.33 & 1 & 0.5 \\ 0.33 & 1 & 0.75 & 1 \\ 1 & 1 & 0.5 & 0.25 \end{pmatrix}$$

Next will be made of matrix multiplication $W * R$ and summing the results of multiplication to get the best alternative ranking of the greatest value.

Of matrix multiplication $W * R$ then get the results as follow : $V_1 = 1.6056$, $V_2 = 2.382$, $V_3 = 1.75$, the largest value of the sum matrix above is V_2 , thus the alternative A 2 (Lecturer 2) is lecturer good-quality.

4 CONCLUSIONS

Making the Decision Support System to perform calculations as the data selectors lecturer with the results of the assessment has successfully built. Systems that have made reference to the formulation of the problem that exists is how the criteria used in determining the quality of faculty, and how perangkingan quality of lecturers using FMADM (Fuzzy Multiple Attribute Decision Making) and method of SAW (Simple Additive Waighting) in college University "X". Some of the conclusions that can be described as follows:

1. The system is intended to assist the user in data processing lecturer, to determine the lecturers are very good (quality), good (quality) or unfavorable (quality)
2. The calculation of the system to perform screening using SAW (Simple Additive weight-ing).
3. Stages of system development process in this research is the identification of problems, systems analysis, design, testing and implementation.

4. The result of the calculation system membobotkan all of the criteria of the existing value so that the value to be obtained in intervalkan, whether its value shellfish, good, very good.
5. The system built only as a tool to provide information to the user or the leadership of a high peerguruan as consideration in making a decision whether the professor could teach for the next period.

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Application Location Based Service (LBS) Location Search Palembang Nature-Based Android

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Abstract

With the development of information systems to make the operating system more diverse mobile devices, the emergence of the Android operating system that is open allows users to search for and acquire various information easily and quickly. Application Search Nature Places is an application that can help bring information on nearby Places Nature is all around. Can be used in the Android Operating System and Global Positioning System (GPS). To be able to use this application, users must be connected to the Internet because it requires data taken from Google Maps. The main facilities contained in this application is a feature that makes it Map and Route users in finding the intended location. With the LBS application is expected to provide information that is accurate, clear and precise to determine location points Nature Palembang, and can facilitate local and foreign tourists and the public, especially the city of Palembang.

Keywords : *Location Based Service (LBS), Android, Global Position System (GPS), Travel*

1 INTRODUCTION

The rapid development of mobile technology in line with the development of information technology (IT). It becomes an opportunity for the developers of IT. One of the most progressive applications on IT recently is mobile technology [1]. By using the mobile device information can be obtained easily in a short time. Mobile applications already used for : 1) Al Quran mobile learning [2], 2) Bus ticket reservation application [1], 3) Mobile dictionary [3], 4) GIS-based residential locations [4], or 5) Geographic Information System of Urban Green Open Space [5]. Various mobile phone has many uses the Android operating system. Android is a package of software for mobile devices, including an operating system, middle-ware and core applications [6]. Android have been used in billion of gadgets like smatphones and tablets [3].

With the development of technology that is increasingly advancing a positive influence for Android users and one of them with the use of Global Positioning System (GPS). GPS technology enables geographical information (latitude and longitude coordinates) [7]. GPS allows the development of Location Based Service (LBS). LBS uses Google Maps API to implement mobile mapping services [8]. LBS is one service that actively act to change the position of the entity so that it can detect the location of objects and provides services according to the location of the known objects. Location based Services give current users' location to retrieve more valuable information near to their location [9].

Most people have to rely on mobile devices to obtain information, including information about nature. That's why the writer android based LBS application development is expected to provide clear information about the location points Palembang travel and able to assist local tourists, foreign and especially the people around Palembang. LBS applications built using the Eclipse software, the Java SDK and Android SDK. Excellence LBS applications are specifically structured to 6 (six) tourist sites Nature Palembang city and the starting point is automatically detected using GPS and Google maps. The rest of this article are consists of: 1) research methodology as section 2 (two), 2) result and discussions as section 3 (three), and 3) conclude with conclusions as section 4 (four).

2 RESEARCH METHODOLOGY

This research was conducted at the Department of Culture and Tourism of Palembang. Methods of data collection in this study were: 1) observation, a method of data collection where researchers recorded information as they witnessed during the study. In this case I made some observations to the Department of Culture and Tourism of the city of Palembang. 2) Documentation, is a method of collecting data by finding and collecting data on issues related to research. 3) Study Library (Literature), is a method of data collection conducted by researchers with examining theories, opinions and support the main ideas to the issues discussed.

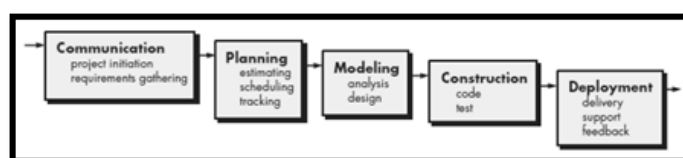


Figure 1: Waterfall Model

The development method used in this study is a Waterfall model [10]. This model is a model of systematic approach that sequentially in software development that begins with the specification needs - needs and will start from the analysis of user needs continue into the process of designing, coding, testing, and maintenance gradually, Waterfall consists of five (5) phases: 1) Communication, 2) Planning, 3) Modeling, 4) Construction, and 5) Deployment (Picture 1)

3 RESULTS AND DISCUSSIONS

Based on the research that has been done, the design and ends with the creation of actual program, the results achieved by the authors is an Application Location Based Service (LBS) Location Search Nature Palembang Based on Android, this application consists of: Splash Screen, Main Page, Wisata Alam, About, and Exit.

3.1 Splash Screen and Main Page

Screen Splash pages are beginning to see applications that are shown before the main page. On page splash screen will display the icon Ampera bridge. Page splash screen (figure 2) will run for 3 (three) seconds before the main page (figure 3) of the application is displayed.



Figure 2: Fig 2 Splash Screen

3.2 Natural Tourism

This is the main page that list whole natural tourism in Palembang (figure 4). This page/menu display the natural tourism destinations, such as : 1) Kuto Besak, 2) Kambang Iwak, 3) Kerto Island, 4) Island Kemaro, 5) Puntti timber, and 6) Musi River (see figure 4).

3.3 Description and Route Maps Nature

Description page and route nature (figure 5) is the detail page of the menu pages nature, this page will be displayed when the user presses one listview displayed by the page menu nature.

Figure 5 is the example one of natural tourism of Benteng Kuto Besak. This page consists of the description of the particular natural tourism. This page then shows the position of current user (red pointer in the circle), and a line that linked inked into destination spot (green pointer).



Figure 3: Fig 3 Main Page



Figure 4: FNatural Tourism

3.4 Administrator Page

Administrator system software is software that is in the web server. System administrators will be used by administrators to process the input, edit and delete menu that will be displayed in LBS applications in the android operating system. The login page is the initial view of the system administrator when accessed. Before heading to the main page of the system administrator, the admin must first input the appropriate username and password. If the username and password as the system administrator will display the main page. Admin main page is a page that is used to add a menu to be displayed on android based mobile LBS application. Natural attractions page is a page that will display data from menu natural attractions that have been added by the admin. Natural attractions input page is a page that will display the data nature LBS applications to be written by admin.

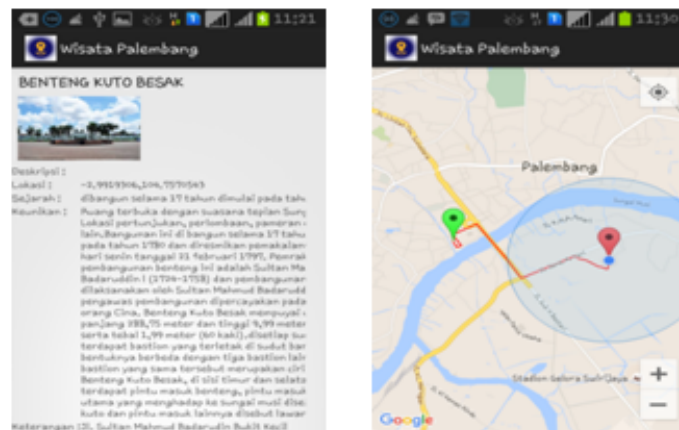


Figure 5: Page Description and Route Maps of Natural Tourism

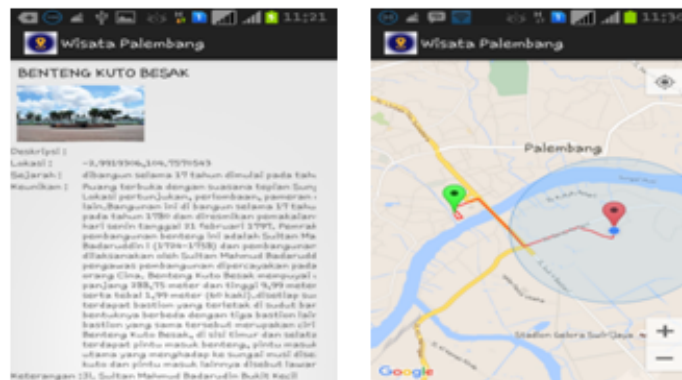


Figure 6: Page Description and Route Maps of Natural Tourism

4 CONCLUSSIONS AND RECOMMENDATIONS

Based on the research that has been done in building applications Location Based Service (LBS) search the natural attractions of the city of Palembang-based android, it can be concluded that:

1. This research resulted in an application Location Based Service (LBS) search the natural attractions of the city of Palembang-based android that can be run on the Android operating system with a minimum version 2.2 (Froyo), up to the latest version 5.0 (Lollipop).
2. LBS applications built using the Java programming language to build software on android mobile devices.
3. The software can be accessed using the Internet connection or online because the software uses techniques JSON (JavaScript Object Notation) as a data exchange format

that connects the database which resides in webserver with mobile android software and integrated with Google Maps.

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Extracted Social Network Mining

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Abstract

In this paper we study the relationship between the resources of social networks by exploring the Web as big data based on a simple search engine. We have used set theory by utilizing the occurrence and co-occurrence for defining the singleton or doubleton spaces of event in a search engine model, and then provided them as representation of social actors and their relationship in clusters. Thus, there are behaviors of social actors and their relation based on Web.

Keywords : *Singleton, doubleton, cluster, behavior*

1 INTRODUCTION

An extracted social network is a resultant from the methods of extracting social network from information sources (web pages, documents, or corpus) [1] or the transformation of the raw data into a social network (pre-processing) [2]. However, Web not only dealing with everything changed dynamically [3], but Web as social media represent all members of social (population) [4, 5], or containing big data as big picture of world. Thus, extraction of social networks always based on parts of social (communities) [6], and then to analyze it so that enable to generate useful information, for example, in the decision making [7]. This needs the sample that can represent population. Therefore, for getting significance of information source and trust, in the extracted social networks need the suitable approaches [8].

In other side, the resources of social network such as vertices/actors, edges/relations, and Web/documents have the relations between one to another [9]. A lot of relations between vertices and edges for expressing some of social structures in Social Network Analysis (SNA) [10], but still a little formula to get information about relations among first two resources and Web [11]. Therefore, this needs a formalism study about resources. In all sides of social network, this paper aimed to provide a basic means of discovering knowledge formally about the extracted social network, we call it social network mining.

2 RELATED WORK AND MOTIVATION

The social networks can be modeled naturally by the graph $G < V, E >$ where $V = \{v_i | i = 1, \dots, n\}$ is a set of vertices, and $\{e_j | j = 1, \dots, m\}$ is a set of edges and e_j in E if two

vertices vk in V and vl in V are adjacent, or $e_j = v_kv_l = v_lv_k$ [12]. In pre-processing of social network mining, extracting the social network from the information sources is the relatively approaches which is formed through modal relations [1]. One of extraction methods is the superficial method that depends heavily on the occurrence and the co-occurrence [3].

Let a word "Web" or a phrase "World Wide Web" is representation an object according to what we think [13]: the computer network is a social network [14]. In expressing the behavior of social, Natural language processing (NLP) as basic layer of social network mining, and we define the term related it as follows.

Definition 1. A term t_x consists of at least one or a set of words in a pattern, or $t_x = (w_1, \dots, w_l), l \leq k, k$ is a number of words $w(s), l$ is number of vocabularies (tokens) in $t_x, |t_x| = k$ is size of t_x .

In NLP, 'Shahrul Azman Noah' and 'Opim Salim Sitompul' as terms, for example, are well-defined names of social actor. We have defined a dynamic space based on concept of NLP application as follows [15].

Definition 2. Let a set of web pages indexed by search engine by Ω . For each search term t_x , where t_x in \sum , i.e. a set of singleton search term of search engine. There are a dynamic space Ω containing the ordered pair of the term $t_{xi}i = 1, \dots, I$ and web pages $\omega_{xj}j = 1, \dots, J : (t_{xi}, \omega_{xj}) = (t_x, \omega_x)_{ij}$, or a vector space $\Omega_x = (t_x, \omega_x)_{ij}$ (is subset of or equal to Ω) is a singleton search engine event of web pages (singleton event) that contain an occurrence (event) of t_x in ω .

Definition 3. Suppose t_x in q and q is a query. Clustering web pages based on query is an implication, i.e if $\omega \rightarrow t_x$ is TRUE then a web page ω in Ω is relevant to q or $\Omega_x = 1$ if t_x is true at all ω in Ω , 0 otherwise, and Ω_x as the cluster of t_x .

Classically, a logical implication associated with inference [16].

Lemma 1. If $|\Omega|$ is the cardinality of Ω and $|\Omega_x| \leq |\Omega|$ then probability of a singleton event Ω_x is

$$P(t_x) = |\Omega_x|/|\Omega| \text{ in } [0, 1]$$

Proof. For any term t_x in q , each web page ω in Ω is relevant to a query q has a probability to other web pages in $\Omega, 0 \leq p(\omega) = 1/|\Omega| \leq 1$. Probability of all web pages that relevant to a query in Ω is $0 \leq p(\Omega_x) = \sum p(\omega) = |\Omega_x|/|\Omega| \leq 1$, or $P(t_x) = p(\Omega_x)$.

In the same concept we have to define also the co-occurrence based on NLP [17].

Definition 4. Let t_x and t_y are two different search terms, $t_x \neq t_y, t_x, t_y$ in \sum , where \sum is a set of singleton term of search engine. There are a dynamic space Ω containing the ordered pair of two terms $\{t_{xi}, t_{yi}\}i = 1, \dots, I$ and web pages $\omega_{xj}j = 1, \dots, J : (\{t_{xi}, t_{yi}\}, \omega_{xyj}) = (\{t_x, t_y\}, \omega_{xy})_{ij}$, or a vector space $\Omega_x \cap \Omega_y = (\{t_x, t_y\}, \omega_{xy})_{ij}$ (is a subset of or equal to Ω) is a doubleton search engine event of web pages (doubleton event) that contain a co-occurrence (event) of t_x, t_y in ω .

Lemma 2. If $|\Omega|$ is the cardinality of Ω and $|\Omega_x \cap \Omega_y| \leq |\Omega|$ then probability of a doubleton event $\Omega_x \cap \Omega_y$ is

$$P(\{t_x, t_y\}) = |\Omega_x \cap \Omega_y|/|\Omega| \text{ in } [0, 1]$$

Proof. As direct consequence of: Definition 4 and Lemma 1.

At the time conducting the extraction for getting occurrences and co-occurrence, we submitted the queries containing the name to Google search engine, we have the hit count = 20,000 for 'Shahrul Azman Noah' (as occurrence) and = 3,000 for 'Opim Salim Sitompul'

(as occurrence), while the hit count for 'Shahrul Azman Noah,Opim Salim Sitompul' (as co-occurrence) is 218. However, if the query contains names that are enclosed in quotation marks, produced the hit count = 2,680 for "Shahrul Azman Noah" (as occurrence) and the hit count = 5,650 for "Opim Salim Sitompul" (as occurrence), while the hit count for ""Shahrul Azman Noah", "Opim Salim Sitompul"" (as co-occurrence) is 61. Therefore, information about social actors in occurrence and social networks in co-occurrences are different in behavior, and we have an assumption [18, 19]: Each probability of forming its own distribution. Different data distribution gives different behavior. In this case, we have the problem.

Theorem 1. The behavior of clusters describes the behavior of a social actor, then the behavior of other actors expressed by the relationships between the clusters.

3 MODEL AND APPROACH

Literally, we can identify social actor based on Named-Entity Recognition (NER) in web pages or any document as follow.

Definition 5. Suppose there are the well-defined actors, then there is $A = \{\alpha_i | i = 1, \dots, n\}$ as a set of social actors.

Each actor literally also has attributes, thus we can define it as follow [20].

Definition 6. Suppose there be the well-identified attributes, then there is $B = \{b_j | j = 1, \dots, m\}$ as a set of attributes of actors.

Definition 7. For all pairs (dyads) of n social actors, a set of relationships $R = \{r_p | p = 1, \dots, m\}$ where a relationship between two actors there are a tie connect them by one or more relations, or $r_p(\alpha_k, \alpha_l) = B_{\alpha_k} \cap B_{\alpha_l}$.

Definition 8. An extracted social network, i.e. $SN = \langle V, E, A, R, \gamma_1, \gamma_2 \rangle$ satisfies the conditions as follow:

1. $\gamma_1(1 : 1)A \rightarrow V$, and
2. $\gamma_2 : R \rightarrow E$

As an approach to formalize the relationship between resources of social networks, and for exploring the behavior, we use the association rule.

Definition 9. Let $B = \{b_1, b_2, \dots, b_m\}$ is a set of attributes. Let M_i is a set of transactions are subsets of attributes or M_i are the subset of or equal to B. The implication $\Omega_{bk} \rightarrow \Omega_{bl}$ with two possible value TRUE or FALSE as an *association rule* if Ω_{bk}, Ω_{bl} are subset of B and $\Omega_{bk} \cap \Omega_{bl} = \phi$.

4 FORMULATION OF BEHAVIOR

Each cluster represents an actor based on the extraction of social networks.

Lemma 3. If for a cluster Ω_x of a search term t_x there exist other cluster Ω_y of a search term t_y where $t_x \neq t_y$, then Ω_x is a stand-alone cluster.

Proof. Based on *Definition 2* and *Definition 9*, we have $t_x \rightarrow t_y$ literally or $\Omega_x \rightarrow \Omega_y$, but $t_x \neq t_y$ such that $\Omega_x \cap \Omega_y = \square$. Therefore, Ω_x is a stand-alone cluster.

Proposition 1. If t_{α_i} in $qi = 1, \dots, n$ and Ω_{α_i} are a stand-alone cluster for each of $\{\alpha_1, \alpha_2, \dots, \alpha_n\} = A$, then Ω_{α_i} represent the behavior of α_i in A, respectively.

Proof. Based on *Definition 9*, we have ω in $\Omega \rightarrow t_{\alpha}$ in q and ω is representation of actor α in A, and because of each ω in Ω has a probability then ω in Ω be the behavior of actor

α in A , but based on *Definition 2* $\Omega\alpha = \{(t_a, \omega_a)_{ij}\}$, Ω_a is representation of α in A . Let there be t_{ak}, t_{al} in $qt_{ak} \neq t_{al}$, we have $\Omega_{ak} \rightarrow \Omega$ and $\Omega_{al} \rightarrow \Omega$: Even though $\Omega_{ak} \rightarrow \Omega_{al}$ or $\Omega_{al} \rightarrow \Omega_{ak}$, but $\Omega_{ak} \cap \Omega_{al} = \Omega_{al} \cap \Omega_{ak} = \phi$. Each of $\Omega_{\alpha i}, i = 1, \dots, n$ is a stand-alone cluster that represent the behavior of an actor.

Lemma 4. Let $t_{ak} \neq t_{al}$ is the different search terms represent two social actors. If t_{ak}, t_{al} in q , then Ω_{akl} is a stand-alone cluster for a pair of social actors.

Proof. As applicable in *Lemma 3* to *Definition 3* and *Definition 2*, ω in $\Omega \rightarrow \{t_{ak}, t_{al}\}$ in q or ω in $\Omega \rightarrow \{t_{ak} \square t_{al}\}$ in q and $(\omega$ in $\Omega \rightarrow t_{ak}$ in $q) \square (\omega$ in $\Omega \rightarrow t_{al}$ in $q)$ and we have $\Omega_{ak} \rightarrow \Omega_{al}$ and $t_{ak} \neq t_{al}$, but $\Omega_{ak} \cap \Omega_{al} \neq \phi$ then $\Omega_{al} \rightarrow \Omega_{ak}$. However, based on *Definition 9* we have $((\Omega_{ak} \rightarrow \Omega_{al}) \rightarrow \Omega) = ((\Omega_{al} \rightarrow \Omega_{ak}) \rightarrow \Omega)$. In other word, $\Omega_{akl} = \{(t_{akl}, \omega_{akl})_{ij}\} = \{(t_{ak} \square t_{al}, \omega_{ak} \square \omega_{al})_{ij}\} = \{(t_a \square t_a, \omega_a \square \omega_a)_{ij}\} (i, j = k \square l) = \{(t_a, \omega_a)_{ij}\} (i, j = k \square l) = \Omega_a$. Thus, akl is a stand-alone cluster of a pair of social actors.

Proposition 2. If Ω_{akl} is a stand-alone cluster for a pair of $\{a_1, a_2, \dots, a_n\} = A$, then Ω_{akl} represent the behavior of relationship between $a) i$ in $A, i = 1, \dots, n$.

Proof. Based on *Lemma 4* we have $\Omega_{akl} = \Omega_a$, and $\Omega_a = \{(t_a, \omega_a)_{ij}\} = \{(t_a \square t_a, \omega_a \square \omega_a)_{ij}\} = \{(t_{ak} \square t_{al}, \omega_{ak} \square \omega_{al})_{ij}\} (i, j = kl) = \{(t_{ak} \square t_{al}, \omega_{ak} \square \omega_{al})\} = \{(t_{ak}, \omega_{ak}) \square (t_{al}, \omega_{al})\} = \{(t_{ak}, \omega_{ak})\} \cap \{(t_{al}, \omega_{al})\} = \Omega_{ak} \cap \Omega_{al}$. Or because name also can be an attribute of social actor, then Based on *Definition 7* we have $\Omega_{ak} \cap \Omega_{al} = B_{ak} \cap B_{al} = r_p(a_k, a_l)$.

Definition 8 has set the existence of a social actor by means of γ_1 and behavior of a social actor based on the result clusters (*Proposition 1*, while the behavior of relationship between social actors refers to the cluster based on dyad (*Proposition 2*) and this behavior based on γ_2 also become behavior of an edge in social network. Specially, in superficial methods r_p in R means the strength relation between two actors ak and al in A by involving one or more of the similarity measurements: mutual information, Dice coefficient, overlap coefficient, cosine, or for example Jaccard coefficient

$$J_c = |\Omega_{ak} \cap \Omega_{al}| / (|\Omega_{ak}| + |\Omega_{al}| - |\Omega_{ak} \cap \Omega_{al}|) \text{ in } [0, 1]$$

In this concept of similarity, $B)ak \cap B_{al} = |\Omega_{ak} \cap \Omega_{al}| / (|\Omega_{ak}| + |\Omega_{al}| - |\Omega_{ak} \cap \Omega_{al}|) = J_c$ such that e_j in E if $r_p > 0$. However the behavior of $r_p (0 \leq r_p \leq 1)$ depends on the behavior of Ω_{ak} is a subset of Ω , Ω_{al} is subset of Ω and $\Omega_{ak} \cap \Omega_{al}$ is a subset of Ω : $|\Omega_{ak}| \leq |\Omega_{al}|$ or $|\Omega_{ak}| \geq |\Omega_{al}|$, $|\Omega_{ak} \cap \Omega_{al}| \leq |\Omega_{ak}|$, and $|\Omega_{ak} \cap \Omega_{al}| \leq |\Omega_{al}|$. If another measurement concept is similar to J_c , then *Theorem 1* is proved. Therefore, we have

Corollary 1. If the behavior of social actors behaves in clusters (of big data) then the behavior of the clusters (of big data) can be represented by the extracted social network.

5 CONCLUSIONS

In this social network study we have presented an analysis for formulating the behavior of resources of social network as a social network mining. Formulation based on a search engine model and the clustering model, and we have obtained an explanation that there are relations between social actors/vertices, relationships/edges, and documents/web based on the clusters are formed. The future work will involve the extraction of a social network to describe the research collaboration for exploring the behavior of social actors and their relationships.

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Information Systems Architecture Online Learning in School with the Zachman Framework

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Abstract

Media online learning or e-learning in today's world of learning, has become one of the learning methods are very popular and began to be implemented in various educational institutions in particular. High School (SMA) or Vocational High School (SMK) is a continuation of the basic education level. Use of information systems e-learning environment of schools to support educational activities at present, there are schools in the region of South Sumatra Province who already use them and many schools in the area who do not understand e-learning. This research aims to develop an e-learning that can be used by all high schools in the region of South Sumatra. With e-learning, it is expected each school can share information that can balance education in the city and that there dipelosok area. To realize it requires an Enterprise Architecture (EA) in building e-learning teresebut. In this study, the EA will be used is the Zachman Framework. The objective of this framework is to provide a basic structure that supports the organization, access, integration, interpretation, development, management and representation change the architecture of an organization's information systems.

Keywords : *E-learning, Enterprise Architecture, Zachman Framewrok*

1 INTRODUCTION

Developments in information technology today is very meaningful for all people but especially in the field of education. Nowadays, the Internet is an information tool that is most widely used by educational institutions, especially in the search for information and communication. Media online learning or e-learning in today's world of learning, has become one of the learning methods are very popular and began to be implemented in various educational institutions in particular. The existence of these learning methods become more cutting edge and up to date because depend on the sophistication of computer technology and the Internet. This is the main attraction for the experts in the field of education to conduct research on the various online learning system. One of them is evidenced by the increasing number of definition or understanding of e-learning experts say that is used as a seminar instructor or writing.

The term e-learning is actually an abbreviation of electronic learning that emphasizes learning by using electronic technology. E-learning as any teaching and learning using electronic circuits (LAN, WAN, or the Internet) to deliver learning content, interaction, or guidance [1]. E-learning in the learning activities occur asynchronously via an electronic device to obtain computer learning materials that fit their needs [2]. According to Hartley [3] E-learning is a type of learning that allows tersampaikannya teaching materials to students using the media Internet, Intranet or other computer network media. Whereas another opinion explaining that explains that the term "e" or an abbreviation of electronics in e-learning is used as a term for any technology that is used to support the efforts of teaching via Internet electronic technology [4].

High School (SMA) or Vocational High School (SMK) is a continuation of the basic education level. In Act No. 20 of 2003 on National Education System Article 18 arranged on secondary education, namely : 1) Secondary education is a continuation of basic education, 2) Secondary education consists of general secondary education and vocational secondary education, 3) Secondary education in the form of secondary school (high school), Madrasah Aliyah (MA), vocational schools (SMK), and madrasah aliyah vocational (MAK), or other equivalent form [5].

Indonesian artifacts in a total of 25 159 units of the school in the academic year 205/2016. while the upper secondary schools or equivalent in the province of South Sumatera there are 823 units, made up of 414 public schools and 409 private schools [6]. Use of information systems e-learning environment of schools to support educational activities at present, there are schools in the region of South Sumatera Province who already use them and many schools in the area who do not understand e-learning. As for e-learning that is used by a school to support their education process is different from other schools that also have made use of e-learning. The concerns raised from this research aims to develop an e-learning that can be used by all high schools in the region of South Sumatera. In addition, each student or teacher at a school that utilizes e-learning [7] to connect with students or teachers at other schools that have used e-learning or in other words the addition of the concept of social media in e-learning. Given this concept it is expected that each school can share information that can balance education in the city and that there in remote areas. To realize it requires an Enterprise Architecture (EA) in building that e-learning. Enterprise Architecture (EA) is the structure of the components that are interconnected with each other, and there are principles and rules in designing that develops over time [8]. There are many kinds of EA with the advantages of each of them Zachman Framework, The Open Group Architecture Framework (TOGAF), the Department of Defense Architecture Framework (DoDAF), the Federal Enterprise Architecture (FEA, and the CIM Open System Architecture (CIMOSA).

In this study, the EA will be used is the Zachman Framework. Zachman Framework is one method to help design enterprise architecture models that can help all parties to define the overall management [9]. The objective of this framework is to provide a basic structure that supports the organization, access, integration, interpretation, development, management and representation change the architecture of an organization's information systems. Each object / description of the architectural representations referenced as artifact. Based on the descriptions above, the authors raise the issue as research material for a this study. The selected title is "Online Learning Information System Architecture At school SMA With Zachman Framework".

Based on the background of this study, it can be identified the problem as follows: 1) The use of e-learning environment of high school has not been widely used, especially in the region of South Sumatra, 2) E-learning used by each school still alone, and 3) The concept for connecting every learner and teacher in the high school environment does not exist. In this study, formulated the main problems that must be resolved to achieve the goal of "How to Build an Online Learning Information System Architecture At school SMA With Zachman Framework?".

In order to resolve those problems, required the formulation of clear objectives measurable and achievable. The main objectives of this study are: 1) Building Architecture of information systems and e-learning technology with the Zachman Framework, and 2) e-learning architecture that was built to connect the entire high school.

From the results of this study are expected to be useful, both theoretically and practically: 1) Obtain an overview of the architecture of information systems technology in the form of an online learning framework blueprint, and 2) The results of this study can be used as a material consideration whether or not e-learning are built to be applied.

Restrictions on the scope of which is discussed in this paper include: 1) The study was conducted in high schools in the region of South Sumatra Province, and 2) to analyze the feasibility of the implementation of e-commerce with the Enterprise Architecture Zachman Framework in the form of a framework blueprint.

2 ZACHMAN FRAMEWORK

The objective of this framework is to provide a basic structure that supports the organization, access, integration, interpretation, development, management and representation change the architecture of an organization's information systems. Each object/description of the representations of architecture referred to as artifact. Zachman framework described in the form of a matrix showing the relationship between perspective and abstraction. Each row represents a level of perspective, namely planners, owners, developers, subcontractors, and functioning enterprise, while each column describe the abstraction / certain aspects of the process, namely the data, function, network, people, time and motivation. Six each of these aspects relating to the basic questions: what, how, where, who, when, and why [10].

Zachman framework is not a method for developing information systems architecture, but Zachman framework is just a framework for categorizing information systems architecture artifact or in other words, the Zachman framework provides an overview of the results of the information system architecture.

In the picture above is explained that the Zachman Framework is a 6 6 matrix that represents the intersection of two classification scheme two-dimensional system architecture. In the first dimension, Zachman described it as a line consisting of six perspectives: 1) The Planner Perspective (Scope Context): List the scope of the description element of business recognized by strategists as a theorist, 2) The Owner Perspective (Business Concept): Model semantic business linkages between the components of a business as defined by the chief executive as the owner, 3) The Designer Perspective (System Logic): A more detailed logic models that contain design requirements and system constraints represented by the architects as a designer, 4) The Builder Perspective (Technology Physics) : The physical model that optimizes the design for specific needs within the constraints of a specific technology, people, costs and scope of time specified by the engineer as a builder, 5) The Implementer Perspective (Com-



Figure 1: Zachman Framework.

ponent Assemblies): The special technology, about how the components are assembled and operated, configured by technicians as the implementer, and 6) The Participant Perspective (Operation Classes): The events of the real functioning system that is used by the technicians as a participant.

For the second dimension, each issue of perspective requires a different way to answer the fundamental questions: who, what, why, when, where and how. Each question requires an answer in a different format. Zachman describe any of the fundamental questions in the form of field/focus [11] form: 1) What (column data): the material used to build the system (inventory set), 2) How (column function): carry out the activity (process transformations), 3) Where (network column): location, tofografi and technology (network nodes), 4) Who (the column): rules and organization (organization group), 5) When (time slot): incidence, cycles, schedule (time periods), and 6) Rev (field goal) : objectives, motivation and initiative (motivation reason).

For each cell in the matrix which is the intersection between the perspective and the focus should be distinctive and unique.

3 RESULTS

Zachman Framework For E-learning, for the preparation of the planning application e-learning necessary stages in the Zachman Framework, which includes the following stages:

3.1 Scope

At this stage often called contextual architecture. At this stage defined functional business model globally and various external requirements of the organization.

3.2 Business Model

At this stage often called the conceptual architecture. At this stage defined models of business processes, business functions allocation, the process of elimination of overlapping

Table 1: Scope

Field/Focus	Notes
Why	Build e-learning that can be used by all high schools in the region of South Sumatra
When	Each user account data processing and generate reports and notifications
Who	Users of e-learning Recommended: Admin, Teacher and Student
Where	Applications include users throughout South Sumatra region
How	Generate e-learning architecture with the concept of social media that can connect all high schools in the region of South Sumatra Generate Blueprint architecture Learning Online In High School With the Zachman Framework.
What	School high school or equivalent in South Sumatra province are 823 units, made up of 414 public schools and 409 private schools

functions and ambiguous.

Table 2: Business Model

Field/Focus	Notes
Why	Provide online learning, ease of learning, flexible time, e-learning with the concept
Why	of social media is that it can search and friendship and exchange of information between users
When	e-learning can be accessed anytime and anywhere access to eraser school
Who	Admin as the main data processing and Teachers give feedback in an online learning activities Student tasks and accessing information from school
Where	E-learning with the concept of social media can do so friendship between users can be connected
How	Between users can exchange information Each user has their own account so that it can store data history Each user can see the history of another user with friendship and permits
What	e-learning is intended per school

3.3 Systems Model

At this stage often called the logical architecture. At this stage defined logical models, project management, and defining requirements.

3.4 Technology Model

At this stage, often called the technology architecture. At this stage defined physical models, technology management, and defining solutions and development.

Table 3: Systems Model

Field/Focus	Notes
Why	The system goes online. To membangunya by using the PHP programming language and MySQL Database
When	Anywhere and anytime
Who	E-learning applications to serve the needs of the learning process online admin, teachers and students.
Where	The process of storing data into the database is distributed
How	Applications also have a system
What	Transaction processing systems use described by use case diagram

Table 4: Tehnology Model

Field/Focus	Notes
Why	Models describing the technology needs of each user in accessing the system
When	Scheduling system
Who	The use of data described using a hierarchical model of the system
Where	Calculating bandwidth requirements so that the system conditions do not occur down
How	Overview of connections between computers in data access speed
What	Overview of the structure of the data in applications built

3.5 Detail Representation

At this stage described how the management system configuration and implementation of the system development.

3.6 Function Enterprise

At this stage, delivering a wide range of guidance for the user to be able to the functioning of the system, perform management operations, and evaluate the system.

4 CONCLUSSIONS AND RECOMMENDATIONS

Based on the discussion made it can be concluded that:

1. The results of this research is a blueprint of the architecture of information systems technology online learning.
2. The information system online learning feasible to secondary schools to improve the quality of learning of students.

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Improved Models of Wireless Pricing Scheme in Multiple Class QoS Networks by Determining the Base Price Value

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Abstract

This paper aims to determine the improved pricing scheme in wireless networks that can provide the maximum benefit for service providers Internet (ISP) that works in multiple class QoS network, which can guarantee a given scheme the satisfaction of consumer service providers and service users. Previous research focusing also on multi class QoS network by fixing the base price shows that by varying the quality premium then, the ISP can gain profit. So, we attempt to improve the models by varying the value of base price. The model used will be transformed into a model optimization which will then be examined by considering as a nonlinear programming problem that can be solved using LINGO13.0. The solutions of the models then are compared to original model proposed by previous research to obtain best results. Of the three models discussed, based on the results of each case, the ISP will get maximum benefit when applying the modified model by varying the base price and quality premium.

Keywords : *Wireless Pricing Scheme, QoS Network, Base Price Value*

1 INTRODUCTION

Therefore internet service providers (ISPs) compete in determining the pricing model of wireless internet that can maximize profits, but with the quality of its Internet services. Research on wireless financing scheme of non linear modeling are ever conducted by [1-3]. The pricing model of wireless network then carried out using mathematical methods programming [4, 5] and improved by fixing the base price [6, 7]. The wireless pricing models of multiple Class QoS networks utilize the bandwidth and end-to-end delay of QoS attributes and use the improved models in multi class QoS networks [8].

However, the pricing scheme of wireless networks in multiple class QoS network is not limited only to have the base price value to be fixed to recover cost. That goal can be extended to promote certain services offered by ISP while the end users can select the services of their preferences.

Therefore, by collecting all results previously conducted, we attempt to extend the research into multiple Class QoS network by considering the base price value to be determined

by ISP to gain certain goals set up by ISP since the profit is also intended to be achieved not only by recovering the cost but also by competing in the market. Then, the main contribution is to improve the models of wireless in multiple class QoS networks by determining the value of base price to achieve the goal of competing in the market while promoting certain services. Two models are improved by using each QoS attribute. The models obtained are also compared with the original one to show the best results. The proposed models then are transformed into nonlinear programming models and to be solved by LINGO 13.0. With this improved models, the ISP is able to improve the model original by utilizing the total base cost and quality premium as well as utilize the utility function that determines the sensitivity of the user in selecting the appropriate service with a budget that users have.

2 RESEARCH METHODOLOGY

In this study, the internet pricing scheme used the model proposed [2] The model will then be modified with the model previously proposed by [9] and improved model of [8, 10] in the objective function and constraint functions as a starting measure in determining the basic QoS, and with pay attention to the premium quality of each class to be fixed or varied. The models formed are based on two assumptions where the first assumption that the base price in the form of variable and premium quality is also constant, and assuming both QoS basic price and quality premium are in the form of variable. Model established will then be processed using the data have been obtained from one server local in Palembang, where the data used consisted of the mail and traffic data traffic which will then be solved using LINGO 13.0 to obtain the optimal solution.

3 RESULTS

The model used in this study is originally from [2] which is then modified by model drawn up [6] for QoS bandwidth. So that the resulting model is to maximize.

$$\sum_j^m \sum_i^n (PR_{ij} \pm PQ_{ij} + (\alpha_j + W_j \log \frac{X_{ij}}{L_{mj}}) Z_{ij}) \quad (1)$$

with some attentions to some important aspects that can affect the optimum result in the form of quality premium of users who have the service performance I_i . then the model (1) for the objective function is a modified model to maximize

$$\sum_j^m \sum_i^n (PR_{ij} \pm PQ_{ij} + (\alpha_j + \beta_j I_j + W_j \log \frac{X_{ij}}{L_{mj}}) Z_{ij}) \quad (2)$$

It means that in order to maximize the total amount consists of the cost to connect with QoS available (PR_{ij}), changes in the cost of all the changes in QoS (PQ_{ij}), and the formulation of financing models in the internet multi class QoS network proposed by where α_j is the base price for each class j , $\beta_j I_j$ is a premium quality of i users who have I_i service performance. The set of constraints play a role as limiting the objective function that must be met in the goal of obtaining optimal results. The first constraint states that a change fee depend on the cost factor on bandwidth QoS attributes, the basic cost to the user i and j class, as well as linearity factors By collecting all the information obtained the following constraints.

$$PQ_{ij} = \left(1 \pm \frac{x}{Q_{bij}}\right) PB_{ij}L_x \quad (3)$$

with Q_{bij} is the nominal value of the QoS attributes network operator. In this case the QoS attributes to be measured is bandwidth, where the maximum value for the bandwidth is 2Mbps. PB_{ij} a basic fee for a connection with the user i and class j , and L_x is linearity factor. Defining PB_{ij} namely:

$$PB_{ij} = \alpha_{ij}(e - e^{-xB})T_l/100 \quad (4)$$

α_{ij} define linear cost factor in user i and j class, the linear factor $(e - e^{-xb})$, and T_l is the traffic load.

$$L_x = \alpha(e - e^{-xb}) \quad (5)$$

$$f \leq \alpha_{ij} \leq g \quad (6)$$

$$h \leq t_l \leq k \quad (7)$$

$$0 \leq x \leq 1 \quad (8)$$

$$0.8 \leq x \leq 1.07 \quad (9)$$

$$\alpha = 1 \quad (10)$$

L_x is a factor that depends on the linearity parameters and $(e - e^{-xb})$, assuming $0 \leq x \leq 1$. The linear factor α_{ij} is limited by the service provider, assume as f and g . Allow able traffic load T_l is also determined by the service provider, say h and k . At the constraints (7), x is increment of QoS, which is set between 0 and 1 suggest simplicly that if 0 means to be in conditions best effort and 1 in a state of perfect service. Value B is set to be between 0.8 and 1.07, because in this range the best quality services occur. A linear parameter value is to be determined, with factor a base rate set. Then, constraints continued with constraints improved [8] as follows.

$$\sum_{i=j}^2 \sum_i X_{ij} \leq Q, i = 1, 2 \quad (11)$$

With Q is total bandwidth of 100MBps atau sebesar 102400 Kbps.

$$X_{ij} \geq L_{mj} - (1 - Z_{ij}), i = 1, 2; j = 1, 2 \quad (12)$$

$$W_j \leq W_{ij} + (1 - Z_{ij}), i = 1, 2; j = 1, 2 \quad (13)$$

$$X_{ij} \geq V_i - (1 - Z_{ij}), i = 1, 2; j = 1, 2 \quad (14)$$

W_{ij} is the sensitivity price for user i in class j . V_i is minimum bandwidth for each user with $V_1 = 6$ Kbps for user 1 and $V_2 = 5$ Kbps for user 2.

$$X_{ij} \geq X_j - (1 - Z_{ij}), i = 1, 2; j = 1, 2 \quad (15)$$

$$X_{ij} \geq Z_{ij}, i = 1, 2; j = 1, 2 \quad (16)$$

$$X_{ij} \geq 0, i = 1, 2; j = 1, 2 \quad (17)$$

$$L_{m_j} \geq 0.01, j = 1, 2 \quad (18)$$

$$W_j \geq 0, j = 1, 2 \quad (19)$$

$$X_{ij} \leq X_j, i = 1, 2; j = 1, 2 \quad (20)$$

$$Z_{ij} = \begin{cases} 1, & \text{user } i \text{ is admitted to class } j \\ 0, & \text{otherwise} \end{cases} \quad (21)$$

For β_j fix, we add the additional constraints as follows.

$$m_j \leq I_j \leq 1; j \in [0, 1] \quad (22)$$

$$I_j = I_{j-1}; j = 1, 2 \quad (23)$$

$$\beta_1 = 0.01, \beta_2 = 0.02 \quad (24)$$

For β_i varies, we have Eq.(22)-(23) and the following equations

$$\beta_j \cdot I_j \geq \beta_{j-1} \cdot I_{j-1}; j > 1 \quad (25)$$

$$l_j \leq \beta_j \leq b_j \quad (26)$$

With l_j as a minimum value for quality premium of class j , and b_j as the maximum value for quality premium of class j .

For α_j varies, we set up the equations as follows.

$$\alpha \geq \beta_{j-1} \cdot I_{j-1}; j > 1 \quad (27)$$

$$s_j \leq \alpha_j \leq u_j, [s_j, u_j] \in [0, 1] \quad (28)$$

Then, we seek to obtain the optimal solution for each case involving the 2 QoS attributes. Fig. 1, and Fig. 2 show the optimal solutions for each case and comparison to the original model and the number of iterations involved in each model, respectively.

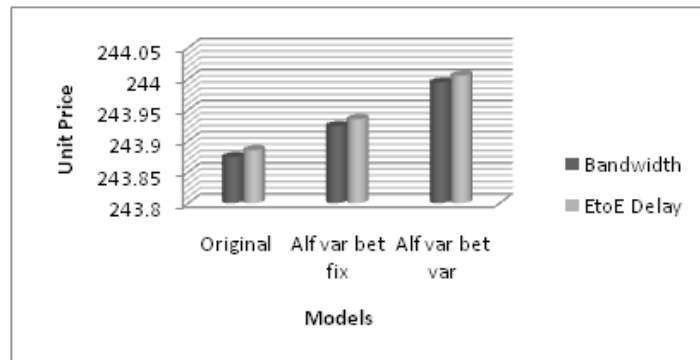


Figure 1: The comparison of the optimal solutions of three models based on the QoS Attributes

From Fig.1, we can see that by varying the base price and the quality premium, the maximum optimal solution can be reached if applying the End-to End Delay attribute. The improved models by varying and fixing the quality premium and varying the base price yield the better optimal solutions with the goals to either promote certain services or users are able to select the class. The End to End delay yield maximum results in model of varying base price and quality premium. This means that the ISP can achieve maximum profit by competing in market and users are able to select the class that are on their preferences.

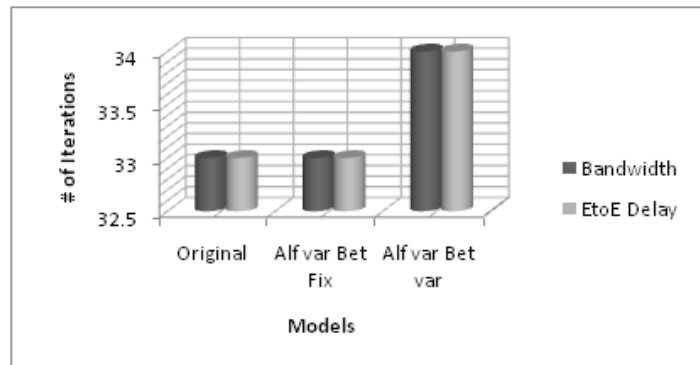


Figure 2: The comparison of the number of iterations need to complete the computation of three models based on the QoS Attributes

Based on Fig. 2, the number of iterations needed to complete the iterations basically is also close for each model with different QoS attribute. It means that, applying the improved models, ISP obtains the maximum profit with the almost same time to complete the models as in original model. Again, for End to End Delay QoS attribute, we have slightly longer time to finish the iterations.

4 CONCLUSSIONS

The objectives of the ISP to achieve the maximum profit when they have the chance to varying the base price to compete in the market is by applying varying the quality premium to enable users to select classes suitable with their budgets. Improved models presented here can show better value in terms of the profit gained and utilize only slightly longer time to finish the iterations.

Acknowledgments.

The research leading to this paper was financially supported by DIKTI through Hibah Bersaing Tahun I 2015.

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Diabetic Retinopathy Stages Classification Using 3D-GLCM

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Abstract

Sustainable Diabetic Mellitus may lead to several complications towards patients. One of the complications is diabetic retinopathy. Diabetic retinopathy is the type of complication towards the retinal and interferes with patients sight. Medical examination toward patients with diabetic retinopathy is observed directly through retinal images using fundus camera. Diabetic retinopathy is classified into four classes based on severity, which are: normal, non-proliferative diabetic retinopathy (NPDR), proliferative diabetic retinopathy (PDR), and macular edema (ME). The aim of this research is to develop a method which can be used to classify the level of severity of diabetic retinopathy based on patients retinal images. Seven texture features were extracted from retinal images using gray level co-occurrence matrix three dimension method (3D-GLCM). These features are maximum probability, correlation, contrast, energy, homogeneity, and entropy; subsequently trained using Levenberg-Marquardt Backpropagation Neural Network (LMBP). This study used 600 data of patients retinal images, consist of 450 data retinal images for training and 150 data retinal images for testing. Based on the result of this test, the method can classify the severity of diabetic retinopathy with sensitivity of 97.37%, specificity of 75% and accuracy of 91.67%.

Keywords : *Diabetic Retinoathy, Stages Classification, 3D-GLCM*

1 INTRODUCTION

Diabetic retinopathy (DR) is one of the Diabetic Mellitus complications and if not treated immediately will lead to permanent blindness. The symptoms shown by patients with DR are microneurism, hemorrhages, hard exudates, soft exudates and neovascularis. At some intensity, these symptoms can be used as stages of DR severity. These stages generally divided into three stages namely non-proliferative diabetic retinopathy (NPDR), proliferative diabetic retinopathy (PDR), and macular edema (ME) [1].

Medical examination by ophthalmologist towards patients with DR is directly observed through retinal images that obtained using fundus camera. Thus the more patients to be

diagnosed the more time will be needed. Therefore, to overcome this lacking, the digital images processing system based on machine learning is needed moreover a system that can be used to classify the retinal images promptly and accurately into DR stages. This will assist optamologists to determine suitable medical treatment for patiens.

The problem that often occurs in anomaly detection using digital images is difficulty in separating between area which is abnormal and area which is non normal. The normal area that has similar feature with abnormal if be computed as a feature of an anomaly image can diminish the uniqueness of an anomaly [2]. This can also happen in the study of DR where there are certain areas in retinal images that should be eliminated because it can reduce the uniqueness of DR images. Study in [3] stated that optic disc (OD) constitutes an area in normal retinal images that contains similar features with DR images such as DR images that contain exudates symptom. Several studies that conducted OD elimination before detecting exudate symptoms indicated higher accuracy than classification without OD elimination [4]. Build upon this analysis, OD should not to be computed because it can influence the accuracy of classification.

Based on background above, the purpose of this study is to develop a method that can be used to classify stages of diabetic retinopathy using 3D-GLCM method that taken from [5] with levenberg-marquardt backpropagation neural network (LMBP). This study expected to give information to the researcher as the continuity of classification stages of diabetic retinopathy.

The study of detecting DR symptoms was conducted by [6], which study about recognized hemorrhage symptoms using template matching. The result of this study shows sensitivity of system 85%. Similar study was also conducted by Garcia [7] about classification of hard exudates symptoms on DR images using RBF method. The accuracy of this study is 88.1%.

David, et al [4] conducted comparisons of DR classification using LVQ and backpropagation classifier. The result is backpropagation can classify with better accuracy 93.3% than LVQ which is 90.3%. Similar study was also conducted [8] in classifying DR symptoms on DR images using feature extraction method along with classification algorithm Learning Vector Quantization (LVQ). DR symptoms that were classified namely microneurisme, exudates and hemorrhage. The performances of this study produce sensitivity of 93.33% and specificity of 90%.

Study about classifying DR stages was also conducted in [9] using histogram features and multi layer perceptron (MLP) classifier. The proposed approach in this study is calculating the area of exudates and blood vessel area henceforth being trained to MLP.

Acharya, et al [10] conducted a study using support vector machine (SVM) to classify stages of DR. In their study, preprocessing conducted by converting RGB to grayscale form and applying adaptive histogram equalization subsequently. After preprocessing, retinal images of DR cropped manually to separate retinal region from its background. The next step is to extract features using Gray Level Co-occurrence (GLCM) method as inputs to SVM classifier. The result of this study shows that system is capable in classifying DR with 85% of accuracy.

Chen, et al [5] in their research using 3D-GLCM to extract features from iris images with system accuracy up to 99.65%. In this study, researcher utilize 3D-GLCM to extract features from DR images then classified using ANN Backpropagation.

2 THE PROPOSED METHOD

The proposed method divided into six steps, which are explained in detail in the next subsections. The overall scheme of the method developed in this work is depicted in Fig. 1.

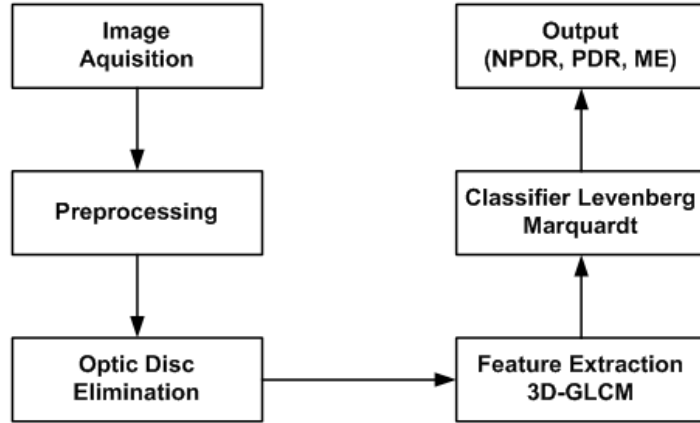


Figure 1: Proposed Method

2.1 Data Acquisition

In this research, the images used were collected from MESSIDOR database (<http://messidor.crihan.fr>). It has been established to facilitate the computer aided diagnosis of DR. 1,200 eye fundus color images of the posterior pole for the database were acquired by 3 ophthalmologic departments using a color video 3CCD camera on a Topcon TRC NW6 non-mydratic retinograph with a 45° FOV and were stored in sizes of either 1,440*960, or 2,240*1,488, or 2,304*1,536 pixels with 8 bits per color plane. 800 images were acquired with pupil dilation (one drop of Tropicamide at 0.5%) and 400 without dilation (<http://messidor.crihan.fr>).

2.2 Preprocessing

Preprocessing was performed to remove the non-uniform background which may be due to non-uniform illumination or variation in the pigment color of eye. Contrast stretching operation was performed to solve this problem [2] before applying median filter process. This technique adjusts the local variation in contrast by increasing the contrast in lower contrast area and lowering the contrast in high contrast area.

$$B(i, j) = \frac{A(i, j) - c}{(d - c)}(L - 1) \quad (1)$$

These preprocessing techniques are explained briefly in the following sections : 1) Contrast Stretching (formula 1). The contrast of an image is the distribution of dark and light pixels. Gray image with low contrast will be seen too dark, too light, or too gray, and 2) Filter Median (formula 2). The median filter is an excellent in reducing salt and pepper noise and often used to improve retinal image quality, especially in diabetic retinopathy [11].

$$f(x, y) = \underset{(s, t) \in S_{x, y}}{\text{median}}\{g(s, t)\} \quad (2)$$

2.3 Optic Disc Elimination

The optic nerve head or optic disk (OD) is one of the important anatomical features that are usually visible in a fundus image of the retina. The OD represents the location of entrance of the blood vessels and the optic nerve into the retina. In fundus images, the OD usually appears as a bright region, white or yellow in color. In the commonly used macula-centered format for fundus images, the OD is located toward the left-hand or right-hand side of the image and is an approximately circular area that is about one sixth the width of the image in diameter, is brighter than the surrounding area, and appears as the convergent area of the blood vessel network. In an image of the retina, all of the properties mentioned above (shape, color, size, and convergence) contribute to the identification of the OD. Identification of the OD is an important step in the detection and analysis of the anatomical structures and pathological features in the retina [12].

In order to eliminate OD, this paper used thresholding, dilation, invert and image multiplication. The steps work as follows : 1) Thresholding (formula 3). Thresholding is the process of changing the degree of gray image into a binary image in order to differentiate the area towards object and background., 2) Dilation (formula 4). Dilation is a morphological operation which state of any given pixel in the output image is determined by applying a rule to the corresponding pixel and its neighbors in the input image. An essential part of the dilation operations is the structuring element (SE) used to probe the input image, 3) Invert. Invert is the process of mapping pixels value of an image in which the value of black pixels (0) will be converted to white pixel (255) and vice versa, and 4) Image Multiplication (formula 5).

$$fa(x) = \begin{cases} 1 & \text{if } f(x, y) > T \\ 0 & \text{if } f(x, y) \leq T \end{cases} \quad (3)$$

$$D(A, B) = A \oplus B = \{x : B_x \cap A \neq \phi\} \quad (4)$$

$$C(x, y) = A(x, y) * B(x, y) \quad (5)$$

2.4 Features Extraction 3D-GLCM

Since the 2D-GLCM is unable to fully represent the texture features of the space domain images, this study used a improved GLCM, called 3D-GLCM, which is expanded from the original 2DGLCM and thus can strengthen and demonstrate the texture features of the space [5].

Six features extracted from 3D-GLCM in this study are : 1) maximum probability, 2) entropy, 3) energy, 4) correlation, 5) contrast, and 6) homogeneity as used in [13]. All features computed as follows : 1) Max Probability (formula 6), 2) Entropy (formula 7). It is the randomness or the degree of disorder present in the image, 3) Energy (formula 8). Energy is sometimes derived from the use of angular second moment. It is the sum of squared elements in the GLCM known as angular second moment, 4) Correlation (formula 9). This

characteristic indicates a high level of correlation between pixels in an image, 5) Contrast (formula 10). The quantity contrast gives the measure of the amount of intensity variation in the image [14], and 6) Homogeneity (formula 11). Homogeneity (formula 11) measures how close the distribution of elements in the GLCM is to the diagonal of GLCM.

$$\text{Max Probability} = \max(P_{i,j}) \quad (6)$$

$$\text{Entropy} = \sum_{i=1}^q \sum_{j=1}^q \sum_{k=1}^q P_{i,j,k} \log_2 P_{i,j,k} \quad (7)$$

$$\text{Energy} = \sum_{i=1}^q \sum_{j=1}^q \sum_{k=1}^q P_{i,j,k}^2 \quad (8)$$

$$\text{Correlation} = \sum_{i=1}^q \sum_{j=1}^q \sum_{k=1}^q \frac{(i - m_r)(j - m_c)(k - m_o)}{\sigma_r \sigma_c \sigma_o} P_{i,j,k} \quad (9)$$

$$\text{Contrast} = \sum_{i=1}^q \sum_{j=1}^q \sum_{k=1}^q [(i - j)^2 + (i - k)^2 + (j - k)^2] P_{i,j,k} \quad (10)$$

$$\text{Homogeneity} = \sum_{i=1}^q \sum_{j=1}^q \sum_{k=1}^q \frac{P_{i,j,k}}{1 + [|i - j| + |i - k| + |j - k|]} \quad (11)$$

Subsequently extracted from 3D-GLCM, these features will be trained using LMBP neural network to obtain accuracy of classification.

2.5 Neural Network Classification

The LMBP neural network architecture had seven input neurons, one hidden layers with seven neurons each and one output neuron. The output neuron will classify four classes as 0.0 for Normal, 0.1 for NPDR and 0.2 for PDR and '0.3' for ME. The network was trained with given set of training data and later tested with remaining testing samples. During the training phase, each output of the LMBP is a real value in the range 0.00.3, whereas the desired output is 0.0, 0.1, 0.2, or 0.3. During the recall phase, the output signal is approximated to binary levels by comparing it with threshold the threshold. The mean square error of the LMBP was set to 0.001.

3 RESULTS

This research used 600 images that divided into two groups namely: 1) training 450 images, dan 2) testing 150 images.

In order to measure the ability of LMBP classifier, these data afterwards were trained and tested. The results as shown in Table.1

The results show that the classifier is able to identify their class up to 90%. This results used to calculate the systems performance by calculating sensitivity, specificity, and accuracy [15].

Table 1: Results of LMBP Classifier

Classes	Training	Testing	Classification		(%)
			Correct	Incorrect	
Normal	75	30	27	3	90.00%
NPDR	150	30	27	3	90.00%
PDR	150	45	42	3	93.33%
ME	75	45	42	3	93.33%

$$Sensitivity = \frac{TP}{TP + FP} \quad (12)$$

$$Specivicity = \frac{TN}{TN + FP} \quad (13)$$

Table 2: Comparison

Sensitivity in %	Specificity in %	Percentage of accuracy (%)
97.37%	75%	91.67%

Table 2 shows the result of sensitivity, specificity, accuracy for the four classes of eye images using neural network classifier. The sensitivity of the system is 97.37% and specificity is 75%, indicating that the result is clinically significant.

This research compared two methods namely method with OD elimination and without OD elimination.

Table 3: Comparison

Approach	Feature extraction	Percentage of accuracy (%)
OD elimination	3D-GLCM	91.67%
without OD elimination	3D-GLCM	72.18%

Table 3 shows that proposed approach produce accuracy of 91.67% higher than approach without OD elimination namely 72.18%. Therefore this method has increased the accuracy of 19.49%.

4 CONCLUSIONS

Based on the discussion made it can be concluded that:

1. The proposed method is able to classify four classes images namely: normal, NPDR, PDR dan ME.
2. The result of this approach produce Sensitivity of 97.37%, Specificity of 75% and Accuracy of 91.67%.

3. The performance of proposed approach increased accuracy of 19.49% higher than approach without OD elimination

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Comparison Route Redistribution on Dynamic Routing Protocol (EIGRP into OSPF and EIGRP into IS-IS)

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Abstract

Each protocol has a routing algorithms and metrics that vary in Determining the best path to a network. The characteristic differences cause problems 1) applications that can only run on Certain routing protocol 2) hardware from various vendors 3) Networking with different routing domain or area. Some aspects of the reference a routing protocol such in terms of the data sent and lost in the process of the data transmission (packet loss), the speed of the data transmission (delay), Also the ability of a routing protocol in choosing the closest distance even the best path in the delivery of the data packets. Those problems can be solved by using routing redistribution techniques. This study will analyze the author's comparison redistribution routing on dynamic routing protocols, routing protocols to find out the which one is better in different networks autonomous system (AS).

Keywords : *Routing Protocol, Redistribute, EIGRP, OSPF, IS-IS*

1 INTRODUCTION

In connecting the LAN network with each other LAN networks would use a tool called a router. In the router itself is no such thing routing protocols. Routing protocol is one of the most important components on the network TCP / IP. Dynamically communicate routing protocol to determine the best path reaches the destination. The packet is forwarded from one router to another router [1].

As for the types of routing in the journal Nanda Satria Nugraha according to (Sutikno, 2012), 1) static routing 2) default routing 3) dynamic routing [2]. Classification prokoto routing versions of Cisco Routing Information Protocol (RIP), Interior Gateway Routing Protocol (IGRP), Enhanced Interior Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF), Intermediate System to Intermediate System (IS-IS), Bolder Gateway Protocol (BGP) [3]. Each protocol has a routing algorithms and metrics that vary in determining the best path to a network.

The characteristic differences cause problems 1) applications that can only run on certain routing protocol 2) hardware from various vendors 3) Networking with different routing area or domain [1]. Some aspects of the reference a routing protocol such in terms of data sent and lost in the process of data transmission (packet loss), the speed of data transmission (delay), also the ability of a routing protocol in choosing the closest distance even the best path in the delivery of data packets.

Those problems can be solved by using routing redistribution techniques. In principle redistribution routing will distribute the routing table is then passed back to the other routing protocols through a router or router terminal which is connecting in a single autonomous system (AS) with autonomous system (AS) others. This study will analyze the authors comparison redistribution routing on dynamic routing protocols, routing protocols to find out which one is better in different networks autonomous system (AS).

Differences in routing protocol will certainly affect performance on a network. Redistribusi routing complexity can receive various routing protocols and routing table can form a more complex, sometimes using the route selection routing redistribution information can not be optimal because of the knowledge and the way configurations as require.

2 LITERATURE REVIEW

2.1 Enhanced Interior Gateway Routing Protocol (EIGRP)

EIGRP is an enhanced version of the Interior Gateway Routing Protocol (IGRP) was developed by Cisco. EIGRP uses distance vector algorithm and distance information similar to IGRP. However, the convergence properties and the operating efficiency of EIGRP have improved substantially over IGRP. (San Jose, CA 95134-1706 [4]. The attributes of EIGRP could be seen in figure 1 [5].

Attributes	
Type	Distance Vector
Algorithm	DUAL
Internal AD	90
External AD	170
Summary AD	5
Standard	Cisco proprietary
Protocols	IP, IPX, Appletalk
Transport	IP/88
Authentication	MD5
Multicast IP	224.0.0.10
Hello Timers	5/60
Hold Timers	15/180

Figure 1: Attributes EIGRP (Jeremy Stretch v2.1)

2.2 Open Shortest Path First (OSPF)

Open Shortest Path First (OSPF) protocol, defined in RFC 2328, is Interior Gateway Protocol is used to distribute routing information within a single Autonomous System [6]. Protocol Header, Attributes, Link State Advertisements, Adjacency States could be seen in figure 2 [7].

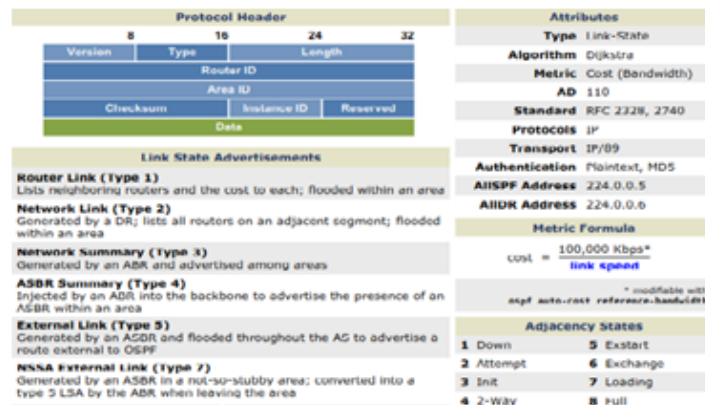


Figure 2: Protocol Header, Attributes, Link State Advertisements, Adjacency States (Jeremy Stretch v2.1)

2.3 Intermediate System to Intermediate System (IS-IS)

ISIS is a routing protocol that was created by the International Standardization Organization (ISO). The goal was created by ISO IS-IS routing protocol is that it be an open standard that can be used by all network devices. But the reality is more widely used is all the protocol and addressing system created based standards organization Open Systems Interconnection (OSI) [8]. The attributes IS-IS could be seen in figure 3 [9].

Attributes	
Type	Link-State
Algorithm	Dijkstra
Metric	Default (10)
AD	115
Standard	ISO 10589
Protocols	IP, CLNS
Transport	CLNP
Authentication	Plaintext, MD5

Figure 3: Attributes IS-IS (Jeremy Stretch v2.1)

3 RESEARCH METHODOLOGY

In this study, the research method to be used is an experimental method of research that is conducting experiments to see an outcome. The results will underscore how the position of a causal relationship between the variables investigated and researched.

In experiments testing is done by the load variation of 32 bytes and 60000 bytes. The purpose of giving the load variation in order to determine the quality of routing protocols when the network is in normal conditions and in conditions of busy. Tests done in one direction and two directions. One direction is where the computer that acts as a client sends

a ping packet to a computer that acts as a server. While the two directions is where the computer that acts as a client and server alike send ping packets simultaneously.

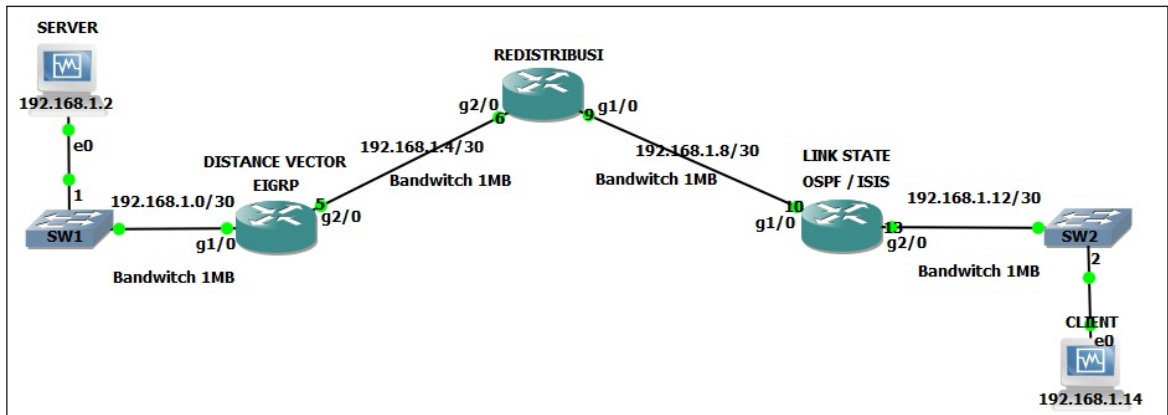


Figure 4: Redistribute EIGRP into OSPF and IS-IS

4 RESULTS AND DISCUSSION

In experiments that have been planned in advance, QoS monitoring system model used for the measurement of parameters of throughput, delay, packet loss at each routing protocol in communication testing 1-way and 2-way with a given load 32bit and 60000bit. From the above explanation, the result of experiments measuring QoS parameters consisting of throughput, delay, and packet loss are as follows:

4.1 Redistribute EIGRP into OSPF

From the test can be seen where to throughput with packet size 32 bytes in one-way communication and two-way communication has almost the same results, namely 100%, and unlike the case when the packet size of 60000 bytes value throughput for one-way communication 91%, while for the communication bidirectional 90%. This is because the load is given more weight when communication is done in two directions resulting network traffic is high.

To delay value by 32 bytes packet size is one-way communication and two-way communication has an average yield of about the same value for the 42ms and 43ms one way to two-way. Unlike the case when the packet size of 60000 bytes have the delay value generated much difference with the average value of 109 for one-way and 49 for the two-way. For the value of packet loss which saw the difference when the packet size is one-way communication 60000 yielding a value of 1%. The result of QoS on Redistribute EIGRP into OSPF could be seen in table 1-3.

4.2 Redistribute EIGRP into IS-IS

From the test can be seen where to throughput with packet size 32 bytes in one-way communication and two-way communication has almost the same results, namely 100%, and unlike the case when the packet size of 60000 bytes value throughput for one-way communica-

Table 1: Throughput value eigrp redistribute ospf

Pakcet Size(Bytes)	Communication	Throughtput		
		Sent	Received(%)	Lost(%)
32	1 direction	299	299 (100%)	0 (0%)
32	2 direction	298	298 (100%)	0 (0%)
60000	1 direction	298	270 (91%)	28 (9%)
60000	2 direction	269	269 (90%)	30 (10%)

Table 2: Delay value eigrp redistribute ospf

Pakcet Size(Bytes)	Communication	Delay (ms)		
		Min	Maks	Average
32	1 direction	25	82	42
32	2 direction	22	104	43
60000	1 direction	37	227	109
60000	2 direction	25	129	49

Table 3: Packet Loss value eigrp redistribute ospf

Pakcet Size(Bytes)	Communication	packet loss (ms)		
		Sent	Lost	Lost (%)
32	1 direction	300	0	0
32	2 direction	299	0	0
60000	1 direction	299	3	1
60000	2 direction	302	0	0

tion 92%, while for the communication bidirectional 80%. This is because the load is given more weight when communication is done in two directions resulting network traffic is high, the same happened to redistribute EIGRP into OSPF.

To delay value by 32 bytes packet size is one-way communication and two-way communication has an average yield equal to the value of 42ms for the one-way as well as for the two-way. Unlike the case when the packet size of 60000 bytes have the delay value generated much difference with the average value of 84 for the one-way and 47 for the two-way. For packet loss where the value of each condition in the test produces the same value is 0%. The result of QoS on Redistribute EIGRP into ISIS could be seen in table 4-6.

5 CONCLUSION

Routing protocol of the measurement results can be seen from the OSPF routing throughput better than routing is-is. In terms of delay and packet loss is-is a routing protocol has better performance than the routing protocol OSPF. Judging of each characteristic can accommodate Adjacency isis routing database of 115, this database contains all neighboring

Table 4: Throughput value eigrp redistribute is-is

Pakcet Size(Bytes)	Communication	Throughtput		
		Sent	Received(%)	Lost(%)
32	1 direction	298	298 (100%)	0 (0%)
32	2 direction	296	296 (100%)	0 (0%)
60000	1 direction	299	274 (92%)	25 (8%)
60000	2 direction	297	239 (80%)	58 (20%)

Table 5: Delay value eigrp redistribute is-is

Pakcet Size(Bytes)	Communication	Delay (ms)		
		Min	Maks	Average
32	1 direction	24	73	38
32	2 direction	31	69	38
60000	1 direction	34	169	84
60000	2 direction	24	92	47

Table 6: Packet Loss value eigrp redistribute is-is

Pakcet Size(Bytes)	Communication	packet loss (ms)		
		Sent	Lost	Lost (%)
32	1 direction	301	0	0
32	2 direction	297	0	0
60000	1 direction	301	1	0
60000	2 direction	300	0	0

routers. Besides routing protocol is-is to have a default metric of different things with the OSPF routing protocol that is dependent on the cost and bandwidth.

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Nonlinear Programming Problem of Bandwidth Based and VolumeBased Call Pricing Scheme in Wireless Networks

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Abstract

The pricing for wireless networks is developed to obtain surplus from subscribers. The linearity factors, elasticity price, price factors are discussed. The new approach of wireless pricing model proposed by previous research are approached by considering the model as the nonlinear programming problem that can be solved optimally using LINGO 13.0. The problem is considered to be nonlinear programming that can be solved using optimization tools. The solutions are expected to give some information about the connections between the acceptance factor and the price. The models attempt to maximize the total price for a connection based on Quality of Service (QoS) parameter. The maximum goal to maximum price is achieved when the provider set the increment of price change due to QoS change and amount of QoS value. The linearity parameter set up for most cases is obtained in ceiling value. Linear price factor ranges between the prescribed value especially cases when we increase the price change due to QoS change and increase the amount of QoS values.

Keywords : *Wireless networks, Maximize total price, QoS parameter*

1 INTRODUCTION

The work that survey on various pricing schemes in networks beginning with the flat rate scheme such as the fixed price plan, time based plan, number of packets plan, single fee plan, Paris Metro Pricing, responsive pricing and reservation based. Other categories are parameter based such as static pricing, smart market pricing, priority pricing, adaptive pricing, cumulus pricing, dynamic pricing, assignment pricing, rate adaption pricing and programmable pricing [1, 2]. Others also discussed some optimization problem of pricing scheme based on bandwidth parameter [3-5] and solved iteratively using LINGO.

The development of wireless networks plays critical role in business life. The issue of optimal pricing that is the condition when the provider has the rights to maximize the revenue

[6]. The beginning research focus on pricing in networks due to Responsive Pricing [7], by performing three stages proposed consist of not using feedback and user adaptation, using the closed-loop feedback and one variation of closed loop form. The pricing plan proposed by Altmann [8] was comprised of the flat rate and usage based pricing. Proposed pricing scheme offers the user a choice of flat rate basic service, which provides access to internet at higher QoS, and ISPs can reduce their peak load. Pricing strategy proposed by Byun [9] is based on economic criteria. They Design proper pricing schemes with quality index yields simple but dynamic formulas. Changes in service pricing can be created and so the revenue. Optimal pricing strategy proposed by Wu [10] is designed by setting up the Flat fee, Pure usage based, Two part tariff. Supplier obtains better profit if chooses one pricing scheme and their ability to pay. Paris Metro Pricing [11, 12] stated that different service class will have a different price. The scheme makes use of user partition and move to choose other class it found same service from other class with lower unit price.

Class of QoS represents the resource reservation but we do not always use the resource. Therefore, by using QoS class, we can implement QoS based pricing for wireless networks [13, 14]. Some recent works describe LTE network pricing scheme that utilizes the QoS parameter, user sensitivity resource block and classify the class into three classes namely gold, silver and bronze [15] and by classifying this, the provider can evaluate the models that suit to the goals of their project.

The pricing models in some part do not really mention about the availability for QoS differentiation and some works does not create the optimization problem to approach the solutions. Pricing for 3G network [13], states that the linearity factor, acceptance factor, elasticity price, traffic load, the provider able to maximize the price and maximize the call function, the solution can be achieved. Pricing strategy proposed by Safari [16] was designed by considering the optimal pricing strategy for specific service as function of time. Their proposed model was created then comparing with the existing approaches available. The models focus on continuous models solved heuristically. Meanwhile, the pricing strategy [17] stated that the dynamic pricing scheme proposed by setting up the model as a partial differential equation (PDE) and solving it numerically. The pricing scheme proposed mainly for pricing companies. Their work utilizes the PDE background by utilizing necessary and sufficient condition of Lagrange. So by solving the boundary conditions the pricing scheme involving company debt can be calculated. Simulation method for designing network proposed by Kennington [18] is able to examine the schemes that are not reached by network testing and able to improve model and performance. Concept of Dynamic pricing introduced by Smyk [19] explains that process to fluctuate prices between consumer and provider. In market condition, the re-priced can often occur. Also, pricingQoS strategy proposed by Jang [20] explains the utility function and cost function are proposed, and pricing mechanism is based on QoS service classes. Strategy proposed by Maill [21] was chosen by creating a model, the discussion on fixed prices, demand is giving to providers, price war is categorized by using the Nash equilibria.

Though some works show the models of wireless pricing based QoS but the discussions about formulating the models into optimization problem are seldom discussed. The main advantage in transforming into mathematical programming is the reasonable models can be designed to support the decision and the decisions are needed in business life. So, in this paper, the new approach of wireless pricing model proposed by [13, 14, 22] are approached by

considering the model as the nonlinear programming problem that can be solved optimally using LINGO 13.0. Two main call function schemes, bandwidth based and volume based are discussed along with the three QoS attributes to see the performance of those three QoS attributes.

2 RESEARCH METHODOLOGY

The models designed are adapted from [13, 14, 22] but the new approach is the by transforming into mathematical programming known as optimization problem approach. The models then solved iteratively using LINGO 13.0. Basically, the models attempt to maximize the total price for a connection based on QoS parameter. The total price is the summation between basic price for a connection and the price change due to QoS change. We have i users and j class. The models are based on two set of categories. First by bandwidth based scheme and second one is volume based scheme. Then, we can examine for each case, which scheme offer the best solution.

The objective of the research is to obtain the revenue for the provider. The model provided by [13, 14] is available. But here, we create the models by gathering all information about parameter and variables and transform all into mathematical programming problem.

So, the objective function will maximize

$$\sum_j^m \sum_i^n (PR_{ij} + PQ_{ij}) \quad (1)$$

which means to maximize the summation of total price that consists of the price for a connection with QoS available and the price change over that QoS. The objective function has limitation to be satisfied to obtain the revenue which is called the sets of the constraints.

The first constraint states that the price change will depends on the factor of the price, that involves the bandwidth as QoS attribute, the basic price at user i and class j , and also the factor of linearity. Then, we have

$$PQ_{ij} = (1 + \frac{x}{2000})PB_{ij}L_x, \text{ for Bandwidth QoS attribute} \quad (2)$$

$$PQ_{ij} = (1 + \frac{x}{350})PB_{ij}L_x, \text{ for End - to End Delay QoS attribute} \quad (3)$$

Where PB_{ij} is the basic price for a connection for user i and the class j and L_x is the linearity factor. Then, α_{ij} which defines the linear price factor in user i and class j , the linear factor $(e - e^{-Bx})$ and the traffic load t_l . So,

$$PB_{ij} = \frac{\alpha_{ij}((e - e^{-Bx}))t_l}{100} \text{ for bandwidth based continuous call pricing scheme, or} \quad (4)$$

$$PB_{ij} = \alpha_{ij}(e - e^{-Bx}) \text{ for Volume based continuous call pricing scheme, or} \quad (5)$$

L_x is a linearity factor that depends on the linearity parameters of a and $(e - e^{-Bx})$. Then

$$L_x = \alpha(e - e^{-Bx}) \quad (6)$$

With x is assumed between 0 and 1.

The linear price factor α_{ij} is set up between prescribed values determined by the provider, say f and g . So,

$$f \leq \alpha_{ij} \leq g \quad (7)$$

The range of allowed traffic load t_l is also determined by the providers, say h and k . Then,

$$h \leq t_l \leq k \quad (8)$$

For x as the amount of increment of decrement in QoS value, we range between 0 and 1 implying 0 is in best effort service case while 1 means in perfect service case. B is arranged between 0.8 and 1.07 since in this range, the best network quality occurs.

$$0 \leq x \leq 1 \quad (9)$$

$$0.8 \leq x \leq 1.07 \quad (10)$$

For parameter value PR_{ij} , the provider arranges the value to have a connection. It also happens in a as the linearity parameters that keep the ratio of the price between floor and ceiling of QoS value is not really high.

Next step, for a model described above, we solve to obtain the optimal solution for each case involving the 3 QoS attributes for bandwidth based and volume based continuous call pricing schemes. Table 1 and Table 2 summarize the solver status for all cases, respectively.

Table 1: Solver Status for Bandwidth Based Continuous Call Pricing Scheme.

QoS Attribute	Bandwidth	BER	End-to-End Delay
Model Class	Nonlinear Programming	Nonlinear Programming	Nonlinear Programming
State	Local Optimal	Local Optimal	Local Optimal
Objective	32.6816	32.7534	3.0468 x 10 ⁷
Infeasibility	0	8.8817 x 10 ⁻¹⁶	1.8626 x 10 ⁻⁹
Iterations	18	18	19
*GMU	25	25	25
**ER	0	1	0

*GMU stands for Generated

Memory Used

*ER stands for Elapsed

Run time

3 RESULTS

Table 1 and Table 2 depict the results for each scheme of continuous call pricing schemes. In Table 1 and Table 2, model class for each QoS attribute defined as nonlinear programming, having local optimal state. The highest objective value to maximize the price for each user is achieved when setting up the QoS attribute of End-to-end delay. In addition, when the scheme is bandwidth based, the objective function value reach the highest value than in volume based scheme since in volume based, the traffic load is already set up as 1. In some cases of QoS attribute, we find the a very small value of infeasibility of the model to show amount constraints are violated, which is a very small value, or we can say, tends to zero. Also, The Extended Solver Status box details similar information for the more advanced branch-and-bound, we have number of iterations required to solve the model which are basically from 24-25 iterations to achieve the optimal solutions.

Table 2: Solver Status for Volume Based Continuous Call Pricing Scheme

QoS Attribute	Bandwidth	BER	End-to-End Delay
Model Class	Nonlinear Programming	Nonlinear Programming	Nonlinear Programming
State	Local Optimal	Local Optimal	Local Optimal
Objective	5.24816	5.25534	3.04664 x 106
Infeasibility	0	0	0
Iterations	16	16	14
*GMU	24	24	25
**ER	0	0	1

4 CONCLUSIONS

The maximum goal to maximum price is achieved when applying the bandwidth based call pricing scheme, since the traffic load takes into considerations. For bandwidth and bit rate error QoS attributes, the difference in objective function value is quite high rather than in end-to-end delay QoS attribute.

Acknowledgments. The research leading to this paper was financially supported by Kementrian Pendidikan Tinggi Malaysia, through Geran Penyelidikan Fundamental (FRGS) Tahun 2014.

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Survey Application for Telkomsel Customer Satisfaction

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Abstract

The purpose of this research is to make Telkomsel Customer Satisfaction Information Media in Kab.musirawas so that they can improve the service and performance of their employe, and also it can give the information about customer satisfaction, able to improve worker quality, and to give them information about the exact number of their customers. With this application system, the employe are able to receive the information about the number of customers, and the number of customers who feels satisfaction with the service or not. Telkomsel customer survey application use programming language PHP and MySQL as database.PHP and MySQL combine to be an easy yet powerful way to create dynamic web pages that actually interact with your visitors. HTML can create useful and well formatted web pages. The data that will be produced login, home, group management, and description management questioner result.

Keywords : *Customer satisfaction, Survey Application, Telkomsel*

1 INTRODUCTION

As the information technology and science have evolved, the information has also been evolving so it can support all the needs and demands of companes to get information from around the globe. so that they need something as a tool to process, access, and save the information sources. It becomes integral part to start or run a business. With the presence of softwares, indeed we hope that the data we have been keeping will be saved regularly or more tidy, so it will be easier to access and process the data. In this modern era, information technology have big influence in human life.

The society can get better for information technology and this research attempt to make application survey user telkomsel, with the internet, in hope that this application will be used to find the information whether the customers are satisfy with the service or not. Based on that information, improve the quality of work. Limantara [1] has investigated a system information the more is private bank in Surabaya and Jakarta for improve service quality

and customer satisfaction . there for the organisation can improve the quality of customer satisfaction.

The Telkomsel service product in Kab.musi rawas has been popular among the society in town because of their competitive prices, and also the network is really good. The level of customer satisfaction is not only for the great price, but also need powerful and stable network, which is can only be achieved by best provider. With that kind of issues, this research will make an application based on internet for PT Telkomsel Customer Survey in kab.musirawas, in hope that this application will be used to find the information whether the customers are satisfy with the service or not, and as the result they can improve all around quality of work to face the tough competition with other providers. In the making of this application, this research using Adobe Dreamweaver CS3 and supported by language program such as PHP and MySQL for database. According to Nugroho [2], ddynamic web pages using PHP linked to a MySQL database can be created using. Application use Web programming refers to the writing, markup and coding involved in Web development, which includes Web content, Web client and server scripting and network security [3]. And the data that will be made are login data, main page, group management, descriptive management, and also questionnaire result.

2 RESEARCH METHODOLOGY

Research methodology used in this research is the SDLC. According to Sukanto & Shalahuddin [4], Software Development Life Cycle (SDLC) is process develop a system software with use methodology. And According to Pressman [5] the systems development life cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. This method was divided into 6 (six) phases, such as:

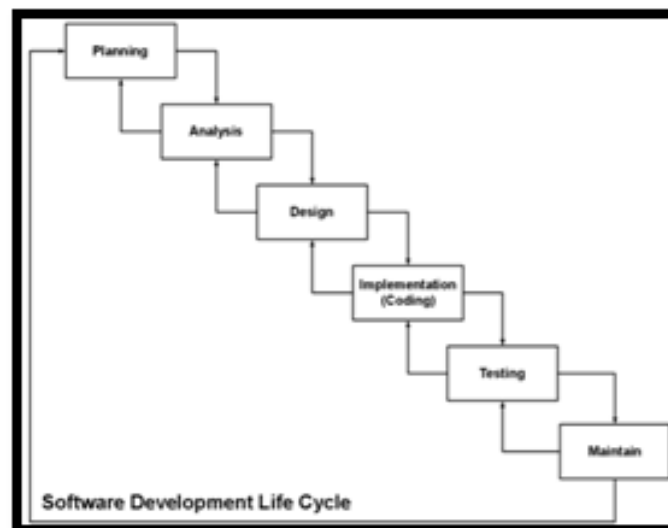


Figure 1: SDLC Model

2.1 Planning and Analysis

The first phase is to identify the problem, which is the one that has been going in PT Telkomsel, is facing the tough competition from other competitors so that they struggle to value the customer satisfaction. This research wants to build the customer survey application program. The purpose of making this system is to give PT Telkomsel the information they need to solve their problem regarding customer satisfaction as well as to improve their quality and service. This research interviewed and did direct observation to running process in PT Telkomsel to decide the expected information and output.

2.2 Design and Implementation (Code)

On this phase, this reserach decide the system layout, system data, and system database contrivance. The writer used flow chart [6], DFD, and ERD [7, 8]. Design analysis current plan such as in figure 2.

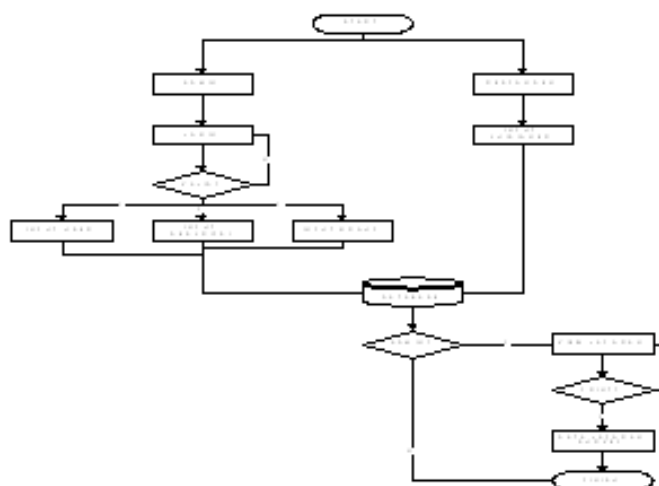


Figure 2: Analysis current plan

This is sytem plan will be made for survey customer application start from admin login if valid admin input user, input description, input group. Admin can view record, print report survey satisfaction user. Then user can be answer for question questioner about satisfation user telkomsel.

Design context diagram is a diagram that consists of a process and describe the scope of a system [9]. Diagram context telkomsel customer survey application such as :

Context diagram above describes the flow of application telkomsel customer satisfaction survey. Admin group question and input the data into the system descriptions question. The system will display the dataa input by the admin and the system will also display the survey data. The system will display the data description and a group of questions to the respondents and the respondents will provide the respondents or input data into the system and answer question.

Then Data flow diagram (DFD) is a model of the system to describe the distirbution system into smaller modules [9]. In the application system customer survey this telkomsel, multiple



Figure 3: Context Diagram

data flow diagram such as :

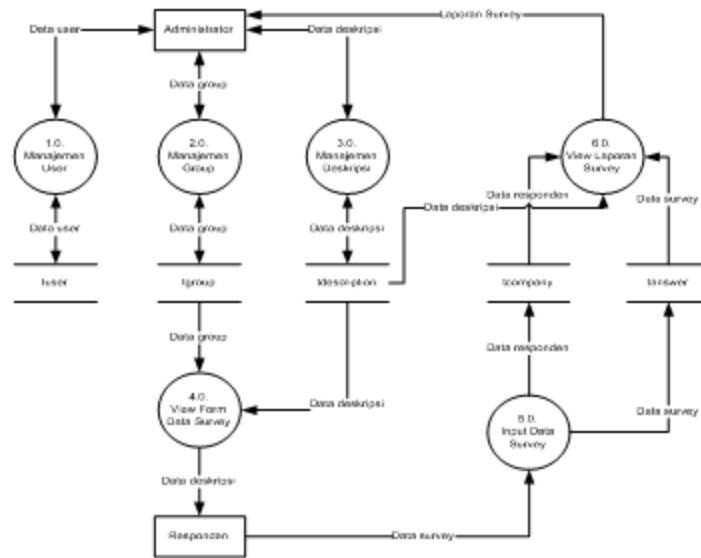


Figure 4: Data Flow Diagram.

This research, ERD explains user answer question and admin receive result questioner graphic from system. Such as:

2.3 Testing and Maintenance

In the testing and maintenace is testing application for admin telkomsel and use application in telkomsel. Maintenace application if system have a problem for application.

3 RESULTS AND DISCUSSION

This Paper presents a application survey customer telkomsel for the investigating relationship between Information Technology. We point out that organizational environment performace improvement can be achieved by the use of information technology infrastructure,

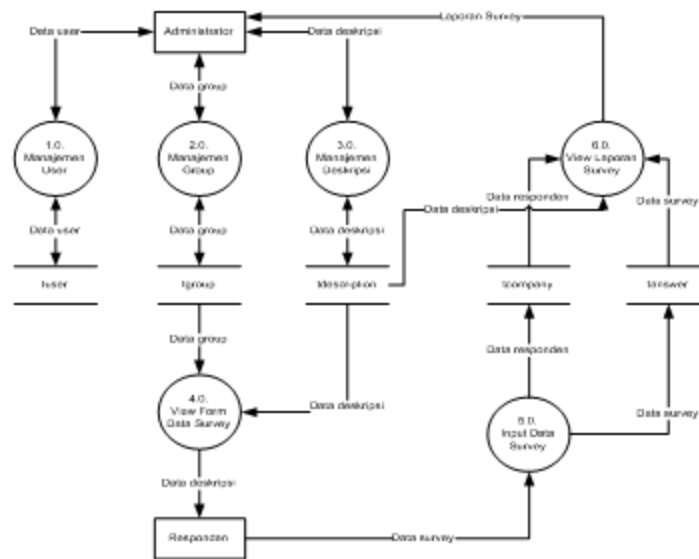


Figure 5: Entity Relationship Diagram

IT human resource and IT management. To enhance the organizational environment performance, the organization should employ their IT infrastructure to connect and share their resource.

This research contributes providing a conceptual application survey customer satisfaction. The conceptual application is a survey application customer satisfaction use telkomsel. The conceptual application help use and employee for increase use telkomsel. Result this research telkomsel survey customer application is login page, home admin, description page, graph page questionnaire, respondents page and customer home customer, questions satisfaction use telkomsel such as :

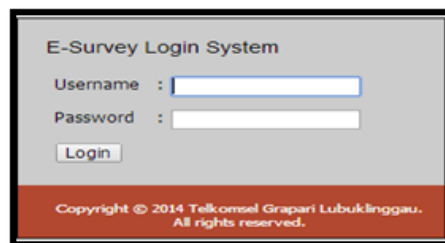


Figure 6: Login User

3.1 Login User

To Sign Into Administrator page, Page The first time shown is the login menu that must be filled by admin, because this application admin only admin to enter the system administrator

to entry data. To enter the main menu admin user must fill in the username and password then click the Login button. The appearance of the login page is as follows:

3.2 Home Admin

The main page of the application telkomsel customer satisfaction survey is the first page that will be displayed when the admin successfully login. The main page is as follows:



Figure 7: Home

3.3 Questionnaire

There is 15 question for user the question that will be submitted by Telkomsel user and filled by the customer. User just choose very good, good, not good, and bad nesxt user save answer in application, about satisfaction user use telkomsel. The page Such as:

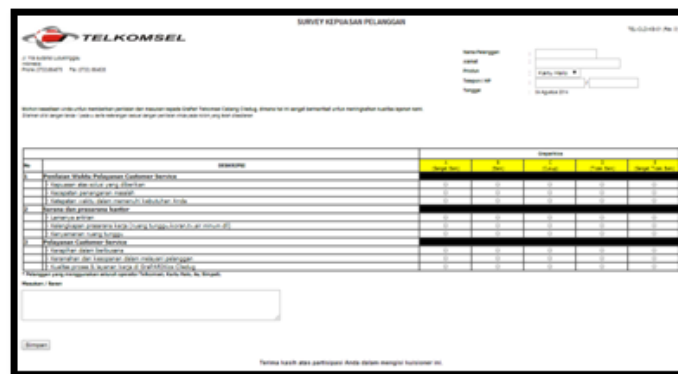


Figure 8: Questionnaire

3.4 Home Graph Questionnaire

The result of questionnaire selected user use telkomsel is graph. Based on the above questionnaire design, assessment and administration guide using a scoring scale approach Gutman.

The determination of the ratings and scores are as follows : 1) The number of choices = 5, 2) The number of questions = infinity (Question inputted as needed), 3) Low Scoring = 0 (selection of wrong answers), 4) High Scoring = 1 (selection of correct answers), 5) Low score = low scoring x number of questions = 0 x 3 = 0 (0%), and 6) The number of high scores = high scoring x number of questions = 1 x 3 = 3 (100%).

This system application survey customer satisfaction is graph questionnaire result 2015-2016 answer A very good is 51%, answer B good is 33%, answer C 14 %, answer D 3% and answer E 0%. So satisfaction customer use telkomsel is very good. The main page is as follows:

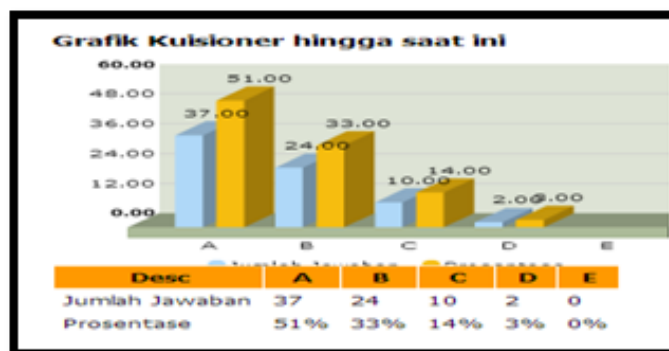


Figure 9: Home Graph Questionnaire

4 CONCLUSIONS

After analysis this problem PT. Telkomsel then be concluded as follows : This system application survey user telkomsel for satisfaction use telkomsel employe know quantity use telkomsel and know satisfaction user telkomsel, after that enables employe to view graphs of user satisfaction telkomsel. PT. Telkomsel can be improve the quality of their services. with application survey user satisfaction telkomsel can be accessed anywhere. The new system is the result of improvement of the existing system, where This application next facilitate employee produce information quickly, right and accurate in satisfaction data customers with processing and preparing reports, as often happens delays in the process report. With this application data produced more effective and efficient.

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Genetic Algorithms Method On Street Lighting Energy Saving

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Abstract

Based on the strategic issues of the development of rock and hill districts Siak Kecil as Industrial Zone, Port and Agribusiness demand developments, improvements and fixtures public roads. Road equipment that is needed is a street lighting (PJU). PJU condition mounted in the district of Bukit Batu and Siak Kecil using AC lamps with high wattage power thus increasing the burden of payment of electricity accounts PJU. This study makes setting brightness lamp LED 50 watts using Genetic Algorithm (GA). Adjust the brightness level control (Illumination) based on time. Hours 1830WIB - 2200 WIB illumination used 100% and hours 2200 WIB - 0600 WIB illumination s varied., Then to electrical energy efficiency but does not reduce the comfort of road users, forming an industrial area that is energy efficient.

Keywords : *Genetic algorithms, Street lighting, Energy saving*

1 INTRODUCTION

The rapid development of of Bengkalis regency, especially created district of Bukit Batu and Siak Kecil as Industry, Harbor, Agribusiness demand growth, improvement of public roads and equipment. Equipment that is needed is a way of street lighting (PJU). The lights used are still many who use lights that are not in accordance with the requirements of the road grade (high wattage lamps with energy but low lux), and also the increasing number of illegal street lighting installed by the communities themselves.

PLN as a provider of electric energy, calculating electrical energy consumption is used for PJU is power consumption recorded in kWh meter for PJU has installed kWh meters and PJU not installed kWh meters based power group that has been set. cost of electrical energy for PJU obtained local government from the local government street lighting tax levied on every month from each subscriber PLN based on the percentage of electricity customer accounts. Load payment of electricity bills PJU Bengkalis progressively increases with lights of PJU installed on street. This condition is very burdensome Bengkalis Government to cover the shortage of electricity costs for PJU.

Some researchers including Agung Nugroho [1] implement PJU savings by turning off most point of the light automatically at certain hours where people have started to sleep,

the roads quiet but the support of the safety factor still needed. Hermawan and Karnoto [2] said that the arrangement of PJU with various classes of roads, lights of different models of structuring the electricity costs each month for PJU installed KWH meter with less than the cost of electricity PJU without KWH meters. The cost of payment of electricity each month will be smaller when selecting the right lighting (energy saving lamps) are the type SONT.

Muamar, Jefri, Syaiful [3] said that the review of the literature shows that the LED lamp can reach values between 50-100 lumens / watt, while the CFL has the efficacy of 60-72 lumens / watt. LED lamp price is relatively expensive, 2-10 times the price of CFL bulbs. Laboratory measurements to measure the characteristics of some examples of LED lights that are commercially available, such as Lumen, Lux, PF, Power and THD. LED lamp efficacy values obtained from the measurements of lumen output power divided by the measured voltage measurements. LED lights use economic study carried out simply using the Present Worth Value (PWV).

The benefits of this research is to support Bengkalis government programs in an effort to form subdistrict of Bukit Batu and Siak Kecil as Industrial Zone, Port and Agribusiness especially in light of Public Roads. Efficiency bill public street lighting, and the success of the energy conservation program with the energy efficiency of electric street lighting which use energy-saving lamps. This study begins with the formulation of the main problem is how to create an industrial park in the field of energy efficient street lighting, how to make the system control lamp brightness level (dimming) to be efficient in the use of electrical energy.

2 RESEARCH METHODS

This research consists of several activities, among which:

2.1 Lux to watts calculation with area in square meters

The luminous flux Φ_v in lumens (lm) is equal to the illuminance E_v in lux (lx) times the surface area A in square meters (m²) [4]:

$$\Phi_v = E_v(lx) \times A(m^2) \quad (1)$$

The power P in watts (W) is equal to the luminous flux Φ_v in lumens (lm), divided by the luminous efficacy in lumens per watt (lm/W):

$$P_{(w)} = \Phi_v(lm) / \eta(lm/W) \quad (2)$$

So the power P in watts (W) is equal to the illuminance E_v in lux (lx) times the surface area A in square meters (m²), divided by the luminous efficacy in lumens per watt (lm/W):

$$P_{(w)} = E_v(lx) \times A(m^2) / \eta(lm/W) \quad (3)$$

So watts = lux * (square meters) / (lumens per watt) or $W = lx * m^2 / (lm/W)$

2.2 LED Parameter

In this paper, we use LED parameter as follows:

Power (P) = 50

Volt (V) = 220

Eff_LED = 0.90

Eff_LM = 31.75

2.3 Program Code

Program in the form of a set of instructions (in software) on hardware, which was written by an arrangement or procedure (syntax) specified, for doing a job than humans (get results / outputs, can be in the form of information, action, etc.) [5]. Program also include a data structure.

The data structure [6] is a model of logic / math specifically organize data. A model should be able to reflect the real-world data connectivity and simple shape / effective (can process the data as needed).As follow in the program code for this research:

```

disp('Optimisasi Konsumsi Daya Lampu PJU LED metoda GA')
maxLUMEN=sum(Ra);
fprintf('Kemampuan Efisiensi LUMEN = %1.0f',maxLUMEN);
disp('Masukkan permintaan Tingkat Kecerahan');
ILUM = input(['ILUM = ']); % Qload = ILUM
if ILUM == maxLUMEN;
    n=Nvar;
    for ii=1:Nvar
        LUMENx=ILUM/n;
        I=V/R;
        Px= 50;           % Px=(fx/fs)^3*P
        Vx=Px/I;         % fx = Vx
        BestLUMEN(ii)=LUMENx;
        BestV(ii)=Vx;    %Bestf = BestV
        BestP(ii)=Px;
    end
    fprintf('\n')
    for ii = 1:Nvar
        fprintf('Tingkat kecerahan %1.0f',ii)
        fprintf(' = %5.3f',BestLUMEN(ii))
        fprintf(' tEGANGAN Led %1.0f',ii)
        fprintf(' = %5.3f',BestV(ii))
    end
    for ii = 1:Nvar
        fprintf('Daya LAMPU LED %1.0f',ii)
        fprintf(' = %5.3f',BestP(ii))
    end
    fprintf('Total Tingkat Kecerahan = %5.2f',ILUM)
    fprintf('Total Daya = %5.2f',sum(BestP))
    break
end
if ILUM > maxLUMEN
    fprintf('KECERAHAN melebihi batas kemampuan')
    break
end

```

3 RESULTS AND DISCUSSION

The measurement results show that the maximum illumination 90, it will generate an electric voltage of 220 volts and 100 watts power as can be seen in table 1 below.

LED lights Voltage 50 watt are dimmed by entering the value iluminasi varied so by using a genetic algorithm will produce a voltage is entered and the power generated will also vary.

Table 1: Simulation results for PJU LED Lamp 2 x 50 watt

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	220	0	100
2	650	220	0	100
3	750	220	0	100

In this study, the maximum number of iterations is also made variations of the number of iterations 550, 650 and 750. The results of simulations with varying levels of iluminasi can be seen in Table 2, Table 3, Table 4, Table 5, Table 6 dan Tabel 7.

Table 2: Simulation results with GA PJU LED lights with Lumen 89

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	197,86	15,23	89,94
2	650	183,05	16,145	83,21
3	750	193,37	17,309	87,9

Table 3: Simulation results with GA PJU LED lights with Lumen 85

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	1,949,764	14,511	68,942
2	650	179,386	15,328	81,54
3	750	194,29	18,172	88,31

Table 4: Simulation results with GA PJU LED lights with Lumen 80

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	1,581,248	13,888	71,874
2	650	180,333	15,124	81,968
3	750	18,37	18,37	77,52

Table 5: Simulation results with GA PJU LED lights with Lumen 70h

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	160,913	14,575	73,142
2	650	135,944	15,445	61,792
3	750	140,98	17,76	64,08

Table 6: Simulation results with GA PJU LED lights with Lumen 60

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	1,364,984	13,606	62,046
2	650	125,821	15,156	57,19
3	750	127,61	16,461	58,00

Table 7: Simulation results with GA PJU LED lights with Lumen 55

No	Number of iteration	Source Voltage (Volt)	Iteration Time	Power PJU light (Watt)
1	550	1,134,102	13,623	51,55
2	650	115,4	14,957	52,454
3	750	112,07	16,255	50,94

ED lights Voltage 50 watt are dimmed by entering the value ilumenasi varied so by using a genetic algorithm will produce a voltage is entered and the power generated will also vary. In this study, the maximum number of iterations is also made variations of the number of iterations 550, 650 and 750. The results of simulations with varying levels of ilumenasi can be seen in Table 2, Table 3, Table 4, Table 5, Table 6 dan Tabel 7. From the above table are the most ideal lumen level with the power and voltage output of 2x50 watt LED Lights PJU that uses the highest iteration 750 iterations.

4 CONCLUSSIONS

From the research that has been done, it can be concluded as follows:

1. Genetic algorithms are used to generate the lamp lumen PJU resulting in efficient power and voltage in order to support the establishment of industrial zones in the district of Bukit Batu and Siak Kecil
2. The simulation results produce good lumen with efficient power obtained by multiplying the number of iterations on genetic algorithms, but also increases long time iteration.
3. PJU LED lamp very well applied, other than low cost also support government programs in an effort to conserve and use renewable energy.

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The Implementation of Knowledge Management Systems in Assets Reconciliation

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Abstract

The development of science in the era of globalization occur very quickly. The human ability to develop a variety of knowledge is getting better with their knowledge is tacit and explicit. Reconciliation asset Parliament Secretariat of Palembang is synchronization goods spending existing fittings in the Parliament Secretariat with Finance and Asset Management Agency (BPKAD) of Palembang. The inventory data created with Microsoft Excel and put into a different folder. The problems that arise Palembang City Council secretariat difficulty of collecting data in the form of information because the data is placed in different folders, so knowledge about the assets secretariat hard to find. This is causing sharing information among employees of the secretariat be closed. The solution to these problems is to build information systems to implement KMS in reconciling asset Parliament Secretariat of Palembang. KMS application in government institutions is necessary to share information and knowledge assets that need to be managed in an institution such as knowledge about the land, equipment, buildings and facilities and other assets.

Keywords : *Knowledge management systems, Assets reconciliation, DPRD*

1 INTRODUCTION

The development of science in the era of globalization occur very quickly. The speed in managing knowledge and information is an attempt to maintain the sustainability and competitiveness of an organization [1]. Knowledge management (KM) focuses on organizing and making available important knowledge, wherever and whenever it is needed [2]. Human ability to develop a variety of knowledge (knowledge) is getting better with their knowledge is tacit and explicit [3]. Tacit knowledge is the knowledge contained in the brain of someone in person is private while Explicit knowledge is knowledge stored or written in a storage medium other than human [4]. The development of the tacit and explicit knowledge can be combined and varied to become a Knowledge Management System (KMS). KMS can now be developed using information technology (IT) to support the ability of an organization, company or institution that requires knowledge and technology as a factor of competitiveness

is very important [5]. Goods or assets belonging to the area is all area properties either purchased or obtained at the expense of the local budget (APBD). They are derived from the acquisition of another valid either moving or not moving along parts - parts or in the form of specific units that can be assessed, calculated, measured or weighed, including animals and plants except cash and other securities [6].

Reconciliation asset Parliament Secretariat of Palembang is synchronization goods spending existing fittings in the Parliament Secretariat with Finance and Asset Management Agency (BPKAD) of Palembang. The inventory data created with Microsoft Excel and put into a different folder. The problems that arise Palembang City Council secretariat difficulty of collecting data in the form of information because the data is placed in different folders, so knowledge about the assets secretariat hard to find. This led to the sharing of information among employees.

The solution to these problems is to build information systems to implement KMS in reconciling asset Parliament Secretariat of Palembang. KMS application in government institutions is necessary to share information and knowledge assets that need to be managed in an institution such as knowledge about the land, equipment, buildings and buildings, and other assets. KMS applications to be built using the PHP programming language and MySQL database.

In accordance with the existing concept and attempt to complete the research, the purpose of this study are : 1) Implementing KMS Asset Reconciliation in Legislative Secretariat of Palembang, and 2) Documenting Knowledge owned by the employees of the old order is not lost because seringya going transition of leadership.

The benefits of this research are : 1) Can help section DPRD secretariat in coordinating the gathering of knowledge and knowledge into a container, so that the institution will not lose the knowledge of employees of the secretariat, 2) As a tool for reconciliation of assets in the Parliament Secretariat Palembang to gain the knowledge needed to the fullest, 3) Fostering a culture of knowledge sharing [7] between employees of the secretariat, 4) Facilitate learning, especially for the new secretariat employees, and 5) Obtain information that is always up to date with their knowledge sharing.

2 RESEARCH METHODOLOGY

Time and place of the research conducted at the Parliament Secretariat of Palembang. The timing of the study conducted from October 2015 through to February 2016.

2.1 Data Collection Methods

In this study, the data collection method used is by collecting primary data and secondary data, namely: 1) Primary Data. Data collection techniques with the primary survey conducted by direct interview to employees Palembang City Council secretariat. It also conducted a field observation for supporting data for this study, and 2) Secondary Data. Secondary data was conducted to complement the data obtained from the primary survey in the form of a literature review related to the research conducted, and documentation.

2.2 Knowledge Management Cycle

Systems Development Cycle Method used in this research is Knowledge Management Cycle. The steps of the knowledge management cycle by Meyer and Zack in Dalkir [8] : 1) Acquisition. In the process of acquisition of the data or information focused on the question of the source material "raw" (such as trust/credibility, accuracy, timeliness, and cost), 2) Refinement. Is an important stage in the process of KM, in the form of physical action, eg migration from one medium to another or logically, 3) Storage/retrieval. A phase store and retrieve that became a bridge between the acquisition and refinement on the upstream side which serve as inputs for the repository to the downstream side product generation, 4) Distribution. Distribution process shows how product information can be distributed to users, not only covers the media used but also the timing, frequency, language and form, and 5) Presentation/Use. The last step is the presentation or use. At this stage all the processes that have been passed in the evaluation here: if the users already have the necessary knowledge. The following figure illustrate the flow KM Cycle:

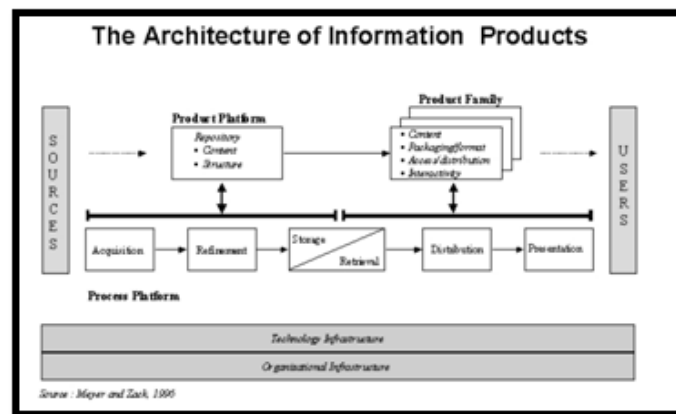


Figure 1: The Flow of KMS

3 RESULTS AND DISCUSSION

After conducting the analysis, and engineering systems that have been discussed previously, the results obtained is a Knowledge Management System On Assets Reconciliation Parliament Secretariat. As a result of making this application is that it helps parts of the secretariat of Parliament in gathering knowledge and coordinate knowledge into a container, so that the institution will not lose the knowledge of employees of the secretariat, as a means for reconciliation of assets in the Parliament Secretariat Palembang to gain the knowledge needed optimally, fostering a culture of knowledge sharing among employees of the secretariat, to facilitate the learning, especially for the new secretariat employees and obtain information that is always up to date with their knowledge sharing.

Information system built using the PHP and MySQL. The result of making this system in the form of KMS On Assets Reconciliation Parliament Secretariat and will be run through a web browser by typing the page <http://localhost/kmsaset/index.php>. Results of the study

are described in the next stage which is the stage of discussion.



Figure 2: The main page of the KMS

3.1 Admin Main Page

Admin page is the main page that is used to manage the assets kms. This page will open a page by displaying a menu that can only be managed by the admin. The menu is as follows:

1) Employees, 2) assets, 3) News, as well as 4) Report.



Figure 3: Assets data input of the KMS

3.2 Input Assets Data

This page of data input is an admin page that is used to add data assets. On this page admin can enter, edit and delete data assets. Data assets include : 1) Category, 2) Name, 3)

Date of acquisitions, 4) Quantity, 4) Assest Price, 5) Notes, 6) Photo/Image, 7) Source, and 8) Source description.

NO	Nama Aset	Kategori Aset	Tanggal Pengadaan	Jumlah / Luas	Harga
1	Mobil Toyota	Kendaraan	2015-01-13	3 Unit	2147483647

Figure 4: Assets data input of the KMS

NO	Judul	Aset	Isi
1	berita acara pertanyaman kendaran dinas	palo sidang	berita acara admin - 2014-12-31
2	berita acara pengembalian kendaran dinas	palo sidang	BERITA ACARA

Figure 5: Assets data input of the KMS

3.3 Page News

Page news data input used by the admin to add the news. On this page admin can edit, delete data news. This page is used to disseminate latest information to all existing employees (figure 5).

3.4 Page Input Meeting Info

Weather data input is used by an employee meeting in recording the results of the meeting. On this page will display the employee records dibiki by employees who access. On this page an employee can change and delete data meeting (figure 6).



Figure 6: Meeting info input of the KMS

The screenshot shows a web browser window displaying a report titled 'Laporan Data Aset Periode [02-01-2013 sd 02-02-2016]'. The report is a table with the following columns: 'NO', 'Nama Aset', 'Kategori Aset', 'Tanggal Pembelian', 'Status / Loan', and 'Harga'. The table contains 18 rows of asset data.

NO	Nama Aset	Kategori Aset	Tanggal Pembelian	Status / Loan	Harga
1	Truck Kater	Truck	01-12-2014	06 975m	4742
2	Mobilha Toyota	kendaraan dinas	01-12-2014	6	113000000
3	Oto Bua Toyota	Bua	01-12-2014	3	243430000
4	Pivanan Kangrened	Mobilha	01-12-2014	3	210000000
5	Jeepha KIA	kendaraan dinas	01-12-2014	3	115000000
6	Onchea	Mobilha	01-12-2014	3	130000000
7	Mobilha Toyota Aranza 1300G	kendaraan dinas	01-12-2014	3	113000000
8	Mobilha Toyota Aranza 1300G	kendaraan dinas	01-12-2014	3	113000000
9	Pick Up	Toyota	01-12-2014	3	131827000
10	Mobilha Nissan New X-Trail	kendaraan dinas	01-12-2014	4	260000000
11	Mobilha Daihatsu	kendaraan dinas	01-12-2014	10	194000000
12	Mobilha Toyota Alphard 2400 G A	kendaraan dinas	01-12-2014	3	786200000
13	Mobilha Toyota Aranza 1.3 GM-T	kendaraan dinas	01-12-2014	4	167700000
14	Mobilha Daihatsu	kendaraan dinas	01-12-2014	2	191200000
15	Mobilha Isuzu	kendaraan dinas	01-12-2014	2	113000000
16	Mobilha Honda New CRV 1.8 AT	kendaraan dinas	01-12-2014	3	191187200
17	Sepeda Motor Honda Vixion MCB 97	kendaraan dinas	01-12-2014	3	45000000
18	Sepeda Motor Honda Atriva	kendaraan dinas	01-12-2014	3	52300000

Figure 7: Assets data input of the KMS

3.5 Page Report Period Assets

Weather asset reports per period is the page that is used to classify the data report assets based onthe transaction date. Once the process is carried out to determine the period (date 1, date 2) as in the picture it will display the corresponding asset data reports specified period (figure 7).

4 CONCLUSSIONS

From the results of the description in previous sections, in the form of analysis and problem solving in the previous chapter, it can be concluded as well as provide suggestions are expected to be useful for asset reconciliation activities DPRD secretariat Palembang :

1. The study produced a program Knowledge Management System On Assets Reconciliation Legislative Secretariat of Palembang.
2. Applications built to help part DPRD secretariat in coordinating the gathering of knowledge and knowledge into a container, so that the institution will not lose the knowledge of employees of the secretariat
3. As a tool for reconciliation of assets in the Parliament Secretariat Palembang to gain the knowledge needed to the fullest.
4. Fostering a culture of knowledge sharing between employees of the secretariat. Jam it, facilitate learning, especially for the new secretariat employees.
5. Obtain information that is always up to date with their knowledge sharing [7].

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Performance Analysis for Migration Method IPv4 to IPv6 Using Dual-Stack Technique

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Abstract

With the exhaustion of the IPv4 addressing space quickly approaching, it has become a high priority for service providers, enterprises, IP appliances manufacturers, application developers, and governments to begin their own deployments of IPv6. A seamless migration from IPv4 to IPv6 is hard to achieve. Therefore several mechanisms are required which ensures smooth, stepwise and independent change to IPv6. Not only is the transition, integration of IPv6 is also required into the existing networks. The solutions (or mechanisms) can be divided into three categories: dual stack, tunneling and translation. This paper discuss about IPv4 and IPv6 and use manual transition strategies and automatic of IPv6 and also compare their performances to show how these transition strategies affects network behavior. In this project the Dual-Stack transition mechanism is implemented in GNS3 (Graphical Network Simulator), using CISCO routers. The operation of this network is viewed with the help of Iperf. The topology uses Dual-Stack technologies, which can be observed by capturing the packets in the Client PC.

Keywords : Internet Protocol, Migration, IPv4, IPv6, Dual-Stack

1 INTRODUCTION

Internet Protocol version 4 (IPv4) is the current Layer 3 protocol used on the Internet and most networks. IPv4 has survived for over 30 years and has been an integral part of the Internet evolution. It was originally described in RFC 760 (January 1980) and obsoleted by RFC 791 (September 1981). In the early years, even with the advent of the World Wide Web in the early 1990s, there were only about 16 million users on the Internet worldwide compared to over 2 billion by 2011 (reference: Internet World Statistics, www.internetworldstats.com). The actual number of devices increases dramatically when taking into account that today's users usually have multiple Internet-enabled devices such as smart phones, tablets, and laptops. IPv6 was first invented by Internet Engineering Task Force (IETF) in the mid 1990s due to the then urgent need to supplement the rapidly diminishing IPv4 addressing space. It was thought that IPv4 would be totally exhausted therefore a successor was designed.

With the majority of networks still utilizing IPv4, there are currently no serious motivational factors to move over to a new method of working when the current provision is still adequate for the majority of users. The debate has been ongoing for years in terms of whether IPv6 should be deployed, hence very few migration plans have been made in the industry [1].

This paper first reviews the current worldwide IPv6 deployment, and compares the technical aspects of the available IPv4-to-IPv6 migration solutions, then discusses the debate on the demand for IPv6 technology. In the following section, the difficulties and challenges of IPv4-to-IPv6 migration with dual-stacks simulation will be addressed together with suggested solutions. Migration strategy will be given as well as proposed decision-making guidelines. The last section will conclude this paper.

2 TRANSITION MECHANISMS

The transition from IPv4 to IPv6 is not a one-day step and involves a lot of changes in network structures with the use of IP addresses. For the future success of IPv6, the next step in deploying IPv6 is to vote for the most suitable transition methods and their management. Although many kinds of transition mechanisms have been invented to help with the process, the implementation of IPv6 is never said to be easy and simple, even for experienced administrators. As a result, the most difficult problem to make decisions for is which method will be chosen for the implementation process to achieve a smooth and seamless transition [2].

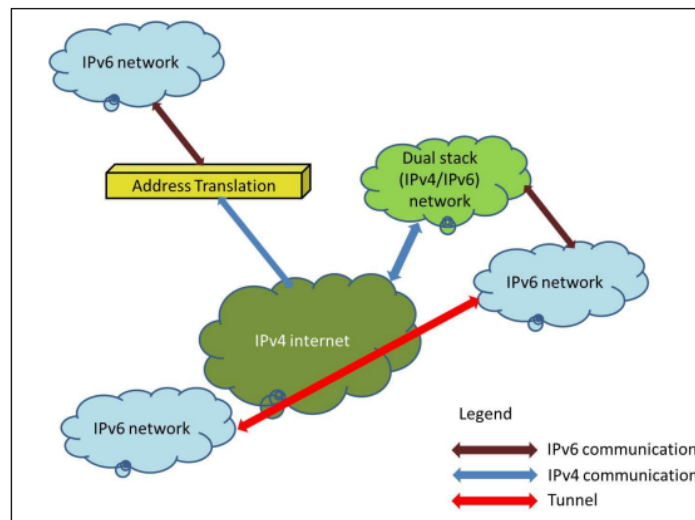


Figure 1: Different transition technologies (Subramanian 2003)

Therefore, to make decision on the best suited transition methods, it is really important to have an overview of the current IPv4 networks. In addition, enterprises must analyze needed functionalities, scalability, and securities in the corporation. Besides, one size does not fit all and a network can be applied different transition mechanisms together to support a complete distributed system. In this section, based on the information from the research and literature review, we would present an overview of some major transition methods as well as relevant

matter to opt out the best methods for large enterprise networks. Each technique possesses individual attributes and plays an important part in the transition process. In general, these techniques can be divided into three categories (figure 1) [3].

2.1 Dual-Stack

However, despite its greatest flexibility, there are still some concerned issues with this method such as every dual-stack device still requires an IPv4 address; two routing tables must be maintained in every dual-stacked router; as two stacks must be run at the same time, additional memory and CPU power will be required; moreover, every network requires its own routing protocol; supplementary security concepts and rules must be set within firewalls to be suited to each stack; a DNS with the ability to resolve both IPv4 and IPv6 addresses is required; finally, all programs must be able to choose the communication over either IPv4 or IPv6, and separate network management commands are required [4].

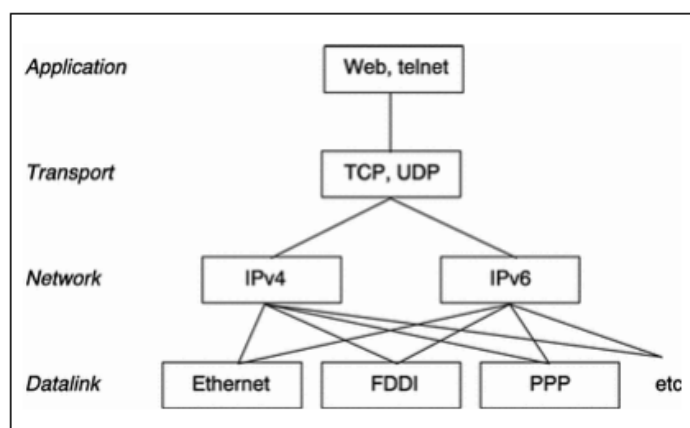


Figure 2: The structure of Dual stack model

As presented in figure 2, the dual stack method [5] is implemented in the network layer for both IPv4 and IPv6. Before transferring the packet to the next layer, the network layer will choose which one to use based on the information from the data link layer. Large enterprise networks that are decided to transit to IPv6 can apply the dual stack method as the basic strategy, which involves the device configuration to be able to utilize IPv4 and IPv6 at the same time on the core routers, perimeter routers, firewalls, server-farm routers, and desktop access routers. Depending on the response to DNS requests, applications can choose which protocol to use and this choice can be made in consonance with the type of IP traffic. Furthermore, hosts can attain both available IPv4 content and IPv6 content. Accordingly, dual stack mechanism presents a flexible transition strategy.

2.2 Tunneling Transition

IPv6 transition process is tunneling as presented in figure 3 [6]. This is used to transfer data between compatible networking nodes over incompatible networks. There are two ordinary scenarios to apply tunneling : 1) the allowance of end systems to apply off link transition

devices in a distributed network, and 2) the act of enabling edge devices in networks to interconnect over incompatible networks. Technically speaking, the tunneling technique utilizes a protocol whose function is to encapsulate the payload between two nodes or end systems. This encapsulation is carried out at the tunnel entrance and the payload will be decapsulated at the tunnel exit. This process is known as the definition of tunnel. Up to date, there exist different tunneling methods such as 6to4, ISATAP, Teredo, DSTM, and 6over4. Tunnels may be manually configured or automatically configured [7].

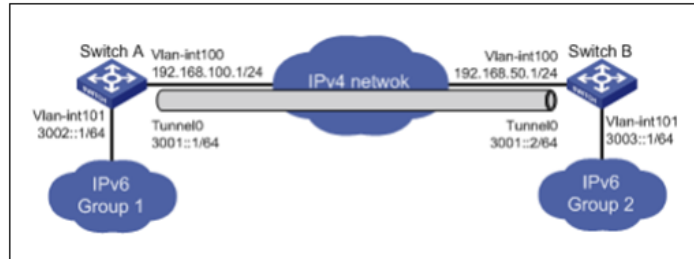


Figure 3: Tunneling transition method

2.3 Translation

Network Address Translation (NAT) is a familiar method in IPv4, commonly used to translate between private (RFC 1918) addresses and public IPv4 address space. NAT64 transparently provides access between IPv6-only and IPv4-only networks. Address Family Translation (AFT) or simply translation, provides communications between IPv6-only and IPv4-only hosts and networks. AFT performs IP header and address translations between these two network layer Protocols [8]. Translation method model could be seen in figure 4 [9].

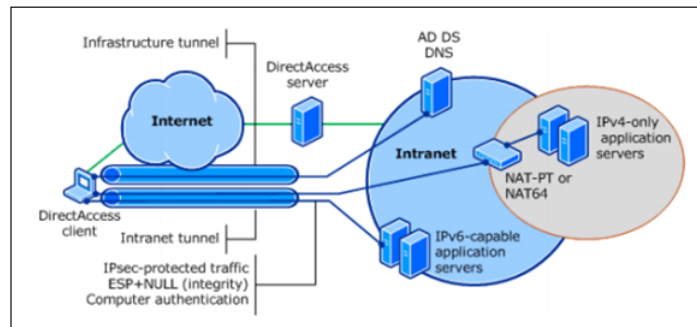


Figure 4: Translation method model

3 RESULTS AND DISCUSSION

The migration over to IPv6 is a necessity in the long term, but IPv6 is not just about IP address space - there are some other advantages including long-term cost savings and better performance. Although transitional approaches are the short-term solution for the IP protocol evolution, network implemented with single routing policy is more agile and flexible with response to network status. If it is difficult for operators to move directly to native IPv6, then they can go implement transition technologies. As for the IPv6 migration, currently small countries are ahead of the IPv6 deployment schedule as compared to larger or more developed countries. Problems arise with hardware differences around the world, and it would be unfeasible to recommend a change in a short period of time. Awareness needs to be made before the implementation. One difficulty of this approach is there is no clear understanding to how long IPv4 will last. Some of the companies and countries are planning to run migration in their network and then move to native IPv6 when all the applications and content is available on IPv6. The network diagram in figure 5 shows the Dual-Stack implemented topology, in which R1, R2, and R3 are three DualStack routers.

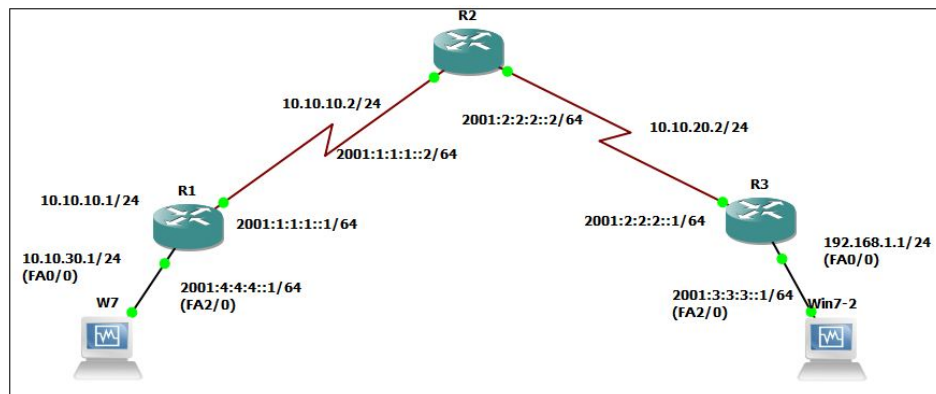


Figure 5: Dual-Stack enabled network

A Dual-Stack is needed when we are in need of connecting IPv6 via IPv4. Dual-Stack is implemented in this network to achieve connectivity between the IPv6 and IPv4 networks directly. On this topology uses IPv4 and IPv6 both of side device, its have objective to know influence QoS.

Iperf and result show in figure 6 shows the Iperf capture made in the Ethernet link between client (IPv4) and server (IPv6). Iperf worked like PING that use the ICMP message contains both, IPv4 and IPv6 fields in its packet.

The explanation from the commands are : -c it means as Client PC, 192.168.1.10 its (IPv4) destination to server, -u for packet type UDP, -b for Bandwidth and 10m for size 10 Megabyte.

The figure 7 shows the Iperf capture made in the Ethernet link between client (IPv6) and server (IPv4).

The two figure shown have different in Bandwidth and Transfer with size 10 Megabyte in the same Dual-Stack topology. Need time to process the header when different protocol IP communicate to destination from source. The main contents to be noted in the IPv4 field are

```

Administrator: Command Prompt
Minimum = 34ms, Maximum = 72ms, Average = 50ms
C:\>iperf3 -c 192.168.1.10 -u -b 10m
Connecting to host 192.168.1.10, port 5201
[ 4] local 10.10.30.10 port 59443 connected to 192.168.1.10 port 5201
[ ID] Interval      Transfer     Bandwidth   Total Datagrams
[ 4] 0.00-1.00 sec  1.08 MBytes  9.83 Mbits/sec  138
[ 4] 1.00-2.00 sec  1.20 MBytes  10.0 Mbits/sec  153
[ 4] 2.00-3.00 sec  1.20 MBytes  10.0 Mbits/sec  153
[ 4] 3.00-4.01 sec  1.19 MBytes  9.95 Mbits/sec  152
[ 4] 4.01-5.01 sec  1.20 MBytes  10.0 Mbits/sec  153
[ 4] 5.01-6.01 sec  1.20 MBytes  10.0 Mbits/sec  153
[ 4] 6.01-7.00 sec  1.20 MBytes  10.1 Mbits/sec  153
[ 4] 7.00-8.00 sec  1.18 MBytes  9.88 Mbits/sec  151
[ 4] 8.00-9.00 sec  1.20 MBytes  10.0 Mbits/sec  153
[ 4] 9.00-10.00 sec 1.20 MBytes  10.1 Mbits/sec  154
-----
[ ID] Interval      Transfer     Bandwidth   Jitter      Lost/Total Datag
rams
[ 4] 0.00-10.00 sec  11.8 MBytes  9.91 Mbits/sec  776.444 ms  702/736 <95%>
[ 4] Sent 736 datagrams
iperf Done.
C:\>_

```

Figure 6: Iperf capture made in the Ethernet link between client (IPv4) and server (IPv6)

```

Administrator: Command Prompt
iperf Done.
C:\>iperf3 -c 2001:3:3:3:10 -b 10m
Connecting to host 2001:3:3:3:10, port 5201
[ 4] local 2001:4:4:75cf:c18b:2f7c:e4bf port 49176 connected to 2001:3:3:3:1
0 port 5201
[ ID] Interval      Transfer     Bandwidth
[ 4] 0.00-1.00 sec  320 KBytes  2.62 Mbits/sec
[ 4] 1.00-2.00 sec  0.00 Bytes  0.00 bits/sec
[ 4] 2.00-3.00 sec  0.00 Bytes  0.00 bits/sec
[ 4] 3.00-4.01 sec  0.00 Bytes  0.00 bits/sec
[ 4] 4.01-5.01 sec  0.00 Bytes  0.00 bits/sec
[ 4] 5.01-6.01 sec  64.0 KBytes  524 Kbits/sec
[ 4] 6.01-7.00 sec  64.0 KBytes  529 Kbits/sec
[ 4] 7.00-8.00 sec  0.00 Bytes  0.00 bits/sec
[ 4] 8.00-9.00 sec  0.00 Bytes  0.00 bits/sec
[ 4] 9.00-10.00 sec  0.00 Bytes  0.00 bits/sec
-----
[ ID] Interval      Transfer     Bandwidth
[ 4] 0.00-10.00 sec  448 KBytes  367 Kbits/sec
[ 4] 0.00-10.00 sec  418 KBytes  342 Kbits/sec
sender
receiver
iperf Done.
C:\>_

```

Figure 7: Iperf capture made in the Ethernet link between client (IPv6) and server (IPv4)

the Protocol Type and the Source and Destination addresses. The Protocol field in the IPv4 header tells the Network layer at the destination host, to which Protocol this packet belongs to. Protocol represents that we know as the encapsulation and decapsulation process of IPv6 packets inside or outside the IPv4.

4 CONCLUSION

Dual stacking is the preferred solution in many scenarios. The dual-stacked device can interoperate equally with IPv4 devices, IPv6 devices, and other dual stacked devices. Tunnels can be created where there are IPv6 islands separated by an IPv4 ocean, which is the norm during these early stages of the transition to IPv6. To experiment and understand the role which IPv6 will play in the future, it is necessary for us to develop hands on experience with the IPv6 technology. Through our effort in creating a Dual-Stack network using GNS3 have allowed us to develop expertise and become technically competent with IPv6 technology in an academic environment. It can increase our knowledge towards the IPv4 to IPv6 transition and migration.

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ENGINEERING APPLICATION

Design of Plastic Mulch Hole Maker to Decrease Work Load and Increase Work Speed Strawberry Farmer in Bali

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Abstract

Strawberry is one of favorite plant in Bedugul (Bali-Indonesia) agro tourism. Soil as growing media strawberry need another layer of plastic in order strawberry can grow well and are not bothered by a pool of water, rain, and sunlight. To coat the soil as planting media, should be made of plastic with a hole diameter and distance between holes. During this strawberry farmers using scissors as a maker of holes. While the hole in the plastic that must be made so much, especially if the planting medium is so broad. For that conducted the research design of plastic mulch hole maker that meets the rules of ergonomics as a tool for holes maker in the plastic to decrease work load of farmers strawberry. The research was conducted on 12 strawberry farmer by "treatment by subject design" which were developed in two treatments such as T0 (make hole on the plastic manually by scissors), T1 (make hole on the plastic by tool of plastic mulch hole meker). Work load was measured by using work heart rate which was count using ten pulses methods, work speed was measured by time of many holes are made on plastic mulch. The data were analysed by using t pired test at significant level 5%. Results were showed as follows: significant of difference ($p < 0.05$) of work load, subjective disorders, and work speed between T0 and T1. The average of work load on T0 and T1 were 101.32 ± 2.51 beats/minute and 90.78 ± 2.33 beats/minute or decreased 10.4%. And then the average of hole product on T0 and T1 were 11,42 1,94 and 96,71 4,52 hole/minute and work speed on T0 or increased 746,8%. Its can be concluded that T1 give larger decreased of work load and give larger increased of work speed compared with T0. That is why, it was recommended the design plastic mulch hole maker should be used by strawberry farmer in Bali.

Keywords : Plastic Mulch Hole Maker, Work Load, Work Speed, Strawberry

1 INTRODUCTION

Bedugul is a tourist area in Bali. there are tours of the lake and the botanical gardens there. besides that some people there is a farmer. Bedugul farmers usually grow vegetables, maize, peanut and strawberry.

Strawberry is one of the many plants encountered in Bedugul Tabanan. Soil as growing media strawberry need another layer of plastic in order strawberry can grow well and are not bothered by a pool of water, rain, and sunlight. To coat the soil as planting media, should be made of plastic with a hole diameter and distance between holes. During this strawberry farmers using scissors as a maker of holes. While the hole in the plastic that must be made so much, especially if the planting medium is so broad.

Make a hole in the plastic manually using scissors to make the worker/farmer quickly feel tired in the hand. besides requiring a long time, the hole that was made is also less precise. especially if the soil is tilled area that requires plastic width/length and the hole that much, then making a hole in the plastic will make the farmers feel tired and appeared ill at the hands of a complaint. for it is necessary to attempt to provide a solution to the problem.

One of the solutions of these problems is to create a tool that can make holes in the plastic with a relatively faster time without cause complaints in the hands of the worker/farmer. The tool designed by ergonomic rule. low cost, making it easy, environmentally friendly, does not require electrical energy. Simple to use. so the design plastic hole tool is made for finding solutions to these problems strawberry farmers. Base on above background, so the problems which can be exposed in this research were as follows: (a) Is design of plastic mulch hole maker can decrease work load strawberry farmers in Bali?, (b) Is design of plastic mulch hole maker can increase work speed strawberry farmers in Bali?

2 MATERIAL AND METHOD

This study was an experimental study with treatment by subject design. There were developed in two treatments such as T0 (make hole on mulch manually using canned heat), T1 (make hole on mulch using design of plastic mulch hole maker). Work load was predicted from heart rate that was counted by 10 rates method on artery radialis by digital stop watch. Environ temperture was measured by sling Psychometer. Noise was measured with sound level meter. work speed was measured by time of many holes are made on plastic mulch. Statistical analysis to know the significant different from data which were collected before and after work, were analyzed with t-paired test at a degree of significance 5%.

3 RESULTS AND DISCUSSIONS

3.1 Subject Characteristic

The total descriptive analysis to data subject characteristic include age, body height, body weight, and work experiences. was presented on Table 1. The means of age subjects on this research is $27,22 \pm 4,12$ year with ranges 19 42 year and total subjects 16 person. Base on statistic analysis can be seen on Table 5.1, subject ages 95% be on interval 21,22 to 30,12 year. So can be said that ranges subject age still on optimal to work because of productive age. Age condition affected to physical work ability or the strength of muscle in self. The maximal fisic ability can be acheave on age range 25 35 years and decrease continously paralel ages increase [1, 2].

Table 1: Data subjects characteristic on farmers

No	Variable	Means	SD	Range
1	Age (yr)	27,22	4,214	19 42
2	Body weight (kg)	60,12	5,162	54,5 69
3	Body tall (cm)	165,11	3,547	155 170
4	Work experiences (yr)	5,21	2,326	2 10
5	Body Mass Index	22,02	0,54	20,22 24,13

3.2 Environment Work Condition

Environmental work condition can indicated from wet temperature, dry temperature, relative humidity, Indeks Temperature Wet Ball (ITWB), noising and light intensities. Environmental condition data which were attained in this research its normality were tested with Kolmogorov Smirnov. (K-S) The result showed that the data work environmental on three treatment distributed normal ($P < 0.05$), To know each treatment showed homogenous data, there were t-paired test. The analysis result work environmental on the research showed on table 2 as follows:

Table 2: Analysis result work environmental measuring on the research

No	Variable	Treatment 0		Treatment 1		t	p
		average	SD	average	SD		
1	Wet temperature (oc)	16,81	2,01	17,01	1,25	-1,473	0,295
2	Dry temperature (oc)	18,12	1,21	18,79	1,71	-0,718	0,551
3	Relative humidity (%)	70,51	3,66	70,24	2,73	0,709	0,523
4	ITWB (oC)	25,14	1,62	25,39	1,56	-1,949	0,092
5	Wind velocity (m/s)	2,15	1,33	2,31	1,42	-3,049	0,181
6	Voice intencyties (dBA)	61,30	1,72	62,11	1,51	1,253	0,382

Analysis result showed on table 2, clarified that wet and dry temperature variable were under borderline value Humindities average each treatment between 70-80%. And voice intencyties (noising) also under borderline voices highest (85 dBA). Those showed that work environmental were on save and comfortable for each treatment so it cant cause physiologies effect that can disturb work. Those result concord with research which were performed by Sutjana located at Bali where its dry temperature around between 28-29C [3]. Manuaba and Kamil stated, that the temperature at dry monsoon increased until 31-32 C at the shade place and attained 36 C under the direct sun rays [4].

The result t paired test to environmental as showed on table 5.3 stated that the variable wet, dry temperature relative humidity, and lighting intencity (at T1 and T2) founded $p < 0,05$. This case stated that each group not different significantly so it can the same effect each group treatment.

3.3 Workload

Workload treat base on heart pulse farmer during a rest (rest heart pulse) and work heart pulse. Before analysis treatment effect was done, it need to normalities test to heart pulse. Normalities test done using Kolmogorov-Smirnov (K-S) test. Test result Kolmogorov-Smirnov (K-S) founded that rest heart pulse and work heart pulse the third treatment normal distributed ($P < 0,05$).

Comparability rest heart pulse done to know first condition the workrs, are there significant differentiated or not. It need to known what the changed workload is original caused by treatment effect or outside factors that follows give changed that workload. Comparability rest heart pulse of farmers done using t paired test. . Analysis result can be seen at Table 3.

Table 3: Compatibilities Heart Pulse Farmers between Treatment.

Variable	T 0		T 1		t	p
	average	SD	average	SD		
Rest Heart Pulse (Pulse/minutes)	68,15	5,22	67,91	4,76	-0,140	0,872
Work Heart Pulse (Pulse/minutes)	103,31	3,45	87,34	2,63	-58,042	0,000

On table 3, can be found that rest heart pulse each group treatment not significantly different ($p > 0,05$). That means first condition rest heart pulse workers for each group treatment can be consider the same. Can we see that the average decrease among treament 0 (T0 / control), treatment 1 (T1). Among group T0 with T1 were significance differences ($P < 0,05$).

during work rest, there were no significant differences in pulse rate in both groups T0 and T1 groups. This indicates that the initial conditions of the worker's workload is the same. while at work, there are differences in working heart rate significantly ($p < 0.05$) between T0 to T1, T0 gives greater pulse. while T1 has a smaller pulse. This shows that there is a pulse decrease between T0 with T1. The average pulse T0 is 103.31, while in T1 was 87.34 or a decrease of 15.5%.

In the T0 group were due to workload including plastic perforate job using the handle of a hand holding a tin of embers attention and caution. Exposure to the sun's heat in the added work of blowing embers on the tin, and the smoke embers in a tin can increase heart rate. This job requires a greater energy. Power or energy is physiologically derived from the body's metabolic processes. This metabolism requires O₂ as the fuel is taken through breathing so that the greater the power purposes the faster frequency of breathing and heart beating.

While in the treatment group T1, the pulse of the work had a significant reduction ($p < 0.05$) for control of 10.4% This is because the work of making a hole mulch treatment assisted by a pit with a natural standing work posture, so that workers feel more comfortable and just do a little pressure to plug the tool into plastic mulch pit. Physiologically energy purposes in the treatment group (T1) was smaller than the T0 group.

Workload (workload) is a body stressor factors that can be divided internal and external of body [5]. Assessment workload objectively the most convenient and inexpensive, quantitatively reliable accuracy is a measurement of heart rate pulse [6].

3.4 Work Speed

To know treatment effect was done difference significant. Average among each group treatment (Control groups or T0, treatment 1 or T1). Statistics test that used is t paired test. Result analysis shown on table 4 as follows:

Table 4: Result Product and Work Productivity Jewel Worker.

Variable	T 0		T 1		t	p
	average	SD	average	SD		
Work Speed (hole/minute)	11,42	1,94	96,71	4,52	18125,28	0,000

On Table 4 above can shown that product and work speed worker has difference significant among both treatment ($p < 0,05$). Shown that work speed on Treatment 1 (T1) more height than Treatment 0 (T0). Average result work speed was 11,42 1,94 holes/minute, on treatment 1, Average result work speed was 96,71 0,925 holes/minute or increased as much 746,8%.

This condition shown that T1 (make hole on the plastic by tool of plastic mulch hole meker) give effect increase work speed better than T0 (make hole on the plastic manually by scissors). Ergonomics intervention to improvement work posture or work station its needed especially at small scale industry [7]. Agro ergonomics approach will play an important role in improving the speed and productivity of farmers [8]. Because of ergonomics intervention at home industry , intervetion use work chair appropriate with anthropometry and etc. will can decrease workload or subjective complain also increase work productivity [9, 10].

4 CONCLUSSIONS AND RECOMMENDATIONS

Based on the research that has been done in previous sections, as follow are some conclusions can be take like as follows:

1. Usage of Design Of Plastic Mulch Hole Maker can decrease work load strawberry farmer in Bali.
2. Usage of Design Of Plastic Mulch Hole Maker can increase work speed strawberry farmer in Bali.
3. There are some suggestion can be present on this research such as follows : a) From the research which has done evidence using Design Of Plastic Mulch Hole Maker can decrease work load strawberry farmer in Bali.can increase work speed farmer so its suggestion design of Plastic Mulch Hole Maker for soil cover (mulch) of strawberry plant, and b) Necessary to study more deeply about the treatment plant strowbery when making trenches and watering to meet the ergonomic rules.

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Design of Baby Walking Assistant (AB3) by Using Axiomatic Design Method

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Abstract

Statistical data from National Population and Family Planning Board (BKKBN) illustrated that the numbers of Indonesian population in 2014 has increased 1,40% from approximately 240 million persons, with 10.000 childbirths/day. Hence, with the huge number of childbirths, a walking tool is required to train babys walking ability. It called as Alat Bantu Berjalan Bayi (AB3)/baby walking assistant. AB3 is designed by using axiomatic design method. The criteria of the design based on customers preferences are simple, safe, strong and stylish. Therefore, the design parameters for AB3 by using axiomatic design method are determined as AB3s appearance design (DP1), comfortable design (DP2), pure cotton material (DP3) and half rounded design model (DP4). Validation that conducted by using Stuart-Maxwell test of Marginal Homogeneity reveals that value of alpha > 0,05 indicates that the proposed design has fulfilled customers preferences.

Keywords : *Baby Walking Assistant, Axiomatic Design Method, BKKBN*

1 INTRODUCTION

The increasing numbers of population become the important issue to be discussed by every country. Hence, the figures are kept being monitored. The increasing population is the indicator of countrys welfare. Since a country is indicated as prosperous country if the number of its gross regional domestic product (PDRB) is less than 1% from the total amount of population [1]. Statistical data from National Population and Family Planning Board (BKKBN) illustrated that the numbers of Indonesian population in 2014 has increased 1,40% from approximately 240 million persons, with 10.000 childbirths/day [2]. The result of study shows that toddlers growth has its own pattern with certain way and speed. Therefore, all toddlers will not accomplish the identical growth point in the same age [3]. Toddlers growth is defined as gross motor skill to maintain the body development that coordinates body movements to sustain body stability. It is parents responsibility to stimulate the growth of childs gross motor skill. According to [4], toddlers age is commonly declared as an ideal time to observe motor skill due to following circumstances: 1) Childs flexible body, 2) Toddlers

still have limited skill, 3) Child is braver to try something new, 4) child love adventures, and 5) Child has more time to study motor skills

Inappropriate motor skills development that is caused by improper tool could cause obstructed motor skills and physical development or else the growth will run unexpectedly. The result of research reveals that the walking progress leads to incorrect development is caused by the existing baby walking assistant that less consider in strengthening the thigh and pelvic muscle that mostly used for walk practicing [5]. In terms of developing motor skills, a child has to be motivated to conduct the movements since motor skills could be formed from compilation of several factors, such as: nerve development, bodys physical characteristic and its possible movement, walking skill control, which needs active efforts from the child to coordinate several components of designated skills. Hence, to train motor skills components and other parts that support babys walking development, a design on appropriate walking tool is required. Product design consists of two words, which are design and product. According to Indonesian dictionary, design means frame of form or plan. Product design should be fashionable, that turns to be the most important part on communitys life style [6].

The process of product design is highly related to configuration, composition, meaning, value and purposes of manmade phenomenon [7]. The nature of products not only efficient in the context of function and economic mechanism, but also should consider on factors of moral, social and its impact to environment [8, 9]. Others that should be fulfilled are global equality, fair trade, social justice and responsibility. They interact each other to form strong bound among products and surroundings [1, 10]. Observation on baby walking assistant will cover material usage, protection strap and baby security system. It will employ product design method and axiomatic design. Axiomatic is product designing method based on functional requirements and maintaining its two basic principles, which are functional freedom and information content minimization [11]. Besides, Axiomatic design helps researcher to carry out designing activity based on the process of logical thinking, rational and tools [12] to expand scientific procedures, general, modified and systematic in design [13]. Axiomatic process are : 1) understanding the customers need, 2) Defining the problem to be solved, 3) Making and selecting a solution, 4) Analyzing and optimizing the solution, 5) Assessing effect of the design towards customer [1]. Basic concepts of Axiomatic Design are Customer Attribute, Functional Requirement, Design Parameter and Process Variable [12].

Ordinal scale non parametric analysis is used to classify measured variables to avoid mistakes in determining data analysis and further research step [14, 15]. Measurement scale justification employs validity and reliability test analysis. Validity test is an instrument to calculate instruments validity by using Spearmans Rank Correlation Method, while Spearmans Rank is an equation from person product moment, which is used to calculate instruments validity. An instrument is indicated as valid if it had correlation coefficient (r) bigger or equal with 0,3 [14, 16]. Reliability test is applied to obtain level of accuracy by using Cronbachs alpha method under scale of 0-1. Development process on product design uses principles of multiple effect design. Prior to previous introduction, researcher tries to create prototype of Alat Bantu Berjalan Bayi (AB3)/Baby walking Assistant that appropriates with concept of childs development and customers preferences by applying concept and method of Axiomatic Design.

2 RESEARCH METHODOLOGY

2.1 Object of Research

Object of this research is the design of Alat Bantu Berjalan Bayi (AB3)/Baby Walking Assistant. The respondents are women with age ranged from 20-30 years old that have children with age ranged from 1-2 years old as the users of AB3. Questionnaires were distributed to random several places. The amounts of respondent were 30 persons. The design of AB3 is constructed by using software inventor fushion 13.2 as one of the supporting tool, while for three dimension and rough sketching, sketch-up pro 9 is also employed. Process of designing on customers requirement applies axiomatic design method. This research was conducted in manufacturing system laboratory, department of Industrial Engineering, Universitas Islam Indonesia.

2.2 Data Collection Process

The research is conducted by removing samples out of population. It is assumed that the population is infinite by using accidental sampling. Data collection techniques are explained as follows: 1) Observation. By conducting direct observation on AB3 users, 2) Interview and Questionnaire. By performing interview and spreading the questionnaire to AB3s users. Interviews samples are taken from 30 respondents that use baby walking assistant with age ranged from 20-30 years old, and 3) Study Literature. This technique involves study literature, books, journals, magazine and other supporting data.

2.3 Process of Design

The steps of design and Axiomatic Design are clarified as follows : 1) Identification on customers requirement. Costumers preferences on the design of AB3 are identified by distributing the open questionnaire. After the data are processed, costumer attributes will be recognized and will be used as basic of further process, 2) Mapping process, from costumer attributes (CAs) to the level of functional requirement and from functional requirement (FRs) mapped to design of parameters (DPs), 3) Design Matrix FR/DP for each level. On this step, Design matrix (DM) is made to adjust the design. Later, to be fitted in the independence axiom on attributes for each level, 4) Questionnaire Improvement. It is carried out under several stages to obtain questions attributes, which are valid and reliable, 5) Determining Functional Requirement. This stage determines functional requirement from customer attribute, in form of functional statement that could fulfill customer attribute, 6) Determining Design Parameters. By defining solution to accomplish current functions, 7) Prototyping. This stage is defined as process to transfer the design parameters at leaf level into a virtual prototype, 8) Design validation. Validation test is performed to evaluate whether the proposed design has met the customers preferences or has not. Validation test in this research employs Stuart-Maxwell test of Marginal Homogeneity.

2.4 Validity and Reliability Method

Data measurement is an effort to relate the concept with reality. Questionnaire is used as an instrument for data collecting. It is composed theoretically in form of Likert scale. Score 5 is categorized as very important, score 4 is categorized as important, score 3 is categorized

as fair/neutral, score 2 is categorized as not important and score 1 is categorized as very not important. Before distributing, the questionnaire should be assessed by using validity and reliability test. Validity test employs Spearmans Rank Correlation Method, while reliability test involves Cronbachs Alpha with scale 0-1 to compare coefficient of reliability.

3 RESULTS AND DISCUSSIONS

3.1 Result on Respondents Needs

The respondents are women with age ranged from 20 30 years old that have children with age ranged from 1-2 as users of AB3. The result on identification of costumers needs toward AB3 accumulates 15 attributes (table 1).

Table 1: Costumers Needs.

No	Customers Needs	No	Customers Needs
1	Attractive	9	Comfortable
2	Elegant	10	Unique
3	Durable	11	Soft surface
4	Big Capacity	12	Easy to maintain
5	Cheap	13	Strong material
6	Simple	14	Modern shape
7	Has more than one safety items	15	Interesting Color
8	Environment friendly		

3.2 Respondents Validation Test

Attributes are considered as valid if the value of Corrected Item-Total Correlation more than or equal with 0,3. It can be notified, there are 4 valid attributes while others are indicated as invalid. The result of the validation test is illustrated by table 2. Valid attributes will become customer attribute (CA) in AB3 designing.

Table 2: Result of validation test on Customers Needs

No	Customers Needs	Corrected Item-Total Correlation	Desc.
1	Simple	0.423	Valid
2	Design on safety items	0.512	Valid
3	Strong material	0.579	Valid
4	Latest design	0.459	Valid

3.3 Respondents Reliability Test

Result on reliability test (to identify accuracy level) by using SPSS yielded that the Cronbach's Alpha value for attributes is 0,721. This value is considered as acceptable. All

four attributes are consistent instruments in data collection. It declared as accurate and could be treated as input data for this research. Reliability value is presented in table 3.

Table 3: Reliability Test

Cronbach's Alpha	N of Items
0.721	4

3.4 Designing Process for Axiomatic Design

3.4.1 Customer Attribute (CA)

Table 4: Result of validation test on Customers Needs.

No	Customers Needs	Code	Description
1	Simple	CA1	Design of shape is not complicated
2	Design on safety items	CA2	Has more than one safety items, baby will be in safe position while learning to walk
3	Strong material	CA3	AB3 uses strong material, not easy to rip or broken off when being used
4	Latest design	CA4	AB3 is designed with high level of uniqueness and fine design, especially for baby supporting design

3.4.2 Customer Attribute (CA), Functional Requirement (FR) and Functional Requirement (FR), Design of Parameter (DP)

Once Customer Attribute (CA) is identified, then CA is mapped to certain function (FR) that will be later answered by Design of Parameter (DP) as the solution. In this research, the decision for design of parameters will be determined by surveys to respondents. Next step in Axiomatic design is zigzagging through decomposition process. Design of Parameter is defined according to functional requirement in the same level and FR in the lower level is defined based on upper level of DP. Decomposition process continues until leaf level is achieved.

3.5 Design of FR and DP Matrix

This matrix design for each level of FR/DP is conducted to ensure that the design has fulfilled the requirement of Independence Axiom. Table 6 shows that DP1 and DP2 fulfill more than one FR. The correlation below diagonal line will refer to triangular or decouple design. In Axiomatic design, this is acceptable. It means that FR is independent and DP is placed on the appropriate order. Therefore, the process can be continued. Afterward, matrix design in every level should be analyzed to determine whether the design concept consistent to independence axiom.

Table 5: Mapping CA to FR and FR to DP

Code	Customer Attribute	Code	Functional Requirement	Code	Design Parameter
CA1	Simple	FR1	Reducing design on AB3	DP1	Appearance design of AB3
		FR11	Reducing colors on AB3	DP11	3 combination of color Ferrari red, black and green
		FR12	Has simple shape	DP12	Unicom shape
		FR13	Reducing extra compartment on AB3	DP13	Space for babys walking
CA2	Design of Safety	FR2	Minimizing the negative effect	DP2	Comfortable design
		FR21	Designing strong AB3	DP21	Could afford heavy load
		FR211	Material combining	DP211	Type of internal and external material
		FR2111	External Part	DP2111	Cotton 70% and cloths foam 30%
		FR2112	Internal Part	DP2112	100% cloth's foam
		FR212	Avoiding fabric perforated on AB3	DP212	Nylon stitch 250
		FR2121	Applying the highest quality of yarn	DP2121	Nylon yarn 250
		FR2122	Performing strong stitching pattern	DP2122	Stitching pattern with double line
		FR22	Designing inclined connection side	DP22	Design of pattern half round
		FR23	Designing harmless handle	DP223	Half round handle made from foam
		FR231	Easy grip	DP231	Half round
		FR232	Gentle grip	DP232	Handle is covered with cotton
		FR24	Applying strong height lock	DP24	Lock with plastic slip model
		FR241	Type of Slip	DP241	Slip Lock
FR242	Locking position	DP242	Upper left and right side corner and in the central of AB3		
CA3	Strong Material	FR3	Minimization of material allergic on baby during utilization	DP3	Pure cotton as material
		FR31	Utilization of material that hard to be ripped or broken	DP31	Cotton and fabric foam for internal part
		FR311	Utilization of material with high level of tension	DP311	Poly cotton
CA4	Latest Design	FR4	Designing AB3 to be different from other existing products	DP4	Half round design
		FR41	Accommodating variation of accessories	DP41	Doll accessories
		FR42	Providing flexible dimension on AB3s body	DP42	Designed from small to bigger size
		FR421	Having smaller size for internal compartment	DP421	Internal circle is measured as 35 cm X 35 cm and length of string as 120 cm
		FR422	Having bigger size for external side	DP422	Internal circle is measured as 45 cm X 45 cm and length of upper string as 120 cm
		FR43	Minimalist pattern design	DP43	D pattern

Table 6: Design of Matrix level 1

	DP1	DP2	DP3	DP4
FR1	X	O	O	O
FR2	O	X	O	O
FR3	O	O	X	O
FR4	X	O	O	X

Table 7: Design of Matrix level 2.

	DP11	DP12	DP13	DP21	DP22	DP23	DP24	DP31	DP41	DP42
FR11	X	O	O	O	O	O	O	O	O	O
FR12	O	X	O	O	O	O	O	O	O	O
FR13	O	O	X	O	O	O	O	O	O	O
FR21	O	O	O	X	O	O	O	O	O	O
FR22	O	O	O	O	X	O	O	O	O	O
FR23	O	O	O	O	O	X	O	O	O	O
FR24	O	O	O	X	O	O	X	O	O	O
FR31	O	O	O	X	O	O	O	X	O	O
FR41	O	O	O	O	O	O	O	O	X	O
FR42	O	X	O	O	O	O	O	O	O	X

In this level 2, matrix design refers to decouple design in which DP12 not only has fulfilled the necessities of FR12 but also could accommodate FR42. It can be translated that matrix level 2 is acceptable.

Table 8 represents design of matrix level 3. It shows matrix of decouple design which indicates that the design is acceptable. Last matrix of design will be design of matrix level 4 FR/DP.

Table 8: Design of Matrix level 3.

	DP11	DP12	DP13	DP21	DP22	DP23	DP24	DP31	DP41	DP42
FR11	X	O	O	O	O	O	O	O	O	O
FR12	X	X	O	O	O	O	O	O	O	O
FR13	O	O	X	O	O	O	O	O	O	O
FR21	O	O	O	X	O	O	O	O	O	O
FR22	O	O	O	O	X	O	O	O	O	O
FR23	O	O	O	O	O	X	O	O	O	O
FR24	O	O	O	O	O	O	X	O	O	O
FR31	X	O	O	O	O	O	O	X	O	O
FR41	O	O	O	O	O	O	X	O	X	O
FR42	O	O	O	O	O	O	X	O	O	X

Design matrix level 4 refers to Diagonal Matrix, hence, this design is also acceptable.

3.6 Validation on Design and Planning

Final step of the research is validation based on parameters design from axiomatic design. Validation test employs Stuart-Maxwell test of Marginal Homogeneity that shows all alpha value on design variables are calculated more than 0,05. This indicates that proposed design has accommodated customers preferences.

Table 9: Design of Matrix level 4

	DP2111	DP2112	DP2121	DP2122
FR2111	X	O	O	O
FR2112	O	X	O	O
FR2121	O	O	X	O
FR2122	O	O	O	X

Table 10: Alpha value for AB3

Customer Attribute	Alpha
Simple	0,267
Design of Safety	0,289
Strong material	0,342
Latest Design	0,431

4 CONCLUSSIONS AND RECOMMENDATIONS

Based on research, it could be concluded that the design criteria of AB3 that preferred by customer are: simple model, design of safety, strong material and latest design. Furthermore, based on axiomatic design method, appearance design (DP1), comfortable design (DP2), pure cotton material (DP3), and half rounded design model (DP4) are set as parameters of design that could fulfill customers preferences. Result of validation test using Stuart-Maxwell test of Marginal Homogeneity shows that all alpha value on design variables are calculated more than 0,05. This indicates that proposed design has accommodated customers preferences.

Acknowledgments. Thank you to Department of Industrial Engineering and all assistants of Manufacturing System and Production System Laboratory, Faculty of Industrial Technology, Universitas Islam Indonesia.

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Design Push Up Detector Using Quality Function Deployment Method and Anthropometry

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Abstract

Push-up is one of the techniques or ways of exercising that must already often done. But there are still many people who do not understand very well how to do push-ups right, most people just do that without realizing it will not generate benefits for our bodies. The purpose of this study is (1) Determine the criteria for consumers of a push up detector with Quality Function Deployment method and (2) To draft wake detection tool design push up athletics with automatic detection ergonomic. Results from this study is that there are 11 criterias in detector design push up and push-up design of the tool sensor detector height can range between 77-82 cm, this figure is taken from the value of percentile 5 to 95 percentile body dimensions vertikal reach. The length of the horizontal sensor between 88-92 cm. This measure is taken from sitting height dimensional.

Keywords : *Quality function deployment, Anthropometri, Push Up detector, Ergonomic*

1 INTRODUCTION

Anthropometric derived from "anthro" which means human and "metric" which means size. Anthropometric is a study related to the measurement of the dimensions of the human body [1]. Anthropometric fields include various sizes of the human body such as weight, position when standing, when stretched out arm, body circumference, leg length, and so on.

Anthropometric data are used for various purposes, such as the design of work stations, working facilities, and the design of products in order to obtain the measures appropriate and feasible with the dimensions of human limbs that will use it. In this study, anthropometric data used as the basis for design of push-up detector. This tool is necessary is designed considering this sport is a sport that is most often done well to lay and athletes. For this time the research is conducted anthropometric data taken from the athletes run, this is done because the araga run is the oldest sport and everyone can easily do this sport. The need for anthropometric data in the draft wake detector tool push up to avoid muscle injuries when doing push-ups with this tool.

Quality function deployment (QFD) method is used to collect expert opinion and voice of customer for product design [2]. This method is expected to determine the priority in the push-up detector.

The objectives of this study were : 1) Determining priority for athletes to push up product detector, 2) obtain a measure for the design of an ergonomic push-up detector. Ergonomics has two main objectives, namely [1] : 1) Improve the effectiveness and efficiency of the work and other activities, 2) Increase the values of certain desirable jobs, including improving security, reducing fatigue and stress, improve comfort and job satisfaction as well as improve quality of life, and 3) Ergonomics applied to fulfill its intended destination in order to effectively and efficiently the human ergonomics teaches several approaches should be applied.

The advantage to implement ergonomics are : 1) The reduced number of occupational illness, 2) The reduced workplace accidents, 3) Medical expenses and compensation for reduced, 4) Occupational stress is reduced, 5) productivity improved, 6) Improved workflow, and 7) A sense of security because it is free from interference injury.

2 RESEARCH METHODOLOGY

The study was conducted in Palembang and Sekayu. Anthropometric data measurement is taken in male athletes aged 18-23 years.

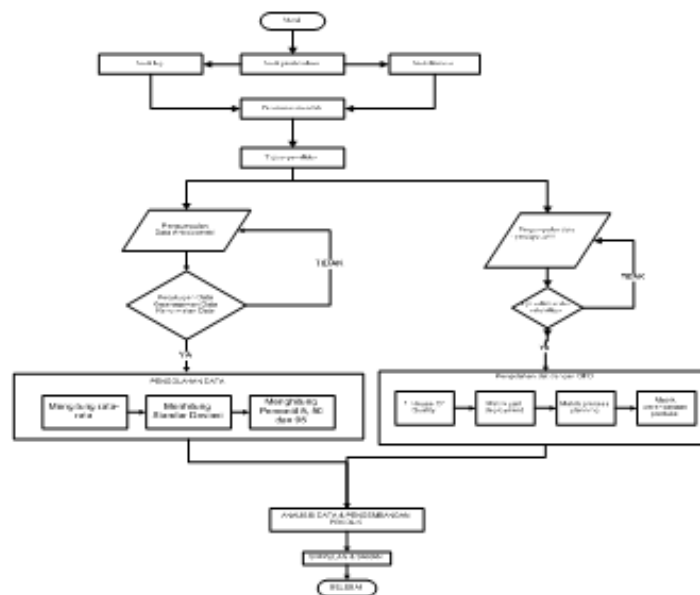


Figure 1: Research flow chart

Data collection is running two stages : 1) Distribution of the questionnaire for QFD, and 2) The collection of anthropometric data by means of direct measurement.

This research was made through several stages, namely : 1) The collection of data through questionnaires to the informant to determine detector push up the criteria that will be created, 2) Determine the design and size of the push-up detector with anthropometric data collection,

and 3) Spread a second questionnaire to prospective users of the push-up detector design that has been designed.

The image in figure 1 shows a flow chart of research and stages of collection and processing of data.

3 RESULTS AND DISCUSSIONS

3.1 Questionnaire Results Quality Function Deployment

QFD data collection method [2] is done by providing a number of questions to the speakers. Speakers in question are those who are experts in the design of products and push up the correct position. From the results of the data collection in the 11 attributes of push-ups get the detector are:

Table 1: Attributes Design Push Up Detector

No	Requirement
1	Selection of the type of sensor
2	Light
3	Lifespan economical material
4	Strength of materials
5	Comfort
6	Selection form
7	Variations size
8	Variations in color
9	Ease of use
10	Selection of materials
11	Multi function tool

Furthermore, the criteria that have been obtained is converted into a questionnaire to ask the prospective users push up detector. After the questionnaires were distributed and tested the validity of the reliability of the test result measuring instrument is Alphas value = 0.823 [3] so that the measuring instrument is reliable.

3.2 Priority Result for Product Design Using QFD

Priority strived for the development of products is as follows : 1) Priority I (Option Type Sensor). An attribute that is easy to be realized because it can use the preferences of the competitors' products. While the technical characteristics that may affect its not good sensor: quality of materials, the quality of the sensor, and the quality function also does not conflict with other technical characteristics, 2) Priority II (Light). Push ups are a light detector includes attributes that affect the level of sales, since most consumers will buy a product tertarik with a light-weight of the product. If the weight of the push-up detector is too heavy, so consumers were reluctant to have. For that as a designer to be responsive and always capture the desires of consumers by means of push-up detector design of lightweight material. The characteristics of which are closely related techniques are dried materials and

the quality of these materials, 3) Priority III (Ease of Operation). At ease with him a push up pengoprasional detector then sipengguna or consumers feel comfortable, and gives special value to the design and development planning tool detector push ups, 4) Priority IV (Age Economical). It is still in the category that is easy to overcome, because of the preference of a competitor's product can be used as a reference, which in turn can re-evaluate the company against its products. But it will be a little in need of thought and a good experience when quality material can survive, 5) Priority V (Convenient Used). Type attribute indeed it is relatively comfortable for its user but through an assessment process that involves preferences so it can be used as a reference.

3.3 Anthropometric Data

Anthropometric term comes from "antro" which means human and "metri" meaning ukuran. In term of anhpometri can be expressed in general as a study related to the measurement of the dimensions of the human body. Humans will basically have the shape, size (height, width, etc.), weight and others are different from one another.

Anthropometry is a data set that is closely linked to the physical characteristics of the human body size, shape and strength as well as the application of these data handling design problem [1].

Anthropometric measurements of the body is static and dynamic. What is called engineering anhpometri associated with the application of the data type of the body to design equipment that is used. Anthropometri divided into two parts : 1) static anthropometry, namely human measurements performed at rest and in a linear fashion on the body surface, and 2) dynamic anthropometric, ie measurement of the state of the physical and human characteristics in a state bergera, pay attention to movements that may occur when workers are doing business. Respondents in this study were 200 respondents consisting of track and field athletes from the region of Palembang and Sekayu. All respondents drawn is male aged between 18-23 years. This meant that the anthropometric data collected are homogeneous.

3.4 Uniformity Test Data Sufficiency and Data

Because the anthropometric data used in push-up detector only two dimension there are Reach Hand (JKT) and sitting height (TDT), then the processing of the data for the two dimensions are:

Table 2: Adequacy and Uniformity Test Result Data.

No	Dimension	x	BKA	BKN	N	N1	Description
1	JKT	77	1,62	75	84	200	2 Enough Data Uniform Data
2	TDT	89,91	1,28	85,86	95,16	200	1 Enough Data Uniform Data

3.5 Calculation of percentiles 5, 50 and 95

Percentile calculation is done to divide into segments of the population for the benefit of researchers. Use of percentile calculation is done with the following formula [4] :

$$5 \text{ percentile} = X - 1.645$$

$$50 \text{ percentile} = X$$

$$\text{Percentile } 95 = X + 1.645$$

The results of the percentile calculation are:

Table 3: Percentile values for Anthropometric

No	Dimension	5%ile	50%ile	95%ile
1	JKT	78	80,60	82
2	TDT	88	89,91	92

Push Up detector design results are as follows:



Figure 2: Push up Detector

4 CONCLUSSIONS AND RECOMMENDATIONS

The result from this research are :

1. The push-up detector is simply and easy tools to operate. The push up detector calculates the number of push-up using the sensor corresponding to the correct push-up position.

2. The size of the dimensions of the tool has been adapted from the results of anthropometric data processing tailored to the user's body posture, thereby reducing the risk of fatigue and improve comfort and user satisfaction.
3. Based on the design , the push ups high detector sensor can range between 77-82 cm.

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Flow Pattern in the Estuary of Musi River Using MIKE-21 Flow Model

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Abstract

Musi river is the largest river in Palembang with a length of more than 750 kilometers and an average width of 540 meters where the maximum width of 1,350 meters is located around the Kemaro island. Basically, sedimentation in the Musi river does include sedimentation due to the high level meeting between the Musi river currents and ocean currents in the Bangka Strait. The silting condition of Musi river is getting more severe because of the sludge that reaches about 40 cm per month. In fact, the volume of sludge could reach 2.5 million meter. There are 13 silting points along the Musi river shipping channel from the Boom Baru port to Bangka Strait. Four points are already very vulnerable because of the silting reaches up to 4 meters. The location which is quite compressis from the northern Payung Island to the estuary, while the location of the worst silting among others is on the outside verge of the Jaran Strait and the water groove of the southern part of the Payung island sedimentation reaches 7 km, so the boat that crosses the groove of Musi river should be guided against the tide that occurs. This research was conducted by using the approach of software models MIKE 21 Flow Model and the results obtained from this study is the pattern of movement of the flow between the other directions and speed of currents and hydrodynamic model of the depth of the river starting from the outside verge to the Musi river which affected the down tide.

Keywords : *Pflow pattern, Musi River, Mike-21, Flow model*

1 INTRODUCTION

Musi river is the largest river in Palembang with a length of more than 750 kilometers and an average width of 540 meters where the maximum width of 1,350 meters is located around the Kemaro island and the minimum width of 250 meters is located around the Musi II Bridge. Musi river has two islands, namely Kembaro (Kemaro) and Kerto islands. The three other major rivers are the Ogan river with an average width of 236 meters, Ogan river with an average width of 211 meters and the Keramasan river with an average width of 103 meters [1].

Musiriver is not only used by people around the course but also by big companies located along the Musi river. They use the Musiriver to deliver the products and bring in the raw material through the vessel. There are so many big ships and even very large pacing in the Musi river. Some companies located along the Musiriver are PT. Pertamina, PT. Sriwijaya fertilizer (PUSRI), Wilmar Group and the Port of Boom Baru, and Port at 35 ilir. The role of the Musiriver is very vital and this so called pulse of Palembang city is now haunted by various problems. One of the problems is the river silting which continues to increase every year. Of course this is very detrimental to the Government of South Sumatra Province, especially at this time of South Sumatra province being intensively attracts investors to invest in the business sector. Basically, sedimentation in the Musiriver does include a high level of sedimentation caused by the current meeting between Musi river and ocean currents in the Bangka Strait.

The silting condition of Musi river is getting more severe because of the sludge that reaches about 40 cm per month. In fact, the volume of sludge could reach 2.5 million meter. There are 13 silting points along the Musi river shipping channel from the Boom Baru port to Bangka Strait. Four points are already very vulnerable because of the silting reaches up to 4 meters. The location which is quite compressis from the northern Payung Island to the estuary, while the location of the worst silting among others is on the outside verge of the Jaran strait and the water groove of the sedimentation in the southern part of the Payung island reaches 7 km, so the boat that crosses the groove of Musi river should be guided against the tide that occurs.

2 RESEARCH METHODOLOGY

This study was carried out with the modeling and simulation of flow patterns and sediment transport in water area of the Bangka Strait in position 2.07 - 2.38 of South Latitude and 104.85 - 105.17 of East Longitude. The research location [2, 3] is in figure 1.

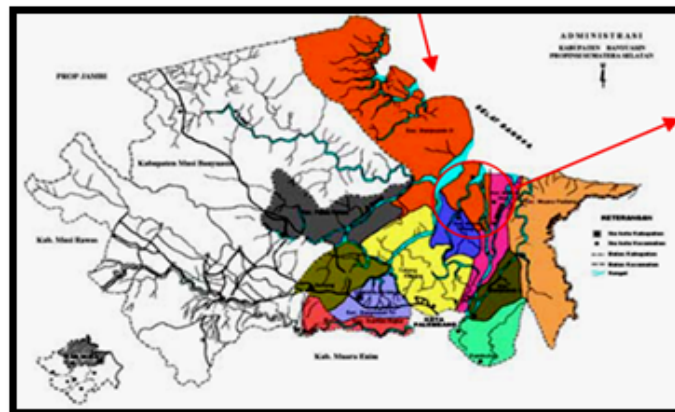


Figure 1: Map of Research Location.

2.1 Tools and Materials

The tools used in this research are as in Table 1 below

Table 1: List of tools used in the study

No	Name of Tools	Number of Uses
1	Stationery 2 pieces	Writing to recording data
2	Computer (RAM 2 GB) 1 unit	Performing general modeling
3	Printer 1 unit	Displaying form of report
4	Software MIKE-21 Model, MS-Excel	Performing modeling and data processing
5	Dongle (licensed program) 1 pieces	Activating the software MIKE-21 FM
6	Laptop and Printer 1 pieces	Assisting to preparing reports

The data used in the analysis are as shown in Table 2.

Table 2: Factors and Willis Deutsch

No	Data properties	Data type	Sources	Units
1	Tidal	Primary	Field	m
2	Bathymetry	Secondary	Bakosurtanal/Pelindo	m
3	The direction and speed of current	Primary	Field	(\circ) & m/s
4	River capacity	Primary	Field	m ³ /s
5	The direction and speed of wind	Secondary	BMG	(\circ) & m/s
6	Base of Sediment	Primary	Field	mm or
7	The concentration of suspended sediment	Primary	Field	mm/l
8	Discharge of sediment from the river	Primary	Field	gram/s

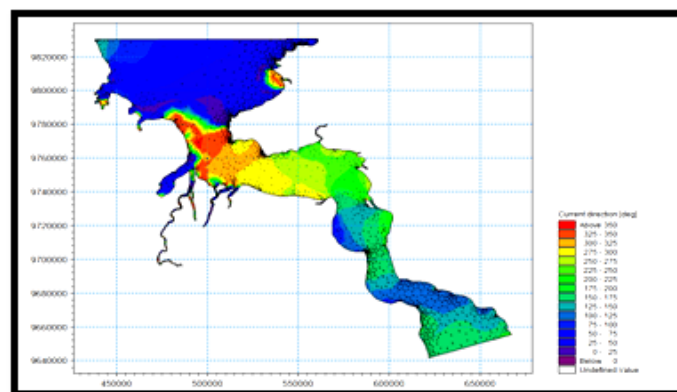


Figure 2: The hydrodynamic model of the river water velocity direction

2.2 MIKE-21 FM Simulation

MIKE-21 Hydrodynamic Module (HD Module) is a mathematical model to calculate the hydrodynamic behavior of the water against a wide variety of styles functions, for example, certain wind conditions and water levels are specified in the open model of the boundary. HD module simulates the water level and the current differences in the various styles function in lakes, estuaries, and beaches [4, 5].

3 RESULTS AND DISCUSSIONS

After all the boundary condition isdiscussed in the modeling, the results of global model output on the outside verge of the Musi river are as in figure 2, figure 3 and figure 4 below.

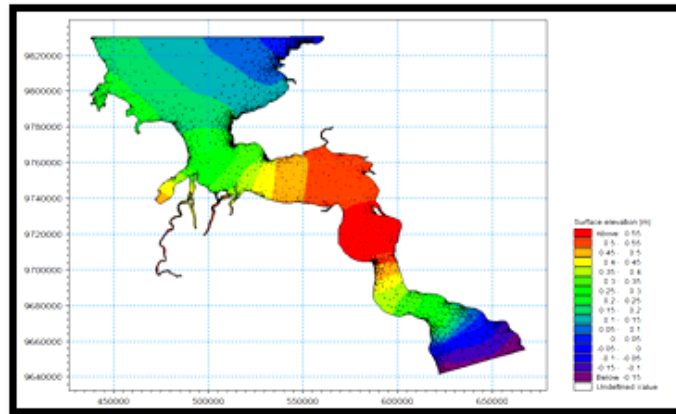


Figure 3: Model hydrodynamic surface elevation watersheds

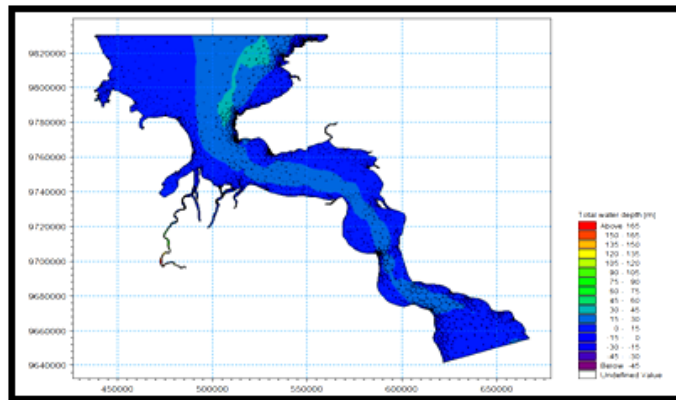


Figure 4: The total depth of the hydrodynamic model of river flow

4 CONCLUSSIONS AND RECOMMENDATIONS

From the analysis of the study, it can be summarized that:

1. Greatest speed direction occurred on the Musi river bank ranges between 300-350 degrees.
2. Threshold elevation of the outer surface of the Musi river ranges between 0.20 m - 0.40m will affect the free area for ships to perform well and safe movement.
3. The total depth of water occurs at 15-30 m and therefore contributes to the flow of the ship movement into the Musi river as a whole.
4. As a recommendation of this study, it is necessary to study more detail about the correlation of sediment movement and move of the ship to the amount of sediment in the Musi river [6].

Acknowledgments. I would like to say thank you to Prof. Ir. Bochari H. Rachman, M.Sc, Rector of Bina Darma University, Prof. Dr. H. Zainuddin Ismail, MM, Vice Rector I and Dr. Sunda Ariana, M.M., M.Pd., Vice Rector II of Bina Darma University who are pleased to give permission and assistance to the author, especially in the preparation of the data so that the paper can be completed.

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