



Antonius Rachmat C <anton@staff.ukdw.ac.id>

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## Paper Submission of Researchers World Journal

4 messages

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**Antonius Rachmat C** <anton@staff.ukdw.ac.id>  
To: researchersworld@gmail.com  
Cc: RGunawan Santosa <gunawan@staff.ukdw.ac.id>

Mon, Feb 13, 2017 at 12:31 PM

Dear Editor of Researchers World Journal,

Please find enclosed a manuscript entitled: "**LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT**" which I am submitting for exclusive consideration of publication as an article in Researchers World of Journal.

The paper demonstrates the use of logistic regression for predicting first semester GPA. As such this paper should be of interest to a broad readership including those interested in science and information technology.

Thank you for your consideration of my work! Please address all correspondence concerning this manuscript to me at Duta Wacana Christian University and feel free to correspond with me by e-mail [anton@staff.ukdw.ac.id](mailto:anton@staff.ukdw.ac.id).

Sincerely,

Antonius Rachmat Chrismanto

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**Arif Anjum** <researchersworld@gmail.com>  
To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

Mon, Feb 13, 2017 at 11:01 PM

Dear Author,

Thanks for your paper submission.

Regards,

[Quoted text hidden]

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**Managing Editor,**  
**Researchers World - Journal of Arts, Science & Commerce**  
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**Antonius Rachmat C** <anton@staff.ukdw.ac.id>  
To: RGunawan Santosa <gunawan@staff.ukdw.ac.id>

Tue, Feb 14, 2017 at 1:09 PM

Ini balasannya pak Gun....

[Quoted text hidden]

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**Antonius Rachmat C., S.Kom, M.Cs**

Dosen Teknik Informatika UKDW

<http://lecturer.ukdw.ac.id/anton> dan <http://ti.ukdw.ac.id>

Fakultas Teknologi Informasi UKDW

<http://www.ukdw.ac.id>

Staff Ahli Perpustakaan UKDW

<http://library.ukdw.ac.id>

ResearchGate Profile

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**RGunawan Santosa** <gunawan@staff.ukdw.ac.id>

Tue, Feb 14, 2017 at 2:33 PM

To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

Trims pak Anton...

Salam,

Gunawan

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PAPER VERSI 1

# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

**R. Gunawan Santosa**

[gunawan@staff.ukdw.ac.id](mailto:gunawan@staff.ukdw.ac.id)

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

**Antonius Rachmat Chrismanto**

[anton@staff.ukdw.ac.id](mailto:anton@staff.ukdw.ac.id)

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

## Abstract

Faculty of Information Technology, Duta Wacana Christian University has two methods of admission of new college students, the first is admission for new students who had educational achievements in high school and the second is use regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology Duta Wacana Christian University. First semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result is used as independent variables. As the training data to create a logistic regression model we use students admission data from 2008 through 2014 class, while the testing data is the new students admission data of 2015 class. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4%. There is a change in the logistic regression form, three models influence only by level of English test result. While the four others model is influenced by the level of English test result and high school location.

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table

## **INTRODUCTION**

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), new students have different educational and environment background. After the prospective new students are accepted as college students of the Faculty of Information Technology DWCU and after learning process in the first semester the results of their study are reflected in acquisition their first semester GPA. GPA of student can be regarded as evaluation of learning outcomes in higher education. There are some students who got GPA high, but there were also students who obtained GPA is very low. At the first semester these students can sometimes move to another faculty. In addition, there are some of these students have not registered for the next semester so that they are no longer active as college students or even resign as a student at the Faculty of Information Technology DWCU. There are many different external factors that may affect the first GPA beside the existing internal factors such as interests, talents, abilities, diligence, self-motivated in student. External factors that used in this research are the location of high school, categories of high school, status of high school, and level of English test result. Location of high school can be categorized into high schools in Java and outside Java, and categories high school that classified by usual high school and vocational high school is also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition the level of English of the students is also possible as a factor affecting students' first semester GPA. In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not seen a relationship between GPA and these factors. This research is the next step of previous research which essentially trying to find mathematical models that logistic regression to predict the categories of students' first semester GPA in Faculty of Information Technology DWCU.

## **LITERATURE REVIEW :**

### **DATA MINING**

As the development of the Internet, the amount of data in the world is also growing. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search is becoming increasingly difficult, especially if it done manually. A search for information in a large number of datasets that can be done automatically using the concept of Data Mining. Data Mining (Knowledge Discovery from Data) is a field discipline in information technology that is interdisciplinary, which is able to perform mining of data in large dataset numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Han & Kamber, 2011).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source). In this research, data sources derived from data from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW.
2. The pre-processing stage is the stage of data cleaning and data processing early in order to be completely ready for use.
3. Phase transformation is the phase transformation of data so that suitable for processing to the next stage in numeric form that is ready to be calculated. This stage also features selection, ie selection stage all the right attributes as the distinguishing feature data.
4. Stage of data mining is the stage where the data mining algorithms applied. Example activities of this stage are clustering, regression, or classification algorithm. In this research we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining has been done before, so that the data mining result phase can be used well for a variety of data other testing.

Several studies using data mining to analyze the concept of academic ability in college (Aziz Ismail, & Ahmad, 2013). There is also research to predict students' academic ability using Data Mining (Ahmad, Ismail, and Aziz, 2015; Thakar, Mehta, Ph.D., and Manisha, Ph.D., 2015). The last study, the use of Data Mining is also used to predict the likelihood of students dropped out and the possibility of student's failed (Jadrić, Garača, & Ćukušić 2010; vadivu & D.Bharathi, 2014).

### **GRADE POINT AVERAGE (GPA)**

In the university, every students, at the end of the semester has to be evaluated of their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (MENTERI RISET, TEKNOLOGI, DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the value of result of each courses taken by its course credit. Then this result is divided by sum of all the number of credits courses have been taken.

GPA is important because it relates to:

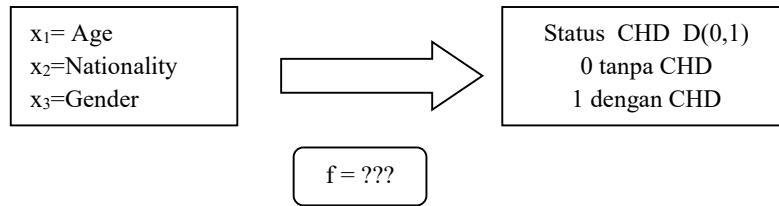
1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA be an important determination for the requirement to apply for jobs.

In a previous study, first semester GPA affect on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester (Santosa & Setiadi, 2015). Therefore first semester GPA is the main focus of this research.

### **LOGISTIC REGRESSION**

Logistic regression was developed and applied in epidemiological research. The common question to this research is "what is the relationship between one or more independent variables (exposure) on the condition of the illness". The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents "no sick" and 1 representing "the sick". As an

example of Kleinbaum D.G. & Klein M. (2002) results of this dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this case CHD stands for Coronary Heart Disease. While the independent variables used is showing  $x_1$  age is,  $x_2$  is nationality and  $x_3$  is gender. Figure 1 illustrates the schematic model of logistic regression.

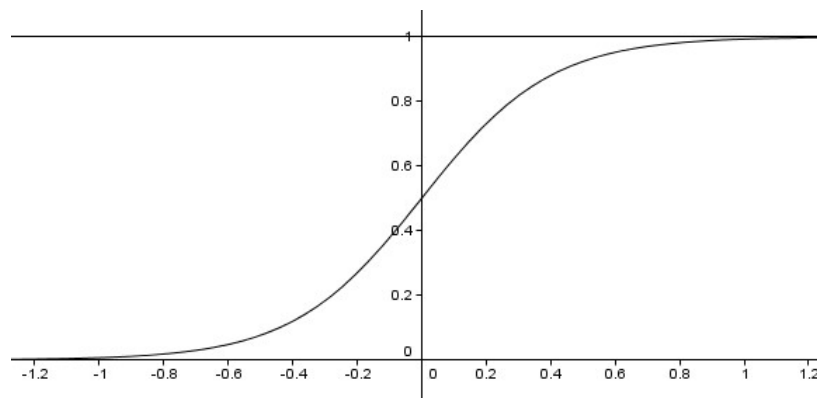


**Figure 1 : The schematic model of logistic regression**

Can also be said that logistic regression model is approach Data Mining that can be used to describe the relationship of several independent variables  $X$  on the dependent dichotomy value variable  $D (0,1)$  (Han & Kamber, 2011; Kantardzic, 2003) . For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data are dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [1]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \quad \dots[1]$$

Form of logistic function is described in Figure 2 below (Hosmer & Lemeshow 2003) .



**Figure 2 : Graph of logistic function**

Shown in Figure 2 above that range the value of  $f(z)$  lies between 0 to 1 regardless of the value of  $z$ .

For  $z \rightarrow -\infty$  then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$  then  $f(\infty) = 1$ . Because the value of  $f(z)$  lies between 0 and 1 is the reason logistic regression was popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms probabilities like these give the value of an individual's risk of getting certain diseases (DW Hosmer & Lemeshow S., 2003).

Another reason why the logistic model became popular is because of the shape of the logistic function. As seen in Figure 2, if we start from  $z = -\infty$  move to the right then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then declined dramatically closed 1 and eventually will approach around 1. These results illustrate shape of the curve S.

Application of the logistic regression was performed by Hajarisman (1998) to be implemented to determine the pattern graduation TPB-IPB. In this study, logistic regression compared with beta-binomial regression method, due to beta-binomial method is easier both in the calculation of probability function decline and in interpreting the parameters that are inside the model. In this research it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model.

This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula [2] and [3]:

$$z = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad \dots[2]$$

so 
$$\hat{f}(z) = \frac{1}{1 + e^{-(\alpha + \sum \beta_i x_i)}} \quad \dots[3]$$

Value  $\alpha$  and  $\beta_i$  is an unknown parameter and will be estimated from the data set in the form of samples by using Maximum Likelihood Estimator (MLE). So that the parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

**CROSSTAB TABLE**

To measure the accuracy of prediction logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Tabel 1:

**Tabel 1 : Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula [4] (Bhattacharyya & Johnson , 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \quad \dots[4]$$

With :

$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

## **METHODOLOGY**

Several stages of the research is as follows:

1. We took the Faculty of Information Technology students data from PUSPINDIKA which consists of Information System Department and Information Technology Department student data. As the only restriction will be taken the student data from two department as much as 8 consecutive academic years ie from year 2008 up to 2015. Data from PUSPINDIKA include the high school category, high school status, high school location and first GPA students.
2. We also obtained data English skills of prospective students from PPBA (Pusat Pelatihan Bahasa Asing).
3. The researchers choose the Faculty of Information Technology students data that received through achievement. In the process of new student admissions in DWUC

there are two ways which path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance, on the path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.

4. Then, after cleaning process, the data is used for logistic regression. Logistic regression model as the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the Formula [2] and [3] above.

$\alpha$  value and  $\beta_i$  is an unknown parameter and will be estimated from sample data using Maximum Likelihood Estimator (MLE). So  $\alpha$  and  $\beta$  be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$

5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line . This 7 models are:
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011
  - Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. Using these 7 logistic regression models to predict the first semester GPA category class of 2015.
7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation) .

## **FINDINGS AND DISCUSSION**

Once the data is done cleaning process can be obtained cumulative number of students of the Faculty of Information Technology that will be used to create a logistic regression. The data can be diagramed as the Table 2 below.

**Table 2 Number of students of the Faculty of Information Technology  
from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1) then the first GPA is transformed into binary data, namely:

$0 < \text{GPA}_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < \text{GPA}_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data .

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis).

Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data.

So that the model has only four independent variables : the status of high school (x1), the location of SMA (x2), category SMA (x3), the level of English (x4). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient ( $\beta$ ). Here's a form of models of computation results before and after simplified ( Santosa & Chrismanto 2016 ).

Model A is the logistic regression model using high school achievement data from class of 2008 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,460 + 1,420(x_4)]\})$$

Model B adalah model Regresi Logistik dengan menggunakan data mahasiswa jalur prestasi angkatan angkatan 2008 sampai dengan angkatan 2009 adalah :

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)]\})$$

dan setelah disederhanakan modelnya menjadi :

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,381 + 0,698(x_4)]\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,793 + 0,833(x_4)]\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,409 - 1,404(x_2) + 0,582(x_4)]\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,350 - 1,057(x_2) + 0,456(x_4)]\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[0,809 - 1,069(x_2) + 0,666(x_4)]\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[0,895 - 1,149(x_2) + 0,738(x_4)]\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3 Summary Table of Logistic Regression Coefficients  
before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equility Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equility Percentage is 74.1%

**Table 4 Summary Table of Logistic Regression Coefficients  
after Significance Test**

Tahun	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	% cocok
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equility Percentage is 73.9 %

By using all seven models in Table 4, it can be predicted first semester GPA category from Information Technology Faculty students which through the high school achievement admission. Row and column in the crosstab table have two categories: category labeled 0 indicates the first semester GPA category below the sample average and a category labeled 1 shows the first semester GPA category above average sample data.

And the results is summarized by Crosstab tables.

**Table 5 Number of students as a result predictive using Model A**

<b>A model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>59</b>	47	106
	1	7	<b>80</b>	87
<b>Total Column</b>		66	127	<b>193</b>

From the Table 5, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1 = "0" in observation is 59. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2 = "1" in observation is 80. So the accuracy of the prediction using model A has Equality Percentage = 72%.

**Table 6 Number of students as a result predictive using Model B**

<b>B model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>0</b>	0	0
	1	66	<b>127</b>	193
<b>Total Column</b>		66	127	<b>193</b>

From the Table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1 = "0" in observation is 0. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2 = "1" in observation is 127. So the accuracy of the prediction using model B has Equality Percentage = 65.8%.

**Table 7 Number of students as a result predictive using Model C**

<b>C model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>0</b>	0	0
	1	66	<b>127</b>	193
<b>Total Column</b>		66	127	<b>193</b>

From the Table 7, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1 = "0" in observation is 0.

And the number of training data which is in Category 2 =”1” in prediction and actually this data is include in Category 2=”1” in observation is 127. So the accuracy of the prediction using model C has Equality Percentage = 65.8%.

**Table 8 Number of students as a result predictive using Model D**

<b>D model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>65</b>	85	150
	1	1	<b>42</b>	43
<b>Total Column</b>		66	127	<b>193</b>

From the table 6, it can be seen that the number of training data which is in Category 1 =”0” in prediction and actually this data is include in Category 1=”0” in observation is 65. And the number of training data which is in Category 2 =”1” in prediction and actually this data is include in Category 2=”1” in observation is 42. So the accuracy of the prediction using model D has Equality Percentage = 55.4%.

**Table 9 Number of students as a result predictive using Model E**

<b>E model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>59</b>	47	106
	1	7	<b>80</b>	87
<b>Total Column</b>		66	127	<b>193</b>

From the table 6, it can be seen that the number of training data which is in Category 1 =”0” in prediction and actually this data is include in Category 1=”0” in observation is 59. And the number of training data which is in Category 2 =”1” in prediction and actually this data is include in Category 2=”1” in observation is 80. So the accuracy of the prediction using model E has Equality Percentage = 72.0 %.

**Table 10 Number of students as a result predictive using Model F**

F model		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

From the table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1="0" in observation is 59. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2="1" in observation is 80. So the accuracy of the prediction using model F has Equality Percentage = 72.0 %.

**Table 11 Number of students as a result predictive using Model G**

G model		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

From the table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1="0" in observation is 59. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2="1" in observation is 80. So the accuracy of the prediction using model G has Equality Percentage = 72.0 %.

## CONCLUSION

From the research that has been done in the previous section then we get some conclusions as follows:

1. From compatibility between the logistic regression model with training data, the model A is the best model, because it has a percentage kesamaan 79.4% .
2. From compatibility between the logistic regression model with training data after significance test, the model A is the best model, because it has a percentage kesamaan 79.4% .

3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are: the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location . It must be a concern for decision makers in the educational process.

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<http://kopertis3.or.id/v2/wp-content/uploads/PERMENRISTEKDIKTI-NOMOR-44-TAHUN-2015-TENTANG-SNPT-SALINAN.pdf>.

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#### **ACKNOWLEDGEMENTS**

The authors would like to thank Informatics Technology Department of Faculty of Information Technology DWCU on all funding and infrastructure so that the completion of this study.

REVIEW ROUND 1



Antonius Rachmat C <anton@staff.ukdw.ac.id>

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## RWorld\_Update\_April\_2017\_X014

8 messages

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Arif Anjum <researchersworld@gmail.com>

Sun, Mar 5, 2017 at 11:26 AM

To: gunawan@staff.ukdw.ac.id, Antonius Rachmat C <anton@staff.ukdw.ac.id>

Dear Author,

Title : " LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT"

I am happy to write that your paper is accepted for first review process and if it is accepted for second review process you have to pay;

For Online = USD130  
For Online + Print = USD180

If it is fine for you please give me your consent. So we will forward your paper for further review process. You will also receive review report.

Regards,

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**Dr. Arif Anjum,**  
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**Researchers World - Journal of Arts, Science & Commerce**  
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Antonius Rachmat C <anton@staff.ukdw.ac.id>

Sun, Mar 5, 2017 at 2:39 PM

To: Arif Anjum <researchersworld@gmail.com>

Cc: RGunawan Santosa <gunawan@staff.ukdw.ac.id>

Thank you very much for your information about our paper. We accept and agree about the second process and pay as you mentioned before.

[Quoted text hidden]

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Antonius Rachmat C <anton@staff.ukdw.ac.id>

Mon, Mar 6, 2017 at 8:24 AM

To: Arif Anjum <researchersworld@gmail.com>

Dear Mr Arif,

I want to ask about the price, if I buy online + print (USD180) how much printed edition I get? just one or two ekslemplar?

Thank you for your information.

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**Antonius Rachmat C., S.Kom, M.Cs**

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Fakultas Teknologi Informasi UKDW  
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**Arif Anjum** <researchersworld@gmail.com>  
To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

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Dear Author,

Thanks for your confirmation. If you pay USD180 you will get one hard copy. For additional copies add USD50.

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To: Arif Anjum <researchersworld@gmail.com>

Mon, Mar 6, 2017 at 10:05 AM

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Ok Thank you very much for your information. I will buy 1 additional copy if accepted.  
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**Arif Anjum** <researchersworld@gmail.com>  
To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

Mon, Mar 6, 2017 at 6:46 PM

Dear Author,

Thanks for your confirmation. I have sent acceptance letter, please proceed earliest.

Regards,  
[Quoted text hidden]

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**Antonius Rachmat C** <anton@staff.ukdw.ac.id>  
To: Arif Anjum <researchersworld@gmail.com>

Wed, Mar 8, 2017 at 1:17 PM

Dar Dr. Arif,  
I will pay using PayPal. Is these correct?  
- Processing Charges USD 130  
- Additional hardcopy (2 exlemplars) USD 50 x 2 = USD 100  
- Total : USD 230

How can I pay it using PayPal? Can you give me some instructions to pay using PayPal?  
Sorry for late reply, Thank you very much  
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**Arif Anjum** <researchersworld@gmail.com>  
To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

Wed, Mar 8, 2017 at 6:54 PM

Dear Sir,

I have sent link. Please check your email .

Regards,  
[Quoted text hidden]

PENERIMAAN DARI REVIEW COMMITTEE



Antonius Rachmat C <anton@staff.ukdw.ac.id>

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## Acceptance Letter\_April\_2017\_X014

1 message

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Arif Anjum <researchersworld@gmail.com>

Mon, Mar 6, 2017 at 8:56 AM

To: gunawan@staff.ukdw.ac.id, Antonius Rachmat C <anton@staff.ukdw.ac.id>

***Dear Author(s),***

Your paper has been accepted for **April 2017** by review committee. Kindly download acceptance letter & deposit the processing charges up to **14-March-2017** for possible publication in April 2017. Please prefer to pay via **Paypal** or **Western Union Money Transfer**.

If you have any query please mail me.

Regards,

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**Dr. Arif Anjum,**  
**Managing Editor,**  
**Researchers World - Journal of Arts, Science & Commerce**  
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## LETTER OF ACCEPTANCE

Date : 04/03/2017

To,

**R. Gunawan Santosa**

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

**Antonius Rachmat Chrismanto**

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

**Dear Sir/Madam,**

It gives me immense pleasure to inform you that your paper entitled "**LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT**" has been accepted by review committee to be publish in *Researchers World – Journal of Arts, Science & Commerce* (Online ISSN: 2229-4686, Print ISSN: 2231-4172, Impact Factor (GIF): 0.685) in April 2017, Volume VIII, Issue – 2.

If you have any query, kindly feel free to contact me.

With cordial regards,



**Dr. Arif Anjum**

Managing Editor,  
Researchers World – Journal of Arts Science & Commerce



## REVIEW REPORT



Antonius Rachmat C <anton@staff.ukdw.ac.id>

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## Review Report-X014

3 messages

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Arif Anjum <researchersworld@gmail.com>

Tue, Mar 28, 2017 at 10:39 AM

To: RGunawan Santosa <gunawan@staff.ukdw.ac.id>, Antonius Rachmat C <anton@staff.ukdw.ac.id>

Dear Author.

Please find herewith review report of your paper. Please resubmit earliest.


Regards,

--

**Dr. Arif Anjum,**  
**Managing Editor,**  
**Researchers World - Journal of Arts, Science & Commerce**  
**Impact Factor (GIF) : 0.765**  
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### 2 attachments

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Antonius Rachmat C <anton@staff.ukdw.ac.id>

Mon, Apr 3, 2017 at 11:51 AM

To: Arif Anjum <researchersworld@gmail.com>

Cc: RGunawan Santosa <gunawan@staff.ukdw.ac.id>

Dear Dr. Arif,

We send a revised of our paper for you.

Thank you.

Regards,

R. Gunawan Santosa & Antonius Rachmat Chrismanto

[Quoted text hidden]

--

**Antonius Rachmat C., S.Kom, M.Cs**

Dosen Teknik Informatika UKDW

<http://lecturer.ukdw.ac.id/anton> dan <http://ti.ukdw.ac.id>

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**Arif Anjum** <researchersworld@gmail.com>  
To: Antonius Rachmat C <anton@staff.ukdw.ac.id>

Tue, Apr 4, 2017 at 8:16 AM

Dear Author,

Thanks for your re-submission. I will update you shortly.

Regards,  
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**Review Form**

Title of Manuscript	Logistic regression model for predicting first semester students GPA category based on high school academic achievement		
Code No. of File			
Reviewer's Name			
Reviewer's Email			
<p><b>Brief Description of the Paper/Article :</b>                  The author has investigated the viability of logistic regression model in predicting students GPA based on the data available from university. With the concept being specific to university and is novel, the author has taken good efforts in developing the paper. However at most sections, language needs to be revised. Further, no limitations and recommendations were mentioned in the paper. The current study results must have been compared with literature which is lacking. The author need to incorporate the suggestions so that the paper can be accepted.</p>			
Paper Rating	Outstanding		
	Very Good		
	Good		Yes
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Does this paper present new ideas or results that have not been previously published?	Yes / No		Yes
Is the paper technically developed as per journal instructions?	Yes / No		No
Are the contents supported/verified by independent evidence (measurements, prior results, etc.)?	Yes / No		Yes
Is the paper concisely written for publication?	Yes / No		No
Is the grammar/spelling adequate for publication?	Yes / No		No
Does the abstract properly reflect the content of the work?	Yes / No		No
Please rate the overall quality of the paper? (Give your rate in numbers from 1 to 10)	1 to 10		3
Publication Recommendations	Accept	Yes/No	
	Accept subject to suitable revision	Yes/No	
	Major Revision and Resubmission	Yes/No	Yes
	Reject	Yes/No	

**ADDITIONAL COMMENTS AND RECOMMENDATIONS FOR AUTHOR(S)**

(The final decision regarding acceptance and rejection will be on these comments.)

# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

## Abstract

Faculty of Information Technology, Duta Wacana Christian University has two methods of ~~admission of admitting~~ new college students ~~in which~~, the first is ~~admission for new students who had on the basis of~~ educational achievements in high school ~~and whereas~~ the second is ~~on the basis of use~~ regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. ~~The F~~ first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result ~~is are~~ used as independent variables. ~~With regards to the As the~~ training data ~~required~~ to create a logistic regression model, ~~we used~~ students' admission data from 2008 through 2014, ~~while the students' data of 2015 is taken as the testing data. class, while the testing data is the new students admision data of 2015 class.~~ The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest ~~percentage~~ of correct predictions between the logistic regression model and training data is 79.4%. There is a change in the logistic regression form, three models influence only by level of English test result. ~~While the~~ ~~while the remaining~~ four ~~others~~ models ~~is are~~ influenced by the level of English test result ~~and~~ high school location.

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table

## INTRODUCTION

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), ~~new~~ students have had different educational and environment backgrounds. After ~~the~~ prospective new students are ~~accepted-admitted~~ as college students ~~of the-at~~ Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in ~~acquisition~~ their first semester Grade Point Average (GPA). ~~The~~ GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who ~~got-secured high~~ GPA high, but there were also students who obtained ~~whereas some obtained low~~ GPA ~~is-very-low~~. At the first semester, these students can sometimes move to another faculty. In addition, there are some ~~of these~~ students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student ~~at-from~~ the Faculty of Information Technology DWCU.

**Commented [w1]:** Dear author, how environmental differences make a difference among students?

There are many different external factors that may affect the first semester GPA beside ~~the~~ existing internal factors such as interests, talents, abilities, diligence, self-motivation ~~in student~~. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java; and ~~the high schools categories high school that are~~ classified by usual high school and vocational high school which is also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and -Private status. In addition, the level of English ~~of the-among the~~ students is also a possible ~~as-a~~ factor affecting students' first semester -GPA. In a previous research, -Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not ~~seen-a-observed a~~ relationship between GPA and these factors. This research is the next step of previous research which essentially ~~trying-tries~~ to find mathematical models ~~that-such as~~ logistic regression to predict the categories of students' first semester GPA ~~in-at the~~ Faculty of Information Technology, DWCU.

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## LITERATURE REVIEW:-

### DATA MINING:

Data is information that is being collected. As the development of information technology grows, the amount of data in the world is growing. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search is becoming becomes increasingly difficult, especially if it is performed done manually. A search for information in from a large number of datasets that can be done automatically using the concept of Data Mining. Data Mining (Knowledge Discovery from Data) is a field discipline in iInformation tTechnology that is interdisciplinary, which is and is able to perform mining of data in large dataset numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Han & Kamber, 2011).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, data sources derived from the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data phase transformation of data from one phase to another so that it becomes suitable for the data for processing to process to the next stage in numeric form that is i.e., ready to be calculated. This stage also features selection, ie- i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining stage Stage of mining stage where the data mining algorithm is applied Examples of this stage Examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.

5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining ~~whether it~~ has been done before, so that the data mining result phase can be used well for a variety of data other ~~than~~ testing.

Several studies using data mining to analyze the concept of academic ability in college ~~were conducted earlier~~ (Aziz Ismail, & Ahmad, 2013). There is also research to predict students' academic ability using Data Mining (Ahmad, Ismail, and Aziz, 2015; Thakar, Mehta, Ph.D., and Manisha, Ph.D., 2015). The last study, the use of Data Mining is also used to predict the likelihood of students dropped out and the possibility of student's failed (Jadrić, Garača, & Ćukušić 2010; vadivu & D.Bharathi, 2014).

Commented [w2]: APA style mismatch.

Commented [w3]: APA style mismatch. Please check.

Commented [w4]: Dear author, these studies can be listed as points and need not to be in separate sentences. Please reconcile.

### GRADE POINT AVERAGE (GPA)

~~In the university, every students, Every student in the university -at the end of the semester~~ has to be evaluated ~~at the end of every semester to evaluate of~~ their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (MENTERI RISET, TEKNOLOGI, DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. ~~It is expressed in value calculated by summing the multiplication of the value of result of each courses taken by its course credit. Then this result is divided by sum of all the number of credits courses have been taken.~~

Commented [w5]: Dear author, please explain it with a formula for calculating GPA

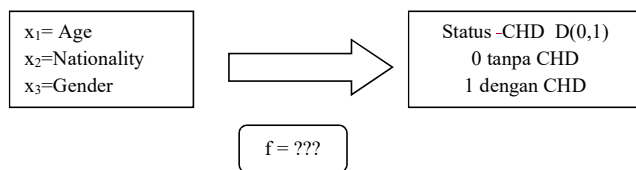
GPA is important because it relates to:

1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA ~~is considered as be~~ an important determination ~~for the requirement to apply for jobsto apply for jobs.~~

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester ~~(Santosa & Setiadi, 2015)~~. Therefore first semester GPA is the main focus of this research.

## LOGISTIC REGRESSION

Logistic regression was developed and applied in epidemiological research. The common question to this research is “what is the relationship between one or more independent variables (exposure) on the condition of the illness”. The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents “no sick” and 1 represents “the sick”. As an example of Kleinbaum D.G. & Klein M. (2002) results of this dichotomy are the status of subjects classified as 0 (“no CHD”) and 1 (“CHD”). In this case, CHD stands for Coronary Heart Disease. While the independent variables used are  $x_1$  age,  $x_2$  is nationality and  $x_3$  is gender. Figure 1 illustrates the schematic model of logistic regression.



**Figure 1: The schematic model of logistic regression**

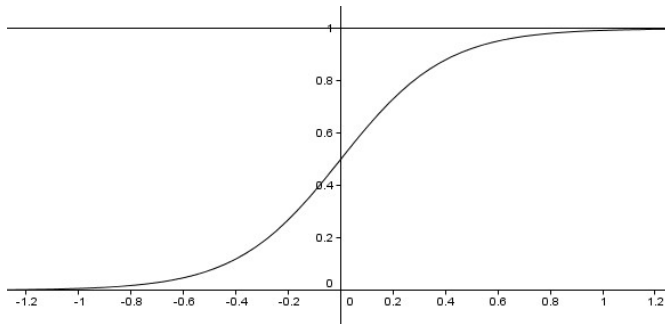
It can also be said that logistic regression model is approach in Data Mining that can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Han & Kamber, 2011; Kantardzic, 2003). For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data are about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [1]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \quad \dots[1]$$

The form of logistic function is described in Figure 2 below (Hosmer & Lemeshow 2003).

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**Commented [w7]:** Please check formatting.



**Figure 2 : Graph of logistic function**

Shown in Figure 2 above that The figure 2 shows the range the value of  $f(z)$  lies between from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Because Since the value of  $f(z)$  lies between 0 and 1, is the reason the logistic regression was is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (DW Hosmer & Lemeshow S., 2003).

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Another reason why the logistic model became popular is because of the shape of the logistic function. As seen observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by Hajarisman (1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method, due to since beta-nomial method is easier for both in the calculating of the probability function decline and in interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model.

This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula [2] and [3]:

$$z = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad \dots [2]$$

so 
$$\hat{f}(z) = \frac{1}{1 + e^{-(\alpha + \sum \beta_i x_i)}} \quad \dots [3]$$

Commented [w8]: Formatting error.

The  $\alpha$  and  $\beta_i$  values are unknown parameters and will be estimated from the data set in the form of samples by using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

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### CROSSTAB- TABLE

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at [Table 1](#):

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula [4] (Bhattacharyya & Johnson , 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \quad \dots[4]$$

With :

Commented [w10]: Formatting error.

$n_{11}$  = number of training data which is- in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

## METHODOLOGY

Several stages of the research is as follows:

- ~~We took the~~ The students' data is retrieved from Faculty of Information Technology ~~students data~~ from PUSPINDIKA which consists of Information System Department and Information Technology Department ~~student data~~. ~~As the only restriction will be taken the~~ A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. ~~The data retrieved from student data from two department as much as 8 consecutive academic years ie from year 2008 up to 2015. Data from~~ PUSPINDIKA includes the high school category, high school status, high school location and first GPA students.
- ~~We also obtained~~ The data English skills ~~data~~ of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) ~~was also retrieved~~.
- The researchers ~~choose~~ chose the Faculty of Information Technology students data that received through achievement. In the process of new student admissions in DWUC, there are two ways which ~~are~~ path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance, ~~in case of~~ ~~on the~~ path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
- Then, after cleaning process, the data is used for logistic regression. ~~In~~ Logistic regression model, ~~as~~ the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , ~~which~~ and can be seen in the ~~F~~ formula [2] and [3] above.  
 $\alpha$  value and  $\beta_i$  is an unknown parameter and will be estimated from sample data using Maximum Likelihood Estimator (MLE). So  $\alpha$  and  $\beta_i$  be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$
- Making 7 logistic regression models for new Information Technology Faculty- students through high school achievement line. ~~This~~ ~~7~~ The seven models are as follows:
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011

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- Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. ~~With the help of Using~~ these 7 logistic regression models, ~~to predict~~ the first semester GPA category class of 2015 is predicted.
  7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation)-.

## FINDINGS AND DISCUSSION

~~After the data is collected, it is cleaned in order to obtain the cumulative number of students at Once the data is done cleaning process can be obtained cumulative number of students of the~~ Faculty of Information Technology ~~that will be used to in order to run create a~~ logistic regression. The data ~~can be diagramed as the Table 2 below is tabulated below~~.

**Table 2:** Number of students of the Faculty of Information Technology from 2008 until 2015

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable -should dichotomy of data D (0,1), then the -first GPA is transformed into binary data, namely:

$0 < \text{GPA}_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < \text{GPA}_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data .

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school ( $x_1$ ), the location of SMA ( $x_2$ ), category SMA ( $x_3$ ), the level of English ( $x_4$ ). -As in the case of ordinary regression of existing- regression model can be simplified to the significance test -for the beta coefficient ( $\beta$ ). Here's-Here is a form of models of computation results before and after simplified (-Santosa & Chrismanto 2016-).

Model A is the logistic regression model using high school achievement data from class of 2008 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,460 + 1,420(x_4)]\})$$

Model B adalah model Regresi Logistik dengan menggunakan data mahasiswa jalur prestasi angkatan angkatan 2008 sampai dengan angkatan 2009 adalah :

Model B is the logistic regression model- using high school achievement data from class of 2008 until class 2009 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)]\})$$

dan setelah disederhanakan modelnya menjadi :

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,381 + 0,698(x_4)]\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,793 + 0,833(x_4)]\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,409 - 1,404(x_2) + 0,582(x_4)]\})$$

Model E is the logistic regression model -using high school achievement data from class of 2008 until class 2012 is

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$$P(x) = 1/(1+\exp\{-[1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)]\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-[1,350 - 1,057(x_2) + 0,456(x_4)]\})$$

Model F is the logistic regression model -using high school achievement data from class of 2008 until class 2013 is

$$P(x) = 1/(1+\exp\{-[1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)]\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-[0,809 - 1,069(x_2) + 0,666(x_4)]\})$$

Model G is the logistic regression model -using high school achievement data from class of 2008 until class 2014 is

$$P(x) = 1/(1+\exp\{-[1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)]\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-[0,895 - 1,149(x_2) + 0,738(x_4)]\})$$

Summary result -for the logistic regression coefficient before significance data can be summarized- in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of- its Equity Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Tahun	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	% cocok
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%

2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of- its Equility Percentage is 73.9 %

By using all the seven models in Table 4, ~~it can be predicted the~~ first semester GPA category from ~~Information Technology Faculty~~ students can be predicted which through ~~the~~ high school achievement admission. ~~The Rows~~ and ~~columns~~ in the crosstab ~~table~~ have two categories: such as the category which is labeled as '0' indicating ~~indicates~~ the first semester GPA category below the sample average and a another category labeled '1' showing ~~shows~~ the first semester GPA category above average sample data.

And the results is ~~summarized~~ by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

A model		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

From the- Table 5, it can be ~~seen-observed~~ that the number of training data under Category 1 = 0 in prediction ~~that the number of training data which is in Category 1 = "0" in prediction~~ and actually this ~~data is included~~ in Category 1 = "0" ~~in-where the~~ observation ~~is~~ 59.

~~And the number of training data which is in Category 2 = "1" in prediction~~ ~~and actually this data is include in Category 2="1" in observation is 80.~~ So the accuracy of the prediction using model A has Equality Percentage = 72%.

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**Table 6 Number of students as a result predictive using Model B**

B model		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193

<b>Total Column</b>	66	127	<b>193</b>
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From the Table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1="0" in observation is 0. And —the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2="1" in observation is 127. So the accuracy of the prediction using model B has Equality Percentage = 65.8%.

**Table 7 Number of students as a result predictive using Model C**

<b>C model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	0	0	0
	1	66	127	193
<b>Total Column</b>		66	127	<b>193</b>

From the Table 7, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1="0" in observation is 0. And —the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2="1" in observation is 127. So the accuracy of the prediction using model C has Equality Percentage = 65.8%.

**Table 8 Number of students as a result predictive using Model D**

<b>D model</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	65	85	150
	1	1	42	43
<b>Total Column</b>		66	127	<b>193</b>

From the table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1="0" in observation is 65. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2="1" in observation is 42. So the accuracy of the prediction using model D has Equality Percentage = 55.4%.

**Table 9 Number of students as a result predictive using Model E**

E model		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

From the table 6, it can be seen that the number of training data which is in Category 1="0" in prediction and actually this data is include in Category 1="0" in observation is 59. And the number of training data which is in Category 2="1" in prediction and actually this data is include in Category 2="1" in observation is 80. So the accuracy of the prediction using model E has Equality Percentage = 72.0 %.

**Table 10 Number of students as a result predictive using Model F**

F model		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

From the table 6, it can be seen that the number of training data which is in Category 1="0" in prediction and actually this data is include in Category 1="0" in observation is 59. And the number of training data which is in Category 2="1" in prediction and actually this data is include in Category 2="1" in observation is 80. So the accuracy of the prediction using model F has Equality Percentage = 72.0 %.

**Table 11 Number of students as a result predictive using Model G**

G model		Prediction Data		Total Row
		0	1	
Observation	0	59	47	106

<b>Data</b>	<b>1</b>	<b>7</b>	<b>80</b>	<b>87</b>
<b>Total Column</b>		66	127	193

From the table 6, it can be seen that the number of training data which is in Category 1 = "0" in prediction and actually this data is include in Category 1 = "0" in observation is 59. And the number of training data which is in Category 2 = "1" in prediction and actually this data is include in Category 2 = "1" in observation is 80. So the accuracy of the prediction using model G has Equality Percentage = 72.0 %.

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### CONCLUSION

~~From the research that has been done in the previous section then we get some conclusions as follows:~~ We arrive at the following conclusion based on the literature.

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1. ~~In terms of From~~-compatibility between ~~the~~-logistic regression model with training data, the model A is the best model, because it has a percentage kesamaaan 79.4% .
2. ~~In terms of From~~-compatibility between the logistic regression model with training data after significance test, the model A is the best model, because it has a percentage kesamaaan 79.4% .
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are:-\_the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by- level of English. While on the D, E, F and G model, influence by -the level of English and high school location . It must be a concern for decision makers in the educational process.

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PAPER HASIL REVISI PENULIS

# **LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT**

## **Abstract**

Faculty of Information Technology, Duta Wacana Christian University (DWCU) has two methods of admitting new college students in which the first is on the basis of educational achievements in high school whereas the second is on the basis of regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. The first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result are used as independent variables. With regards to the training data required to create a logistic regression model, we used students' admission data from 2008 through 2014, while the students' data of 2015 is taken as the testing data. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4% .There is a change in the logistic regression form, three models influence only by level of English test result while the remaining four models are influenced by the level of English test result and high school location.

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table

## INTRODUCTION

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), students have had different educational and environment backgrounds. The different environments background means having a secondary school they have taken or take. For example, those coming from senior high school in Java and outside Java. And also they maybe come from ordinary high school or vocational high school. The last, they also maybe come from public high school or private high school high school. After prospective new students are admitted as college students at Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in their first semester Grade Point Average (GPA). The GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who secured high GPA whereas some obtained low GPA. At the first semester, these students can sometimes move to another faculty. In addition, there are some students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student from the Faculty of Information Technology DWCU.

There are many different external factors that may affect the first semester GPA beside existing internal factors such as interests, talents, abilities, diligence, self-motivation. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java and the high schools are classified by usual high school and vocational high school which also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition, the level of English among the students is also a possible factor affecting students' first semester GPA. In this research we only limit on factors as mentioned above. Actually there are many more factors that may affect the GPA categories that is not covered, such as: gender, interests studies, family economic level, employment background of parents / guardians and others.

In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not observed a relationship between GPA and these factors. This research is the next step of previous research which essentially tries to find mathematical models such as logistic regression to predict the categories of students' first semester GPA at the Faculty of Information Technology, DWCU.

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## **LITERATURE REVIEW:**

### **DATA MINING:**

Due to the internet development, there is a rise in global data usage. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search becomes increasingly difficult, especially if it is performed manually. A search for information from a large number of datasets can be done automatically using Data Mining. Data Mining (Knowledge Discovery from Data) is a discipline in Information Technology that is interdisciplinary and is able to perform mining of data in large numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Rud, 2010).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data transformation from one phase to another so that it becomes suitable for the data to process to next stage in numeric form i.e., ready to be calculated. This stage also features selection i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining is the stage when the data mining algorithms are applied. Few examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining whether it has been done before, so that the data mining result phase can be used well for a variety of data other than testing.

Several studies using data mining to analyze the concept of academic ability in college were conducted earlier, such as:

- Aziz, Ismail, & Ahmad (2013) conduct research by building a prototype system to predict Students Academic Performance (SAP) in Higher Education Institution (HLI) using Naive Bayes algorithm based on Weka. This system can provide early warning of potential weaknesses in the students' learning. Parameters that are used in this research were gender (male / female), race (Malaysia, China, or India), origin (from town or rural), how to get into university (STPM, diploma, or matriculation), parents income, and the first semester GPA (high, low, and medium)
- Ahmad, Hafieza Ismail, & Abdul Aziz (2015) conduct research related to data mining to predict the IP category of the first half using Decision Tree algorithm, Naive Bayes, and Rule Based Classification. Based on these studies showed that the Rule Based Classification is the best method among the three methods above, with the accuracy reached 71.3%. In this study they divided GPA into 3 categories: low, medium and high level.
- Thakar, Mehta, & Manisha (2015) present a paper which contains extensive and exhaustive survey on the arise of data mining to education and its direction in the future.
- The use of Data Mining is also used to predict the likelihood of students dropped out (Jadrić, Garača, & Ćukušić, 2010) and the possibility of student's failed (Vadivu & Bharathi, 2014).

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## GRADE POINT AVERAGE (GPA)

Every student in the university has to be evaluated at the end of every semester to evaluate their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (MENTERI RISET, TEKNOLOGI, DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the course grade point taken and course credits. Then this result is divided by sum of all gradable credits courses have been taken, as express in formula (1) below:

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$$GPA = \frac{\sum \text{Course Grade Point} * \text{Course Credits}}{\sum \text{Gradable Credits}} \quad \dots (1)$$

GPA is important because it relates to:

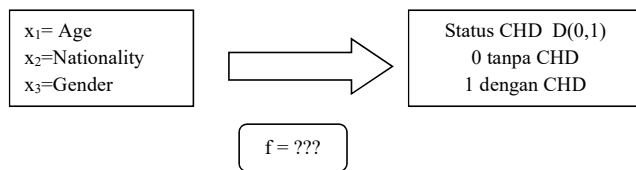
1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA is considered as an important determination to apply for jobs.

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester. Therefore first semester GPA is the main focus of this research.

## LOGISTIC REGRESSION

Logistic regression was developed and applied in epidemiological research. The common question to this research is “what is the relationship between one or more independent variables (exposure) on the condition of the illness”. The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents “no sick” and 1 represents “the sick”. Kleinbaum & Klein (2002) do research about classification of Coronary Heart Disease (CHD) and result the dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this research, the independent variables used are  $x_1$  as age,  $x_2$  as nationality and  $x_3$  as gender. Figure 1 illustrates the schematic model of logistic regression.

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**Figure 1: The schematic model of logistic regression**

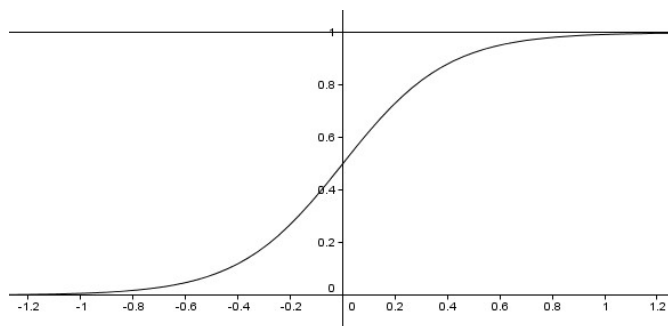
It can also be said that logistic regression model in Data Mining can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Kantardzic, 2003). For epidemiology researchers, this logistic regression is the most

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popular procedure, especially when the data is about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [1]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \quad \dots(2)$$

The form of logistic function is described in Figure 2 below (Hosmer & Lemeshow, 2003)



**Figure 2 : Graph of logistic function**

The Figure 2 shows the range the value of  $f(z)$  lies from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Since the value of  $f(z)$  lies between 0 and 1, the logistic regression is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (Hosmer & Lemeshow, 2003).

Another reason why logistic model became popular is because of the shape of the logistic function. As observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by Hajarisman (1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method since beta-binomial method is easier for both calculating the probability function decline and interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model. This research is the logistic regression model  $f$  and the

main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula (3) and (4):

$$z = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad \dots(3)$$

so 
$$y = \hat{f}(z) = \frac{1}{1 + e^{-(\alpha + \sum \beta_i x_i)}} \quad \dots(4)$$

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The values  $\alpha$  and  $\beta_i$  are unknown parameters and will be estimated from the data set in the form of samples using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

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### CROSSTAB TABLE

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Table 1:

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula (5) below (Bhattacharyya & Johnson, 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \quad \dots(5)$$

with :

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$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

## METHODOLOGY

Several stages of the research is as follows,

1. The students' data is retrieved from Faculty of Information Technology from PUSPINDIKA which consists of Information System Department and Information Technology Department. A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. The data retrieved from PUSPINDIKA includes high school category, high school status, high school location and first GPA students.
2. The English skills data of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) was also retrieved.
3. The researchers chose the data from Faculty of Information Technology students that received through achievement. In the process of new student admissions in DWUC, there are two ways which are path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance in case of path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
4. Then, after cleaning process, the data is used for logistic regression. In logistic regression model, the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , and can be seen in the Formula (3) and (4) above.  
 $x_1, x_2, x_3, \dots, x_k$  are value from training data. We use  $x_1, x_2, x_3, \dots, x_k$  to get parameter value of  $\alpha$  and  $\beta_i$  which is unknown parameters. Then we estimate  $\alpha$  and  $\beta_i$  by using Maximum Likelihood Estimator (MLE) symbolized as  $\hat{\alpha}$  and  $\hat{\beta}_i$ . Furthermore  $\hat{\alpha}$  and  $\hat{\beta}_i$  will be used for predicting  $y$  as seen in Formula (4).
5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line. The seven models are as follows,
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011

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- Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. With the help of these 7 logistic regression models, the first semester GPA category class of 2015 is predicted.
  7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation).

## FINDINGS AND DISCUSSION

After the data is collected, it is cleaned in order to obtain the cumulative number of students at Faculty of Information Technology in order to run logistic regression. The data is tabulated as Table 2 below.

**Table 2: Number of students of the Faculty of Information Technology from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1), then the first GPA is transformed into binary data, namely:

$0 < \text{GPA}_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < \text{GPA}_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data .

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of

SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school ( $x_1$ ), the location of SMA ( $x_2$ ), category SMA ( $x_3$ ), the level of English ( $x_4$ ). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient ( $\beta$ ). Here is a form of models of computation results before and after simplified (Santosa & Chrismanto, 2016).

Model A is the logistic regression model using high school achievement data from class of 2008 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,460 + 1,420(x_4)]\})$$

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,381 + 0,698(x_4)]\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-0,793 + 0,833(x_4)]\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,409 - 1,404(x_2) + 0,582(x_4)]\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,350 - 1,057(x_2) + 0,456(x_4)]\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[-1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[0,809 - 1,069(x_2) + 0,666(x_4)]\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is

$$P(\mathbf{x}) = 1/(1+\exp\{-[1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)]\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-[0,895 - 1,149(x_2) + 0,738(x_4)]\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equility Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equility Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Tahun	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	% cocok
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equility Percentage is 73.9 %

By using all the seven models in Table 4, the first semester GPA category from Information Technology students can be predicted through high school achievement admission. The rows and columns in the crosstab table have two categories such as the category which is labeled as '0' indicating the first semester GPA category below the sample average and another category labeled '1' showing the first semester GPA category above average sample data. And the results is summarized by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

Model A		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
Total Column		66	127	193

Based on Table 5, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model A has Equality Percentage = 72%.

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**Table 6 Number of students as a result predictive using Model B**

Model B		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
Total Column		66	127	193

Based on Table 6, it can be seen that there are 0 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the

actual observation data. So the accuracy of prediction using model B has Equality Percentage = 65.8%.

**Table 7 Number of students as a result predictive using Model C**

Model C		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
Total Column		66	127	193

Based on Table 7, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

**Table 8 Number of students as a result predictive using Model D**

Model D		Prediction Data		Total Row
		0	1	
Observation Data	0	65	85	150
	1	1	42	43
Total Column		66	127	193

Based on Table 8, it can be seen that there are 65 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 42 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model D has Equality Percentage = 55.4%.

**Table 9 Number of students as a result predictive using Model E**

<b>Model E</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>59</b>	47	106
	1	7	<b>80</b>	87
<b>Total Column</b>		66	127	<b>193</b>

Based on Table 9, it can be seen that there are 59 prediction data in the category  $1 = 0$  and it is also true in the category  $1 = 0$  corresponds to the actual observation data. There are also 80 prediction data in the category  $2 = 1$  and it is also true in the category  $2 = 1$  corresponds to the actual observation data. So the accuracy of prediction using model E has Equality Percentage = 72%.

**Table 10 Number of students as a result predictive using Model F**

<b>Model F</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>59</b>	47	106
	1	7	<b>80</b>	87
<b>Total Column</b>		66	127	<b>193</b>

Based on Table 10, it can be seen that there are 59 prediction data in the category  $1 = 0$  and it is also true in the category  $1 = 0$  corresponds to the actual observation data. There are also 80 prediction data in the category  $2 = 1$  and it is also true in the category  $2 = 1$  corresponds to the actual observation data. So the accuracy of prediction using model F has Equality Percentage = 72%.

**Table 11 Number of students as a result predictive using Model G**

<b>Model G</b>		<b>Prediction Data</b>		<b>Total Row</b>
		0	1	
<b>Observation Data</b>	0	<b>59</b>	47	106
	1	7	<b>80</b>	87
<b>Total Column</b>		66	127	<b>193</b>

Based on Table 11, it can be seen that there are 59 prediction data in the category  $1 = 0$  and it is also true in the category  $1 = 0$  corresponds to the actual observation data. There are also 80 prediction data in the category  $2 = 1$  and it is also true in the category  $2 = 1$  corresponds to the actual observation data. So the accuracy of prediction using model G has Equality Percentage = 72%.

## CONCLUSION

We arrive at the following conclusion based on the literature.

1. In terms of compatibility between logistic regression model with training data, the model A is the best model, because it has a percentage kesamaan 79.4% .
2. In terms of compatibility between the logistic regression model with training data after significance test, the model A is the best model, because it has a percentage kesamaan 79.4% .
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location . It must be a concern for decision makers in the educational process.
5. The percentage of equality of this research is still not satisfied, so in future we will try to use other methods that can increase the equality percentage or add other variables that have not been taken into our consideration.

**Commented [w15]:** Dear author, you did not mentioned the study limitations and what is the recommendation for the future.

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**Commented [w16]:** Dear author, please check and confirm the APA referencing style in the complete list of references.

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Antonius Rachmat C <anton@staff.ukdw.ac.id>

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6 messages

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- Figure 1
- Formula (2)

- Text in Table

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# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

***R. Gunawan Santosa,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

***Antonius Rachmat Chrismanto,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

## ABSTRACT

*Faculty of Information Technology, Duta Wacana Christian University (DWCU) has two methods of admitting new college students in which the first is on the basis of educational achievements in high school whereas the second is on the basis of regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. The first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result are used as independent variables. With regards to the training data required to create a logistic regression model, we used students' admission data from 2008 through 2014, while the students' data of 2015 is taken as the testing data. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4% .There is a change in the logistic regression form, three models influence only by level of English test result while the remaining four models are influenced by the level of English test result and high school location.*

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table.

## **INTRODUCTION:**

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), students have had different educational and environment backgrounds. The different environments background means having a secondary school they have taken or take. For example, those coming from senior high school in Java and outside Java. And also they maybe come from ordinary high school or vocational high school. The last, they also maybe come from public high school or private high school high school. After prospective new students are admitted as college students at Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in their first semester Grade Point Average (GPA). The GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who secured high GPA whereas some obtained low GPA. At the first semester, these students can sometimes move to another faculty. In addition, there are some students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student from the Faculty of Information Technology DWCU.

There are many different external factors that may affect the first semester GPA beside existing internal factors such as interests, talents, abilities, diligence, self-motivation. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java and the high schools are classified by usual high school and vocational high school which also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition, the level of English among the students is also a possible factor affecting students' first semester GPA. In this research we only limit on factors as mentioned above. Actually there are many more factors that may affect the GPA categories that is not covered, such as: gender, interest in studies, family economic level, employment background of parents / guardians and others.

In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not observed a relationship between GPA and these factors. This research is the next step of previous research which essentially tries to find mathematical models such as logistic regression to predict the categories of students' first semester GPA at the Faculty of Information Technology, DWCU.

## **LITERATURE REVIEW:**

### **DATA MINING:**

Due to the internet development, there is a rise in global data usage. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search becomes increasingly difficult, especially if it is performed manually. A search for information from a large number of datasets can be done automatically using Data Mining. Data Mining (Knowledge Discovery from Data) is a discipline in Information Technology that is interdisciplinary and is able to perform mining of data in large numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Rud, 2010).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data transformation from one phase to another so that it becomes suitable for the data to process to next stage in numeric form i.e., ready to be calculated. This stage also features selection i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining is the stage when the data mining algorithms are applied. Few examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining whether it has been done before, so that the data mining result phase can be used well for a variety of data other than testing.

Several studies using data mining to analyze the concept of academic ability in college were conducted earlier, such as:

- (Aziz, Ismail, & Ahmad, 2013) conduct research by building a prototype system to predict Students Academic Performance (SAP) in Higher Education Institution (HLI) using Naive Bayes algorithm based on Weka. This system can provide early warning of potential weaknesses in the students' learning. Parameters that are used in this research were gender (male / female), race (Malaysia, China, or India), origin (from town or rural), how to get into university (STPM, diploma, or matriculation), parents income, and the first semester GPA (high, low, and medium)
- (Ahmad, Ismail, & Aziz, 2015) conduct research related to data mining to predict the IP category of the first half using Decision Tree algorithm, Naive Bayes, and Rule Based Classification. Based on these studies showed that the Rule Based Classification is the best method among the three methods above, with the accuracy reached 71.3%. In this study they divided GPA into 3 categories: low, medium and high level.
- (Thakar, Mehta, & Manisha, 2015) presented a paper which contains extensive and exhaustive survey on rise of data mining to education and its direction in the future.
- The use of Data Mining is also used to predict the likelihood of students dropped out (Jadrić, Garača, & Ćukušić, 2010) and the possibility of student's failed (Vadivu & Bharathi, 2014).

**GRADE POINT AVERAGE (GPA):**

Every student in the university has to be evaluated at the end of every semester to evaluate their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (RISET, TEKNOLOGI, & DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the course grade point taken and course credits. Then this result is divided by sum of all gradable credits courses have been taken, as express in formula (1) below:

$$GPA = \frac{\sum \text{Course Grade Point} * \text{Course Credits}}{\sum \text{Gradable Credits}} \dots (1)$$

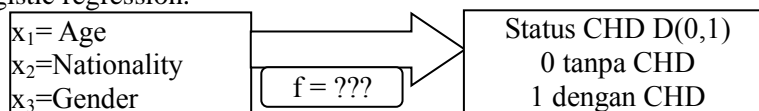
**GPA is important because it relates to:**

1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA is considered as an important determination to apply for jobs.

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester. Therefore first semester GPA is the main focus of this research.

**LOGISTIC REGRESSION:**

Logistic regression was developed and applied in epidemiological research. The common question to this research is "what is the relationship between one or more independent variables (exposure) on the condition of the illness". The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents "no sick" and 1 represents "the sick". (Kleinbaum & Klein, 2002) do research about classification of Coronary Heart Disease (CHD) and result the dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this research, the independent variables used are  $x_1$  as age,  $x_2$  as nationality and  $x_3$  as gender. Figure 1 illustrates the schematic model of logistic regression.

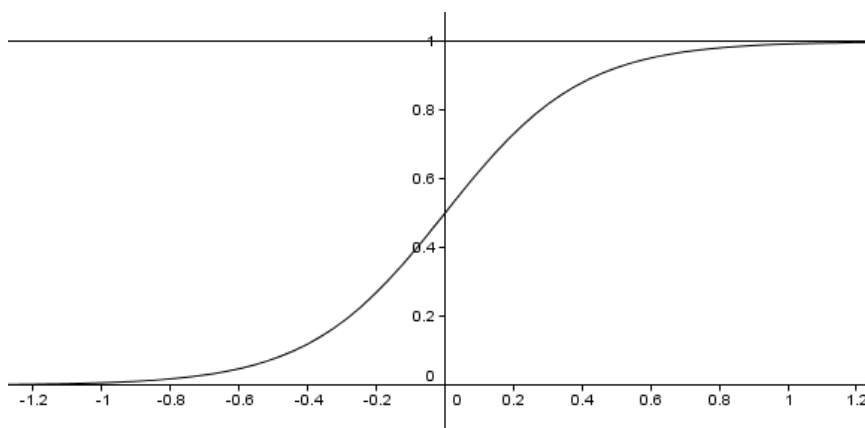


**Figure 1: The schematic model of logistic regression**

It can also be said that logistic regression model in Data Mining can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Kantardzic, 2003) . For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data is about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [1]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \dots (2)$$

The form of logistic function is described in figure 2 below (Hosmer & Lemeshow, 2003)



**Figure 2: Graph of logistic function**

The Figure 2 shows the range the value of  $f(z)$  lies from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Since the value of  $f(z)$  lies between 0 and 1, the logistic regression is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (Hosmer & Lemeshow, 2003).

Another reason why logistic model became popular is because of the shape of the logistic function. As observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by (Hajarisman, 1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method since beta-binomial method is easier for both calculating the probability function decline and interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model. This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula (3) and (4):

$$z = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k \dots (3)$$

so 
$$y = \hat{f}(z) = \frac{1}{1+e^{-(\alpha+\sum\beta_ix_i)}} \dots (4)$$

The values  $\alpha$  and  $\beta_i$  are unknown parameters and will be estimated from the data set in the form of samples using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

**CROSSTAB TABLE :**

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Table 1:

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula (5) below (Bhattacharyya & Johnson R.A., 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \dots (5)$$

with

$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

**METHODOLOGY:**

Several stages of the research is as follows;

1. The students’ data is retrieved from Faculty of Information Technology from PUSPINDIKA which consists of Information System Department and Information Technology Department. A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. The data retrieved from PUSPINDIKA includes high school category, high school status, high school location and first GPA students.
2. The English skills data of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) was also retrieved.
3. The researchers chose the data from Faculty of Information Technology students that received through achievement. In the process of new student admissions in DWUC, there are two ways which are path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance in case of path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
4. Then, after cleaning process, the data is used for logistic regression.  
In logistic regression model, the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , and can be seen in the Formula (3) and (4) above.  
 $x_1, x_2, x_3, \dots, x_k$  are value from training data. We use  $x_1, x_2, x_3, \dots, x_k$  to get parameter value of  $\alpha$  and  $\beta_i$  which is unknown parameters. Then we estimate  $\alpha$  and  $\beta_i$  by using Maximum Likelihood Estimator (MLE) symbolized as  $\hat{\alpha}$  and  $\hat{\beta}_i$ . Furthermore  $\hat{\alpha}$  and  $\hat{\beta}_i$  will be used for predicting  $y$  as seen in Formula (4).
5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line. The seven models are as follows,
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011
  - Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. With the help of these 7 logistic regression models, the first semester GPA category class of 2015 is predicted.
7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation).

**FINDINGS AND DISCUSSION:**

After the data is collected, it is cleaned in order to obtain the cumulative number of students at Faculty of Information Technology in order to run logistic regression. The data is tabulated as Table 2 below.

**Table 2: Number of students of the Faculty of Information Technology from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1), then the first GPA is transformed into binary data, namely:

$0 < GPA\_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < GPA\_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data.

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school (x1), the location of SMA (x2), category SMA (x3), the level of English (x4). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient ( $\beta$ ). Here is a form of models of computation results before and after simplified (Santosa & Chrismanto, 2016).

Model A is the logistic regression model using high school achievement data from class of 2008 is;

$$P(x) = 1/(1+\exp\{-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,460 + 1,420(x_4)\})$$

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is;

$$P(x) = 1/(1+\exp\{-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,381 + 0,698(x_4)\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is;

$$P(x) = 1/(1+\exp\{-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,793 + 0,833(x_4)\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is;

$$P(x) = 1/(1+\exp\{-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,409 - 1,404(x_2) + 0,582(x_4)\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is;

$$P(x) = 1/(1+\exp\{-1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,350 - 1,057(x_2) + 0,456(x_4)\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is;

$$P(x) = 1/(1+\exp\{-1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,809 - 1,069(x_2) + 0,666(x_4)\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is;

$$P(x) = 1/(1+\exp\{-1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,895 - 1,149(x_2) + 0,738(x_4)\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equility Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Tahun	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	% cocok
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equility Percentage is 73.9 %

By using all the seven models in Table 4, the first semester GPA category from Information Technology students can be predicted through high school achievement admission. The rows and columns in the crosstab table have two categories such as the category which is labeled as ‘0’ indicating the first semester GPA category below the sample average and another category labeled ‘1’ showing the first semester GPA category above average sample data. And the results is summarized by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

Model A		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 5, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model A has Equality Percentage = 72%.

**Table 6: Number of students as a result predictive using Model B**

Model B		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 6, it can be seen that there are 0 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model B has Equality Percentage = 65.8%.

**Table 7: Number of students as a result predictive using Model C**

Model C		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 7, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

**Table 8: Number of students as a result predictive using Model D**

Model D		Prediction Data		Total Row
		0	1	
Observation Data	0	65	85	150
	1	1	42	43
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 8, it can be seen that there are 65 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 42 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model D has Equality Percentage = 55.4%.

**Table 9: Number of students as a result predictive using Model E**

Model E		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 9, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model E has Equality Percentage = 72%.

**Table 10: Number of students as a result predictive using Model F**

Model F		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 10, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model F has Equality Percentage = 72%.

**Table 11: Number of students as a result predictive using Model G**

Model G		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 11, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model G has Equality Percentage = 72%.

## CONCLUSION:

We arrive at the following conclusion based on the literature.

1. In terms of compatibility between logistic regression models with training data, the model A is the best model, because it has a percentage kesamaaan 79.4%.
2. In terms of compatibility between the logistic regression models with training data after significance test, the model A is the best model, because it has a percentage kesamaaan 79.4%.
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location. It must be a concern for decision makers in the educational process.
5. The percentage of equality of this research is still not satisfied, so in future we will try to use other methods that can increase the equality percentage or add other variables that have not been taken into our consideration.

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HASIL KOREKSI PROOF READING DARI PENULIS

# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

***R. Gunawan Santosa,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

***Antonius Rachmat Chrismanto,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

## ABSTRACT

*Faculty of Information Technology, Duta Wacana Christian University (DWCU) has two methods of admitting new college students in which the first is on the basis of educational achievements in high school whereas the second is on the basis of regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. The first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result are used as independent variables. With regards to the training data required to create a logistic regression model, we used students' admission data from 2008 through 2014, while the students' data of 2015 is taken as the testing data. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4% .There is a change in the logistic regression form, three models influence only by level of English test result while the remaining four models are influenced by the level of English test result and high school location.*

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table.

## **INTRODUCTION:**

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), students have had different educational and environment backgrounds. The different environments background means having a secondary school they have taken or take. For example, those coming from senior high school in Java and outside Java. And also they maybe come from ordinary high school or vocational high school. The last, they also maybe come from public high school or private high school high school. After prospective new students are admitted as college students at Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in their first semester Grade Point Average (GPA). The GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who secured high GPA whereas some obtained low GPA. At the first semester, these students can sometimes move to another faculty. In addition, there are some students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student from the Faculty of Information Technology DWCU.

There are many different external factors that may affect the first semester GPA beside existing internal factors such as interests, talents, abilities, diligence, self-motivation. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java and the high schools are classified by usual high school and vocational high school which also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition, the level of English among the students is also a possible factor affecting students' first semester GPA. In this research we only limit on factors as mentioned above. Actually there are many more factors that may affect the GPA categories that is not covered, such as: gender, interest in studies, family economic level, employment background of parents / guardians and others.

In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not observed a relationship between GPA and these factors. This research is the next step of previous research which essentially tries to find mathematical models such as logistic regression to predict the categories of students' first semester GPA at the Faculty of Information Technology, DWCU.

## **LITERATURE REVIEW:**

### **DATA MINING:**

Due to the internet development, there is a rise in global data usage. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search becomes increasingly difficult, especially if it is performed manually. A search for information from a large number of datasets can be done automatically using Data Mining. Data Mining (Knowledge Discovery from Data) is a discipline in Information Technology that is interdisciplinary and is able to perform mining of data in large numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Rud, 2010).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data transformation from one phase to another so that it becomes suitable for the data to process to next stage in numeric form i.e., ready to be calculated. This stage also features selection i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining is the stage when the data mining algorithms are applied. Few examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining whether it has been done before, so that the data mining result phase can be used well for a variety of data other than testing.

Several studies using data mining to analyze the concept of academic ability in college were conducted earlier, such as:

- (Aziz, Ismail, & Ahmad, 2013) conduct research by building a prototype system to predict Students Academic Performance (SAP) in Higher Education Institution (HLI) using Naive Bayes algorithm based on Weka. This system can provide early warning of potential weaknesses in the students' learning. Parameters that are used in this research were gender (male / female), race (Malaysia, China, or India), origin (from town or rural), how to get into university (STPM, diploma, or matriculation), parents income, and the first semester GPA (high, low, and medium)
- (Ahmad, Ismail, & Aziz, 2015) conduct research related to data mining to predict the IP category of the first half using Decision Tree algorithm, Naive Bayes, and Rule Based Classification. Based on these studies showed that the Rule Based Classification is the best method among the three methods above, with the accuracy reached 71.3%. In this study they divided GPA into 3 categories: low, medium and high level.
- (Thakar, Mehta, & Manisha, 2015) presented a paper which contains extensive and exhaustive survey on rise of data mining to education and its direction in the future.
- The use of Data Mining is also used to predict the likelihood of students dropped out (Jadrić, Garača, & Ćukušić, 2010) and the possibility of student's failed (Vadivu & Bharathi, 2014).

**GRADE POINT AVERAGE (GPA):**

Every student in the university has to be evaluated at the end of every semester to evaluate their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (RISET, TEKNOLOGI, & DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the course grade point taken and course credits. Then this result is divided by sum of all gradable credits courses have been taken, as express in formula (1) below:

$$GPA = \frac{\sum \text{Course Grade Point} * \text{Course Credits}}{\sum \text{Gradable Credits}} \dots (1)$$

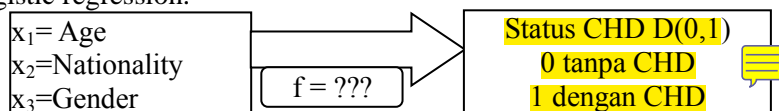
**GPA is important because it relates to:**

1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA is considered as an important determination to apply for jobs.

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester. Therefore first semester GPA is the main focus of this research.

**LOGISTIC REGRESSION:**

Logistic regression was developed and applied in epidemiological research. The common question to this research is "what is the relationship between one or more independent variables (exposure) on the condition of the illness". The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents "no sick" and 1 represents "the sick". (Kleinbaum & Klein, 2002) do research about classification of Coronary Heart Disease (CHD) and result the dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this research, the independent variables used are  $x_1$  as age,  $x_2$  as nationality and  $x_3$  as gender. Figure 1 illustrates the schematic model of logistic regression.



**Figure 1: The schematic model of logistic regression**

It can also be said that logistic regression model in Data Mining can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Kantardzic, 2003) . For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data is about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [1]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \dots (2)$$

The form of logistic function is described in figure 2 below (Hosmer & Lemeshow, 2003)

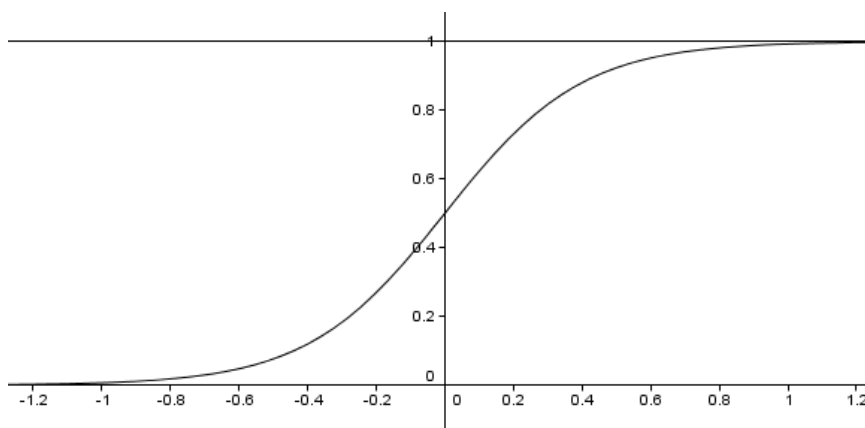


Figure 2: Graph of logistic function

The Figure 2 shows the range the value of  $f(z)$  lies from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Since the value of  $f(z)$  lies between 0 and 1, the logistic regression is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (Hosmer & Lemeshow, 2003).

Another reason why logistic model became popular is because of the shape of the logistic function. As observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by (Hajarisman, 1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method since beta-binomial method is easier for both calculating the probability function decline and interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model. This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula (3) and (4):

$$z = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k \dots (3)$$

so 
$$y = \hat{f}(z) = \frac{1}{1+e^{-(\alpha+\sum\beta_ix_i)}} \dots (4)$$

The values  $\alpha$  and  $\beta_i$  are unknown parameters and will be estimated from the data set in the form of samples using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

**CROSSTAB TABLE :**

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Table 1:

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula (5) below (Bhattacharyya & Johnson R.A., 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \dots (5)$$

with

$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

**METHODOLOGY:**

Several stages of the research is as follows;

1. The students’ data is retrieved from Faculty of Information Technology from PUSPINDIKA which consists of Information System Department and Information Technology Department. A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. The data retrieved from PUSPINDIKA includes high school category, high school status, high school location and first GPA students.
2. The English skills data of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) was also retrieved.
3. The researchers chose the data from Faculty of Information Technology students that received through achievement. In the process of new student admissions in DWUC, there are two ways which are path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance in case of path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
4. Then, after cleaning process, the data is used for logistic regression.  
In logistic regression model, the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , and can be seen in the Formula (3) and (4) above.  
 $x_1, x_2, x_3, \dots, x_k$  are value from training data. We use  $x_1, x_2, x_3, \dots, x_k$  to get parameter value of  $\alpha$  and  $\beta_i$  which is unknown parameters. Then we estimate  $\alpha$  and  $\beta_i$  by using Maximum Likelihood Estimator (MLE) symbolized as  $\hat{\alpha}$  and  $\hat{\beta}_i$ . Furthermore  $\hat{\alpha}$  and  $\hat{\beta}_i$  will be used for predicting  $y$  as seen in Formula (4).
5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line. The seven models are as follows,
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011
  - Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. With the help of these 7 logistic regression models, the first semester GPA category class of 2015 is predicted.
7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation).

**FINDINGS AND DISCUSSION:**

After the data is collected, it is cleaned in order to obtain the cumulative number of students at Faculty of Information Technology in order to run logistic regression. The data is tabulated as Table 2 below.

**Table 2: Number of students of the Faculty of Information Technology from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1), then the first GPA is transformed into binary data, namely:

$0 < GPA\_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < GPA\_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data.

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school (x1), the location of SMA (x2), category SMA (x3), the level of English (x4). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient (β). Here is a form of models of computation results before and after simplified (Santosa & Chrismanto, 2016).

Model A is the logistic regression model using high school achievement data from class of 2008 is;

$$P(x) = 1/(1+\exp\{-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,460 + 1,420(x_4)\})$$

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is;

$$P(x) = 1/(1+\exp\{-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,381 + 0,698(x_4)\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is;

$$P(x) = 1/(1+\exp\{-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,793 + 0,833(x_4)\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is;

$$P(x) = 1/(1+\exp\{-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,409 - 1,404(x_2) + 0,582(x_4)\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is;

$$P(x) = 1/(1+\exp\{-1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,350 - 1,057(x_2) + 0,456(x_4)\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is;

$$P(x) = 1/(1+\exp\{-1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,809 - 1,069(x_2) + 0,666(x_4)\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is;

$$P(x) = 1/(1+\exp\{-1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,895 - 1,149(x_2) + 0,738(x_4)\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	α	β <sub>1</sub>	β <sub>2</sub>	β <sub>3</sub>	β <sub>4</sub>	Equity Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equility Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Tahun	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	% coc
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equility Percentage is 73.9 %

By using all the seven models in Table 4, the first semester GPA category from Information Technology students can be predicted through high school achievement admission. The rows and columns in the crosstab table have two categories such as the category which is labeled as ‘0’ indicating the first semester GPA category below the sample average and another category labeled ‘1’ showing the first semester GPA category above average sample data. And the results is summarized by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

Model A		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 5, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model A has Equality Percentage = 72%.

**Table 6: Number of students as a result predictive using Model B**

Model B		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 6, it can be seen that there are 0 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model B has Equality Percentage = 65.8%.

**Table 7: Number of students as a result predictive using Model C**

Model C		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 7, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

**Table 8: Number of students as a result predictive using Model D**

Model D		Prediction Data		Total Row
		0	1	
Observation Data	0	65	85	150
	1	1	42	43
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 8, it can be seen that there are 65 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 42 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model D has Equality Percentage = 55.4%.

**Table 9: Number of students as a result predictive using Model E**

Model E		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 9, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model E has Equality Percentage = 72%.

**Table 10: Number of students as a result predictive using Model F**

Model F		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 10, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model F has Equality Percentage = 72%.

**Table 11: Number of students as a result predictive using Model G**

Model G		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 11, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model G has Equality Percentage = 72%.

## CONCLUSION:

We arrive at the following conclusion based on the literature.

1. In terms of compatibility between logistic regression models with training data, the model A is the best model, because it has a percentage kesamaaan 79.4%.
2. In terms of compatibility between the logistic regression models with training data after significance test, the model A is the best model, because it has a percentage kesamaaan 79.4%.
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location. It must be a concern for decision makers in the educational process.
5. The percentage of equality of this research is still not satisfied, so in future we will try to use other methods that can increase the equality percentage or add other variables that have not been taken into our consideration.

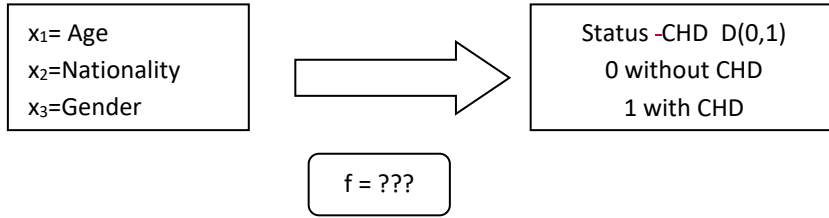
## ACKNOWLEDGEMENTS:

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**Figure 1: The schematic model of logistic regression**

FILE FINAL PUBLIKASI

# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

***R. Gunawan Santosa,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

***Antonius Rachmat Chrismanto,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

## ABSTRACT

*Faculty of Information Technology, Duta Wacana Christian University (DWCU) has two methods of admitting new college students in which the first is on the basis of educational achievements in high school whereas the second is on the basis of regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. The first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result are used as independent variables. With regards to the training data required to create a logistic regression model, we used students' admission data from 2008 through 2014, while the students' data of 2015 is taken as the testing data. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4% .There is a change in the logistic regression form, three models influence only by level of English test result while the remaining four models are influenced by the level of English test result and high school location.*

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table.

## **INTRODUCTION:**

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), students have had different educational and environment backgrounds. The different environments background means having a secondary school they have taken or take. For example, those coming from senior high school in Java and outside Java. And also they maybe come from ordinary high school or vocational high school. The last, they also maybe come from public high school or private high school high school. After prospective new students are admitted as college students at Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in their first semester Grade Point Average (GPA). The GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who secured high GPA whereas some obtained low GPA. At the first semester, these students can sometimes move to another faculty. In addition, there are some students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student from the Faculty of Information Technology DWCU.

There are many different external factors that may affect the first semester GPA beside existing internal factors such as interests, talents, abilities, diligence, self-motivation. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java and the high schools are classified by usual high school and vocational high school which also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition, the level of English among the students is also a possible factor affecting students' first semester GPA. In this research we only limit on factors as mentioned above. Actually there are many more factors that may affect the GPA categories that is not covered, such as: gender, interest in studies, family economic level, employment background of parents / guardians and others.

In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not observed a relationship between GPA and these factors. This research is the next step of previous research which essentially tries to find mathematical models such as logistic regression to predict the categories of students' first semester GPA at the Faculty of Information Technology, DWCU.

## **LITERATURE REVIEW:**

### **DATA MINING:**

Due to the internet development, there is a rise in global data usage. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search becomes increasingly difficult, especially if it is performed manually. A search for information from a large number of datasets can be done automatically using Data Mining. Data Mining (Knowledge Discovery from Data) is a discipline in Information Technology that is interdisciplinary and is able to perform mining of data in large numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Rud, 2010).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data transformation from one phase to another so that it becomes suitable for the data to process to next stage in numeric form i.e., ready to be calculated. This stage also features selection i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining is the stage when the data mining algorithms are applied. Few examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining whether it has been done before, so that the data mining result phase can be used well for a variety of data other than testing.

Several studies using data mining to analyze the concept of academic ability in college were conducted earlier, such as:

- (Aziz, Ismail, & Ahmad, 2013) conduct research by building a prototype system to predict Students Academic Performance (SAP) in Higher Education Institution (HLI) using Naive Bayes algorithm based on Weka. This system can provide early warning of potential weaknesses in the students' learning. Parameters that are used in this research were gender (male / female), race (Malaysia, China, or India), origin (from town or rural), how to get into university (STPM, diploma, or matriculation), parents income, and the first semester GPA (high, low, and medium)
- (Ahmad, Ismail, & Aziz, 2015) conduct research related to data mining to predict the IP category of the first half using Decision Tree algorithm, Naive Bayes, and Rule Based Classification. Based on these studies showed that the Rule Based Classification is the best method among the three methods above, with the accuracy reached 71.3%. In this study they divided GPA into 3 categories: low, medium and high level.
- (Thakar, Mehta, & Manisha, 2015) presented a paper which contains extensive and exhaustive survey on rise of data mining to education and its direction in the future.
- The use of Data Mining is also used to predict the likelihood of students dropped out (Jadrić, Garača, & Čukušić, 2010) and the possibility of student's failed (Vadivu & Bharathi, 2014).

**GRADE POINT AVERAGE (GPA):**

Every student in the university has to be evaluated at the end of every semester to evaluate their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (RISET, TEKNOLOGI, & DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the course grade point taken and course credits. Then this result is divided by sum of all gradable credits courses have been taken, as express in formula (1) below:

$$GPA = \frac{\sum \text{Course Grade Point} * \text{Course Credits}}{\sum \text{Gradable Credits}} \dots (1)$$

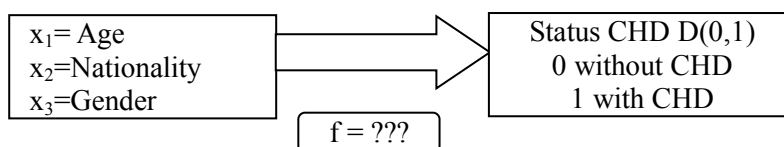
**GPA is important because it relates to:**

1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA is considered as an important determination to apply for jobs.

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester. Therefore first semester GPA is the main focus of this research.

**LOGISTIC REGRESSION:**

Logistic regression was developed and applied in epidemiological research. The common question to this research is "what is the relationship between one or more independent variables (exposure) on the condition of the illness". The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents "no sick" and 1 represents "the sick". (Kleinbaum & Klein, 2002) do research about classification of Coronary Heart Disease (CHD) and result the dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this research, the independent variables used are  $x_1$  as age,  $x_2$  as nationality and  $x_3$  as gender. Figure 1 illustrates the schematic model of logistic regression.

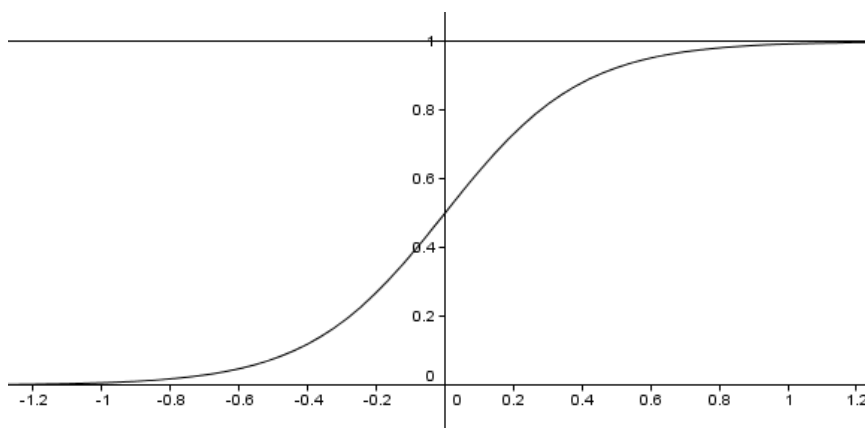


**Figure 1: The schematic model of logistic regression**

It can also be said that logistic regression model in Data Mining can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Kantardzic, 2003) . For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data is about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [2]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \dots (2)$$

The form of logistic function is described in figure 2 below (Hosmer & Lemeshow, 2003)



**Figure 2: Graph of logistic function**

The Figure 2 shows the range the value of  $f(z)$  lies from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Since the value of  $f(z)$  lies between 0 and 1, the logistic regression is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (Hosmer & Lemeshow, 2003).

Another reason why logistic model became popular is because of the shape of the logistic function. As observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by (Hajarisman, 1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method since beta-binomial method is easier for both calculating the probability function decline and interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model. This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula (3) and (4):

$$z = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k \dots (3)$$

so 
$$y = \hat{f}(z) = \frac{1}{1+e^{-(\alpha+\sum\beta_ix_i)}} \dots (4)$$

The values  $\alpha$  and  $\beta_i$  are unknown parameters and will be estimated from the data set in the form of samples using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

**CROSSTAB TABLE :**

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Table 1:

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula (5) below (Bhattacharyya & Johnson R.A., 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \dots (5)$$

with

$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

**METHODOLOGY:**

Several stages of the research is as follows;

1. The students’ data is retrieved from Faculty of Information Technology from PUSPINDIKA which consists of Information System Department and Information Technology Department. A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. The data retrieved from PUSPINDIKA includes high school category, high school status, high school location and first GPA students.
2. The English skills data of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) was also retrieved.
3. The researchers chose the data from Faculty of Information Technology students that received through achievement. In the process of new student admissions in DWUC, there are two ways which are path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance in case of path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
4. Then, after cleaning process, the data is used for logistic regression.  
In logistic regression model, the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , and can be seen in the Formula (3) and (4) above.  
 $x_1, x_2, x_3, \dots, x_k$  are value from training data. We use  $x_1, x_2, x_3, \dots, x_k$  to get parameter value of  $\alpha$  and  $\beta_i$  which is unknown parameters. Then we estimate  $\alpha$  and  $\beta_i$  by using Maximum Likelihood Estimator (MLE) symbolized as  $\hat{\alpha}$  and  $\hat{\beta}_i$ . Furthermore  $\hat{\alpha}$  and  $\hat{\beta}_i$  will be used for predicting  $y$  as seen in Formula (4).
5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line. The seven models are as follows,
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011
  - Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. With the help of these 7 logistic regression models, the first semester GPA category class of 2015 is predicted.
7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation).

**FINDINGS AND DISCUSSION:**

After the data is collected, it is cleaned in order to obtain the cumulative number of students at Faculty of Information Technology in order to run logistic regression. The data is tabulated as Table 2 below.

**Table 2: Number of students of the Faculty of Information Technology from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1), then the first GPA is transformed into binary data, namely:

$0 < GPA\_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < GPA\_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data.

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school (x1), the location of SMA (x2), category SMA (x3), the level of English (x4). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient ( $\beta$ ). Here is a form of models of computation results before and after simplified (Santosa & Chrismanto, 2016).

Model A is the logistic regression model using high school achievement data from class of 2008 is;

$$P(x) = 1/(1+\exp\{-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,460 + 1,420(x_4)\})$$

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is;

$$P(x) = 1/(1+\exp\{-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,381 + 0,698(x_4)\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is;

$$P(x) = 1/(1+\exp\{-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,793 + 0,833(x_4)\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is;

$$P(x) = 1/(1+\exp\{-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,409 - 1,404(x_2) + 0,582(x_4)\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is;

$$P(x) = 1/(1+\exp\{-1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-1,350 - 1,057(x_2) + 0,456(x_4)\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is;

$$P(x) = 1/(1+\exp\{-1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,809 - 1,069(x_2) + 0,666(x_4)\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is;

$$P(x) = 1/(1+\exp\{-1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)\})$$

and after a simplified model becomes:

$$P(x) = 1/(1+\exp\{-0,895 - 1,149(x_2) + 0,738(x_4)\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equity Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equity Percentage is 73.9 %

By using all the seven models in Table 4, the first semester GPA category from Information Technology students can be predicted through high school achievement admission. The rows and columns in the crosstab table have two categories such as the category which is labeled as ‘0’ indicating the first semester GPA category below the sample average and another category labeled ‘1’ showing the first semester GPA category above average sample data. And the results is summarized by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

Model A		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 5, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model A has Equality Percentage = 72%.

**Table 6: Number of students as a result predictive using Model B**

Model B		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 6, it can be seen that there are 0 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model B has Equality Percentage = 65.8%.

**Table 7: Number of students as a result predictive using Model C**

Model C		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 7, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 =

1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

**Table 8: Number of students as a result predictive using Model D**

Model D		Prediction Data		Total Row
		0	1	
Observation Data	0	65	85	150
	1	1	42	43
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 8, it can be seen that there are 65 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 42 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model D has Equality Percentage = 55.4%.

**Table 9: Number of students as a result predictive using Model E**

Model E		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 9, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model E has Equality Percentage = 72%.

**Table 10: Number of students as a result predictive using Model F**

Model F		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 10, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model F has Equality Percentage = 72%.

**Table 11: Number of students as a result predictive using Model G**

Model G		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 11, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model G has Equality Percentage = 72%.

## CONCLUSION:

We arrive at the following conclusion based on the literature.

1. In terms of compatibility between logistic regression models with training data, the model A is the best model, because it has a percentage kesamaaan 79.4%.
2. In terms of compatibility between the logistic regression models with training data after significance test, the model A is the best model, because it has a percentage kesamaaan 79.4%.
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location. It must be a concern for decision makers in the educational process.
5. The percentage of equality of this research is still not satisfied, so in future we will try to use other methods that can increase the equality percentage or add other variables that have not been taken into our consideration.

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<p><b>Michael Sunday Agba</b> Federal Polytechnic Idah, Nigeria.</p> <p><b>Mohammad Reza Iravani</b> Department of Social work Islamic Azad University, Iran</p> <p><b>Mohammed Viqaruddin</b>, Ph.D. Aurangabad, India</p> <p><b>Mohd Norfian Alifiah</b>, PhD Senior Lecturer Department of Accounting and Finance Faculty of Management Universiti Teknologi Malaysia.</p> <p><b>Mohd.Ab. Malek Bin Md. Shah</b> Lectuer Department of Laws, Universiti Teknologi Mara (UITM) Malaysia</p> <p><b>Moyaassar I. Ahmed Al. Jubuory</b>, Professor, Head of Post graduate, Committee in Industrial Management Department, College of Administration &amp; Economic, University of Mosul, Mosul, Iraq</p> <p><b>Ms. Anshu Aroraa</b>, Panjab, Chandigarh, India</p> <p><b>Ms. Maitri</b> Assistant Professor Management Education &amp; Research Institute, Janakpuri Affiliated to GGSIP University, India</p> <p><b>Mujtaba Momin</b> Faculty of Business Administration, Prince Salman Bin Abdul Aziz University, KSA</p> <p><b>N. Jayalakshmi</b> Assistant Professor, CMR Law School, Bangalore</p> <p><b>Naveed R. Khan</b> Department of Management and Leadership, Faculty of Management and Economics Universiti Pendidikan Sultan Idris - UPSI, Malaysia.</p> <p><b>Nooney Lenin Kumar</b> Lecturer, Department of Business Studies, Nizwa College of Technology, Nizwa, Sultanate of Oman</p> <p><b>P. Pratheepkanth</b> Department of Accounting, University of Jaffna, Sri Lanka.</p>	<p><b>APOSTU Iulian</b> University of Bucharest, Faculty of Sociology and Social Work, Romania</p> <p><b>Praveen Kumar Anshuman</b> Assistant Professor, Dept. of English, Kirori Mal College, University of Delhi, Delhi, India</p> <p><b>Prof. Lokanath Suar</b> Faculty in Law G.M Law College, Odisha, India</p> <p><b>Prof. Nawab Ali Khan</b> Department of Commerce Aligarh Muslim University, India</p> <p><b>Prof. Shiv K. Tripathi</b> Professor &amp; Chairman Postgraduate Programme Committee) Faculty of Commerce, Mzumbe University, Mzumbe (Tanzania)</p> <p><b>Prof. Wan Mansor Wan Mahmood</b>, <i>PhD</i>, Professor of Finance, Universiti Teknologi MARA Terengganu Dungun, Terengganu, Malaysia</p> <p><b>Professor Dr. Ravinder Rena</b> Department of Economics Faculty of Economic and Management Sciences (EMS), University of the Western Cape, Cape town, South Africa</p> <p><b>Ramandeep Kaur</b> Assistant Professor (Business Communication), G. D. Goenka University, Gurgaon, India</p> <p><b>Ramel D. Tomaquin</b>, PhD DPA Dean, College of Arts and Sciences Surigao Del Sur State, University (SDSSU), Tandag City Surigao Del Sur, Philippines</p> <p><b>Ramir Philip Jones V. Sonsona</b>, DALC Associate Professor Communication Arts, Languages &amp; Literature, College of Arts and Sciences Mindanao University of Science &amp; Technology (MUST), Philippines.</p> <p><b>Smita Sinha</b>, Head, Department of Linguistics Berhampur University, Orissa India.</p> <p><b>Sreehari Ravindranath</b> School of Life Skills Education &amp; Social harmony, Rajiv Gandhi National Institute of Youth Development, Sriperumbudur, Tamil Nadu, India</p>	<p><b>Srivastava, Dr. Sachin Kumar</b> Sr. Lecturer &amp; Asst. Proctor, Department of Business Administration Amity University, UP, India</p> <p><b>Sunanda Sharma</b> Assistant Prof, Department of Commerce, R.S.D College, India</p> <p><b>Trilok Kumar Jain</b> Dean, Suresh Gyan Vihar University Jaipur, India.</p> <p><b>Turyahikayo Everest</b> Uganda Management Institute, Kampala-Uganda.</p> <p><b>Shipra Vaidya</b> National Council of Educational Research and Training, New Delhi, India</p> <p><b>Dr. Madan Lal Bhasin</b> Professor, School of Accountancy Universiti Utara Malaysia (UUM), Sintok, Kedah, Malaysia.</p> <p><b>Fethi KAYALAR</b> PhD. Asst Professor Erzincan University, Turkey</p> <p><b>Islami Xhavit</b> Albania</p> <p><b>Dr. Suhas B. Dhande</b> Director &amp; Professor, K.R. Sapkal College of Management Studies. (Savitribai Phule Pune University) Sapkal Knowledge Hub, Nashik, India.</p> <p><b>Hart Okorie Awa</b> Department of Marketing, Faculty of Management Sciences, University of Port Harcourt, Nigeria</p> <p><b>Ukaulor, Chidimma Stella</b> Assistant Lecturer, Department of Philosophy, Imo State University Owerri, Nigeria.</p> <p><b>Rommel Valencia Tabula</b> ESL/EFL Lecturer Naresuan University Amphoe Muang Phitsanulok, Phitsanulok, Thailand</p>
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# BUSINESS ARCHITECTURE DEVELOPMENT FOR INTEGRATED AGRICULTURE INFORMATION SYSTEM (IAIS) USING TOGAF FRAMEWORK

**Rosa Delima,**

Department of Informatics  
Duta Wacana Christian, University, Indonesia

**Halim Budi Santoso,**

Department of Information System  
Duta Wacana Christian, University, Indonesia.

**Joko Purwadi,**

Department of Informatics  
Duta Wacana Christian, University, Indonesia.

## ABSTRACT

*Integrated Agriculture Information System (IAIS) is a system that specially manage data, information, and knowledge in Agriculture. Currently, IAIS development is done by arranging blueprint system. Blueprint is developed using Enterprise Architecture approach through TOGAF model framework. This article specifically discusses the Business Architecture Component, which is one of the architectures in TOGAF Framework. The development of IAIS Business Architecture started from the definition of targeted architecture, components, making the architecture. Through architecture development process, it is defined that IAIS has three main goals: (1) Empowering farmers by using ICT tools; (2) architecture and application development for IAIS; (3) IAIS is a connector to all stakeholders in agriculture. To reach those targets, the researchers built organization structure and an actor that is involved in using IAIS. There are four main functions: (1) System, Information Technology Infrastructure, and Organization Standardization; (2) Developing, managing, and maintaining application and infrastructure; (3) IAIS Implementation; (4) Management and Organization. Meanwhile, the services in IAIS are: (1) User Registration; (2) Requesting Application Services; (3) Requesting Information and Communication Technology Training Services; (4) Tendering Services; (5) Requesting Services; (6) Requesting Information; (7) Information Sharing; (8) Consulting (9) Recording and Observing User Specific Data; (10) Giving Agriculture Information and Knowledge.*

**Keywords:** Integrated Agriculture Information System Architecture; Business Architecture, TOGAF Framework.

**INTRODUCTION:**

Indonesia is one of the largest agricultural countries in the world. During 2010 – 2013, this sector has contributed 14.9% in Indonesia’s Gross Domestic Product (GDP) (Direktorat Pangan dan Pertanian, 2013) with 26.14 million of household works in agriculture sector (Badan Pusat Statistik, 2013). Based on those data, agricultural sector has big influence to Indonesia economic and society welfare. One of its ways to improve productivity and quality of agricultural product in Indonesia is by utilization of Information and Communication Technology in Agriculture Sector.

Implementation of Information and Communication Technology in agricultural sector gives some benefits: (1) Increasing agriculture production; (2) Mitigating risk in agriculture sector; (3) Supporting profit optimization to farmers; (4) Increasing effectiveness in information sharing and communication between stakeholder in agriculture sector; (5) Increasing farmer’s bargaining power; and (6) Supporting agriculture environmentally friendly (Delima, Santoso, & Purwadi, 2016). ICT brings big benefits to increase productivity, but implementation of ICT is still minimized. Some of the applications of agriculture with Indonesia language as the main language is still limited and can’t be accessed, such as publication, public service, and product sales and agriculture tools from some vendors. Meanwhile, some of agricultural website which use Indonesian language as the main language as information and knowledge source is still limited (Delima & Purwadi, 2015). This problem is the main reason to develop Integrated Agriculture Information System (IAIS).

Nowadays, IAIS is still in development phase. This system is specifically in place to process data, information, and knowledge in agriculture sector. IAIS is planned to be an integrated agriculture system that has some connected subsystems and able to link stakeholders in agriculture sector.

The development process of a complex and integrated system needs well planned activities in some phases in order for all components in the system to have good interoperability capacity. System development plan is covered in system blueprint. System blueprint includes strategic development: (1) Organization vision and mission; (2) Data, Information, and Knowledge requirements; (3) Infrastructure requirements; (4) Application requirements; (5) Human resources requirements. Blueprint can be a guidance to develop and implement system.

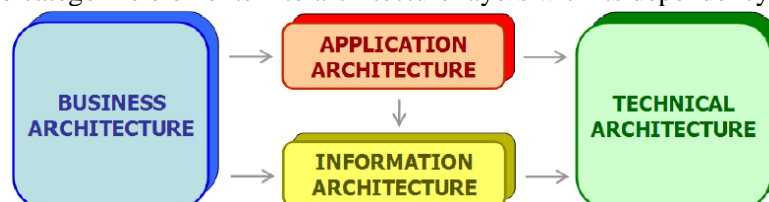
Enterprise Architecture (EA) approach is used to develop IAIS blueprint. Enterprise Architecture is used because of its ability to integrate all functions in Information Technology with organization business process (Marques, Borges, Sousa, & Pinho, 2011). Enterprise Architecture has 4 different architecture layers: (1) Business Architecture; (2) Application Architecture; (3) Information Architecture and (4) Technical Architecture. This article discusses about the development of Business Architecture for IAIS. Business Architecture Component is developed based on TOGAF Framework. Business Architecture is the second component in TOGAF and has 6 catalogues, 3 matrixes, and 9 diagrams. Business Architecture can help in determining the business activities and stakeholders involved in every business processes. Thus, will ease to develop application and information architecture.

**LITERATURE REVIEW:**

**ENTERPRISE ARCHITECTURE:**

Enterprise Architecture is an architecture to design an enterprise system. This architecture involves business process modelling and information characteristics (Schekkerman, 2004). By using EA, an organization can identify system needs to support business process and align the organization needs and information technology functions (Pereira & Sousa, 2005). This architecture is also able to give information and knowledge to decision makers. Enterprise Architecture is able to give integration perspective for all information technology function which is related with organization business process (Marques, Borges, Sousa, & Pinho, 2011). Through this architecture, organization can determine initial step, requirement analysis, and arrange plan to implement information technology components to reach organizational objectives (Anthony, 2008).

Enterprise Architecture is developed based on needs to get Enterprise Architecture framework within organization to describe enterprise by connecting its business, application, information, and technology. Figure 1 shows real practice to categorize elements into architecture layers with its dependency.



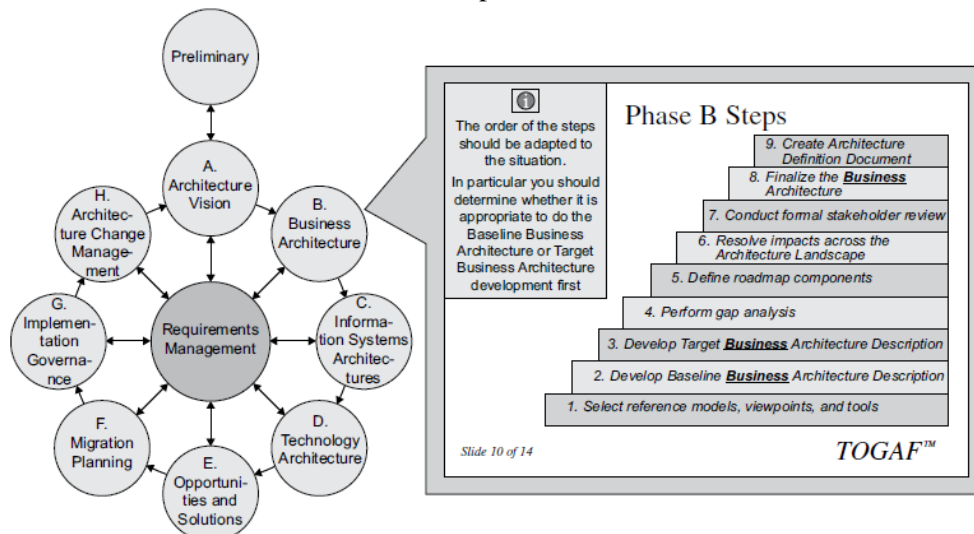
**Figure 1: Enterprise Architecture Layer** (Enterprise Architecture Solution, 2004)

Enterprise Architecture usage is based on condition that information technology architecture covers Information System and application in the specified business unit. From some companies and enterprises, from different scale of companies, this method is able to be used. Complexity in big companies determine what information system is needed to be built. Thus, Enterprise Architecture has to been standardized and integrated into all level within companies. Without standardization and integration, companies or organizations create its own failure (Stenzel, 2007).

Complexity and dependency within enterprise business unit can be illustrated as a blueprint. Thus, every parts are involved to understand, starts from executive to customers (de Vries & Van Rensburg, 2009). Enterprise Architecture is not the only solution. Enterprise Architecture is a communication tool to draw and give some explanation about information in the form of diagrams and support verbal communication within different stakeholders. In every relationship between business and information technology, Enterprise Architecture is able to be used in strategic, tactical, and operational level.

**TOGAF FRAMEWORK:**

Technically, TOGAF Framework is used to develop blueprint for IAIS. TOGAF is one of the frameworks for Enterprise Architecture. TOGAF Architecture is used as a tool to support development, implementation, and maintenance of Enterprise Architecture (Horrison, 2009). In terms of advantage, it is its flexibility to collaborate with other frameworks makes this framework special. TOGAF is designed to develop function of its element iteratively. Development phase in TOGAF is known as TOGAF Architecture Development Method (ADM). Figure 2 shows TOGAF Architecture Development Method (ADM).



**Figure 2: TOGAF Architecture Development Method (Horrison, 2009)**

From figure 2, we can see that there are one preliminary phase and eight phases. Those phases are:

1. Preliminary Framework and Principle. This phase is a preliminary stage which determine Enterprise Architecture scope. In this phase, organization commitment is being developed in enterprise architecture.
2. Vision Architecture. This phase focus on the importance vision of enterprise architecture to achieve organization goals. In this phase, some statements are developed: organization profile, vision and mission, organization objective, organization business process, organization unit, and architecture current condition.
3. Business Architecture. This phase determine business model or business activity based on business scenario.
4. Information System Architecture. This phase emphasizes on activity how information systems are built based on business architecture and function. This definition includes data architecture and application architecture.
5. Technology Architecture. This phase decide on technology portfolio including software and hardware.
6. Opportunities and Solution. This phase determine the benefit gained from enterprise architecture through business architecture, data architecture, application architecture, and technology architecture. Those architectures will be indicators to choose and set the architecture to be implemented.
7. Migration planning. This phase evaluates migration system and gap analysis to implement the systems.
8. Implementation Governance. This phase set the organization and IT governance.

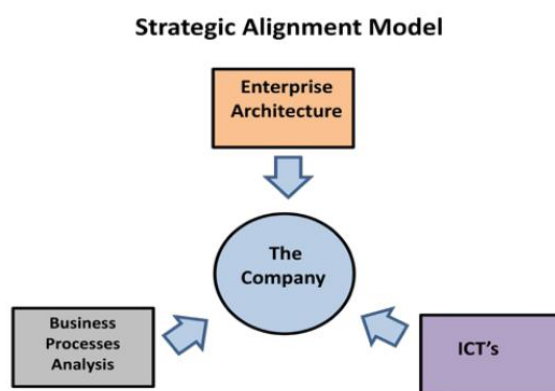
9. Architecture Change Management. This phase implements plan for architecture management of the new systems.

Figure 2 (Harrison, 2009) shows business architecture development process which consist of 9 phases: (1) Select reference, viewpoints, and tools; (2) Develop Baseline Business Architecture Description; (3) Develop Target Business Architecture Description; (4) Perform gap analysis; (5) Define roadmap components; (6) Resolve impacts across the architecture landscape; (7) Conduct formal stakeholder review; (8) Finalize the Business Architecture; (9) Create Architecture Definition Documents.

**BUSINESS ARCHITECTURE:**

Business architecture provides a multi-faceted view of the organization’s key components (Wolfenden and Welch, 2000). Business architecture is a strategic and holistic approach that helps to identify, assess, and prioritize opportunities for performance improvement. Business architecture permits the examination of interactions within an organization. In this planning, it also records some management function within organization and business processes in this organization. Thus, the approach builds up a multidimensional blueprint from which an implementation plan can be derived that specifies and prioritizes problematic areas where performance improvements can be targeted (Wolfenden & Welch, 2000).

Business architecture is important to develop since it is a strategic blueprint for the organization. By developing business architecture, organization can take advantage by increasing its productivity and competitiveness. The competitiveness of organizations refers to the ability to produce goods and services efficiently at a reasonable price and high quality (Menchaca A. V., November 2014). Business architecture is also a gateway to develop information system architecture according to TOGAF. Thus, there is a relationship between business and information technology.



**Figure 3: Strategic Alignment Model** (Menchaca A. V., November 2014)

Figure 3 shows the alignment between business process analysis, enterprise architecture, and ICT. With these premises, the first step is to develop Business Architecture. The main objective by defining the Business Architecture is to define the business, documenting organizational structure, identifying, and defining business function and processes relying on strategic planning with their areas of internet (Menchacha, 2014). Business Architecture can be some points: mission, vision, objectives, goals, values and policies, business processes, procedures and functions, organizational structure, situational analysis, customers, markets, products and long, medium, and short strategies (Menchaca, et al., December 2013).

**RESEARCH METHODOLOGY:**

There are five steps in this methodology to develop business architecture: (1) Select model and viewpoints; (2) Determine business architecture goals; (3) Develop architecture component; (4) Socialize architecture; (5) Finalize architecture. This article specifically construct four initial steps in the development of business architecture.

**DETERMINING BUSINESS ARCHITECTURE GOALS:**

Next step to develop business architecture for IAIS Blueprint is determining business architecture goals. Researchers skip the process of developing baseline business architecture because IAIS is the first system to be developed. Thus, in the development of business architecture, i the step of determining baseline and gap analysis

can be ignored. Based on current conditions, there are three goals of IAIS Architecture: (1) Empowering farmers to use ICT Tools; (2) Creating and Developing Architecture and Application for IAIS; (3) IAIS is a communication tools for every agriculture stakeholders.

**DEVELOPING ARCHITECTURE COMPONENTS:**

In TOGAF Version 9, it is defined that business architecture components consists of 7 catalogues, 2 matrixes, and 9 diagrams. Those architecture components can be seen in Table 1: Business Architecture Components in IAIS Blueprint.

**Table 1: Business Architecture Components in IAIS Blueprint**

Catalog	Matrix	Diagram
Organization/actor	Business Interaction	Business Footprint
Driver/Goal/Objective	Actor/Role	Business Service/Information
Role		Functional Decomposition
Business Service/Function		Product Lifecycle
Location		Goal/Objective/Service
Process/Event/Control/Product		Business Use Case
Contract/Measure		Organization Decomposition
		Process Flow
		Event

**DEVELOPING ARCHITECTURE:**

IAIS Business Architecture consists of three main parts such as Business Motivation, IAIS Organization, and Business Services & Functions. Business motivation elaborate goal, objective, and drivers of the architecture. IAIS Organization tells us actor, role, and organization structure of IAIS Developers. The last part gives definition about IAIS services and its correlation with organization roles.

**ANALYSIS AND DISCUSSION:**

**BUSINESS MOTIVATION:**

Organization business motivation reflects relationship between organization goals, objectives, organization drivers, and responsible actors in organization in order to achieve goals. IAIS developer organization is a study group for faculty member in Information Technology Faculty Duta Wacana Christian University. This organization has three main goals: (1) Farmers Empowerment to use ICT Tools; (2) Developing Architecture and Application for IAIS; (3) IAIS as a communication tools among stakeholders in agriculture sector. Table 2 describes relationship between IAIS Goals, Objectives, and Drivers.

**Table 2: Goal, Objective, and Driver IAIS**

Goal	Objective	Driver
Farmers Empowerment in Using ICT Tools	The number of farmers who use ICT to help in their agriculture processes	Increasing farmer’s abilities and capabilities
	Establish Online Community	Increasing farmer’s role in modern farming based on community and ICT
		Increasing farmers access to information and farming technology
Development of Architecture and Application for (IAIS) Integrated Agriculture Information System	Blueprint strategy for system development	Modern agriculture requires the support of ICT
	Availability of IT Infrastructure	Increasing technology infrastructure
	Development of Agriculture Information Systems and Knowledge Based Systems	Increasing of ICT role to increase productivity in agriculture sector
		Increasing of farmer’s access to information and farming technology
Connecting Agricultural Stakeholders Through IAIS	Number of Stakeholders Involved and Using The Application	The availability of applications that can connect agricultural Stakeholders.
	The Formation of Online Communities for Stakeholders and the number of stakeholders involved	Increasing need for online communication

**IAIS ORGANIZATION:**

Organization definition of Business Architecture contains unit definition organization, actor, roles, and locations. Developer organization in IAIS is study group IAIS. This study group is a part of faculty member of Information Technology Faculty Duta Wacana Christian University. This organization is led by a chairman and has 4 main divisions: System Research and Development, Service and Training Division, Quality Assurance Division, and Governance Division. Otherwise, the stakeholder in IAIS can be grouped into four categories such as Academician, Public Sector, Private Sector, and Farmers. Farmers are the most important stakeholders in this system. Organization unit and actors of this group can be seen in Table 3 below:

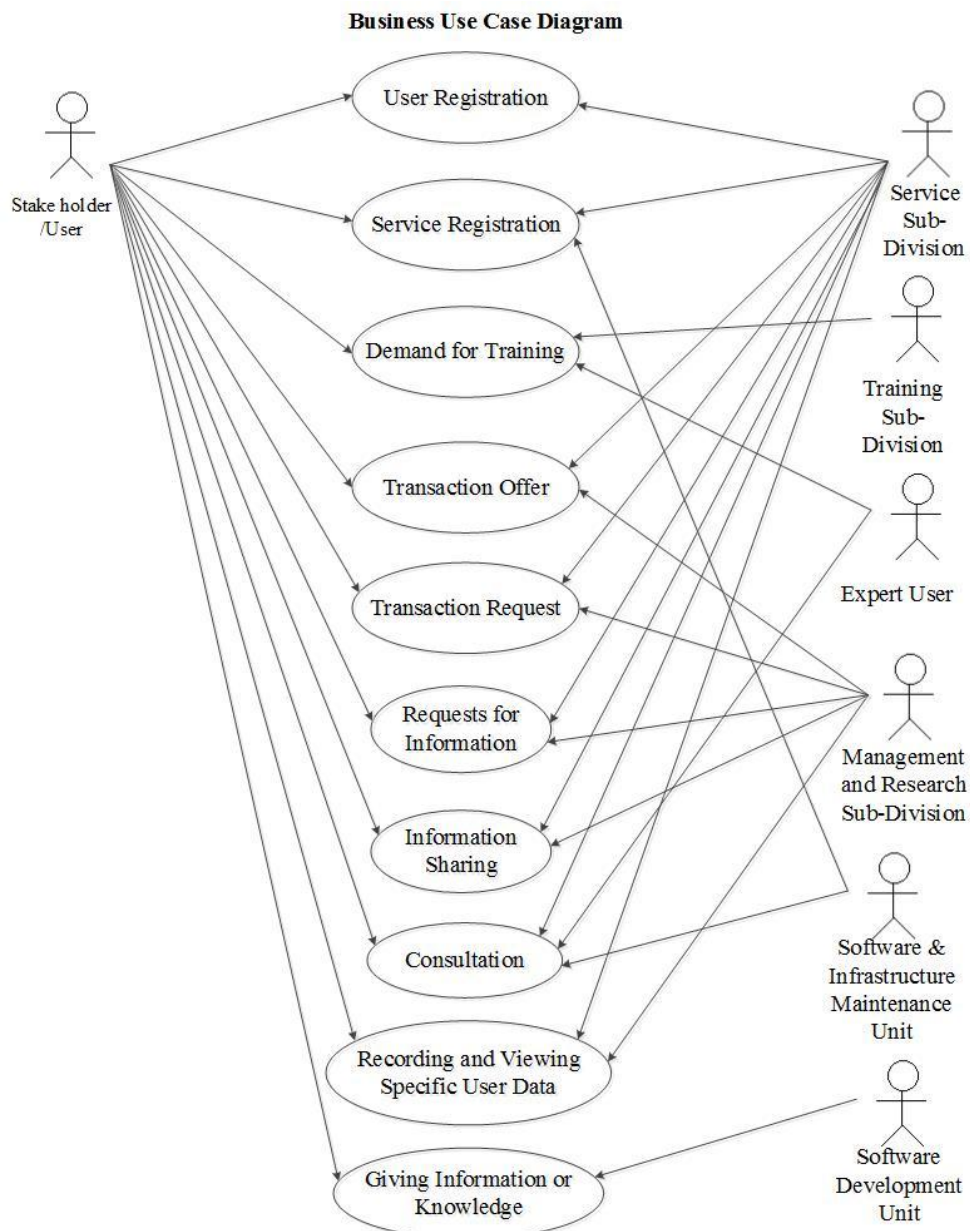
**Table 3: Organization and Actor Catalog**

<b>Organization Unit</b>	<b>Actor</b>
Study Group	Study Group Chairman
Research and Development System	Division Head
	Application and Technology Infrastructure Sub Division Head
	Database and Knowledge Sub Division Head
	Head of Application Development Unit
	Head of Application Maintenance Unit
	Head of Technology Infrastructure Development and Maintenance Unit
	Head of Data Administration Unit
	Head of Knowledge Administration Unit
	Application Development Staff
	Application Maintenance Staff
	Technology Infrastructure Development and Maintenance Staff
	Data Administration Staff
	Knowledge Administration Staff
Services and Training Division	Division Head
	Service Sub Division Head
	Training Sub Division Head
	Service Staff
	Training Staff
Quality Assurance Division	Division Head
	IAIS Product Quality Assurance Sub Division Head
	IT Governance Quality Assurance Sub Division Head
	IAIS Product Quality Assurance Staff
IT Governance Quality Assurance Staff	
Governance Division	Division Head
	Public Service Sub Division
	Finance Sub Division
	Public Service Staff
	Finance Sub Division
<b>Stakeholder</b>	
Farmers	Farmers
	Farmers Community
Academician	Academician of Information Technology
	Academician of Agriculture
	Information Technology Practitioner
	Agriculture Instructor
Public Sector	Government
	NGO
Private Sector	Supplier

Organization Unit	Actor
	Distributor
	Cooperative
	Financial Institutions
	Fertilizer and Pesticide Industry
	Telecommunication Operator / Provider
	Courier and Transportation Services

**BUSINESS SERVICES AND FUNCTIONS:**

IAIS Business Architecture accommodates all services provided by IAIS. There are 10 (ten) IAIS services: (1) User Registration; (2) Requesting Application Services; (3) Requesting Information and Communication Technology Training Services; (4) Tendering Services; (5) Requesting Services; (6) Requesting Information; (7) Information Sharing; (8) Consulting (9) Recording and Observing User Specific Data; (10) Giving Agriculture Information and Knowledge. Relationship between business services and actor can be seen in Business Use Case Diagram as stated in the figure 4 below:



**Figure 4: IAIS Business Use Case Diagram**

IAIS has four main business functions: (1) System, Information Technology Infrastructure, and Organization Standardization; (2) Developing, managing, and maintaining application and infrastructure; (3) IAIS Implementation; (4) Management and Organization. Relationship between business function and actor can be seen in figure 5 below:

Figure 6 shows the relationship between services and business function in IAIS. Overall, relationship between goal, objective, actor, services, and function can be seen in figure 7, figure 8, and figure 9.

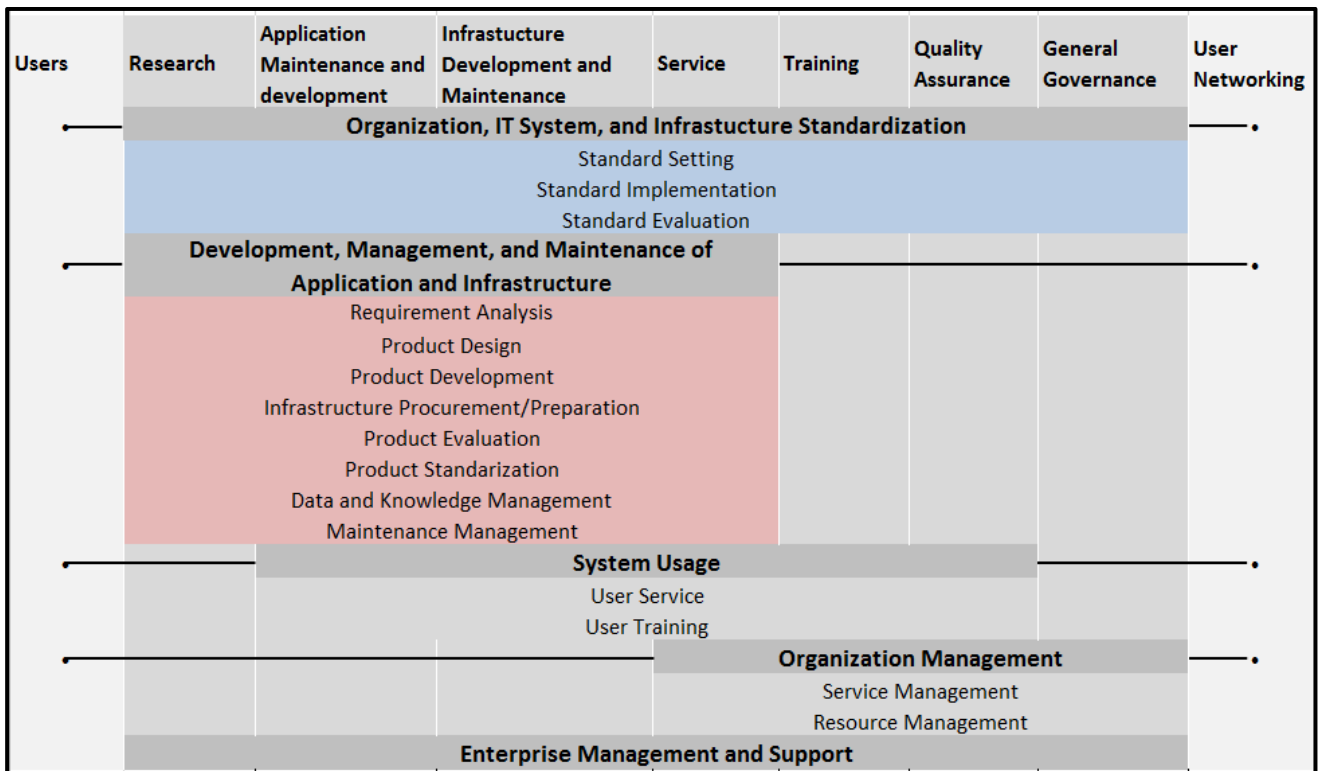


Figure 5: IAIS Functional Decomposition Diagram

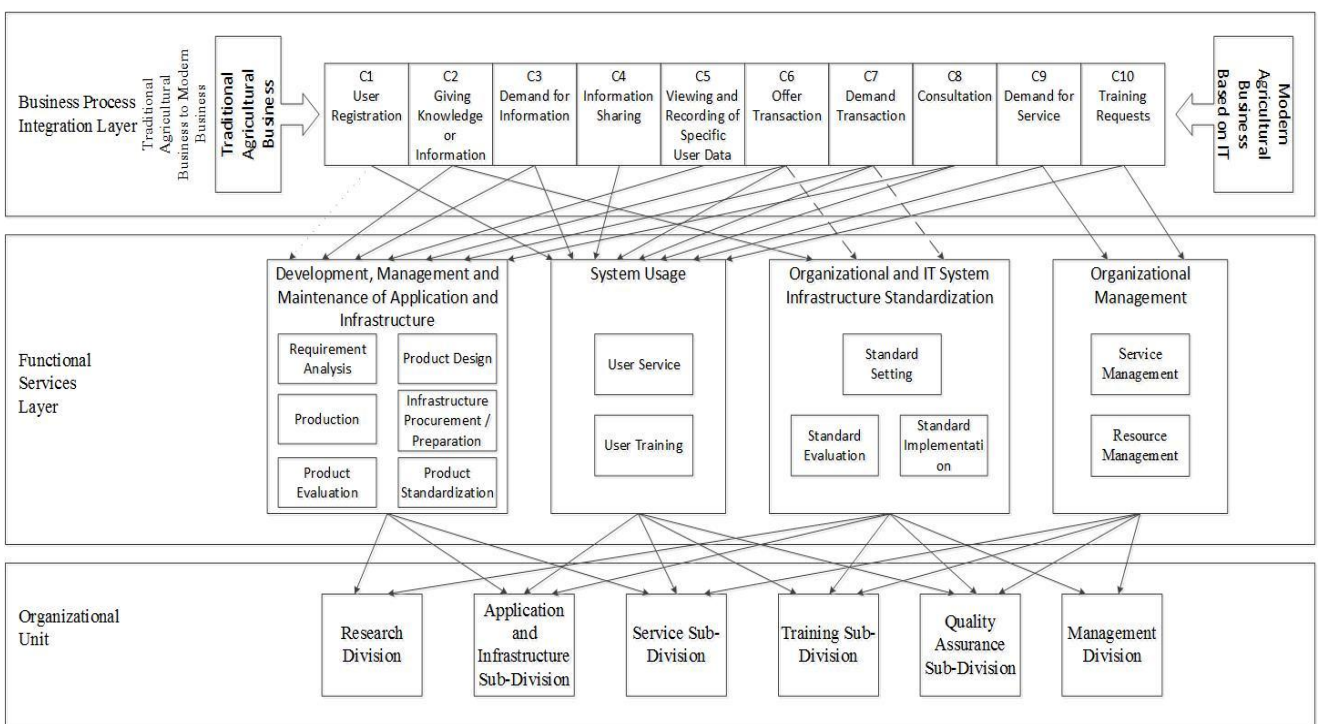


Figure 6: IAIS Business Services and Functional Diagram

Goal1 - Goal/ Objective / Service Diagram

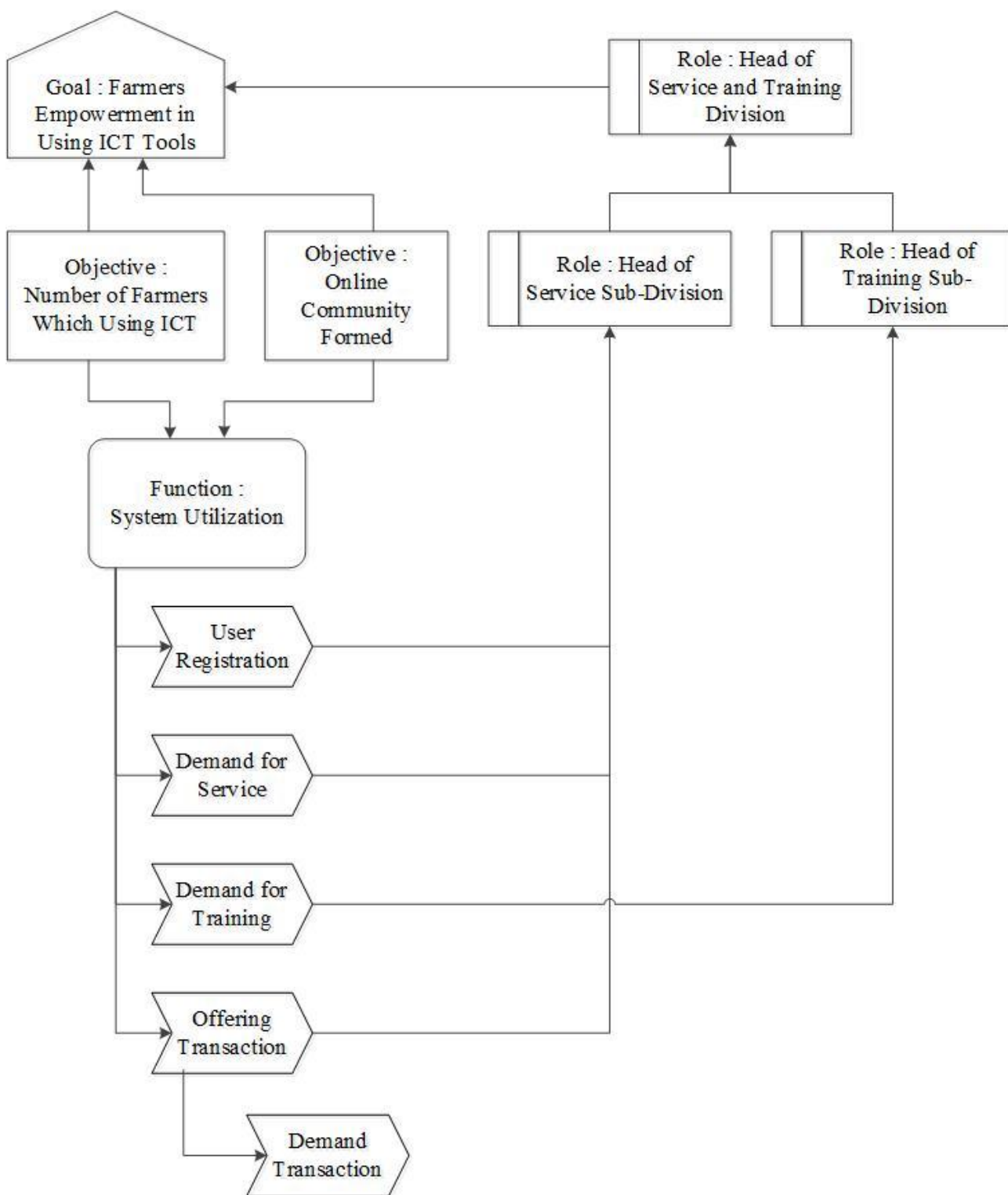


Figure 7: IAIS First Goal, Objective, Function, Services, and Actors Diagram

Goal 2 - Goal / Objective/ Service Diagram

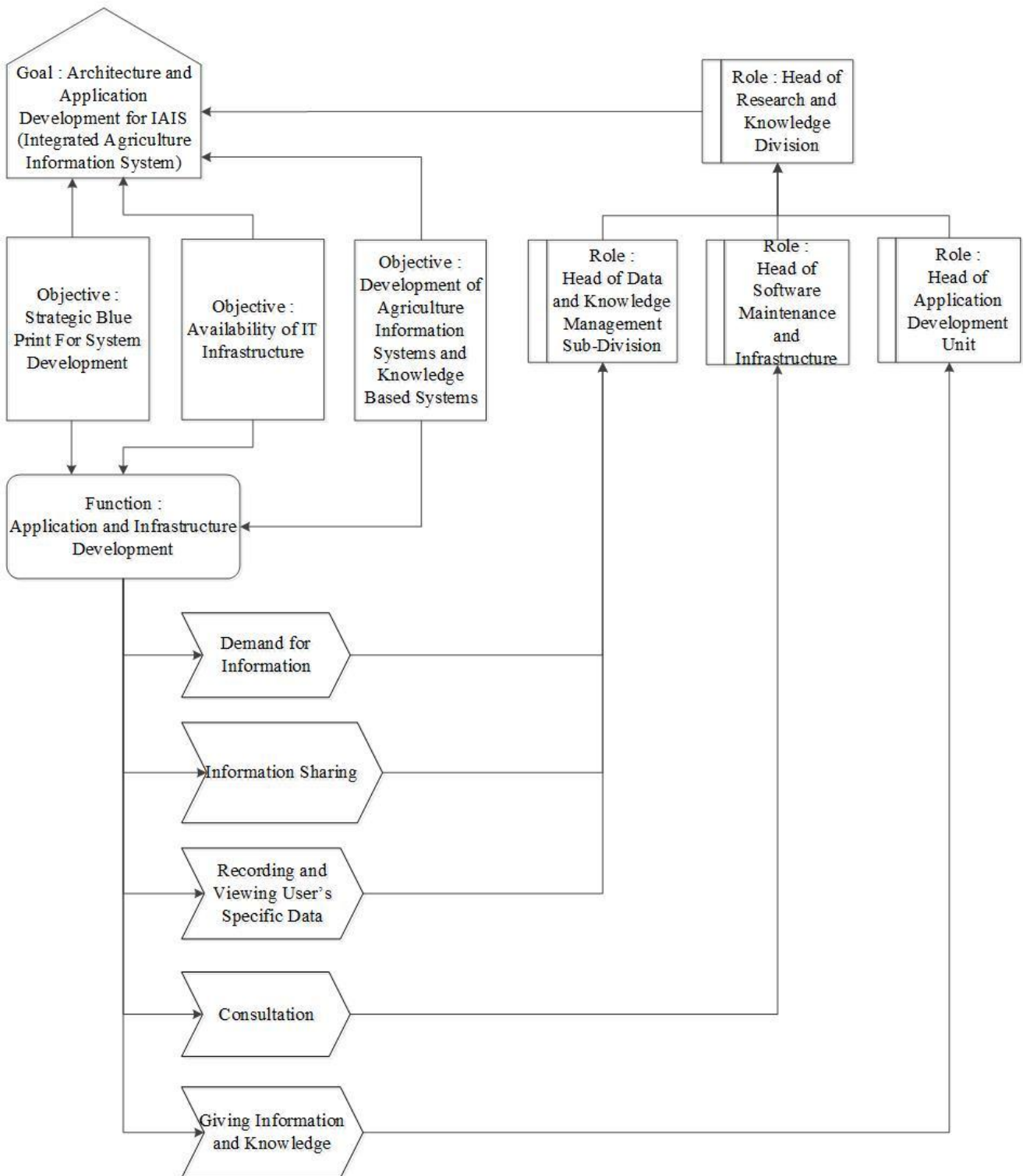


Figure 8: IAIS Second Goal, Objective, Function, Services, and Actors Diagram

Goal3 - Goal / Objective / Service Diagram

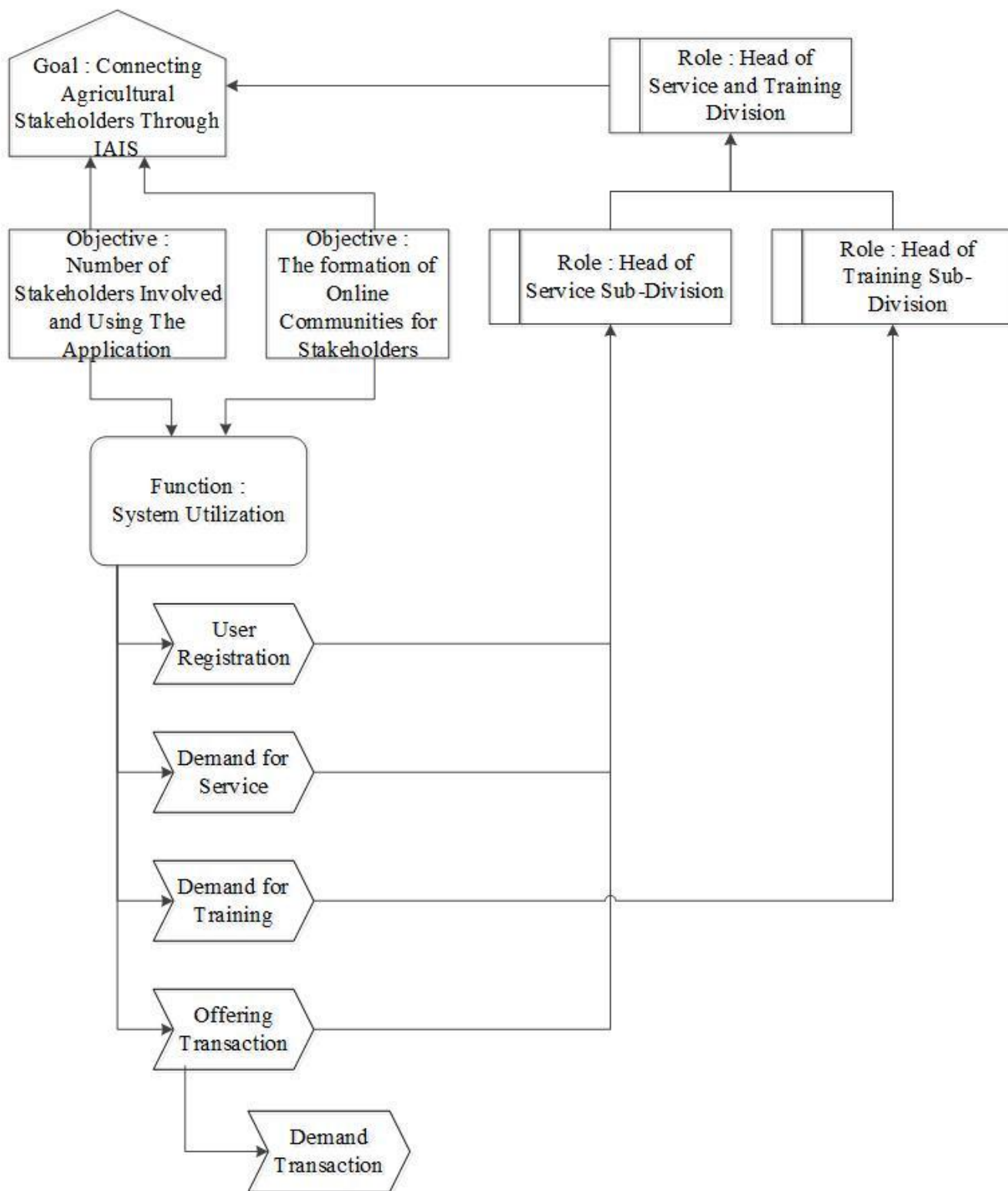


Figure 9: IAIS Third Goal, Objective, Function, Services, and Actors Diagram

## CONCLUSION:

### Based on the analysis, it can be concluded:

1. IAIS Architecture has three main targets such as (1) Farmers Empowerment to use ICT Tools; (2) Developing Architecture and Application for IAIS and (3) IAIS as a communication tools among stakeholders in agriculture sector.
2. IAIS Developer Organization has four divisions such as System Research and Development, Service and Training Division, Quality Assurance Division, and Governance Division
3. There are four functions and ten services offered by IAIS. Those 4 functions are: (1) System, Information Technology Infrastructure, and Organization Standardization; (2) Developing, managing, and maintaining application and infrastructure; (3) IAIS Implementation; (4) Management and Organization. The ten services offered are (1) User Registration; (2) Requesting Application Services; (3) Requesting Information and Communication Technology Training Services; (4) Tendering Services; (5) Requesting Services; (6) Requesting Information; (7) Information Sharing; (8) Consulting (9) Recording and Observing User Specific Data; (10) Giving Agriculture Information and Knowledge

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# THE EFFECTS OF FORMAL INSTRUCTION ON THE ACQUISITION OF ENGLISH FRICATIVE CONSONANTS OF INDONESIAN EFL LEARNERS

*Sukardi Weda,*

English Literature,  
Study Program  
Universitas Negeri Makassar, Indonesia.

*Andi Elsa Fadhilah Sakti,*

English Literature  
Study Program, Universitas Negeri  
Makassar, Indonesia

## ABSTRACT

*Indonesian and English fricative consonants reveal different phonetic classification and symbols in the International Phonetic Alphabet (IPA). English has voiceless labiodental /f/, voiceless dental /θ/, voiceless alveolar /s/, voiceless palato-alveolar (post-alveolar) /ʃ/, voiced labiodental /v/, voiced dental /ð/, voiced alveolar /z/, and voiced palato-alveolar (post-alveolar) /ʒ/. Indonesian has voiceless labiodental /f/, voiceless alveolar /s/, voiced labiodental /v/, and voiced alveolar /z/. Indonesian does not have voiceless dental /θ/, voiced dental /ð/, voiceless palato-alveolar (post-alveolar) /ʃ/, and palato-alveolar (post-alveolar) /ʒ/. The difference in phonetic classification and symbol overlooks subsegmental difference in aspiration that exists between the two. In English there are many sounds symbolized by palato alveolar /ʃ/ and /ʒ/, and dental /θ/ and /ð/, which are absent in Indonesian. These sounds make difficulties to Indonesian speakers of English. This study therefore aims to find out whether formal instruction improve the acquisition of English fricative consonants by Indonesian learners of English. The population of this study is students of English Literature Study Program Faculty of Languages and Literature Universitas Negeri Makassar Indonesia. The study reveals that formal instruction improved the acquisition of English fricative consonants by Indonesian learners of English.*

**Keywords:** Formal instruction, fricative consonants, English, Indonesian learners of English.

## INTRODUCTION:

(Gimson, 1985a) reveals that each of us uses infinite number of different speech sounds when we speak English. Gimson therefore argues that it is true to say that it is difficult to produce two sounds which are precisely identical from the point of view of instrumental measurement: two utterances by the same person of the word 'cat' may well show quite marked differences when measured instrumentally.

(Weda, 1998) states that as a foreign language, English presents great difficulties with regard to its pronunciation. The pronunciation of English poses many problems of a different kind from those which we face when we learn our mother tongue (first language). (Gimson A. , 1987) points out that, before we try to produce sounds which we are new to us, it is therefore essential that we should perceive the differences between the sounds in the new language, and between the new sounds and those of our own languages with which we have become so familiar. (Weda, 2009) reports from his study that Indonesian university students had difficulties in identifying the stress for 3 to 7 syllable words under the umbrella of phonology. (Weda, 2005) focused on studying stress because Indonesian speakers of English tend to stress words randomly and this phenomenon tends to produce incorrect pronunciation which will give negative effect in maintaining communication with others, especially for the native speakers of English. (Weda, 2014) emphasizes that stress studies under the umbrella of phonology needs serious attention, because there can be unsuitable stress used in communication that may lead to misunderstanding or miscommunication. Weda adds that the accuracy of acceptability of stress in utterances will give a clear signal to the listeners, and improve the quality of speakers' utterances.

The study by (Brown, 2000) sought to experimentally investigate how the grammars of Japanese speakers, Korean speakers, and Mandarin Chinese speakers affect their acquisition of English contrasts and whether, given the necessary conditions, novel segmental representations can be constructed. Brown found that the acquisition of a second language (L2) is clearly somehow different from that of a first language (L1): adult second language learners rarely (if ever) achieve the same native competence that children do learning their first language and, conversely, children never experience the degree of difficulty that L2 learners do.

Language is unique, because the speaker of language A sometimes meets difficulties in uttering the sounds of Language B but the speaker of language B can produce the sounds of language A easily. This is because, the speaker B is familiar with the sound in his mother tongue, as an example is Indonesian speakers of English can produce [ŋ] sound at the beginning of a word easily, because this sound can occur at the beginning of Indonesian language, for example at the word 'jambek' and 'jilu' while in English 'ŋ' sound is absent at the beginning of a word and the English speaker find difficulties to pronounce the sound in at the beginning of a word. (Fromkin, Rodman, & Hyams, 2007) gave good example in keeping with this statement. They exemplify that a sound such [ŋ] is difficult for an English speaker to pronounce at the beginning of a word but easy for a Vietnamese speaker means that there is no general notion of "difficulty of articulation" that can explain all of the sound patterns of particular language. For some Buginese speakers in pronouncing plosive /p/, they tend to pronounce labiodental /f/, either in pronouncing Indonesian words, English words, and other languages.

Second language (L2) or Foreign Language (FL) learners sometimes meet difficulties in pronouncing new words in an L2 or FL. In adult language learning, the attempt to master the phonological subtleties of another language can become the source of great difficulty for teacher and student alike when the reality of a learner's target language production does not meet established goals (Reeder, 1997).

The purpose of this study was to determine whether a foreign or second language formal instruction in the pronunciation practice of English fricative consonants causes the pronunciation of those fricative consonants by Indonesian speakers of English as a foreign language (EFL) to become closer to the speakers of English sounds. Two key questions are addressed: Do the students have good pronunciation of English fricative consonants after they followed the pronunciation practice in phonology subject? and what are the constraints of students' pronunciation in English fricative consonants?

Scovel, in his comprehensive overview of the critical period in 1998, stated that phonological accents in a second language (L2), more than other linguistic skills, would most exhibit age effects because accent was the only part of language that was physical and demanded neuromuscular programming (Ioup, 2008).

Weda (2012) reveals that one of the things that everybody knows about language is that they have different accents. (Roach, 1987) argues that languages are pronounced differently by people from different geographical places, from different social classes, of different ages and different educational background.

## LITERATURE REVIEW:

(Weda, 2012) says that as a second or foreign language in many countries, English presents great difficulties dealing with its language elements (grammar, vocabulary, and pronunciation). The pronunciation of English

reveals many problems because the way of pronouncing English and Indonesian sounds or phonemes is different. (Karjo, 2016) describes that one of the five phonological factors causing stress placement errors is mispronunciation. Therefore the Indonesian learners of English should understand the sound symbols or phonemes in English. This is because some English consonants differ with Indonesian consonants. Clearly, look at the place and manner of articulation of Indonesian and English as revealed in table 1 and 2.

**INDONESIAN CONSONANTS SOUNDS:**

**Table 1: Indonesian consonant sounds (Soderberg, 2008)**

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Palatal	Velar	Glottal
Plosive & affricate	p b		ɾ	d	tʃ dʒ		k g	(ʔ)
Nasal	M			n		ɲ	ŋ	
Flap/trill				r				
Fricative		(f)		s (z)	(ʃ)			
Approximant	w					j		
Lateral approximant				l				

**ENGLISH CONSONANT SOUNDS:**

**Table 2: Table of English consonant phonemes (Roach, 1987), (Díaz-Campos, 2004)**

	Bilabial	Labiodental	Dental	Alveolar	Palato-alveolar	Palatal	Velar	Glottal
	- +	- +	- +	- +	- +		- +	
Plosive	p b			t d			k g	
Fricative		f v	θ ð	s z	ʃ ʒ			h
Affricate					tʃ dʒ			
Nasal	m			n			ŋ	
Lateral				l			ɭ	
Flap					r			
Approximant					ɹ ɻ			
Glide	w					j		

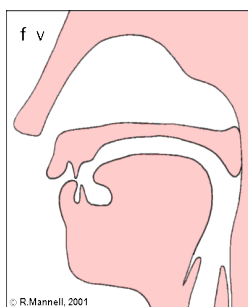
**THE FRICATIVES OF ENGLISH:**

The fricative consonants in English can be seen in the tabel 3 below: *Table 3. The fricative consonants of English (Roach, 1987)*

	Labiodental	Dental	Alveolar	Palato-alveolar	glottal
Fortis (Voiceless)	f	θ	s	ʃ	h
Lenis (Voiced)	v	ð	z	ʒ	

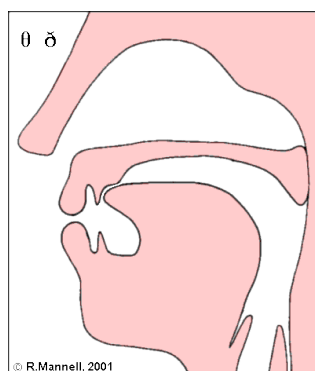
Now we will look at the fricative consonants separately, according to their place of articulation. The following examples are taken from (Roach, 1987) and the figures are taken from (Mannell, 2009).

f, v (example words: ‘fan,’ ‘van’; ‘safer,’ ‘saver,’ ‘half,’ ‘halve’). These are labiodental, that is the lower lip is in contact with the upper teeth as shown in Figure 1. The fricative noise is never very strong and is scarcely audible in the case of v (Roach, 1987).



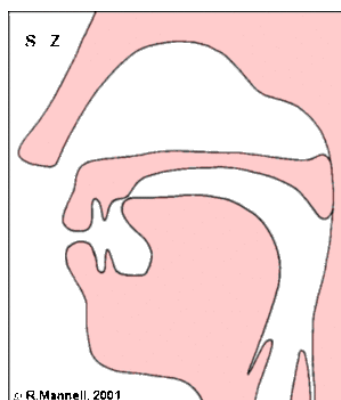
**Figure 1: Articulation of Labiodental fricatives (Mannell, 2009)**

θ, ð (example words: ‘thumb,’ ‘thus;’ ‘either,’ ‘father;’ ‘breath,’ ‘beathe’). The dental fricatives have sometimes been described as if the tongue was actually placed between the teeth, and it is common for teachers to make their students do this when they are trying to teach them to make this sound (Road, 1987). In fact, however, the tongue is placed inside the teeth, as shown in Figure 2, with the tip touching the inside of the lower front teeth and the blade touching the inside of the upper teeth. The air escapes through the gaps between the tongue and the teeth (Road, 1987).



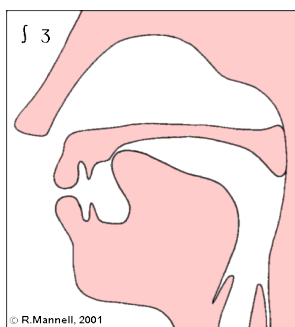
**Figure 2: Articulation of dental fricatives (Mannell, 2009)**

s, z (example words: ‘sip,’ ‘zip;’ ‘facing,’ ‘phasing;’ ‘rice,’ ‘rise’). These are alveolar fricatives, with the same place of articulation as t and d (Roach, 1987). He adds that to produce alveolar fricatives, the air escapes through a narrow passage along the centre of the tongue, and the sound produced is comparatively intense. The tongue position is shown in Figure 3.



**Figure 3: Articulation of alveolar fricatives (Mannell, 2009)**

ʃ, ʒ (example words: ‘ship,’ (initial ʒ is very rare in English); ‘Russia,’ ‘measure;’ ‘Irish,’ ‘garage’). These fricatives are called palato-alveolar, which can be taken to mean that their place of articulation is partly palatal, partly alveolar (Roach, 1987). He then adds that the tongue is in contact with an area slightly further back than that: for s, z as revealed in Figure 4. Roach also suggests that if we make s, then ʃ, we should be able to feel our tongue move backwards in which the air escapes through a passage along the centre of the tongue, as in s and z, but the passage is a little wider.



**Figure 4: Articulation of palato-alveolar fricatives (Mannell, 2009)**

h (example words: ‘head,’ ‘ahead,’ ‘playhouse’). The place of articulation of this consonant is glottal. This means that the narrowing that produces the friction noise is between the vocal cords (Roach, 1987). Roach then adds that if we breathe out silently, then produce h, we are moving our vocal cords from wide apart to close together. Phonologically, h is a consonant. It is usually found before vowels. As well as being found in initial position it is found medially in words such as: ‘ahead’ əhed, ‘greenhouse’ gri:nhaʊs (Roach, 1987).

### PREVIOUS STUDIES:

In linguistic study domain, phonology is one of the most interesting topics to discuss but very little studies are available about the phonological studies in Indonesian context. May be because, this subject is claimed as one of the most difficult subjects in the area of linguistics. Some students say that phonology is very difficult subject and it needs high concentration to understand each topic revealed in the subject. Some other lecturers avoid to teach phonology because it presents very complicated materials. In keeping with this, (Gimson A. C., 1985a) says that although linguistic science has made rapid and spectacular progress in the present century, it is not merely in modern times that speech and language have been the object of serious study. Extensive study done by Indonesian linguists focusing on the pronunciation and phonology in English in Indonesian context today also becomes difficult effort. Therefore this study focuses on the fricative consonants in English made by Indonesian speakers of English becomes one of endeavors to conduct study in the area of phonology in Indonesia. In the teaching-learning process in the classroom setting, the lecturer should employ a variety of methods and approaches to attract students’ involvement and participation. One of the very early methods employed in the classroom is the formal instruction with various activities.

In the international context, some studies have been conducted to show the effects of formal instruction of pronunciation towards the acquisition of pronunciation by L2 or FL learners. (González-Bueno, 1997) demonstrates that after receiving formal instruction in the pronunciation of Spanish stops, subjects of the experimental group produced Spanish stops with VOT duration at the post test were shorter than the VOT duration of stops produced at the pretest. He adds that formal instruction can account for the improvement in the pronunciation of only these two sounds, /p/ and /g/. However, it would appear that the trend towards improvement in the pronunciation of the remaining stops /b, t, d, k/ by the experimental subjects is also due to formal instruction in the pronunciation of these Spanish sounds. The conclusion of González-Bueno’s studies is that the experiment seem to be an indication of some positive effect that formal instruction has on the improvement of the pronunciation of Spanish stops.

(Elliot, 1995) reports that, to determine the success of using formal instruction to improve L2 pronunciation, the research findings revealed that the methodology used for teaching pronunciation can be significantly improved in pronunciation for the subjects in the experimental group. He therefore adds that the type of instruction provided can be described as multimodal consisting of: (a) teaching concrete rules about point, place, and manner of articulation; (b) designing class presentations on pronunciation that appeal to individual differences in learning styles and preferences-aurally (e.g., listening passages with student attention focused on sound over meaning), orally (e.g., word and sentence repetition exercises), and visually (e.g., the use of articulatory facial diagrams); (c) employing both deductive and inductive modes of teaching pronunciation; (d) providing students with ample drill and practice exercises; and (e) giving immediate feedback in order to prevent phonological fossilization.

(Elliot, 1997) study sought improvement in the L2 pronunciation of the subjects through formal phonological instruction. He states that the subject pronunciation improved significantly for the word reading, sentence repetition, and word repetition exercise. Experimental group pronunciation of the free elicitation portion of the pronunciation test approached statistical significance. (Díaz-Campos, 2004) reveals that other important

independent variables play a role in L2 pronunciation, specifically, the following eight factor groups were found to be statistically significant; years of formal language instruction, reported use of Spanish before the semester, reported use of Spanish outside the classroom during the semester (days), reported use of Spanish outside the classroom during the semester (hours), gender, entrance OPI, exit OPI, and level at which formal instruction began.

Bui (2016) showed that the EFL learners’ problems in pronouncing /θ/ and /ð/ need attention from the teachers. Along with giving proper instruction, the teachers can acknowledge the students about the possible mistakes they might make. Moreover, it is significant to create an environment in which the students can feel confident and motivated to make use of their English on a regular basis. These studies show the benefits of the inclusion of formal instruction in improving learners’ pronunciation in L2 classroom. Similarly, this study examines whether the formal instruction can improve students’ pronunciation in fricative consonants.

**RESEARCH METHOD:**

**Experimental Design and Methodology:**

The hypothesis that the present study tests is: Formal instruction in phonology subject improve students’ pronunciation in English fricative consonants among Indonesian learners of English. The process of acquisition of fricative sounds of experiment group will improve much more than the pronunciation of a control group which does not receive formal instruction.

In this study, formal instruction is the independent variable and the improvement of the pronunciation of English fricative consonants is dependent variable. The pre-test and post-test of experimental group and control group were analyzed using Statistical Package for Social Sciences (SPSS). In this present study, both the experimental and the control group received identical treatment except for formal instruction as independent variable on English fricative pronunciation, which was given only to the experimental group (English Literature Class A).

**Subjects of the Study:**

The subjects of the study were 67 students at the English Literature Study Program Faculty of Languages and Literature *Universitas Negeri Makassar* (UNM), 18 males and 49 females, between 17 and 19 ages. The subjects were registered in the first semester and attended phonology subject.

The experimental group was the class B of the phonology subject and the control group was the class A of the phonology subject.

**Table 4: Subjects’ Information**

School Level	Major	Semester	N	Gender
University	English Literature study program	1 <sup>st</sup> Semester	67	18 males, 49 females

The subjects were recorded in the beginning of the course. They were asked to read list of words in which they have fricative consonants. After giving formal instruction to experimental group as treatment for 14 meetings, the researcher therefore gave them posttest. The list of words in the posttest was the same in which the researcher asked the subjects to read the words to identify the fricative consonant pronunciation.

Both the experimental and the control groups met for 90-minutes sessions per week. Only the experimental group received formal instruction in the articulation and perception of English /f, θ, s, ʃ, v, ð, z, ʒ/. The formal instruction consisted of a five to seven minute periods at the beginning of the experimental group. The study was conducted in one semester on September 2016 to January 2017.

**In the control class, the instructional pattern was as follows:**

- 1) A theoretical and practical introduction to the articulation of English voiceless and voiced fricative consonants is given. The theoretical introduction explained what fricative consonants consist of, especially in English, with reference to their articulatory, acoustic, and mingographic tracings. Diagrams or picture of articulator position (tongue, teeth, and lips) of organic speech for each fricative consonant which were shown on the slides. For purpose of practice, students were asked to produce the fricative consonants, either in their representation as symbols or as segments in certain words. The teacher frequently gave examples to the students, by producing the fricative consonants followed by the students, the sound symbols pronounced by the lecturer and the students repeated the sounds.
- 2) Another activity was the students were asked to provide examples of fricative sounds in the words.
- 3) Finally, the students were asked to present the topics in phonology in group tasks.

**The Test:**

There are two test in this study. The pre-test was administered at the beginning of the study and the post-test was administered at the last meeting. Between the two tests, there was treatment given to the students, that is “formal instruction” in which all topics relating to the pronunciation practice and theory of phonology and phonetics, especially the fricative consonant sound. There were a variety of activities in the treatment, those are classroom presentation in which the students presented their slides dealing with the phonological items, consonants, voiced and voiceless consonants, manner of articulation, place of articulation, phonemes, vowels, diphthongs, etc. and the students repeated the sounds after the lecturer. The words in which the fricative sounds exist can be seen in the following list of words.

**Table 5: List of words in fricative consonant testing**

Labiodental /f v/	Dental /θ ð/	Alveolar /s z/	Palato-aleolar /ʃ ʒ/	Glottal /h/
face /feis/	thing /θiŋ/	see /si:/	shoe /ʃu:/	here /hiə(r)/
laugh /læf/	health /helθ/	rice /rais/	action /'ækʃn/	behind /bi'haind/
very /'veri/	these /ði:z/	zoo /zu:/	vision /'viʒn/	
save /seiv/	breathe /bri:θ/	rise /raiz/	usual /'ju:ʒl/	

**Procedure of Data Collection:**

The data were collected using a written test. The data obtained from the written test were checked to enable the researcher to identify the correct and incorrect pronunciation of English fricative consonants found in the testee in English. The fricative consonant transcription were identified, noted, calculated, and analyzed.

**Technique of Data Analysis:**

The data will be analyzed using inferential and descriptive statistics (Statistical Package for Social Sciences/SPSS) IBM SPSS Statistics 20 showing the t-test, mean, standard deviation (SD), percentage, and histogram. The most significant source for actual English fricative transcription was Oxford Advanced Learner’s Dictionary of Current English by (Hornby, 1987).

**RESULTS AND DISCUSSION:**

The performance of the students in the experimental and control groups was shown that the mean score, standard deviation, and percentage of students’ correct pronunciation on the fricative English consonants. The means and standard deviation of each fricative consonant and for each group, both at pretest and posttest, were calculated and stated in table 10 and 11.

**Pretest (Experimental Group):**

**Table 6: Subjects’ correct and incorrect transcription percentage in pretest for experimental group**

Labiodental /f v/	Correct	Incorrect	Incorrect Transcription
face /feis/	32 (100)	0	
laugh /læf/	10 (31.25)	22 (68.75)	/ləv/,/lau/,/ləv/,/lauv/,/laugh/,/lav/,/lovv/,/lauegh/,/la:fh/, /la:ffh/,/leuv/,/laug/
very /'veri/	31 (96.88)	1 (3.12)	/'eri/
save /seiv/	26 (81.25)	6 (18.75)	/seif/,/safe/,/saif/,/sef/,/sef:/
Dental /θ ð/			
thing /θiŋ/	5 (15.62)	27 (84.38)	/dzing/,/dzin/,/ting/,/dzink/,/tsin:k/,/ts:ink/,/thingk/,/thi:k/, /t:ink/,/tink/,/thing/ti:nk/,/tingk/,/ti:nk/,/ti'ng/
health /helθ/	4 (12.5)	28 (87.5)	/helt/,/helth/,/hel:th/hal:th/,/helt:h/,/hi:lth/,/hel:th/,/hèl:t/ /hə:lt/,/hə:lt/,/hi:elt/,/hi:elt/,/hilth/,/heel/,/
these / ði:z)	2 (6.25)	30 (93.75)	/di:z/,/thēs/,/dese/,/thiz/,des/, /des/,/di:s/,/dis/,/dez/,/dez/,/tis/,dêβ/,/θi:s/,/dise/,/ti:is/dhi:s/ /tese/,/θəs/,/θish/,/des/,/di:z/,/thēs/,/dese/,/dɜs/,/

Labiodental /f v/	Correct	Incorrect	Incorrect Transcription
breathe /bri: ð/	0	32 (100)	/breit/, /brit/, /bre:t/, /breth/, /brif/, /bre:th/, /bre:t/, /bre:th/, /bre:/, /bre:h/ /bri:th/, /breth/, /breth:/breəθh/, /br:th/, /br:eth/ /br:ith/, /brith/, /berithe/, /brə:θ/, /bret/, /breθ/, /brit/brith/, /bräth/, /breith/, /breat/, /brit:h/, /brithe/, /bride/, /bret/, /brid/, /briths/, /brith' /
<b>Alveolar /s z/</b>			
see /si:/	32 (100)	0	
rice /rais/	30 (93.75)	2 (6.25)	/raiz/
zoo /zu:/	32 (100)	0	
rise /raiz/	0	32 (100)	/rais/, /raise/, /r-a-i-s/, /ri:s/, /ris/, /rays/, /ris/, /
<b>Palato-aleolar /ʃ ʒ/</b>			
shoe /ʃu:/	1 (3.12)	31 (96.88)	/syu/, /soe/, /shu/, /s-h-u/, /shü/, /su:e/, /syü/, /sue/, /shu:/, /sow/ /so/, /su/
action /'ækʃn/	2 (6.25)	30 (93.75)	/eksyen/, /aktion/, /aktim/, /e-g-s-y-e-n/, /æktion/, /eiktjen/ /ek:sion/, /ɜksion/, /eksen/, /aksyen/, /ëksyen/, /äksyen/, /ak'sion/, /aksion/, /eksien/, /eksian/, /eksyien/, /eksion/, /ekssyien/,
vision /'viʒn/	2 (6.25)	30 (93.75)	/visyen/, /vison/, /visien/, /v-i-s-y-o-n/, /vision/, /visi:en/, /visiyen/ /visyēn/, /visiən/, /vesion/, /visyion/, /visiyen/, /visiön/, /fisi:n/, /visyien/
usual /'ju:ʒl/	1 (3.12)	31 (96.88)	/yusual/, /y-u-z-u-a-l/, /uzual/, /uizal/, /ju:zəl/, /usuʌl/ /yusuel/, /uzuel/, /yuzwel/, /uzual/, /usual/, /u:sual/, /yusuəl/, /yusel/, /'yusual/
<b>Glottal /h/</b>			
here /hiə(r)/	32 (100)	0	
behind /bi'haind/	32 (100)	0	

**Pretest (Control Group):**

**Table 7: Subjects' correct and incorrect transcription percentage in pretest for control group**

Labiodental /f v/	Correct (%)	Incorrent (%)	Incorrect Transcription
face /feis/	33 (94.29)	2 (5.71)	/ves/
laugh /læf/	14 (40)	21 (60)	/lav/, /logh/, /ləu:k/, /lagh/, /lau:k/, /lov/, /lakhv/, /lə:uft/, /legh/, /la:gh/, /laugh/, /laug/, /lau:g/, /lag/
very /'veri/	30 (85.71)	5 (14.29)	/ferui/, /feriy/, /feri/, /'feri/
save /seiv/	19 (54.29)	16 (45.71)	/seve/, /sef/, /tsef/, /seif/, /se:f/, /sèif/, /save/, /sef/, /saf/, /
<b>Dental /θ ð/</b>			
thing /θink/	3 (8.57)	32 (91.49)	/tinkg/, /tink/, /tin:/, /think/, /ting/, /tsink/, /tsing/, /th:ng/, /thingk/, /thing/, /thin/, /thi:ng/, /ti:ng/, /t:ing/, /sing/, /tingk/ /tink/, /:ting/
health /helθ/	2 (5.71)	33 (94.29)	/helt/, /helth/, /hel:th/, /hal:th/, /helt:h/hèl:t/, /hə:lt/, /hi:elt/, /hilth/, /helt/
these /ði:z)	2 (5.71)	33 (94.29)	/di:z/, /tese/, /des/, /t-d-i-s-s/, /dis/, /diis/, /dh:es/, /th:s/, /teis/, /θis/, /
breathe /bri: ð/	1 (2.86)	34 (97.14)	/breit/, /brit/, /breth/, /brif/, /bre:th/, /bre:t/, /bre:/, /bre:h/, /bri:th/, /breth:/, /breəθh/, /br:th/, /br:eth/, /br:ith/, /brith/, /berithe/, /brə:θ/, /bret/, /breθ/, /brith/

Labiodental /f v/	Correct (%)	Incorrent (%)	Incorrect Transcription
<b>Alveolar /s z/</b>			
see /si:/	35 (100)	0	
rice /rais/	30 (85.71)	5 (14.29)	raiβ
zoo /zu:/	34 (97.14)	1 (2.86)	/su:/
rise /raiz/	0	35 (100)	/rais/
<b>Palato-aleolar /ʃ ʒ/</b>			
shoe /ʃu:/	2 (5.71)	33 (94.29)	/shu/,/su:/,/syu/,/sue/,/syu:/,/s:yu/,/sho:/,/shu/s/,/shyu/, /syû/,/shaw/,/sö/,/syu:u/,/su'e/,/shar/,/su/,/sou/,/shu/,/
action /'ækʃn/	2 (5.71)	33 (94.29)	/eksyen/,/æksyen/,/eksien/,/eksyien/,/aksyen/,/eksyen/,/ac:ti/ /action/,/ek:syen/,/æksien/,/ekthem/,/ac:ion/,/aksion/, /æktion/,/eksio:n/,/aksyion/eksion/
vision /'viʒn/	2 (5.71)	33 (94.29)	/visien/,/visyen/,/visi:en/,/vis:o/,/vision/,/fi:syen/,/vison/,/ vition/, /visɜn/,/fi:si:en/, /visin/,/vesyon/,/
usual /'ju:ʒl/	0	35 (100)	/yusuəl/,/yusel/,/uzel/,/yu:sual/,/yusual/,/u:sual/,/juzel/, /yuzel/,/usel/,/yuzuel/,/yûsual/,/us:l/,/usuel/,/us:l/,/yu:swèl/ /yu:su:el/,/yuzel/,/usual/,/yuzuəl/,/usual/
<b>Glottal /h/</b>			
here /hiə(r)/	35 (100)	0	
behind /bi'haind/	35 (100)	0	

**Posttest (Experimental Group):**

**Table 8: Subjects' correct and incorrect transcription percentage in posttest for experimental group**

Labiodental /f v/	Correct	Incorrent	Incorrect Transcription
face /feis/	32 (100)	0	
laugh /læf/	23 (71.87)	9 (28.13)	/læv/, /la:v/, /lauv/, /lav/, /læ:v/, /l^v/, /lagh/, /l^æf/, /la'v/
very /'veri/	32 (100)	0	
save /seiv/	27 (84.38)	5 (15.62)	/seif/, /se:if/, /sæf/, /sa'f/
<b>Dental /θ ð/</b>			
thing /θiŋ/	23 (71.87)	9 (28.13)	/ðing/, /diŋ/, /thin/
health /helθ/	17 (53.13)	15 (46.87)	/helt/, /helð/, /həlt/, /helth/, /həlt/, /head/, /hel:d/he:lt/, /heəlt/, healð/
these / ði:z)	26 (81.25)	6 (18.75)	/di:s/, /dhes/, /te's/, /
breathe /bri: ð/	21 (65.63)	11 (34.37)	/bret/, /b:eth/, /bereth/, /bri:th/, /briəðh/, /brait:he/, /bri:t/, /b(r)ith/, /breithe/, /bread/, /breatθe/
<b>Alveolar /s z/</b>			
see /si:/	32 (100)	0	

Labiodental /f v/	Correct	Incorrent	Incorrect Transcription
rice /rais/	29 (90.63)	3 (9.27)	/r^iz/, /raiz/
zoo /zu:/	32 (100)	0	
rise /raiz/	17 (53.13)	15 (46.87)	/rais/, /r^is/
<b>Palato-aleolar /ʃ ʒ/</b>			
shoe /ʃu:/	16 (50)	16 (50)	/ʳsyu/, /su:/, /syu:/sui/, /sj:uu/, /shu:/, /syu/, /soe/
action /'ækʃn/	16 (50)	16 (50)	/æksyen/, /ekzien/, /ek:syen/, /'eksyen/, /ε:sion/, /ak:tion/, /eksen/, æksiæn/. /aksyen/, /ek:syen/, /aksion/, /æctision/, /ækan/, /eksion/
vision /'viʒn/	17 (53.13)	15 (46.87)	/viʃon/, /visiøn/, /viʃion/, /'viʃøn/, /vi:ʃn/, /visiøn/, /viʃn/, /vi:ʃiøn/, /vi:ʃen/, /visen/, /visien/, /vizion/, /vizon/, /vi:ʃion/
usual /'ju:ʒl/	17 (53.13)	15 (46.87)	/yusual/, /usual/, /yu:sel/, /ju:sual/, /yu.su.al/, /yuzel/, /usuəl/, /ju:zuəl/
<b>Glottal /h/</b>			
here /hiə(r)/	32 (100)	0	
behind /bi'haind/	32 (100)	0	

**Posttest (Control Group):**

**Table 9: Subjects' correct and incorrect transcription percentage in posttest for control group**

Labiodental /f v/	Correct (%)	Incorrent (%)	Incorrect Transcription
face /feis/	35 (100)	0	
laugh /læf/	29 (82.86)	6 (17.14)	/l^k/, /lauft/, /lau:c/, /lav/, /laug:h/, /laft/
very /'veri/	34 (97.14)	1 (2.86)	/ʳfe:ri/
save /seiv/	24 (68.57)	11 (31.43)	/seif/, /sef/, /sæf/, /səf/, /saf/
<b>Dental /θ ð/</b>			
thing /θink/	17 (48.57)	18 (51.43)	/tiŋ/, /thing/, /ti:ng/, /thin/, /ting/, /tin:k/
health /helθ/	14 (40)	21 (60)	/ʳhə,lt/, /helt/, /helt/, /helth/, /he:lf/, /həlt/, /'həlt/, /halth/, /həalth/, /hæ:l/, /hælt/, /halth/, /həalt/, /'həilt/, /hælt/, /
these /ði:z)	16 (45.71)	19 (54.29)	/dis/, /thez/, /di:s/, /the:s/, /thi:z/, /ti:s/, /this/, /these/, /des/, /tis/, /əi:z/
breathe /bri: ð/	12 (34.29)	23 (65.71)	/briət/, /bred/, /bre:st/, /bræt/, /briə/, /breth/, /bri:th/, /bre:lt/, /bri:ə/, /bre:it/, /brid/, /briəth/, /briet:/, /brit/, /brith/, /b:etʃ/, /bri:ə/
<b>Alveolar /s z/</b>			
see /si:/	35 (100)	0	
rice /rais/	32 (91.43)	3 (8.57)	/raiʃ/, /raic/, /raiz/
zoo /zu:/	35 (100)	0	
rise /raiz/	21	14	/rais/, /ris/, /ra:is/, /rai:s/, /'rais/, /r^is/, /r^is/

Labiodental /f v/	Correct (%)	Incorrent (%)	Incorrect Transcription
	(60)	(40)	
<b>Palato-aleolar /ʃ ʒ/</b>			
shoe /ʃu:/	21 (60)	14 (40)	/shu/, /shoo/, /səu/, /shu:/, /sue/, /su:/, /su/, /syu/, /shu/
action /'ækʃn/	16 (45.71)	19 (54.29)	/æksən/, /eik:sən/, /akshən/, /eksen/, /eksyen/, /'æksyən/, /æksən/, /ac:sən/, /aksien/, /əksən/, /eksion/, /a:syən/, /aksiən/, /'eksyen/, /'æksn/, /astion/, /eksyein/
vision /'viʒn/	18 (51.43)	17 (48.57)	/vi:sien/, /vitʃən/, /vizhən/, /visən/, /viʃn/, /vi:syən/, /visi:ən/, /vis/, /fæsan/, /vijion/, /vʒən/, /visien/, /visyien/, /vision/, /fæsan/, /viʃen/, /visien/
usual /'ju:ʒl/	15 (42.86)	20 (57.14)	/yu:sual/, /yə'zual/, /yuzuəl/, /yu:zuel/, /usuəl/, /yuzual/, /'yuzual/, /usual/, /ju:su:al/, /yu:zuak/, /usuəl/, /yusal/, /usual/
<b>Glottal /h/</b>			
here /hiə(r)/	35 (100)	0	
behind /bi'haind/	35 (100)	0	

As revealed in tables 4 and 5 in pretest for experimental and control group, the subjects faced difficulties in pronouncing labiodental fricative ‘f’ in final position for word “laugh” and they met difficulties in pronouncing labiodental fricative ‘v’ in final position for word “save.”

In pronouncing dental fricative ‘θ’ and ‘ð,’ the subjects found difficulties, either in initial position or final position. As illustrated in table 2 and 3, above 90% of misspronouncing words made by the subjects. The tables 2 and 3 also show that the subject met difficulties in pronouncing palato-aleolar /ʃ and ʒ/, in which above 94% of misspronouncing words made by the subject, either in initial or final position. The subjects also met difficulties in pronouncing alveolar ‘z’ in final position, as in word “rise,” and 100% of misspronouncing words made by the subjects, either in pretest or in posttest. In posttest for experimental and control group as shown in table 6 and 7, in posttest for control group, the subjects still met difficulties in pronouncing dental ‘θ’ in initial and final position, where there were above 50% of misspronouncing words made by the subjects, either in initial and final position. They also met difficulties in pronouncing dental ‘ð’ in initial and final position, where there were above 50% of the subjects misspronouncing in words “thing,” “health,” “these,” and “breathe.”

In posttest for experimental group, the misspronouncing words were under 50%. This means that there were some great changes made by the subjects after giving formal instruction in the classroom setting.

Therefore, the statistical testing reveals that the formal instruction improved the subjects’ acquisition of fricative consonants as illustrated in the following mean score, standar deviation (SD), significance test, and t-test.

This present study was designed to determine the success of using formal instruction to improve EFL pronunciation. The findings revealed that the methodology used for teaching pronunciation significantly improved the pronunciation for the subjects in the experimental group. The type of formal instruction consisting of: (i) speech organs, (ii) teaching concrete rules about point and manner of articulation, (iii) consonants, (iv) chart of cardinal vowels, (v) short and long vowels, (vi) diphthongs, (vii) triphthongs, (viii) stress. After attending mid-term test, the subjects were grouped into 6 and they presented their group tasks on different topics to practice their pronunciation and understanding.

Test of significance (t-test) was used to test the hypothesis. This test was used to identify the significant difference between the results of students’ mean score of the students who were taught the subject using formal instruction and the students who were taught the subject using conventional way. In conventional way, the teacher focused on transferring materials or topics in front of the classroom without classroom presentation of the students.

**Table 10: The mean score and standard deviation of students’ pretest**

Group	Sample	Mean Score	Standard Deviation
Experimental	32	8.16	2.23
Control	35	7.80	2.15

Table 10 reveals that the mean score of experimental group in pretest was 8.16 with standard deviation was 2.23 and the mean score of control group in pretest was 7.80 with standard deviation was 2.15. This means that both experimental and control group categorized in *fair* classification.

**Table 11. The mean score and standard deviation of students' posttest**

Group	Sample	Mean Score	Standard Deviation
Experimental	32	13.50	0.51
Control	35	12.66	0.61

Table 11 shows that the mean score of experimental group in posttest was 13.50 with standard deviation was 0.51 and the mean score of control group in posttest was 12.66 with standard deviation was 0.61. This means that both experimental and control group in posttest was categorized in *good* classification.

**Table 12: The difference of mean score between pretest of experimental and control group**

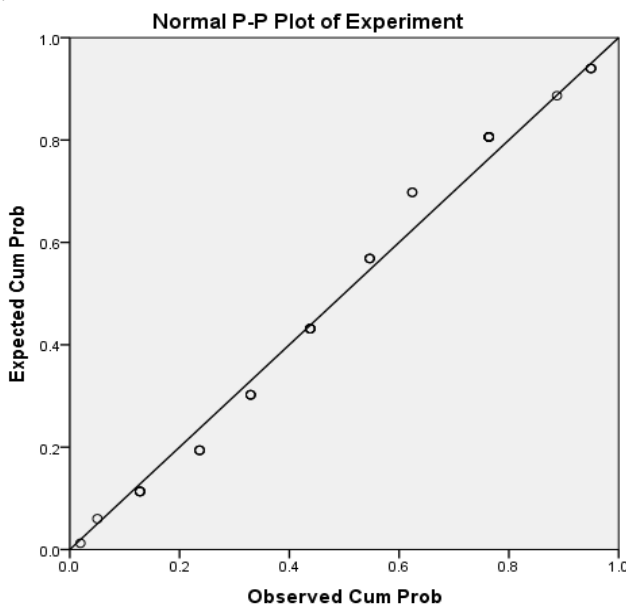
Consonant Acquisition	Mean Score		Difference	P. Value
	Experimental	Control		
Fricative Consonants	8.16	7.80	0.36	0.000

Table 12 illustrates that the probability value was 0.000 is smaller than 0.05 at the level of significance ( $0.000 < 0.05$ ). This means that there is a significant difference between control group and experimental group. This reveals that the acquisition of English fricative consonants of the students of experimental group is significantly higher than the control group.

**Table 13: The difference of mean score between posttest of experimental and control group**

Consonant Acquisition	Mean Score		Difference	P. Value
	Experimental	Control		
Fricative Consonants	13.50	12.66	0.84	0.000

Figure 5 plots mean acquisition of fricative consonants in experimental group. The figure shows a positive improvement of students' pronunciation on the fricative consonants after treatment whereby  $p < .05$  and the improvement is strong. Therefore, figure 6 plots mean acquisition of fricative consonants in control group. The figure reveals a positive improvement whereby  $p < .05$ , but the changes in experimental group was bigger than in control group.



**Figure 5: Plots of experimental group in posttest**

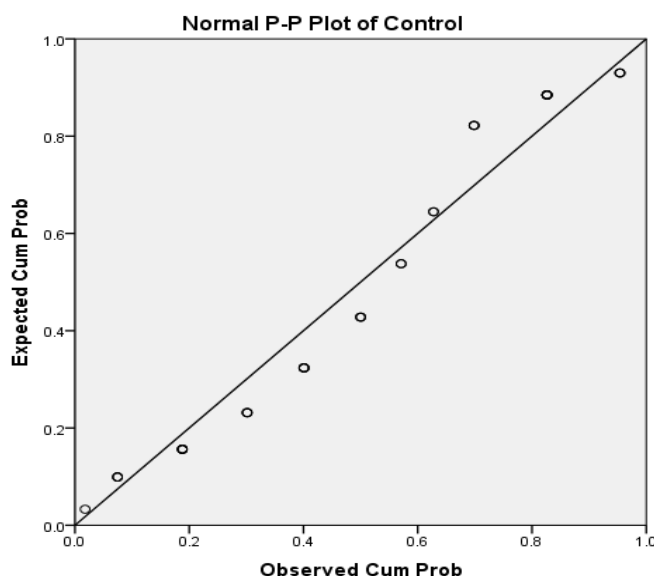


Figure 6: Plot of control group in posttest

Table 13 shows that the probability value was 0.000 is smaller than 0.05 at the level of significance ( $0.000 < 0.05$ ). This means that there is a significant difference between control group and experimental group in posttest. This reveals that the acquisition of English fricative consonants of the students of experimental group is significantly higher than the control group after treatment.

From the inferential statistics, we can see that there was significant improvement of students’ fricative consonant acquisition after giving formal instruction in the classroom setting. The mean scores of the pretest and posttest of both experimental and control group are shown in chart 1 below.

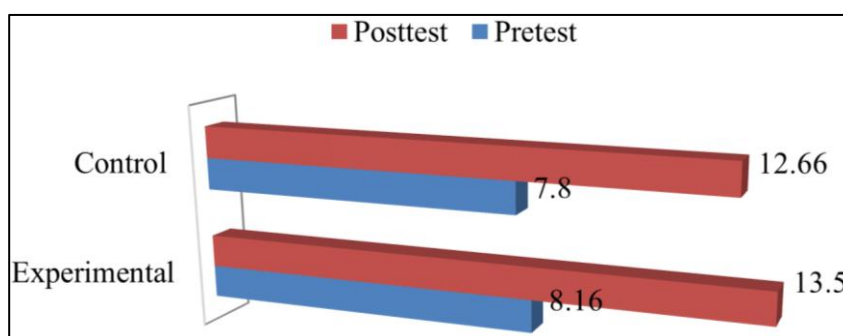


Chart 1: The mean score of both pretest and posttest in experimental and control group

Chart 1 shows the means score of control group and experimental group in pretest and posttest. The mean score of experimental group in pretest was 8.16 and the mean score of control group in pretest was 7.80. In posttest, the mean score of experimental group was 13.50 and the mean score of control group was 12.66.

**CONCLUSION:**

Based on the two key questions as previously stated. The study therefore concludes that the students have pronunciation improvement of English fricative consonants after they followed the phonology subject using formal instruction.

The constraints of students’ pronunciation in English fricative consonants were that the students felt difficulties in pronouncing labiodental fricative ‘f’ in final position for word “laugh” and they met difficulties in pronouncing labiodental fricative ‘v’ in final position for word “save.” In pronouncing dental fricative ‘θ’ and ‘ð,’ the subjects found difficulties, either in initial position or final position. As revealed in the discussion, above 90% of misspronouncing words made by the subjects. In pronouncing palato-aleolar /ʃ and ʒ/, there were above 94% of misspronouncing words made by the subject, either in initial or final position. The subjects also met difficulties in pronouncing alveolar ‘z’ in final position, as in word “rise,” and 100% of misspronouncing words made by the subjects, either in pretest or in posttest.

Therefore, in posttest for experimental and control group, the subjects still met difficulties in pronouncing dental

‘θ’ in initial and final position, where there were above 50% of misspronouncing words made by the subjects, either in initial and final position. They also met difficulties in pronouncing dental ‘ð’ in initial and final position, where there were above 50% of the subjects misspronouncing in words “thing,” “health,” “these,” and “breathe.”

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# SMEs MARKETING STRATEGIES DEVELOPMENT IN IMPROVING COMPETITIVE ADVANTAGES (STUDY ON CENTER OF MAKING BEADS IN JOMBANG)

*Widyastuti,*

Lecturer,

Departement of Management, Faculty of Economics  
Universitas Negeri Surabaya, Surabaya, Indonesia

*Nadia Asandimitra Haryono,*

Lecturer,

Departement of Management,  
Faculty of Economics  
Universitas Negeri Surabaya  
Surabaya, Indonesia

*Monika Tiarawati,*

Lecturer,

Departement of Management,  
Faculty of Economics  
Universitas Negeri Surabaya  
Surabaya, Indonesia

## ABSTRACT

*Important things owned by SMEs are superior and unique products. Products with more value will have the competitiveness to compete in the market. Beads' craftsmen market share in Jombang declining due to the invasion of beads products from China, which is cheaper than local products. For that, the craftsmen should implement strategy that can produce products that have competitive advantage. The purpose of this research is to know the problems faced by beads' SMEs in Jombang associated with the competitive advantage of its products and its marketing strategy formulation in increasing competitive advantage. The data in this study were gathered using questionnaire and interviews, while sampling technique used is accidental sampling. The SWOT analysis is used to analyze obtained data. The population in this research is owner of the beads' SMEs in Gudo Jombang with total samples are 6 respondents. The results showed that the problems faced by SMEs in Jombang was limited distribution, access to raw materials and product innovation, as well as capital and skilled personnel. A strategy should be developed by SMEs is expanding its distribution network through distributor or retailer; to create more innovative products as well as add new products but still related.*

**Keywords:** SMEs, competitive advantage, strategy, SWOT analysis.

## INTRODUCTION:

The increasing business competition in this globalization era is something unavoidable among business players. The success of SMEs in the globalization era depends on planning and implementation of own strategies (Porter, 1980). Although SMEs play an important role in the national economy, SMEs still have low competitiveness. The study results from Center for Industry SME and Business Competition Studies of Trisakti University shows that the competitiveness of the micro, small and medium enterprises in Indonesia is the lowest compared to member countries of the Asia Pacific Economic Cooperation (Sarwani, 2012).

Low competitiveness impact company's long-term existence. Competitive advantage is one factor to be considered by companies to achieve its objectives. (Porter, 2008) said that the competitive advantage is the most important thing in terms of a company's performance to compete and grow so they can defend themselves from the market's competitive pressures.

The competitive advantage for the company is a company's ability to provide added value to its products. The added value that will attract consumers who must be willing to buy your products that have the same benefits as competitors but at lower prices, or have unique characteristics compared with competitors, but at a higher price (Porter, 1985). SMEs that have a competitive advantage manufacture products that are competitive. Competitive products marked with a quality product, in accordance to the wishes of consumers and be able to compete with similar products and has its own uniqueness (Song & Parry, 1997)

(Sriyana, 2010), in his research on SMEs in Bantul, found that SMEs are still facing fundamental problems such as product quality, marketing and business sustainability. Marketing problems faced by SMEs in general is limited market access. They were only able to sell their products in the area where it is produced and have not been able to reach a larger extent.

The competitive advantage for the company is that the company is implementing a strategy that cannot be replicated by its competitors (Barney, 1991). According to (Knight, Summer 2000), the company's potential is shown by the company's business strategy in responding to the challenges and opportunities caused by the business environment. Company implements its strategy in order to attract customers and deal with a variety of environmental problems, such as competitors and suppliers.

Strategy is everything executed by the company to achieve its objectives. According to (Rostro & Grudzewski, 2008), understand the rules of marketing can help companies determine the strategies undertaken in gaining a competitive advantage. (Varadarajan & Cunningham, 1995) states that the purpose of such marketing strategy is to achieve a competitive advantage. Creating products that have more value for consumers, promotion and setting competitive prices are some forms of marketing strategies that can help SMEs dominate the market.

The business value of glass beads' craft industry got decreased in the last decade. Jombang beads began to lose market share in both local and global markets for various reasons due to high turnaround of younger generation from being beads' craftsmen and changed their profession into factory workers due to scarcity of raw materials. Many factories were switched from using non-glass packaging causing the raw materials used to make the beads hard to get.

The flood of China's beads production played a big role in the decline of market share of beads' craft. Unlike China's beads products that are manufactured through industrial processes, the Jombang beads were manually appreciated as craft. So despite having the same quality, the Chinese beads were less compared to Jombang beads that are relatively more expensive.

During these days, beads' craftsmen sell their products in conventional way. Marketing is done through distributors, who then distribute it to other regions such as Bali and Kalimantan. In addition, the product beads are sold in Jombang outlets and in surrounding areas.

Based on the background, the problem statement is designed that focus on the study area i.e., what are the problems faced by SMEs in Jombang beads related to the product's competitive advantage? And how SMEs' marketing strategy formulation beads in Jombang in order to increase it competitive advantage?

## LITERATURE REVIEW:

### Marketing Strategy:

Marketing strategy is an activity undertaken by marketers in a competitive situation in an ever-changing environment. According to Knight (2000), the marketing strategy is important for a company because it can help companies achieve success. The marketing strategy is designed to generate tactics and other measures that could meet the demands of consumers in a particular market and ultimately to achieve company goals.

The marketing strategy is one of the functional strategies that form an overall business strategy. Companies can

develop a marketing strategy that is owned by considering four marketing mix, namely product, price, place and promotion. Companies must pay attention to the products that are sold in accordance with the expectations of consumers, the price paid by consumers must be in accordance with the benefits they get, promotions have to increase market share and have optimal channel distribution (Išoraitė, 2009)

In determining a strategy that should be taken, marketers must consider the company's position among its competitors. (Tjiptono, 2007) states that companies can use two or more marketing programs simultaneously, because each program has a different effect on demand. So, there is a mechanism required here which can coordinate marketing programs in order to be aligned and integrated with the company's vision. This mechanism is called the 'marketing strategy'.

According to (Tjiptono, 2007), the process of selecting marketing strategies require a number of types of information to be considered such as

1. Products' purpose or target: The purpose of the product should be used as guidelines to determine the basic types of strategies needed. On the contrary, if the purpose of the product emphasize more on cash flow and profitability, the marketing strategy should be focused on maintaining or increasing demand from its current customer base;
2. Market opportunities: Market opportunities characteristics and size should be clearly defined based on market analysis and market measurement. Market analysis provides information about who buy the product's form and who does not, and situations when the product is used and situations when it is not followed by the factors that affect the willingness and ability to buy. This information will be useful for managers in selecting strategies and programs to increase the number of users or user level
3. Market success: Marketing managers must understand what is the product's competitive advantage and the necessary marketing spending levels to achieve market success. Through competition analysis, companies can understand who are its competitors, the extent of the intensity of the competition, and what are the advantages that need to be developed in order to compete effectively, confront the competitor brand directly or competitors' class products indirectly.

#### **Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis:**

(Novicevic, Harvey, Autry, & Bond III, 2004) states that the SWOT analysis combines four essential components which include the company's internal situation (Strengths and Weaknesses) and external factors encountered in the environment (Opportunities and Threats). Company should identify four important components to be able to take the lead in determine the right strategy for the company.

The four components of SWOT analysis can be described as follows (David, 2009): Strengths are activities in the company that showed the superiority of the company relative to its competitors. Strengths are special competence that gives company a competitive advantage in the marketplace.

Weaknesses are activities within the company that can hinder the performance of the company. Financial resources, management capabilities and marketing skills can be a source of weakness of the company.

Opportunities are external environment conditions that can benefit the company. The change in technology and the growing relationship between the company and the buyer or supplier are some source of opportunities.

Threats are external environmental conditions that will be harmful to the company's position in the marketplace. The existence of government regulations the new or revised can be a threat to the company's success

(Ayub, Razzaq, Aslam, & Iftekhar, 2013) states that SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) is an evaluation tool used by marketers to assess the strategy undertaken by the company. SWOT analysis help companies identify potential and strength so that it can make use of it to exploit opportunities and ward off the threats; identify weaknesses so that the strategy of the company that owned can reduce these weaknesses.

SWOT analysis is performed to identify the key factors that are important in achieving the company's goals (Srivastava, Franklin, & Martinette, 2013). SWOT Analysis allows companies and SMEs to determine the most appropriate strategy. External Factor Evaluation (EFE) matrix allows strategists to summarize and evaluate information about the economic, social, cultural, demographic, environmental, political, governmental, legal, technological, and competitive. At Internal Factor Evaluation (IFE) matrix, will summarize and evaluate the strengths and weaknesses of the major functional areas of business, and also be element for identifying and evaluating the relationship between those areas. SWOT analysis is based on the assumption that an effective strategy would maximize the strengths and minimize the weaknesses and the opportunities and threats (David, 2009).

**Competitive Advantage:**

Competitive advantage is the strategy adopted by the company or organization in order to survive and face the business competition by utilizing a variety of business opportunities that exist. (Wang, 2014) states the competitive advantage gained when a company developed a strategy that allows it to outperform its peers. According to Jab (1999), competitive advantage can be achieved if customers receive a consistent difference in the most important attribute of the product compared to competitors.

Companies can be successful in achieving a competitive advantage if the company remains focused on pursuing a strategy of product differentiation, utilizing advances in technology and use all the resources of the company (Srivastava, Franklin, and Martinette, 2013)

**METHODOLOGY:**

This study is a qualitative research with exploration and observation on the owners of SMEs in Gudo, Jombang. The population in this study are SMEs’ of beads’ craftsmen in Gudo, Jombang. The samples in this study are chosen using accidental sampling technique that gives a questionnaire and interviews to the craftsmen who are incidentally met without any specific consideration. The sample in this study amounted to six respondents where the respondents are owners of SMEs beads located in Gudo, Jombang. Data collection is done through library research, in-depth interviews and field observations.

ETOP (Environmental Treath and Opportunity Profile) is used to analyze the external environment. ETOP analysis is conducted by gathering information about the opportunities and threats that must be monitored and confronted by the craftsmen so that the goals set can be achieved. SAP (Strategic Advantage Profile) was used to analyze the internal environment in the form of strengths and weaknesses within the company. To conduct this analysis, craftsmen must identify the strengths and weaknesses which happened in his SMEs.

The SWOT analysis approach is used to formulate the development strategy of SMEs. SWOT (Strength, Weakness, Opportunities, Threats) analysis is used to evaluate the opportunities and challenges in the business environment and the internal environment (Kuncoro, 2005), with the factors combining Strengths, Weaknesses, Opportunities and Threats.

**FINDINGS AND DISCUSSION:**

Based on the research results, the obtained SWOT table is as follows:

**Table 1: SWOT Analysis**

<p><b>Strength</b></p> <ol style="list-style-type: none"> <li>1. Have a quality product</li> <li>2. The products are well known to overseas market</li> <li>3. Has several variations of the product</li> <li>4. Having a promotional campaign with a wider range</li> <li>5. Understanding consumer needs</li> <li>6. Price according to quality</li> </ol>	<p><b>Opportunity</b></p> <ol style="list-style-type: none"> <li>1. Local government assistance for domestic marketing through exhibition</li> <li>2. Training for manufacture of the raw material beads</li> <li>3. Promotion via the Internet</li> <li>4. Consumer demand for accessories products increases</li> </ol>
<p><b>Weakness</b></p> <ol style="list-style-type: none"> <li>1. Raw material shortages</li> <li>2. The high price of raw materials</li> <li>3. The production process takes a long time</li> <li>4. Lack of capital</li> <li>5. Difficulty finding skilled employees</li> </ol>	<p><b>Threat</b></p> <ol style="list-style-type: none"> <li>1. The existence of a similar product of China with cheaper prices</li> <li>2. Lack of government aid</li> <li>3. Lack of government support in marketing their products abroad</li> </ol>
<p>Strength = (+) 6 Weakness = (-) 5  <b>Total SAP = (+) 1</b></p>	<p>opportunity = (+) 4 Threat = (-) 3  <b>Total ETOP = (+) 1</b></p>

ETOP (Environmental Treath and Opportunity Profile) and SAP (Strategic Advantage Profile) calculation results show in table 1. If described in SWOT matrix, the result will be as follows:

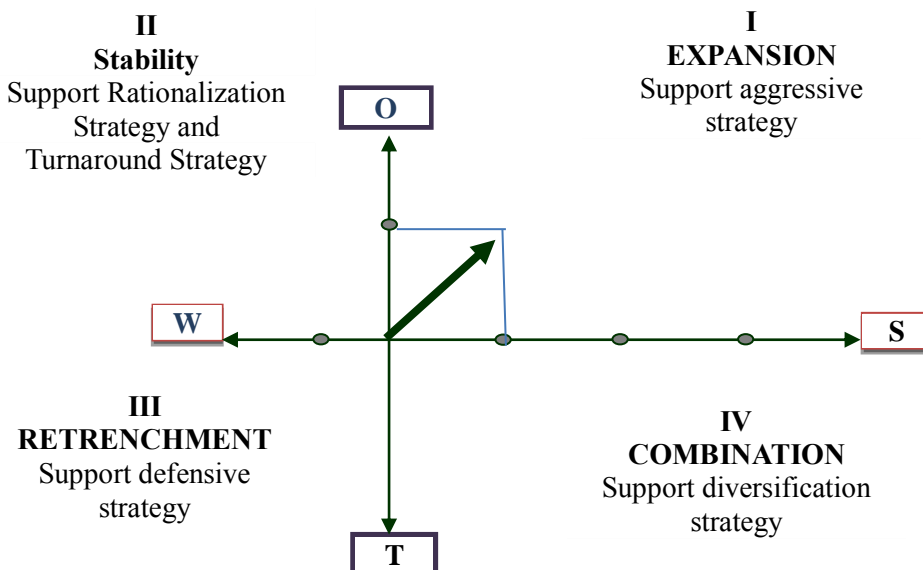


Figure 2: SWOT Matrix

From the figure 2, we can understand the result of internal and external environmental audits that are carried out to beads' SMEs in Gudo which indicates that beads' SMEs is in Quadrant I which supports Strength Opportunity (SO) strategies. SO Strategies mean that beads' SMEs can use the force to take advantage of existing opportunities.

The Quadrant I illustrates that SMEs in this district are into expansion plans and support the aggressive strategy. An organization is able to expand if the company is well positioned to use its internal strength in order to take advantage of existing opportunities, overcome any weaknesses, and avoid all external obstacles.

Based on the collected field data, a general idea is obtained that the beads' SMEs are still weak with limited distribution channels and they lack capital and skilled manpower. Therefore, the development effort is made in the following manner:

1. Helping ease of access to capital, by connecting beads' SMEs with banking through micro-credit institutions, public owned company through CSR programs, and others
2. Market expansion and marketing training, which is conducted to provide an understanding of marketing strategies for the expansion of channel distribution, making online application (web training, blogs, and other social media), product innovation by making products accessories quality as well as pay attention to labels and product packing training in product design development.

Product innovation is one of the strategies to achieve competitive advantage. This is in accordance with the opinion of (Atuahene-Gima & Ko, 2001) which states that the strategy of product innovation would make the company become more competitive. Product innovation can be achieved by considering the value expected by consumers with the value contained by an existing product. The difference between the two values is the area that can be utilized by the company to create new products.

The increase in market share can be achieved through a quality product. Quality products can certainly attract the attention of consumers. This is accordance with (Moghaddam & Foroughi, 2012) research which found that the quality of products, variety of products can increase market share.

### CONCLUSIONS:

Based on the purpose of research and analysis results, it can be concluded that the problems, faced by beads' SMEs in Gudo based on SWOT analysis, are limited access to distribution and product innovation as well as capital and skilled labor. The strategies are formulated based on the results of SWOT analysis, a) *Forward Integration*, b) *product development*, and c) *concentric diversification*. The marketing strategy chosen for developing Beads' SME are helping in promotion, training in market expansion by making online application, develop product innovation, create attractive labels and packing.

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# DEVELOPING A *MAHĀRAH AL-QIRĀ'AH* TEACHING MODEL BASED ON GRAMMATICAL AND DISCOURSE COMPETENCE

*Nurlaila,*

Arabic Language Education Department,  
State Institute for Islamic Studies Batusangkar, West Sumatera, Indonesia.

*Pratomo Widodo,*

Graduate School,  
Yogyakarta State University,  
Yogyakarta, Indonesia

*Sukamta,*

Arabic Language and Literature Department,  
Sunan Kalijaga State Islamic University,  
Yogyakarta, Indonesia

## ABSTRACT

*This study aims to develop a mahārah al-qirā'ah teaching model based on grammatical competence and discourse competence applicable for teaching mahārah al-qirā'ah to undergraduate students of Arabic Language Education Department, and determine the effectiveness of the developed model in teaching reading comprehension. This study used Borg & Gall's research design and model development, consisting of seven steps. The study voluntarily involved students in three IAINs in West Sumatera, IAIN Padang, IAIN Bukittinggi, and IAIN Batusangkar in the academic year of 2014/2015 and 2015/2016. Four techniques: observation, interview, documentation, and test were employed to collect data. The combination of descriptive qualitative and quantitative techniques were utilized to analyse data. Two findings are documented of which the first is, the developed teaching model set based on grammatical competence and discourse competence is feasible to be used for teaching mahārah al-qirā'ah for undergraduate students of Arabic Language Education Department while the second is, the implementation of the developed model is effective in teaching reading comprehension.*

**Keywords:** Learning Model, Mahārah al-Qirā'ah, Grammatical Competence, Discourse Competence.

## INTRODUCTION:

Reading is the most basic and important skill for second (Weisi, 2012) and foreign language learners. The reading skill is often required for academic, professional, and personal purposes (Jahangard, Moinzadeh, & Karimi, 2011). In academic settings, reading is assumed to be the central means for learning new information and the primary means for independent learning. Reading also provides the foundation for synthesis and critical evaluation skills (Grabe & Stoller, 2001).

Reading is much more than pronouncing words (Tovani, 2000). Comprehension is a central goal of reading (Grabe, 2009). Comprehension is a kind of up-market synonym for understanding (Smith, 2004). Therefore, reading comprehension can be defined as the ability to understand information in a text (Lopez, 2008). Reading must be about thinking and constructing meanings. Understanding how meaning is constructed from printed texts is essential if teachers are to improve the comprehension of their students (Tovani, 2000).

In learning Arabic, the reading skill (termed mahārah al-qirā'ah in Arabic) is the main objective which the particular learners wish to attain, whether with Arabic as second language or as a foreign language. According to (Abdullah, 2008), various research results indicated that most learners study Arabic in order to be able to read Alquran, Hadis, and classical books written in Arabic.

Mahārah al-qirā'ah is one of the most important subjects at Jurusan PBA (Jurusan Pendidikan Bahasa Arab 'Arabic Language Education Department'). Mahārah al-qirā'ah belongs to the group of subjects called MKK (Mata Kuliah Keilmuan dan Keterampilan 'Science and Skill Subject'). The learning of this subject is oriented towards reading comprehension. It denotes that after completing mahārah al-qirā'ah class, students are hopefully able to comprehend the meaning of texts in Arabic. Comprehension is a central matter in reading process and should become the focus of learning because the main objective of reading is comprehension of the text being read.

Based on a preliminary study about the learning of mahārah al-qirā'ah at Jurusan PBA within three IAINs (Institut Agama Islam Negeri 'State Institute for Islamic Studies') in West Sumatera, Indonesia, namely, IAIN Padang, IAIN Bukittinggi, and IAIN Batusangkar in the academic year of 2014/2015 and 2015/2016, the researcher concerned here discovered the phenomena which are almost the same. The subject called mahārah al-qirā'ah is worth four up to six semester credit units (with classes divided into mahārah al-qirā'ah I, II, and III respectively) but there is no clear difference yet in the expected reading comprehension aspect among those levels of mahārah al-qirā'ah. The insufficiency in the number of available lecturers to deliver classes on mahārah al-qirā'ah is somehow a possible factor in creating the difference between the lecture taught in mahārah al-qirā'ah I and mahārah al-qirā'ah II or III. It also causes an overlapping among class materials. Besides, the learning of mahārah al-qirā'ah is text-oriented which means that the texts become the points of reference in designing the learning material. The difference in level among the classes of mahārah al-qirā'ah is only in the texts being used. Majority of the texts used are not authentic texts, either, so that they do not sufficiently attract students' interest.

Students' learning achievement in the class of mahārah al-qirā'ah is also low in level. On an average only 20-30 % of the students who have attended the mahārah al-qirā'ah class are able to comprehend texts well. According to a lecturer of the subject, the low level of students' ability in comprehending texts is caused by the insufficient adequacy of their background knowledge in being used for text comprehension, implying, among others, that they do not possess sufficient vocabulary, understand grammar, and understand the inter-sentential relation in paragraphs or the inter-paragraph relation in texts.

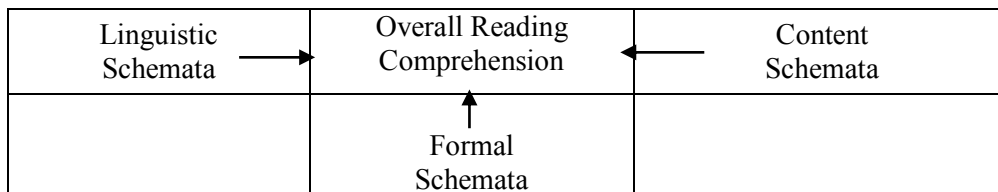
Comprehension is a constructive process in which the reader creates meaning based on his background knowledge (Gunning, 2010). The reader brings a wide range of background knowledge to reading and actively constructs the meaning of the text by comprehending what the writer intends and by interpreting it in terms of the background knowledge activated by the reader (Grabe, 2009). According to Huang (2009), comprehending words, sentences, and entire texts requires the ability to relate the material (the present visual information printed on the page) to one's own knowledge (the non-visual information already stored and organized in the brain).

According to schema theory, reading comprehension is an interactive process between the text and the reader's prior knowledge in order to recreate the intended meaning (Jahangard, Moinzadeh, & Karimi, 2011). Efficient comprehension requires the ability to relate the textual material to one's own knowledge. Every act of comprehension involves one's knowledge of the world as well (Carrell & Eisterhold, 1983).

The readers's background knowledge (prior knowledge) is called 'schema'. There are three major types of schemata which are closely related to reading comprehension, namely, linguistic schemata, formal schemata, and content schemata. Linguistic schemata refer to the background knowledge of vocabulary, grammar, and

idioms. Formal schemata, often known as textual schemata, refer to the background knowledge of the organizational forms and rhetorical structures of different written text types. Content schemata refer to the knowledge of the world or the background knowledge of the content domain of a text (Ahmadvand & Barati, 2014); (Huang, 2009); (Salmi, 2011). Figure 1 explains about the interaction of three types of schemata (Levine & Reves, 1994).

**Figure 1: The Interaction of Three Types of Schemata**



Reading comprehension involves activating the appropriate schemata in order to make sense of incoming information. Therefore, it is important to emphasize the activation of background knowledge prior to reading in order to facilitate comprehension (Jahangard, Moinzadeh, & Karimi, 2011). When students possess three schemata, they are in a better position to comprehend their assigned reading. Deficiency in any of the above schemata will result in a reading comprehension deficit. Understanding the role of schema in the reading process provides insights into why students may fail to comprehend text material (Issa, 2006).

(Gascoigne, 2005) affirms that most studies about L2 reading have concluded that the readers rely upon different sets of competencies while reading. The commonly identified sets of competencies include grammatical competence, discourse competence, sociolinguistic competence, and strategic competence.

In relation with the learning of mahārah al-qirā'ah at Jurusan PBA, students' low-level ability in comprehending texts as stated by the aforementioned lecturer of the subject is because of their weakness in two competencies, namely, grammatical competence and discourse competence, because they do not possess sufficiently adequate vocabulary, grammar, the inter-sentential relation in paragraphs (cohesion) or the inter-paragraph relation in texts (coherence). Therefore, activating the two competencies before reading is need to be done.

Grammatical competence includes knowledge of morphology, syntax, vocabulary, and mechanics. Discourse competence includes the ability to understand cohesive devices such as pronouns and conjunctions, as well as the ability to recognize how coherence is used to maintain the message's unity (Gascoigne, 2005). Grammatical competence and discourse competence are two competence types that are important in reading. (Grabe, 1991) affirms that fluent readers need a sound knowledge of language structure and a large recognition of vocabulary (grammatical competence). According to (Mu, 2006), the knowledge of cohesion and coherence (discourse competence) directly influences reading comprehension.

The activation of grammatical competence and discourse competence can contribute to two schemata, namely, linguistic schemata, and formal schemata (Tahsildar & Yusoff, 2014); (Uysal, 2012). The research concerned here developed a model of teaching mahārah al-qirā'ah that lecturer could use to overcome students' weaknesses in certain areas of competence needed for text comprehension and particularly weaknesses in grammatical competence and discourse competence.

**METHOD:**

The model of development used is 'R&D (Research and Development) model' from (Borg & Gall, 1983) as reference, which was performed up to the 7th step, i.e., research and information collecting, planning, developing preliminary form of product, preliminary field testing, main product revision, main field testing, and operational product revision. The development went through steps that were grouped into four stages of development, namely, preliminary study, development, preliminary field testing, and main field testing.

Basically, the preliminary study was made in the course of needs analysis so that important components that needed to be developed and certain aspects, that needs to be paid attention to, during the model development could be formulated. The preliminary study was conducted through literature study and field study. The field study was done at Jurusan PBA of three IAINs in West Sumatera, namely, IAIN Padang, IAIN Batusangkar, and IAIN Bukittinggi.

After preliminary study, the procedure of model development was continued by entering the stage of product development. The results of the preliminary study became the basis for product development. In the initial step, a design of a mahārah al-qirā'ah teaching model with grammatical competence and discourse competence as basis was developed. With the model design as basis, a teaching model set was constructed, consisting of the

syllabus, lesson plan, learning material, and assessment set. After the teaching model was constructed, validation was made in the course of attaining a valid model. The teaching model is validated by two experts and two practitioners by using validation sheet as the data collection instrument. The collected data were validation results and suggestions on the developed teaching model set. Then a revision was done in accordance with both the results and suggestions from validators.

The model resulting from the revision underwent preliminary field testing using the one-group pretest-posttest design. With results of the preliminary field testing as basis, revision was made and the results underwent main field testing i.e., testing on a larger scale using the pretest-posttest control group design. After main field testing, product was revised when it was found that the model was not yet fit.

**RESULTS AND DISCUSSION:**

This section presents the data obtained at each step of the research and development. The steps of the research and development model with the data obtained at each of the steps are as follows.

**Initial Product Development:**

The development of an initial draft of the teaching model was initiated with a formulation of the objectives to be attained through the class of mahārah al-qirā’ah. In formulating the objectives, the researcher referred to the levels of reading ability stated in Common European Framework of Reference (CEFR). For the class of mahārah al-qirā’ah I, the researcher decided the objectives in line with the reading ability at the level between B1-B2 according to CEFR and integrated it with the grammatical competence and discourse competence which becomes the basis of the model development. Grammatical competence consists of knowledge of vocabulary, morphology, and syntax whereas the discourse competence consists of knowledge of cohesion and coherence.

The texts were selected in accordance with the objectives formulated. In addition, the texts were also adapted to the grammatical and discourse components which became the focus of discussion. Priority was given to authentic texts. Then the teaching model set was constructed, consisting of the syllabus, lesson plan, learning material, and assessment set.

Each lesson in the model consisted of two parts. The first part was for the schemata stage, which was the stage of students’ competence formation, namely, the formation of their grammatical competence and their discourse competence. The second part was for the text comprehension stage. Each learning aspect was organized in accordance with the interest of the learning of reading using grammatical competence and discourse competence as basis.

After development, the preliminary draft of the teaching model was validated by four validators i.e., two experts and two practitioners. The validation results of the developed teaching model set were tabulated according to each component and subcomponent that were in the validation instrument. Then the mean score for each aspect validated from the four validators was calculated. Further the scores were converted into qualitative data by means of a scale with four values to determine the criteria for fitness of the developed teaching model set. A recapitulation of the validation results of the developed teaching model set is presented in the following table.

Table 1: Validation Results of The Developed Teaching Model Set

No.	Components	Expert Validator		Practitioner Validator		Mean	Criteria
		1	2	1	2		
1	Syllabus	3.68	3.12	3.93	3.50	3.56	Very Good
2	Lesson Plan	3.77	3.27	4	3.88	3.73	Very Good
3	Learning Material	3.53	3.12	3.88	3.71	3.56	Very Good
4	Assessment Set	3.87	3.20	4	3.80	3.72	Very Good
<b>Mean</b>							Very Good

Based on Table 2, it could be concluded that the mean score of the validation results of the whole teaching model set was 3.63 with the criterion, very good denoting that the validators judged the developed teaching model set was ready to be tested. However, there were some suggestions from the validators like additions or improvements in some parts in both aspects of content and writing. Therefore, the teaching model set could be used for testing at the next stage after revision in accordance with the suggestions given by validators.

**Preliminary Field Testing:**

The preliminary field testing used the one-group pretest-posttest design, using a group of students. The preliminary field testing was done to know the effectiveness of the developed teaching model in improving the students' ability in mahārah al-qirā'ah. The developed teaching model effectiveness was measured by comparing pre-test and post-test scores. The results of the preliminary field testing on the teaching model set are presented as follows.

**Table 2: Description of Pretest and Posttest Data in the Preliminary Field Testing**

No.	Data Description	Pretest	Posttest
1	Mean	63.33	73.33
2	Standard Deviation	8.16	6.83
3	Minimum Score	50.00	65.00
4	Maximum Score	75.00	85.00

The effectiveness of the developed teaching model in increasing the students' ability in mahārah al-qirā'ah was inferred through this comparison in the preliminary field testing. The results show that the value of significance is 0.042. The criteria are that when  $asympt.sig (2-tailed) < \alpha$ , it means that there is a significant difference and when  $asympt.sig (2-tailed) > \alpha$ , then there is a difference but it is not significant. With a specified level of significance i.e., ( $\alpha$ ) of 0.05, it could be concluded that the pretest scores differed significantly with the posttest scores (because  $0.042 < 0.05$ ) thus inferring that the developed teaching model is effective in improving students' ability in mahārah al-qirā'ah.

An observation of the accomplishment of the learning by means of the developed teaching model set was made by two observers who helped the researcher observe all the learning activities throughout the learning process in class. Through observation, the two observers were trained first in order to be able to use the observation sheet to assess the accomplishment of the learning. A summary of the results of the observation on the accomplishment of the learning in the preliminary field testing is presented in Table 4.

**Table 3: The Results of The Observation in The Preliminary Field Testing**

No.	Session	Accomplishment Percentage (%)		Mean (%)	Criteria
		Observer 1	Observer 2		
1	I	75.00	75.00	75.00	Good
2	II	81.25	75.00	78.13	Good
3	III	87.50	81.25	84.38	Very Good
Mean (%)		81.25	77.08	79.17	Good

Based on the data collected from the observation on the accomplishment of the learning by means of the developed teaching model in the preliminary field testing, the mean scores for the learning accomplishment of the three sessions were respectively 75.00 %, 78.13 %, and 84.38 %. The mean score for the learning accomplishment of the three sessions altogether was 79.17 % and the criterion was good.

**Main Field Testing:**

The main field testing was done after the preliminary field testing and the revision was done based on the results retrieved from the preliminary field testing. The main field testing used the pretest-posttest control group design with two groups of students. The group in the experimental class was given the treatment using the developed teaching model while the group in the control class was given the treatment using the teaching model usually used by the lecturer.

The data for the pretest and posttest scores of the experimental and control groups was analyzed. The analysis used was t-test with independent samples. The data was first tested for normality and homogeneity. In the test of normality, the value of significance obtained for the experimental and control groups were 0.587 and 0.220 respectively. The test criteria was that when  $asympt.sig (2-tailed) < \alpha$ , it means that the data is not normally distributed whereas when  $asympt.sig (2-tailed) > \alpha$ , then the data is normally distributed. With a level of significance ( $\alpha$ ) of 0.05, it could be concluded that the values of significance for the two groups were greater

than 0.05 ( $0.587 > 0.05$  and  $0.220 > 0.05$ ). It means that the pretest and posttest scores of the experimental and control groups are normally distributed.

As far as the test of homogeneity is concerned, the value of significance obtained was 0.277. The test criteria is that when  $F_{obtained} > F_{table}$  or  $sig < \alpha$ , it means that the data is not homogenous and when  $F_{obtained} < F_{table}$  or  $sig > \alpha$ , it means that the data is homogenous. With a level of significance ( $\alpha$ ) of 0.05, it could be concluded that the value of significance was greater than 0.05 ( $0.277 > 0.05$ ), meaning that the data were homogenous.

A hypothesis testing was conducted by using the t-test with independent samples with the purpose of discovering the effectiveness of the developed teaching model in improving the students' ability in mahārah al-qirā'ah. The value of significance was 0.025. With a level of significance ( $\alpha$ ) of 0.05, then  $sig$  (2-tailed)  $< \alpha$  ( $0.025 < 0.05$ ), meaning that on the average the increase from the pretest scores to the posttest scores of the experimental class (14.2105) was significantly different from that of the control class (9.0476). It indicated that the experimental class was greater in improvement than the control class. It implied that the developed teaching model can improve students' ability in mahārah al-qirā'ah. So  $H_0$  was rejected and  $H_a$  was accepted.

The results of the observation on the accomplishment of the learning by means of the developed teaching model in the main field testing are presented in Table 5.

Table 4: The Results of The Observation in The Main Field Testing

No.	Session	Accomplishment Percentage (%)		Mean (%)	Criteria
		Observer 1	Observer 2		
1	I	81,25	75,00	78,13	Good
2	II	87,50	87,50	87,50	Very Good
3	III	81,25	93,75	87,50	Very Good
4	IV	93,75	87,50	90,63	Very Good
5	V	100,00	93,75	96,88	Very Good
Mean (%)		88,75	87,50	88,13	Very Good

The mean scores for the accomplishment of the learning of the five sessions in the main field testing were respectively 78.13 %, 87.50 %, 87.50 %, 90.63 %, and 96.88 %. The mean score for the learning accomplishment of the five sessions altogether was 88.13 % and the criterion was very good.

**Product Revision:**

The revision of the developed teaching model was done in three stages, namely, after the validation, after the preliminary field testing, and after the main field testing. The revision in the first stage was on all subsets of the model with varying portions, the revision in the second stage was on lesson plan and the teaching materials, and the revision in the third stage was on the aspect of the writing only.

The stages of development process resulted a mahārah al-qirā'ah teaching model based on grammatical competence and discourse competence. It was a learning model with emphasis on the importance of grammatical competence and discourse competence as basic knowledge for the teaching of mahārah al-qirā'ah. With the stages of development undergone, hopefully, the resulting model set could be used in teaching and learning and could improve students' ability in the class of mahārah al-qirā'ah.

**CONCLUSION:**

With the results of the research and development that have been done as basis, it could be concluded that the product of development in the form of the model of learning is fit to be used for the learning of mahārah al-qirā'ah for students of the Arabic Language Education Department. According to validators, the feasibility to use the whole set of developed teaching model is, very good with an average score of 3.67. The developed teaching model is also effective in improving the students' ability in reading comprehension. The value of significance obtained in the preliminary field testing and the main field testing were 0.042 and 0.025 ( $< 0.05$ ).

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## **JIGSAW IMPLEMENTATION OF COOPERATIVE LEARNING MODEL: A STUDY ON INDONESIAN ELEMENTARY SCHOOL**

***Herawaty Bukit,***

Senior Lecturer,  
Faculty of Science Education,  
State University of Medan, North Sumatera, Indonesia

### **ABSTRACT**

*Jigsaw cooperative learning model is a learning environment in which students learn together in small heterogeneous groups to complete learning tasks. The research was conducted among fourth grade students studying at Elementary School 028229, Western District of Binjai, North Sumatra province of Indonesia with Social Sciences subject during the Academic Year, 2015-2016. The result showed that there is an increase in achievement of learning objectives and can increase the students' interest in participating in cooperative learning. At the end of the study, the value of activity and completeness of student learning outcomes in classical reaches 75% of the total number of 40 students or it has reached the Minimum Completeness Criteria specified at 65.*

**Keywords:** Cooperative Learning, Jigsaw, Minimal Completeness Criteria, Social Sciences.

## INTRODUCTION:

Education is a community need to develop one's own potential to have the spiritual power of religion, self-control, personality, intelligence, noble character, and skills needed by themselves towards the upliftment of society, nation and the state. Indonesian education system is one of the largest education system in Asian region and fourth largest in the world with over 50 million students and 2.6 million teachers in more than 250,000 schools (World Bank, 2014). But a study by Network for Education Watch Indonesia (JPPI) reveals the index of education services in Indonesia in 2016 ranks lower than the Philippines and Ethiopia (The Jakarta, 2017). Education and teaching can be managed in line with expectations, if influenced by factors that are interrelated and mutually supportive. For students, especially primary school students, it is very important to achieve education through the student's activity during the learning process.

One success indicator students learning process is obtaining the value of good learning outcomes. Learning outcomes are results obtained by students after participating in learning whereas the learning outcomes are usually expressed in the form of numbers, letters or words (Arikunto, 2006). In Indonesian national education system learners' achievement towards educational success is expressed through a Minimum Completeness Criteria (MCC). MCC is the minimum criterion to declare learners that they have achieved mastery called Minimum Completeness Criteria (Sudrajat, 2008).

MCC is determined prior to the beginning of the school year. Education requires a reference criterion for actions that remain on the assessment results that provide remedial services to those who have completed or enrichment services for those who are beyond MCC. MCC is set by the education unit on the basis of results of the deliberations of subject teachers in educational units who possess similar characteristics.

Jigsaw cooperative learning, the strategy was first developed by Elliot Aronson (1971) in Texas University and California University (Marhamah & Mulyadi, 2013). Jigsaw cooperative learning is one type of cooperative learning that encourage students to actively help each other in mastering the subject matter to achieve maximum performance (Indrawati, 2009). In jigsaw learning model, there are two learning groups such as the original group and the group of experts. The home group is the parent group of students consisting of students by ability, origin, and their family backgrounds are diverse, whereas the expert group is a group of students consisting of members of different origins who are assigned to study, explore the specific topics and complete the tasks related to the topic for later purposes as explained to the members of the original group. In Jigsaw strategy, cooperative learning is emphasized by active participation and helping by one set of students to that of the other to build comprehension (Marhamah & Mulyadi, 2013).

Jigsaw learning model is applied in learning process to achieve competencies that have been defined and known to students by distributing complete teaching materials (Roestiyah, 2001). This technique can be used in some subjects such as science, social science, mathematics, religion, and language. Aronson (1980) opined that Jigsaw is a good method to encourage students of large group to study a specific type of content.

Social Science is a field of study that study, examine and analyze the symptoms and social problems in the community while reviewing the various aspects of the variety of life. The main focus of the social science program is to make individuals understand the social life in the human world, its activities and interaction aimed at generating community members who are free, who have a sense of responsibility to preserve, continue and expand the values and ideas of the community for generations future (Supriatna, 2007). The instruction of Social Science is designed in such a way to create and enhance the capability of students towards social living that evolves in a continuous manner (Miaz, 2015). To complete these objectives, social science program should focus on providing an experience that can help each and individual student. Some studies (Miaz, 2015) have been conducted earlier in the areas of social science and some in economics (Chu., 2014), while some in mathematics (Zakaria, Solfitri, Daud, & Abidin, 2013) and jigsaw activities for not using the appropriate methods and instructional media.

## LITERATURE REVIEW:

### Cooperative Learning:

Cooperative learning is a teaching and learning activity in small groups where the students learn and work together to arrive at an optimal learning experience in terms of individual and group experiences (Nurhadi, 2003). Various researchers proved that cooperative learning has extensive effects on the outcome, especially among the school education (1-4) for which they list out various reasons such as idea that students learn more by doing something active than by simply watching and listening has long been known to both cognitive psychologists and effective teachers (Felder. & Brent., 2017). In cooperative learning, student motivation and retention of the learning material is visible through the outcome (Adams, 2013).

**Jigsaw Cooperative Learning:**

Jigsaw cooperative learning model was developed by (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978). According to Indrawati (2009), Jigsaw cooperative learning is one of the cooperative learning types that encourage students to help each other in an active manner to master the subject matter for achieving the maximum performance. Researchers such as (Hedeem, 2013, pp. 325-332) reported that irrespective of the subject matter involved, those students who are working small groups usually can learn more than what is being taught by the teacher. They can also retain the same knowledge for a long term than when the same content is presented in other instructional formats. Based on the experiences of the students who receive jigsaw cooperative learning the teachers proposed preparing jigsaw lessons aimed at improving the students' skills in condensing information and explaining them to others (Eilks, Markic, & Witteck, 2010)

**Minimal Completeness Criteria (MCC):**

Minimal completeness criteria is the minimum criteria set to certify learners that they have achieved mastery (Sudrajat, 2008). MCC is determined by referring to the criteria set by the Ministry of National Education of Indonesia which contains complexity of the material, carrying capacity of the school and intake (ability) students among the other criteria

**Social Sciences:**

Social Sciences is an integrated study material that encompasses simplified, adapted, selected and modified organized skills as history, geography, sociology, anthropology, and economics. The overall aims of social science education in primary schools is as follows (Ischak, 2003):

1. Equipping students with socially useful knowledge in their life through class in society.
2. Equipping students with the ability to identify, analyze, and develop alternative solutions for social problems that may occur in life.
3. Equipping students with the ability to communicate with fellow citizens and share scientific fields and areas of expertise.
4. Equipping students with awareness, a positive mental attitude and the skills to use environment to be a part of that life. Equipping students with the ability to develop scientific knowledge and social sciences in accordance with the development of life.

**METHODOLOGY:**

The research model used in this study is a model of class action, which is research activities carried out in the class. This classroom action research conducted in the fourth grade, Elementary School 028229, Western District of Binjai North Sumatra Province of Indonesia, amounting to 40 students consisting of 20 girls and 20 boys whose level of absorption as students is quite varied. The research is conducted among elementary school fourth grade students for social sciences subject during the academic year, 2015 - 2016.

The process activities of students and teachers is done through observation sheet. In data collection about the student and teacher performance, the study used sheets of observations in which a score range of one to five is given where if the observed activity is carried out by teachers and students and if the observed activity is not carried out by teachers and students, they are scored 0 (zero). The assessment aspects of student learning activity observed in this study are,

1. Worksheets Implement discussion group
2. Work in teams
3. Actively ask questions / feedback
4. Presenting the results of discussions

The activities of students and teachers are assessed through two cycles of observation. The first cycle activities comprises of drafting and designing lesson plans, developing learning scenarios, designing the observation sheet of students as well as designing the first cycle and a final test answer key. The second cycle is implemented by making changes to certain sections based on the reflection of the first cycle with the same research procedures being implemented as in Phase I.

The student learning outcomes are assessed by calculating the value of individual mastery learning, the value of the average student and student grades classical completeness.

**Value completeness Individuals:**

Individual student mastery value calculated as follows;

$$NP = \frac{R}{SM} \times 100$$

NP = Value Sought

R = The scores obtained by students

SM = The maximum score

When the results obtained are  $\geq 65$ , then the categorized is completed, whereas if the results obtained are  $<65$ , then the categorized is incomplete (Purwanto, 2008).

**Average Value Entire Students:**

The average value of all of the students is calculated as follows (Purwanto, 2008):

$$\bar{X} = \frac{\sum fi \cdot xi}{\sum fi}$$

**Complete Classical Values:**

The Classical Completeness Value is calculated as follows (Aqib, 2009)

$$P = \frac{\sum \text{Siswa yang tuntas belajar}}{\sum \text{Siswa}} \times 100\%$$

**FINDINGS AND DISCUSSION:**

The study results on learning outcomes among the fourth grade elementary school students studying at 028229 Western District of Binjai North Sumatra Province of Indonesia, with Social Sciences subject for the academic year, 2015 - 2016 is presented in Table 1.

**Table 1: Results 1<sup>st</sup> Test Cycle and 2<sup>nd</sup> Cycle**

Criteria	Results 1 <sup>st</sup> Test Cycle	Results 2 <sup>nd</sup> Test Cycle
Average	59.48	72.12
Classical Completeness	57.5%	75%

From Table 1, it can be inferred that there is an increase in the value of tests in 2<sup>nd</sup> Cycle. In the 1<sup>st</sup> cycle, there are some areas that still need improvement, so that the average results of the test scores in the 1<sup>st</sup> cycle reached 59.48 only whereas the classical completeness reached 57.5% only. Classical jigsaw cooperative learning method is said to be not yet achieved as only 23 students out of the 40 have obtained scores  $\geq 65$ . In the 2<sup>nd</sup> cycle, the student activity got increased and reached an average value of the test on the 2<sup>nd</sup> cycle of 72.12 and classical completeness 75%. Classical jigsaw cooperative learning method is said to be complete because, of total 40 students, 30 have obtained scores  $\geq 65$ .

**CONCLUSION:**

Based on the results, the study concluded that the Jigsaw cooperative learning model can produce an effective contribution in the achievement of learning objectives in the subject of social sciences at the elementary school where teachers have the creativity of professional performance in developing learning in the classroom. This is in line with the previous studies conducted by Miaz, Chu and various other researchers. The Jigsaw cooperative learning model could improve the students' learning outcomes with regards to the understanding of the material, the development of attitudes and social skills. The Indonesian education system must be improved through such cooperative learning models since the recent reports said that its ratings are far behind Philippines as stated earlier. Improving student learning outcomes obtained from an atmosphere of openness and concerned teachers in developing learning climate of democratic, open, cooperative and collaborative academic in the climate partnership.

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## AN ANALYTICAL STUDY OF FAMILY'S THEATRICAL ROLE IN INFLUENCING CONSUMER BEHAVIOUR

***Surinder Kumar,***

Research Scholar,  
Department of Management,  
Singhania University, Pacheri Bari,  
Jhunjhunu (Rajasthan), India.

***Dr. Vipul Jain,***

Professor,  
Department of Management,  
Roorkee Engineering and Management  
Technology Institute, Shamli, India.

### ABSTRACT

*A family is an important stratum for any purchasing by the consumers within the society. It constitutes an important economic and social unit that affects consumption decisions of individual family members. The aim of the present study is to analytically discuss about the family's theatrical role in influencing consumer behaviour. This paper is an attempt to enquire the influenced role of family members in buying process and consumer behaviour related to Fast Moving Consumer Goods and Durables too. The research is exploratory and descriptive in nature. The research is conducted in Ambala and Yamuna Nagar, the two important districts of the State of Haryana. Based on the evidences it was concluded that in the purchasing of FMCG, men spouse and elders play an important role while women spouse a minor role though in the purchase of durable items men spouse role is vital and major but elders, women spouse and kids are influencers. Children's have also a role of initiator as well.*

**Keywords:** Family Theatrical Role, Influence, Buying Process, Consumer Behaviour.

## INTRODUCTION:

Consumer behaviour can be defined as the decision making process and physical activity involved acquiring, evaluating, using and disposing of goods and services. Consumer behavior refers to the behaviour that consumer display in searching purchasing, using, evaluating and disposing of products and services that they expect to satisfy the needs.

So far as family theatrical role in influencing consumer behaviour is concerned; Family is an important consumption and spending unit. It is crucial for marketers to understand families since they frequently seek to influence the purchase decisions made by them. This involves a study of the nature of decision-making process, that is, an investigation of role structure in decision-making among the members of a family and the family specific characteristics. Role-structure in decision-making describes the manner in which influence, across elements of the decision process, is distributed among members of a decision-making unit (Anderson & Sullivan, 1993). According to Pavleen (2006), family role structure is defined as the way in which members of the unit taking decision influence the process of making decisions. The nature of influence of family members is also seen to vary by product category. While for some product purchases, husband may be most influential, for others, wife or other family members may decide about all or most dimensions of the purchase. The possibilities of dominance between spouses may take any of the following forms:

- Autonomic decisions: Where decisions are made unilaterally by the spouse.
- Husband-dominated decisions: Where husband has the most significant influence in purchase outcome.
- Wife-dominated decisions: Where wife has the most significant influence in purchase out-come.
- Syncretic decisions: Where the spouses jointly decide about the purchase.

Role-specialization of wives is observed to be high for purchase of groceries, furniture, and clothing, while that of husbands is significant for the purchase of automobiles and life insurance policies. Vacations and housing decisions are seen to fall under the joint-consensus category and those of savings, investments and household appliances under the autonomic category.

Families are more complex to understand as compared to individual consumers for specific roles played by family members undergo dynamic and continuous changes because of psychographic and attitudinal metamorphosis. Some families remain essentially traditional in their life styles following the traditional role patterns and relationships, while others adopt more materialistic orientations; wherein the individual family member becomes of prime importance because of his individuality. In such families, the choice of each individual needs to be considered independently and every individual priority owes due consideration before the final decision outcome. Still, some other families are left in between-trying to adopt the modern life style and at the same time confining to the traditional norms and values. The roles and relationships in such families follow an entirely different pattern. These shifts are also being increasingly caused by participation of women in the labor force. The dual-career families, within a social stratum, have relatively greater discretionary income to buy products that are otherwise sometimes out of reach, for single-earner families. Not only are the buying structures different, but also the persons involved in the purchase and use of these products differ due to various factors playing in the family, one of which is the time pressure experienced by women in such families. Children also display varying levels of involvement not only across product categories but also across family types.

Influence is assumed when due to the act of a person in a particular way; another person's behaviour is affected or influenced. For an analyst on consumer behavior in a family, it is essential to know who is important for what aspects of decision making. In a family, different individuals play different roles and sometimes, play multiple roles. Often, it is noticed that the person who undertakes purchase transactions on behalf of a family may not always be the decision maker in the family. Decisions for buying a particular product or service are an outcome of a complex set of interactive processes among the various members of a family. In some situations, the husband plays a dominating role, in some situations, it is the wife; further, in some situations, it is the Elders; moreover, in some situations, it is the children, and lastly, in some situations, it is a composite decision by all the members of the family. Normally, it is seen that there exist six roles in a family. They are initiator, influencer, decider, financier, purchaser, and user. A family has a huge impact on the personality of an individual. As a primary unit, the family invariably provides the base for the ultimate face to face interactions. From the individual consumer's point of view, family differs from larger reference groups; in that, family members need to take joint decisions for joint consumption needs from a relatively fixed amount of financial resources. In such a situation, the family influences individual personality, attitudes, and values as well as the decision making processes that take place in the purchase of goods and services.

## LITERATURE REVIEW:

In management literature, there are a number of studies on consumer purchasing behaviour, family members influence on consumer purchasing decision. A few studies related to family theatrical role in influencing consumer behaviour have been reviewed are outlined below:

In a study (Grey, Peter, Davis, & Rigau, 2016) on the role of husband and wife in family decision making, found that the husband's influence 'was considerably higher than that of the wife. In case of purchase of consumer durables, the husband and wife jointly took decisions. The study also found the existence of a significant role played by children in the decision making process, especially in the matter of brand selection process.

(Lantos, 2015) found that the husbands played - ideally - an instrumental role and the wives played an emotionally expressive role in decision making process in a family. The study also found that husbands' influence was significantly greater than that of wives in decision making related to purchases.

(Singh & Nayak, 2014) tried to examine the impact of teenager - peer interaction in the family purchase decision. It proposed that the nature of teenager's interaction with peers has an impact on the family decision-making process. The study found that the more the teenagers interact with peers, the more they contribute in the initiation stage of the family decision-making process.

(Sharma, Sonwaney, & Vandana, 2013) examined the role of children in family purchase decisions, and found that influence exerted by children varied by product category and stage of the decision making process. For some products, they are active initiators, information seekers, and buyers; whereas, for other product categories, they influence purchases made by the parents. The purchasing act is governed by how they have been socialized to act as consumers; wherein, characteristics such as parental style, family's sex - role orientation (SRO), and patterns of communication play key roles.

(Wut & Chou, 2013) tried to examine the impact of perceived buying preferences of individual family members on perceived family buying preferences. The study found that there is a synergy effect in a family decision-making process. The synergy effect is expressed as positive correlations between individual family members' buying preferences.

(Rani, Mailka 2012) in her study, tried to analyze the role of women in buying behaviour for durables. The findings of the study revealed that at the final purchase decision stage for cars, only 10% women dominated the decision-making process. As washing machines are mainly used by women, for washing machines, 44% of the women dominated the decision making process.

(Gupta, Sachin, & Mittal, 2010) conducted a study on the degree of influence exerted by the different members of the family. The study found that the family head exerted the highest level of influence in the purchase of a product followed by retailers, other members of the family, and relatives.

(Juyal & Singh, 2009) tried to ascertain the effects of female role orientation in family purchase decisions. It was found that there is a difference in female role orientation vis-a-vis their family type (joint or nuclear), age, education, and income levels. Women are found to play more positive role in the purchase of durables they personally use than the durables for the family usage.

The study has confirmed the traditional dominant role of men in taking the family purchase decisions, as revealed in the reviewed literature. Secondly, it also confirms the increasing role of women and children. However, majority of the studies reviewed have concentrated on the role played by husband and wife. The roles of the Elders were not considered. In a few studies, the role played by women and children in taking the family purchase decisions were considered, but as a separate study. Keeping in mind the above facts, following objectives have been set for the study, which are given below.

## OBJECTIVES OF THE STUDY:

1. To study how different members of a family influence the family theatrical role as initiator, influencer, decider, financier, buyer, and user with respect to FMCGs and durables.
2. To rank the priority elements under study i.e. husband, wife, Elders, and children, based upon individual influences in the family theatrical role, and construct a customized model for each district under each product category.

## METHODOLOGY:

For the purpose of study, both primary and secondary data has been taken in to account. Primary data is collected through a structured questionnaire, comprised of six questions to analyze the buying behaviour of the rural consumers with respect to FMCGs and durables. The questionnaire tried to elicit responses regarding the

various roles i.e. initiator, influencer, decider, buyer, and user, played by various persons in a family-like husband, wife, Elders, and children. For data analysis, simple counts and percentage have been used. Statistical tools used to derive the observations are simple counts and percentages.

**NATURE OF THE RESEARCH:**

The present research is a combination of exploratory as well as descriptive in nature.

**AREA AND TENURE OF RESEARCH:**

Ambala and Yamuna Nagar Districts of the State of Haryana were selected for the study. These two districts have been selected based upon the assumption that they are the most ideal districts (economy wise) for the study (and neither takes any extreme positions). The study was conducted from February 2016 to January 2017.

**Sampling Technique:**

The method of multi-staged sampling has been used for collection of primary data. The sampling units comprise of the consumers of the rural areas in the identified districts i.e. Ambala and Yamuna Nagar (Haryana).

**Sample Size:**

A sample size of 200 respondents participated in the study from each district (total 400 respondents) as this is common for behavioural studies. The sample size was determined both by qualitative approach and quantitative approach.

**Analysis and Findings for Fast Moving Consumers’ Goods (FMCGs)**

The analysis throws up interesting results. The details of the analysis and major findings are given below district wise with the description of the major role players in purchase decisions and the consequent implications for the managers.

**(1) For Ambala District:** The significant findings of Ambala District are shown in the Table No. 1, as given below:

**Table No. 1: Family Theatrical Role of Ambala District for FMCGs**

No. of times as	Initiator	Rank	Influencer	Rank	Decider	Rank	Financer	Rank	Purchaser	Rank
Husband (in %)	48 24%	3	79 39.5%	2	66 33%	1	101 50.5%	1	93 46.5%	1
Wife (in %)	34 17%	4	16 8%	3	34 17%	4	7 3.5%	4	8 4%	4
Elders (in %)	64 23%	1	91 45.5%	1	54 27%	2	78 39%	2	84 42%	2
Children (in %)	54 27%	2	14 7%	4	46 23%	3	14 7%	3	15 7.5%	3
Sample	200		200		200		200		200	

**Husband:** It is observed that husbands played a major role by acting 50.5% of the time as the financer followed by 46.5% of the time as the purchaser. Furthermore, husbands acted as the influencer 39.5% of the time, and acted as the decider 33% of the time.

**Wife:** It is observed that the wives acted as the initiator and decider 17% of the time, respectively. Furthermore, the wives acted as the influencer 8% of the time.

**Elders:** The role of Elders is also quite important. They acted as the financer 39% of the time, followed by acting as influencers 45.5% of the time. Elders acted as purchasers 42% of the time.

**Children:** Children’s role in FMCG purchases is the least, with children acting as initiator 27% of the time, which is followed by 23% of the time as the decider.

As **Users** of the purchased FMCGs, all the members of the family (comprising of husband, wife, Elders, and children) together were found to be the major users (77% of the time) of the items purchased. They are followed by children who turned out to be the second major users (16% of the time) of the purchased FMCGs. Lastly, the adult members of the family (comprising of husband, wife, and the Elders), who were individually found to be using the FMCG products in varying percentage [were together using 7% of the time (out of which husband used 1% of the time, wife used 5% of the time, and Elders used 1% of the time), turned out to be the third major users of the items purchased.

Based upon the percentage of occurrence, husband, wife, Elders, and children played different family roles (as depicted in the Table 1) for FMCGs in Ambala District. Different ranks have been assigned, where Rank 1 stands for exerting the highest degree of influence and Rank 4 stands for exerting the lowest degree of influence in their respective roles.

**(2) Analysis for Yamuna Nagar District:** The significant findings of Yamuna Nagar District are shown in the Table 2.

**Table No. 2: Family Theatrical Role of Yamuna Nagar District for FMCGs**

No. of times as	Initiator	Rank	Influencer	Rank	Decider	Rank	Financer	Rank	Purchaser	Rank
Husband (in %)	54	2	52	2	68	1	93	1	91	1
	27%		27%		34%		46.5%		45.5%	
Wife (in %)	38	3	47	3	50	3	14	3	10	4
	19%		23.5%		25%		7%		5%	
Elders (in %)	82	1	81	1	62	2	81	2	84	2
	41%		40.5%		31%		40.5%		42%	
Children (in %)	26	4	20	4	20	4	12	4	15	3
	13%		10%		10%		6%		7.5%	
Sample	200		200		200		200		200	

**Husband:** It has been found that husbands played the most important role - acting as the initiator 27% of the time and 46.5% of the time as the financer. Furthermore, husbands were found to act as the purchaser 45.5% of the time.

**Wife:** It has been found that wife acted as the influencer 23.5% of the time, 25% of the time as the decider, and 19% of the time, she acted as the initiator.

**Elders:** It has been found that Elders' role was significant, as they acted 41% of the time as the initiator, 40.5% of the time as the financer, and 40.5% of the time as the influencer.

**Children:** Children's role in FMCG purchases is the least - with them acting as the initiator 13% of the time, and acting as the influencer 10% of the time.

As **Users** of the purchased FMCGs, all the members of the family (comprising of husband, wife, Elders, and children) together were found to be the major users (85% of the time) of the items purchased. They are followed by children who turned out to be the second major users (9% of the time) of the purchased FMCGs. Lastly, the adult members of the family (comprising of husband, wife, and the Elders) who were individually found to be using the items in varying percentages [were together found to be using the items 6% of the time (out of which husband used 1% of the time, wife used 4.5% of the time, and Elders used the items 0.5% of the time) turned out to be the third major users of the items purchased.

Based upon the percentage of occurrence, husband, wife, Elders, and children played different family roles, which are depicted in the Table 2 for FMCGs in Yamuna Nagar District. Different ranks have been assigned, where Rank 1 stands for exerting the highest degree of influence and Rank 4 stands for exerting the lowest degree of influence in their respective roles.

**ANALYSIS AND RESULTS FOR CONSUMER DURABLES:**

**(1) Analysis for Ambala District:** The significant findings of Ambala District are shown in the Table 3.

**Table No. 3: Family Theatrical Role of Ambala District for Consumer Durables**

No. of times as	Initiator	Rank	Influencer	Rank	Decider	Rank	Financer	Rank	Purchaser	Rank
Husband (in %)	32	3	26	4	138	1	149	1	108	1
	16%		13%		69%		74.5%		54%	
Wife (in %)	77	2	68	1	46	2	8	3	47	2
	38.5%		34%		23%		4%		23.5%	
Elders (in %)	13	4	39	3	13	3	36	2	3	4
	6.5%		19.5%		6.5%		18%		1.5%	
Children (in %)	78	1	67	2	3	4	7	4	42	3
	39%		33.5%		1.5%		3.5%		21%	
Sample	200		200		200		200		200	

**Husband:** It has been found that husbands played a very major role as financier and decider, acting as financier 74.5% of the time, and acting as the decider 69% of the time. The husbands were also found to act as the purchaser 54% of the time.

**Wife:** It has been found that the wife plays a major role as initiator and influencer acting as initiator 38.5% of the time and acting as the influencer 34% of the time. Furthermore, it has been found that 23% of the time, she acted as the decider, and acted as the purchaser 23.5% of the time.

**Elders:** It has been found that Elders played a minor role - acting as influencer 19.5% of the time, acting as the financier 18% of the time, and acting as decider 6.5% of the time.

**Children:** Children played a major role as the initiator and influencer. They acted as the initiator 39% of the time and acted as the influencer 33.5% of the time. Furthermore, children acted as the purchaser 21% of the time.

As **Users** of the purchased products, all the members of the family (comprising of husband, wife, Elders, and children) together were found to be the major users (67% of the time) of the purchased durables. They are followed by wives, who were exclusively found to be the second major users (22% of the time) of the purchased durables. Lastly, children were found to exclusively use the purchased durables 11% of the time.

Based upon the percentage of occurrence; husband, wife, Elders, and children played different family roles (as depicted in the Table 3) for durables in Ambala District. Different ranks have been assigned, where Rank 1 stands for exerting the highest degree of influence, and Rank 4 stands for exerting the lowest degree of influence in their respective roles.

**(2) Analysis for Yamuna Nagar District:** The significant findings of Yamuna Nagar District are shown in the Table 4.

**Table No. 4: Family Theatrical Role of Yamuna Nagar District for Consumer Durables**

No. of times as	Initiator	Rank	Influencer	Rank	Decider	Rank	Financier	Rank	Purchaser	Rank
Husband (in %)	21 10.5%	3	33 16.5%	4	141 70.5%	1	163 81.5%	1	138 69%	1
Wife (in %)	78 39%	2	68 34%	1	32 16%	2	8 4%	3	47 23.50%	2
Elders (in %)	13 6.5%	4	34 17%	3	22 11%	3	23 11.5%	2	5 2.5%	4
Children (in %)	88 44%	1	65 32.5%	2	5 2.5%	4	6 3%	4	10 5%	3
Sample	200		200		200		200		200	

**Husband:** It has been found that husbands played a very major role as financier, decider, and purchaser. They acted as the financier 81.5% of the time, acted as the decider 70.5% of the time, and acted as the purchaser 69% of the time.

**Wife:** Wives played a major role as initiator and influencer. They acted as the initiator 39% of the time and acted as the influencer 34% of the time. Furthermore, the wives acted as the decider and purchaser 23.5% of the time, respectively.

**Elders:** It has been found that the Elders played a minor role. They acted as the influencer 17% of the time, acted as the fmncer 11.5% of the time, and acted as the decider 11% of the time.

**Children:** The children played a major role - they contributed as the initiator 44% of the time and acted as the influencer 32.5% of the time.

As **Users** of the purchased products, all the members of the family (comprising of husband, wife, Elders, and children) together were found to be the major users (made purchases 66% of the time) of the purchased durables. They are followed by wives who were exclusively found to be the second major users (24% of the time) of the purchased durables. Lastly, children are found to exclusively use the purchased durables 10% of the time,

Based upon the percentage of occurrence ; husband, wife, Elders, and children played different family roles are depicted in the Table 4 for durables in Yamuna Nagar District. Different ranks have been assigned, where Rank 1 stands for exerting the highest degree of influence, and Rank 4 stands for exerting the lowest degree of influence in their respective roles.

In the district of Yamuna Nagar, husbands basically played the overall dominating role as financier, decider, and purchaser, and to some extent, as an influencer. Wives played the role of an initiator, influencer, and to some

extent, as a purchaser. Elders played the role of an influencer, and to some extent, as a financier and decider. Children played the role as an initiator and influencer only.

### CONCLUSION :

In the FMCG sector, in rural Ambala, it is observed that a significant role was played by husbands and Elders in the various family role decisions. Wives basically played the role of homemaker and had a minor role as influencer. Majority of the goods purchased were for the family's consumption. In rural Yamuna Nagar, Elders and husbands also played significant roles in all aspects of family decisions. Husbands played a major role as financier, decider, and purchaser. Therefore, marketers can target husbands and Elders in product promotions and advertisements. Moreover, the advertisements can highlight the benefits that can be derived by the usage of the products by the consumers.

In the consumer durables sector, it is seen that among the majority of the respondents, the financier is the decider who happens to be the husband in both the districts. The husbands were also involved in making the purchases of the durables. This is in stark contrast to the FMCG sector, where other members of the family are also seen to be involved in purchase transactions. Wives, on the other hand, played the role of an initiator, influencer, decider, and purchaser in a major way. The Elders basically played the role of an influencer. Lastly, children played a big role as an initiator, and to some extent, as an influencer and purchaser. Therefore, marketers can go for persuasive advertisements to target the husbands. Since the husbands are the financiers and deciders, the durable companies can go for sales promotion, especially with the finance companies where husbands can be the targeted. Moreover, informative advertisements can be targeted to the wives and children.

### LIMITATIONS OF THE STUDY:

The study has been confined to two districts of Haryana. However, the two districts may not be a representation of the entire population of rural Haryana. At the same time, the research is based mainly on the information supplied by the consumers of rural Haryana only. Due to low levels of literacy and conservative nature of rural folks, the eagerness of the respondents to respond was low. The women were not very forthcoming with the responses.

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## THE DEVELOPING OF NATIONALISM IN ACEHNES LOCAL WISDOM FOR THOSE WHO RUNS THE ISLAMIC SHARIA

*Drs. Sulaiman, M. Si*

Syiah Kuala University,  
Banda Aceh, Indonesia

*HafidhMaksum, S. Pd, M. Pd*

Serambi Makkah University,  
Banda Aceh, Indonesia

### ABSTRACT

*Acehnes people, in their histories so far, are considered as strong Islam adherents. Islam not only has been sought to be upheld in the middle of society which means to implement its teaching, but also it has become the main foundation in the formation of nationalism traditions of the royal palace in the past is loaded with Islamic values, from using titles, government concept, ceremonial tradition at palace (which did not distinguish between the Islamic and the royal tradition) and various religious policies of the kingdom, especially in the 17th century. Islam was not only a source of inspiration for the development and the progress in Aceh in various fields, but also acted as the main motor in a strong resistance against the Portuguese in Malacca in the first half of the 16th century, and Dutch in during the last 19th century and early 20th century. War in the name of religion had always upheld by the community consistently.*

**Keywords:** Nationalism, Islamic Sharia.

## INTRODUCTION:

Nationalism is an understanding that creates and maintains the sovereignty of a country to realize the concept of general identity for a group of people (residents). This bonding occurs and grows in society when people (residents) start thinking about living together in a particular area, i.e a country that is no longer under the control of other nations (Kahim, 1995, p. 18). (Riff, 1982, p. 54). (Komalasari, 2008). It should be understood that Indonesia has various ethnic groups who inhabit in islands. Every island is isolated from one to another due to natural factors, resulting in an environment where relationship among islands is not easy. These conditions encourage the growth of tribal characteristics in terms of linguistic, and cultural ones which are different from one to another so it rises to the distinctive nature of each, according to the environment.

Under different conditions, the nationalism of Acehnese grew through the signal of their senses of nationhood and fate similarity which was followed with resistance against the invaders and other rejections. In the sense, the reactions of the Acehnese towards invaders' actions and attitudes which marked the rebellion in some areas were conducted by the Acehnese personages. The rebellion swore politically separate from the invaders and to repel invaders from Aceh' s land.

The implementation of Islamic sharia in Aceh is able to overcome new problems such as the rising sense of nationalism among Indonesian people. The flow problem can create Achenese nationalism identity. If we look at now a days from nationalism attitude (as the important elements in the growth of nationalism), we experienced changes towards better direction. (Maksum, 2017, p. 77).

Islamic sharia is one of the solutions in creating Acehnese nationalism, because in Islamic sharia, we are demanded to act good to fellows without any discrimination and to teach love to the home land. (Zainuddin, 1961, p. 21).

## DISCUSSION:

### a. Nationalism in Islamic Perspective:

Islam to its adherents is not only a religion in the sense of Western studies, but it is also a system that encompasses all aspects in human life. In his book, (Boisard, 1980, p. 183) assess that the universality of islam as a religion and social system can be proved from four terms : metaphysical term, religious term, sociological and political terms. As the belief in oneness of god is poured in a very strong belief, Islam is a universal ideology that can not be equated with ideologies of any religion. Besides this fundamental aspect, Islamic concept of human being is to help the universality of human. Human beings are independent and responsible. However, a human being is not secluded because he or shelive in a social environment and he or she will need to bear the consequences of his or her deeds. Double-Islamic conception of the individual is appropriate with the concept of universality that is accepted by modern western philosophy.

Islam also teaches moral universality. It is no doubt about the fact that islamic teachings can enter and expand in any geographical areas irrespective of different cultural environments. Divine revelations are addressed to all human beings so they embrace Islam and specifically directed from one level to another level to the faithful to obey his rules. Obeying Muhammad's teachings means disconnecting relations with tribal social order and identify ownself with the new unity (Dault, 2005, p. 160). Yet, affiliation and loyalty to the faith-based community does not mean Islam forbids bonds that exist outside these bonds on the basis of faith. Instead, Islam encourages other forms of bonds, such as family ties, as long as is not contradictory to Islam (Umari, 1999, p. 12).

The study about the relationship between Islam and nationalism stemmed from the Middle East region (Dault, 2005, p. 184). Just like in Indonesia, some Middle East students who studied in Europe returned home with the concept of nationalism as studied in the West. Western concept of soldering affects 'wathan' word in Arabic to give its political sense. They believed that European countries development in was affected by strong individuals and their social patriotism toward their nations. This is described in Al-Tahtawi statement, an influential Arabian theoretical who stated that patriotism is the source of development and strength, the means to overcome the distance between Islam and Europe (Azra, 2002, p. 172). The development of thinking from secular nationalism impacts on Muslim political order. The structure of nation was adopted from West and it is only used as the sole structure in the legal government with international association. This fact resulted in the disintegration of the Muslim worlds into many nations and states that are no longer based on the teachings of Islam. The base material of a nation adheres, only to ethnicity, culture, and areas that ignore religious category (faith).

The loss of faith from nationalism formulation rose criticism from some of the Muslim personages. They believed that this weakened the Islamic unity. Ali Muhammad Naqvi, for instance, said that Islam does not

match with nationalism as both ideologies are different altogether. The criteria of 'national' as the basis of community building is rejected by Al-Quran, since the concepts of nationals and locals are only temporary while Islam has universal goals. Another rationale is secularism spirit in nationalism that wanted the strict separation between religion and politics (Dault, 2005:188)

The leveled critics positioned Islam vis-à-vis nationalism. Nevertheless, in Indonesian context, none of those pillars in Pancasila as state ideology contradict with Islamic teachings. Even (Kuntowijoyo, 1997). (Triantoro, 2008, p. 94) opines that Pancasila is Islamic objectives. He reminds that Islam and Pancasila are identical. Ideology without religion can work because there are things in human beings which are called as Immanuel Kant as categorical imperative, like values of discipline, loyal, generous, and other etiquette values. There are sin and rewards system exist in religion, heaven and hell, kosher and illicit for those who believe in all and based on faith and lead one to act in accordance with his believed categories. Categorical imperative as secular system also has personal punishment, like feeling guilty and intuitional punishment that embody in formal punishment.

Pancasila unites the concept of power (divinity and popular sovereignty), of process (humanity and nationality), and goal (social justice). The uniquenesses of Pancasila is that the power is laid under God and teodemokrasi people. This term (teodemokrasi) is formed from two terms such as theocracy and democracy. Theocracy is nothing but by omitting negative connotation of western style for Muslims i.e otherwise called as Tauhid (monotheism), making God as the center. It means that the power of god is above power of the nation. In power implementation it is held by noticing religious principals, such as discussion and justice. Democracy is a power system with sovereignty which is entirely in the hands of the people without any binding with laws of the God. Therefore, teodemokrasi is a concept of national power which is limited by God law in one side and by people on the other side. It can be formulated that it is the power that people owe with the belief, that the source of power is God. Before the concept of democracy was known, the power responsibility was held by God only, which was misused. In Javanese history for instance, a king used title 'khalifatullah' (caliph of God) and in people awareness system the power of king was considered as the power of God and cannot be violated. There is a negative connotation toward teokrasi system in political study in the West due to this concept (Kntowijoyo, 1997: 62, (Burhan, 2001, p. 29), (Yatim, 2001, p. 68)

Indonesian Nationalism is in the form of nation-states and uses democracy as political system that has no conflicts with Islam as long as it does not break the stipulated restricts in the religion. (Maududi, 2004, p. 54) declares that every person in Muslim Society has rights and power to be the caliph of god and all individuals are equal. The institution that handles state affairs should be formed appropriately upon the will of individuals in the society. Their opinions of determining the organization, leader, and all things are related to governance that is appropriate with Islamic principles. In this case, Islamic political system is the real democracy.

#### **b. Islam as bindingelement of Acehese nationalism:**

Historically Islam is the main pillar in realization of Islamic brotherhood in this kingdom. This theme became so popular in Aceh, so that the Muslim societies from various regions like Arab, Turkey, India, Persia and many more were found in this kingdom, for trading, teaching Islam, or even to settle here forever (Rasyid, 1992, p. 56) Hence, C. SnouckHugronje, in the end of 19<sup>th</sup> century informed that many Arabians stayed in Aceh, particularly, the descents of prophet Muhammed (PBUH) who were titled with habib and sayyid. They were so honored by Acehese people, as not only Muslim scholar, but also they are descents of the prophet Muhammad (PBUH). The good relationship with Turkey had been legally stranded in the middle of 16<sup>th</sup> century when Aceh attacked Portuguese in Malacca. Regardless of politic interests and trading they had at that time, Islamic elements played fundamental role especially when facing Portuguese who were continuously considered as a threat to Islam, in both Red Sea Hindi Sea. regions Moreover, these Europeans, adventured to all over the world in the name of trading interests and missionaries who also continued the spirit of crusade and nearly succeeded to conquer Mecca. On behalf of Islam, Turkey constantly gave its attention to Aceh, so they involved in many battles in Aceh, especially in supplying weapons and military advisors. Till today, many such advisors stay in this kingdom.

Islam, not only plays its role in the ground and middle floor as the binding element among the ethnicities in this archipelago, but it also plays an important role at high level in Aceh. Aceh, on behalf of Islam, has great tolerance toward other ethnicities. If in the system of traditional governance (kingdom) the highest power can be only handed over to the royal family, which had not happened in Aceh. This kingdom had never handed over the highest power to royal family. Between years, 1579-1586, Aceh was led by Sultan `Ala al-Din, son of Mansur Shah from Perak Futher between the years, 1586-1589, another one from outside Aceh, `Ala al-Din Ri`ayat Shah, son of Munarwan Shah from Indera Pura (West Sumatera), led Aceh. Iskandar Thani, who led

Aceh from 1636 to 1641, was Sultan AhmadX's son from Pahang, although he was son-in-law of Iskandar Muda. In the 18<sup>th</sup> century Aceh was led by Arabian ancestry, even Bugis.

Perhaps it is interesting to quote a little story here from traditional work from the 17<sup>th</sup> century which known as Hikayat Malem Dagang. Acehnese kingdom under the leadership of Iskandar Muda told that Aceh was in secure and prosperous position, until the arrival two of family members from Pahang kingdom, such as King Raden and his sister named princess Pahang. These two were welcomed by Iskandar Muda with all honors. When they faced the king, those two guests conveyed their intention of arrival i.e to embrace Islam. After embracing Islam legally, Princess Pahang was then married to Iskandar Muda, while her brother King Raden married Iskandar's sister. The interesting part here is the texts that declares this marriage is to prove all that they got converted to Islam.

Yet, this condition was disturbed by the arrival of their brother, named King Si-Ujut. He was the commander of Pahang. His arrival was welcomed with state ceremony. He was feted in Aceh and even given territories; such Ladong and Krueng Raya. After three years of stay in Aceh, Si-Ujut asked his brother to return home to Pahang. Which the King Raden rejected. This made, furious Si-Ujut threaten to kill him and demolish all Aceh regions. However his actions were forgiven by Iskandar Muda. Yet, in his way back to home i.e Pahang Si-Ujut and his entourage grabbed peoples' treasure whomever they met and territories of Ladong and Krueng Raya. Even he seized and murdered some Acehnese sailors whom he met brutally. Provoked with this act Iskandar Muda decided to attack Si-Ujut on the basis of jihad justification done by Iskandar Muda.

Among the important points to be inferred from the history is that the Island was very strong to King Iskandar Muda and married the person who officially embraced Islam Further his actions on the threatening by King Si-Ujut to Aceh is also same. The threatening and seizing to kingdom meant attack to the king, and it also meant to Islam itself. In the traditional system governance in a form of kingdom governance in which the authority and the kingdom cannot be separated. Therefore, the honor shown to officials means the honor shown to kingdom and Islam, and on the contrary as well (Maksum, 2016), (Faisal, 2016, pp. 125-130).

## CONCLUSION:

Attitude of Nationalism and tolerance on behalf of Islam still exists in Aceh or in other words Islam is still the 'the binding element' among Muslims in Acehnese view nowadays. This needed to be elevated to find out the level of society appreciation to Islamization today. It may not be wrong to understand that the opportunities provided for Islamic sharia implementation in Aceh are appropriate in creating the attitude of nationalism. The Islamic sharia is expected to be able to muffle conflicts in this country. Aceh is permitted to implement Islamic sharia formally, which was declared officially by Abdurrahman Wahid the president of Indonesia on 19th December 2000 at Baitur rahman mosque. The president further issued constitutions such as Number 18 Year 2001, as a drum to implementation of Islamic sharia in the entire island. This drum was beaten by Aceh governor Abdullah Puteh on 1st Muharam 1423 H who declared the beginning of implementation of Islamic sharia totally (Zarkasyi, 2005, p. 104). It was amazing that without any striving and hard working as had ever done by Tgk. Daud Beureu'eh and his fellows Aceh was permitted to implement Islamic sharia. From the conflict perspective, perhaps it can be understood that when 'Islam' has become the formal basis and guidance in this region as the way of life, it is expected that when muslim kill themselves, they will one day gets vanished and a condition will be created where attitude of nationalism will pop up to the surface, without seeing to any ethnic group background. In other words, Islam is expected to be 'binder of nationalism' that is able to unite Muslims in this country which had ever occurred in Acehnese history.

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# LOGISTIC REGRESSION MODEL FOR PREDICTING FIRST SEMESTER STUDENTS GPA CATEGORY BASED ON HIGH SCHOOL ACADEMIC ACHIEVEMENT

***R. Gunawan Santosa,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

***Antonius Rachmat Chrismanto,***

Department of Informatics  
Duta Wacana Christian University,  
Indonesia.

## ABSTRACT

*Faculty of Information Technology, Duta Wacana Christian University (DWCU) has two methods of admitting new college students in which the first is on the basis of educational achievements in high school whereas the second is on the basis of regular test entrance examination. This research will seek forms of functional relationships through logistic regression to the first semester GPA category of the student in Faculty of Information Technology, Duta Wacana Christian University. The first semester GPA category is used as the dependent variable and the location of high school, high school class, high school status, and level of English test result are used as independent variables. With regards to the training data required to create a logistic regression model, we used students' admission data from 2008 through 2014, while the students' data of 2015 is taken as the testing data. The accuracy of the model in predicting data, is measured by the percentage of correct predictions in this regard through Crosstab tables between the predicted data and the real observation of the 1st semester GPA from new students of 2015 class. This research found seven models. The highest percentage of correct predictions between the logistic regression model and training data is 79.4% .There is a change in the logistic regression form, three models influence only by level of English test result while the remaining four models are influenced by the level of English test result and high school location.*

**Keywords:** logistic regression, prediction, accuracy model, Crosstab table.

## **INTRODUCTION:**

One of the important stakeholders in university is students. Before entering Duta Wacana Christian University (DWCU), students have had different educational and environment backgrounds. The different environments background means having a secondary school they have taken or take. For example, those coming from senior high school in Java and outside Java. And also they maybe come from ordinary high school or vocational high school. The last, they also maybe come from public high school or private high school high school. After prospective new students are admitted as college students at Faculty of Information Technology, DWCU and after learning process in the first semester, the results of their study are reflected in their first semester Grade Point Average (GPA). The GPA of a student can be regarded as evaluation of learning outcomes in higher education. There are some students who secured high GPA whereas some obtained low GPA. At the first semester, these students can sometimes move to another faculty. In addition, there are some students who have not registered for the next semester, so that they are no longer active as college students or even resign as a student from the Faculty of Information Technology DWCU.

There are many different external factors that may affect the first semester GPA beside existing internal factors such as interests, talents, abilities, diligence, self-motivation. External factors that are used in this research are the location of high school, categories of high school, status of high school, and level of English test result. The location of high school can be categorized into high schools in Java and outside Java and the high schools are classified by usual high school and vocational high school which also thought to be investigated. Similarly, the status of high school is categorized into high school with the status of State and Private status. In addition, the level of English among the students is also a possible factor affecting students' first semester GPA. In this research we only limit on factors as mentioned above. Actually there are many more factors that may affect the GPA categories that is not covered, such as: gender, interest in studies, family economic level, employment background of parents / guardians and others.

In a previous research, Santosa & Setiadi (2015) have investigated about the factors that affect students' GPA significantly, but they have not observed a relationship between GPA and these factors. This research is the next step of previous research which essentially tries to find mathematical models such as logistic regression to predict the categories of students' first semester GPA at the Faculty of Information Technology, DWCU.

## **LITERATURE REVIEW:**

### **DATA MINING:**

Due to the internet development, there is a rise in global data usage. Data is a collection of facts that have been valid and ready to be used for the purposes of seeking information. Information can be obtained in various ways, either manually or automatically. If the amount of data is too large, then the information search becomes increasingly difficult, especially if it is performed manually. A search for information from a large number of datasets can be done automatically using Data Mining. Data Mining (Knowledge Discovery from Data) is a discipline in Information Technology that is interdisciplinary and is able to perform mining of data in large numbers in order to obtain various kinds of information in the form of certain patterns that are hard to find by searching manually (Rud, 2010).

Stages of data mining in knowledge discovery process is as follows (Han & Kamber, 2011):

1. Data collection phase (either from a database or other data source): In this research, the data retrieved from the achievements of high school students who come from the path of achievement in the Faculty of Information Technology UKDW act as the data source.
2. The pre-processing stage is the stage of data cleaning and data processing early, in order to be completely ready for use.
3. Phase transformation is the data transformation from one phase to another so that it becomes suitable for the data to process to next stage in numeric form i.e., ready to be calculated. This stage also features selection i.e., selection stage of all the right attributes as the distinguishing feature data.
4. Data mining is the stage when the data mining algorithms are applied. Few examples in this stage are clustering, regression, or classification algorithm. In this research, we use logistic regression algorithm analysis.
5. Phase evaluation is the stage to check the validity, accuracy, precision stages of data mining whether it has been done before, so that the data mining result phase can be used well for a variety of data other than testing.

Several studies using data mining to analyze the concept of academic ability in college were conducted earlier, such as:

- (Aziz, Ismail, & Ahmad, 2013) conduct research by building a prototype system to predict Students Academic Performance (SAP) in Higher Education Institution (HLI) using Naive Bayes algorithm based on Weka. This system can provide early warning of potential weaknesses in the students' learning. Parameters that are used in this research were gender (male / female), race (Malaysia, China, or India), origin (from town or rural), how to get into university (STPM, diploma, or matriculation), parents income, and the first semester GPA (high, low, and medium)
- (Ahmad, Ismail, & Aziz, 2015) conduct research related to data mining to predict the IP category of the first half using Decision Tree algorithm, Naive Bayes, and Rule Based Classification. Based on these studies showed that the Rule Based Classification is the best method among the three methods above, with the accuracy reached 71.3%. In this study they divided GPA into 3 categories: low, medium and high level.
- (Thakar, Mehta, & Manisha, 2015) presented a paper which contains extensive and exhaustive survey on rise of data mining to education and its direction in the future.
- The use of Data Mining is also used to predict the likelihood of students dropped out (Jadrić, Garača, & Čukušić, 2010) and the possibility of student's failed (Vadivu & Bharathi, 2014).

**GRADE POINT AVERAGE (GPA):**

Every student in the university has to be evaluated at the end of every semester to evaluate their learning outcomes. According to Indonesian Technology Research Higher Education Department (RISTEK DIKTI) (RISET, TEKNOLOGI, & DAN PENDIDIKAN, 2015), Grade Point Average (GPA) is the result of assessment outcomes of learning for university students at the end of semester. It is expressed in value calculated by summing the multiplication of the course grade point taken and course credits. Then this result is divided by sum of all gradable credits courses have been taken, as express in formula (1) below:

$$GPA = \frac{\sum \text{Course Grade Point} * \text{Course Credits}}{\sum \text{Gradable Credits}} \dots (1)$$

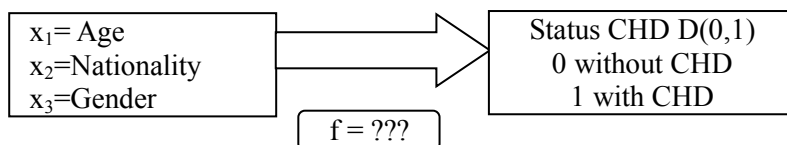
**GPA is important because it relates to:**

1. The number of courses that can be taken in the following semester.
2. At the end of the graduation in university, GPA is considered as an important determination to apply for jobs.

In a previous study (Santosa & Setiadi, 2015), first semester GPA affects on another next semester's GPA. So there is a strong correlation between first semester GPA and GPA of the next semester. Therefore first semester GPA is the main focus of this research.

**LOGISTIC REGRESSION:**

Logistic regression was developed and applied in epidemiological research. The common question to this research is "what is the relationship between one or more independent variables (exposure) on the condition of the illness". The condition of the illness is worth a dichotomous variable (binary) i.e 0 represents "no sick" and 1 represents "the sick". (Kleinbaum & Klein, 2002) do research about classification of Coronary Heart Disease (CHD) and result the dichotomy are the status of subjects classified as 0 ("no CHD") and 1 ("CHD"). In this research, the independent variables used are  $x_1$  as age,  $x_2$  as nationality and  $x_3$  as gender. Figure 1 illustrates the schematic model of logistic regression.



**Figure 1: The schematic model of logistic regression**

It can also be said that logistic regression model in Data Mining can be used to describe the relationship of several independent variables X on the dependent dichotomy value variable D (0,1) (Kantardzic, 2003) . For epidemiology researchers, this logistic regression is the most popular procedure, especially when the data is about dichotomous disease conditions. Logistic regression is based on a logistic function which can be seen in the formula [2]:

$$f(z) = \frac{1}{1+e^z} \text{ dengan } -\infty < z < \infty \dots (2)$$

The form of logistic function is described in figure 2 below (Hosmer & Lemeshow, 2003)

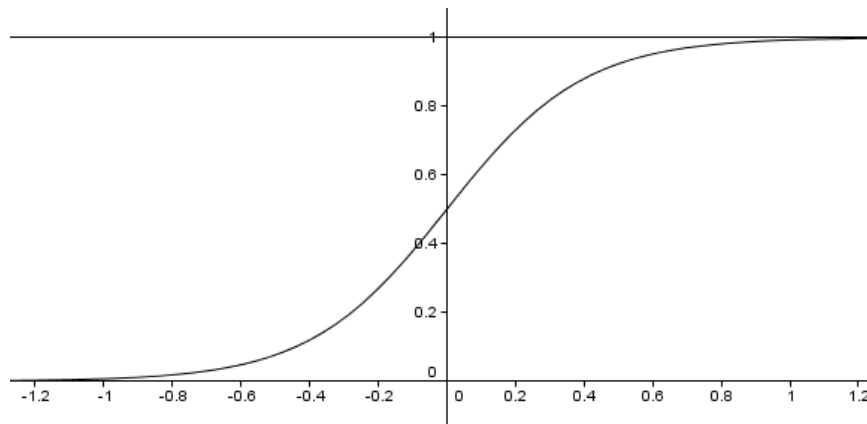


Figure 2: Graph of logistic function

The Figure 2 shows the range the value of  $f(z)$  lies from 0 to 1 regardless of the value of  $z$ . For  $z \rightarrow -\infty$ , then  $f(-\infty) = 0$  and for  $z \rightarrow \infty$ , then  $f(\infty) = 1$ . Since the value of  $f(z)$  lies between 0 and 1, the logistic regression is popular. This model is designed to describe the probability that always lies between 0 and 1. In epidemiological terms, probabilities like these give the value of an individual's risk of getting certain diseases (Hosmer & Lemeshow, 2003).

Another reason why logistic model became popular is because of the shape of the logistic function. As observed in Figure 2, if we start from  $z = -\infty$  move to the right, then the value  $f(z)$  rose sharply curved approaches  $z = 0$  for a while, then it gets declined dramatically close to 1 and eventually will approach around 1. These results illustrate the shape of the curve S.

Application of the logistic regression was performed by (Hajarisman, 1998) to be implemented in order to determine the pattern graduation TPB-IPB. In this study, logistic regression was compared with beta-binomial regression method since beta-binomial method is easier for both calculating the probability function decline and interpreting the parameters that are inside the model. In this research, it has been shown that beta-binomial regression model is a tool that is able to address overdispersi in clustered binary observational data compared to the usual binary logistic regression model. This research is the logistic regression model  $f$  and the main focus is  $z$  can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , which can be seen in the formula (3) and (4):

$$z = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k \dots (3)$$

so 
$$y = \hat{f}(z) = \frac{1}{1 + e^{-(\alpha + \sum \beta_i x_i)}} \dots (4)$$

The values  $\alpha$  and  $\beta_i$  are unknown parameters and will be estimated from the data set in the form of samples using Maximum Likelihood Estimator (MLE). The parameters  $\alpha$  and  $\beta_i$  can be estimated by  $\hat{\alpha}$  and  $\hat{\beta}_i$ .

**CROSSTAB TABLE :**

To measure the accuracy of prediction, logistic regression model can be used Crosstab (Cross tabulation) between the prediction categorical data and the observation categorical data value as seen at Table 1:

**Table 1: Crosstab between Observation Data and Prediction Data**

		Prediction Data		Total Row
		Category 1	Category 2	
Observation Data	Category 1	$n_{11}$	$n_{12}$	$b_1$
	Category 2	$n_{21}$	$n_{22}$	$b_2$
Total Column		$k_1$	$k_2$	$n$

The accuracy of the prediction results measured by Formula (5) below (Bhattacharyya & Johnson R.A., 1977):

$$\text{Equality Percentage EP} = (n_{11} + n_{22}) / n \dots (5)$$

with

$n_{11}$  = number of training data which is in Category 1 in Prediction and actually this data is include in Category 1 in Observation

$n_{22}$  = number of training data which is in Category 2 in Prediction and actually this data is include in Category 2 in Observation

$n$  = number of all training (test) data.

**METHODOLOGY:**

Several stages of the research is as follows;

1. The students’ data is retrieved from Faculty of Information Technology from PUSPINDIKA which consists of Information System Department and Information Technology Department. A total of 8 consecutive academic years of student data was retrieved from 2008 to 2015. The data retrieved from PUSPINDIKA includes high school category, high school status, high school location and first GPA students.
2. The English skills data of prospective students from PPBA (Pusat Pelatihan Bahasa Asing) was also retrieved.
3. The researchers chose the data from Faculty of Information Technology students that received through achievement. In the process of new student admissions in DWUC, there are two ways which are path of high school achievement line and non-high school achievement lines (regular admission through entrance test). The difference between these two paths are in the process of acceptance in case of path to achievement is not to take the test academic skills (ability of Numerical, Verbal, Spatial and Analogies tests) while the non-achievement path should follow the four tests of academic ability.
4. Then, after cleaning process, the data is used for logistic regression.  
In logistic regression model, the main focus is  $z$  which can be written as a linear combination of  $x_1, x_2, x_3, \dots, x_k$ , and can be seen in the Formula (3) and (4) above.  
 $x_1, x_2, x_3, \dots, x_k$  are value from training data. We use  $x_1, x_2, x_3, \dots, x_k$  to get parameter value of  $\alpha$  and  $\beta_i$  which is unknown parameters. Then we estimate  $\alpha$  and  $\beta_i$  by using Maximum Likelihood Estimator (MLE) symbolized as  $\hat{\alpha}$  and  $\hat{\beta}_i$ . Furthermore  $\hat{\alpha}$  and  $\hat{\beta}_i$  will be used for predicting  $y$  as seen in Formula (4).
5. Making 7 logistic regression models for new Information Technology Faculty students through high school achievement line. The seven models are as follows,
  - Model A is the logistic regression model using data from student class of 2008
  - Model B is the logistic regression model using student data from 2008 up to 2009 class
  - Model C is the logistic regression model using data from 2008 students to the class of 2010
  - Model D is the logistic regression models using data from 2008 students to the class of 2011
  - Model E is the logistic regression models using data from 2008 students to the class of 2012
  - Model F is the logistic regression models using data from 2008 students to the class of 2013
  - Model G is the logistic regression models using data from 2008 students to the class of 2014
6. With the help of these 7 logistic regression models, the first semester GPA category class of 2015 is predicted.
7. Measuring accuracy of the results of logistic regression prediction of seven such models to actual observed category class of 2015 data by using Crosstab table (cross tabulation).

**FINDINGS AND DISCUSSION:**

After the data is collected, it is cleaned in order to obtain the cumulative number of students at Faculty of Information Technology in order to run logistic regression. The data is tabulated as Table 2 below.

**Table 2: Number of students of the Faculty of Information Technology from 2008 until 2015**

No	Class	Total	High School Achievement	Regular Admission
1	2008	368	63	305
2	2008 until 2009	628	72	556
3	2008 until 2010	892	128	764
4	2008 until 2011	1143	273	870
5	2008 until 2012	1387	398	989
6	2008 until 2013	1592	523	1069
7	2008 until 2014	1763	613	1150
8	2015	254	193	61

Because the dependent variable should dichotomy of data D (0,1), then the first GPA is transformed into binary data, namely:

$0 < GPA\_1 < \text{average}$  coded into "0" and  $(\text{Average} + 0.0001) < GPA\_1 < 4.000$  encoded into "1", in this case the average is taken based on the entire sample data.

The next step is *data transformation* (data is transformed or converted into a form suitable for processing or analysis). Data category of SMA ("1" for high school and "2" for vocational high school), the status of SMA ("1" to the State high school and "2" for the Private high school), the location of SMA ("1" to high school from Java and "2" for high school from outside Java) and level English (level\_1 encoded into "1", level\_2 encoded into "2", level\_3 encoded into "3" and ESP encoded into "4") transformed from alpha numeric data into numerical data because logistic regression data requires a numeric type data. So that the model has only four independent variables: the status of high school (x1), the location of SMA (x2), category SMA (x3), the level of English (x4). As in the case of ordinary regression of existing regression model can be simplified to the significance test for the beta coefficient ( $\beta$ ). Here is a form of models of computation results before and after simplified (Santosa & Chrismanto, 2016).

Model A is the logistic regression model using high school achievement data from class of 2008 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-22,567 - 0,490(x_1) - 0,015(x_2) + 20,124(x_3) + 1,523(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-1,460 + 1,420(x_4)\})$$

Model B is the logistic regression model using high school achievement data from class of 2008 until class 2009 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-22,060 + 0,587(x_1) - 0,540(x_2) + 21,206(x_3) + 0,802(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-0,381 + 0,698(x_4)\})$$

Model C is the logistic regression model using high school achievement data from class of 2008 until class 2010 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-0,565 + 0,050(x_1) - 0,648(x_2) + 0,664(x_3) + 0,768(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-0,793 + 0,833(x_4)\})$$

Model D is the logistic regression model using high school achievement data from class of 2008 until class 2011 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-1,895 - 0,181(x_1) - 1,438(x_2) - 0,125(x_3) + 0,573(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-1,409 - 1,404(x_2) + 0,582(x_4)\})$$

Model E is the logistic regression model using high school achievement data from class of 2008 until class 2012 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-1,509 - 0,236(x_1) - 1,160(x_2) + 0,320(x_3) + 0,465(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-1,350 - 1,057(x_2) + 0,456(x_4)\})$$

Model F is the logistic regression model using high school achievement data from class of 2008 until class 2013 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-1,625 - 0,251(x_1) - 1,082(x_2) - 0,322(x_3) + 0,646(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-0,809 - 1,069(x_2) + 0,666(x_4)\})$$

Model G is the logistic regression model using high school achievement data from class of 2008 until class 2014 is;

$$P(\mathbf{x}) = 1/(1+\exp\{-1,575 - 0,160(x_1) - 1,121(x_2) - 0,367(x_3) + 0,712(x_4)\})$$

and after a simplified model becomes:

$$P(\mathbf{x}) = 1/(1+\exp\{-0,895 - 1,149(x_2) + 0,738(x_4)\})$$

Summary result for the logistic regression coefficient before significance data can be summarized in Table 3.

**Table 3: Summary Table of Logistic Regression Coefficients before Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-22.567	0.490	-0.015	20.124	1.523	79.4%
2008 sd 2009	-22.060	-0.587	-0.540	21.206	0.802	76.4%
2008 sd 2010	-0.565	0.050	-0.648	0.664	0.768	71.9%
2008 sd 2011	1.895	-0.181	-1.438	-0.125	0.573	75.1%
2008 sd 2012	1.509	-0.236	-1.160	0.320	0.465	71.6%
2008 sd 2013	1.625	-0.251	-1.082	-0.322	0.646	71.5%
2008 sd 2014	1.575	-0.160	-1.121	-0.367	0.712	73.7%

Table 3 shows that the average of its Equity Percentage is 74.1%

**Table 4: Summary Table of Logistic Regression Coefficients after Significance Test**

Class	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Equity Percentage
2008	-1.460	0	0	0	1.420	76.2%
2008 sd 2009	-0.381	0	0	0	0.698	75%
2008 sd 2010	-0.793	0	0	0	0.833	73.4%
2008 sd 2011	1.409	0	-1.404	0	0.582	75.1%
2008 sd 2012	1.350	0	-1.057	0	0.456	72.4%
2008 sd 2013	0.809	0	-1.069	0	0.666	71.9%
2008 sd 2014	0.895	0	-1.149	0	0.738	73.9%

Table 4 shows that the average of its Equity Percentage is 73.9 %

By using all the seven models in Table 4, the first semester GPA category from Information Technology students can be predicted through high school achievement admission. The rows and columns in the crosstab table have two categories such as the category which is labeled as ‘0’ indicating the first semester GPA category below the sample average and another category labeled ‘1’ showing the first semester GPA category above average sample data. And the results is summarized by Crosstab tables.

**Table 5: Number of students as a result predictive using Model A**

Model A		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 5, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model A has Equality Percentage = 72%.

**Table 6: Number of students as a result predictive using Model B**

Model B		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 6, it can be seen that there are 0 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model B has Equality Percentage = 65.8%.

**Table 7: Number of students as a result predictive using Model C**

Model C		Prediction Data		Total Row
		0	1	
Observation Data	0	0	0	0
	1	66	127	193
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 7, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 127 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model C has Equality Percentage = 65.8%.

**Table 8: Number of students as a result predictive using Model D**

Model D		Prediction Data		Total Row
		0	1	
Observation Data	0	65	85	150
	1	1	42	43
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 8, it can be seen that there are 65 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 42 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model D has Equality Percentage = 55.4%.

**Table 9: Number of students as a result predictive using Model E**

Model E		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 9, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model E has Equality Percentage = 72%.

**Table 10: Number of students as a result predictive using Model F**

Model F		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 10, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model F has Equality Percentage = 72%.

**Table 11: Number of students as a result predictive using Model G**

Model G		Prediction Data		Total Row
		0	1	
Observation Data	0	59	47	106
	1	7	80	87
<b>Total Column</b>		<b>66</b>	<b>127</b>	<b>193</b>

Based on Table 11, it can be seen that there are 59 prediction data in the category 1 = 0 and it is also true in the category 1 = 0 corresponds to the actual observation data. There are also 80 prediction data in the category 2 = 1 and it is also true in the category 2 = 1 corresponds to the actual observation data. So the accuracy of prediction using model G has Equality Percentage = 72%.

## CONCLUSION:

We arrive at the following conclusion based on the literature.

1. In terms of compatibility between logistic regression models with training data, the model A is the best model, because it has a percentage kesamaaan 79.4%.
2. In terms of compatibility between the logistic regression models with training data after significance test, the model A is the best model, because it has a percentage kesamaaan 79.4%.
3. The best logistic regression model was used to predict first semester GPA category student of 2015 class year are the model A, E, F and G with each match percentage is 72%.
4. There is change in the logistic regression, model A, B, C influence only by level of English. While on the D, E, F and G model, influence by the level of English and high school location. It must be a concern for decision makers in the educational process.
5. The percentage of equality of this research is still not satisfied, so in future we will try to use other methods that can increase the equality percentage or add other variables that have not been taken into our consideration.

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## TED HUGHES'S VISION OF POWER AND ENERGY: A SPECIAL REFERENCE TO "THE HAWK IN THE RAIN"

*Dr. Ritu Sharma,*

Associate Professor,  
Department of English, Dyal Singh College,  
Karnal, Haryana, India

### ABSTRACT

*Ted Hughes is a versatile genius. He is one of the foremost poets in English literature. The violence is present in Hughes's poetry as a desperate wish to be out of the human altogether. Hughes is a poet who finds the human condition too much to take." The poetry of Ted Hughes has an element of violence. For him violence and power go together. The Hawk in the Rain is the first collection of poems by Ted Hughes. The Hawk in the Rain "pitches us into the thick of a battle between vitality and death, which Hughes claimed was his only subject. It is, in this poem as in many, a one-sided battle. The poem The Hawk in the Rain" presents a contrast between the steadiness, stability and strength of a hawk and the unsteadiness and sense of danger of a human being. We find the most vivid picture of the hawk being hurled down by a furious dream, and dashing against the earth, to be killed that instant. The Hawk in the Rain" illustrates Hughes's vision of power and energy.*

**Keywords:** violence, desperate, instinctual energy, hawk, vitality, anxiety-ridden, persona, combatant, predator, hurled down, atrocities, rationality, humanism.

## INTRODUCTION:

Ted Hughes is a versatile genius. He is one of the foremost poets in English literature. Hughes contends that the western civilization has overvalued science and intellect which has led to a breakdown of communication between human beings on the one hand and the world of nature and instinctual urges on the other. Ted Hughes may be called a poet of violence in a limited sense. The theme of violence finds a vivid expression in his poetry especially in his war and animal poems. Ted Hughes is, above all, a poet of nature. In his times, nature is no longer a simple, guiding, moral force like that of Wordsworth. The poetry of Ted Hughes has an element of violence. For him violence and power go together.

According to (*Martin Dodsworth, 1983*), the violence is present in Hughes's poetry "as a desperate wish to be out of the human altogether. Hughes is a poet who finds the human condition too much to take."<sup>1</sup> "It was a violent time" Thom Gunn's description of the Elizabethan age could equally be applied to the 1950s. Again and again the poets of this decade returned to the central theme of violence, yet, constantly shrank back from engaging with it. In 1957, the poetic career of Ted Hughes began with the publication with *The Hawk in the Rain*. This volume brought him recognition and much critical acclaim.

*The Hawk in the Rain* is the first collection of poems by Ted Hughes. Its immediate success in literary circles was mainly because of the celebration of instinctual energy in several of its poems. But one of the prominent features of this collection is the poet's ambivalent attitude towards violence. This volume announces the major theme man in relation to the animals, the earth, the weather, time and morality. Ted Hughes's commitment to the way of living where the instincts predominate is artistically suggested through many of his poems.

*The Hawk in the Rain* is a volume of poems which also contains a poem "The Hawk in the Rain", the title of which is then used by Ted Hughes as the title of the whole volume. It is one of the most famous poems in this volume. In this poem the speaker is a man walking laboriously, when it is raining heavily. This man looks at a hawk in the distant sky; and he watches the bird which symbolizes violence; and we are made to feel that the hawk may one day view the earth from a victim's stand point and feel "the ponderous shires crash on him." The speaker feels that he would be swallowed by the mud or the earth. He is acutely conscious of the violence of Nature at this time, while the hawk sits still and at ease. But then it occurs to the speaker that a day would come when this hawk, taking a wrong direction in the course of a furious storm, would be forced downwards and flung down to the earth, to be killed instantly. Thus the hawk's blood would mingle with the mud on the ground. The very first stanza suggests that this is not just a walk across a field but a "lifelong condition" and a "war between vitality and death."

*Drown in the drumming plough land, I drag up  
Heel after heel from the swallowing of the earth's mouth  
From clay that clutches my each step to the amble  
With the habit of the dogged grave..... (HR-I)*

In his anxiety-ridden state of mind, the persona gets a glimpse of the hawk whose seeming effortless defiance of the violent elements, instead of infusing in him the will to struggle, further incapacitates him. Quite unlike his legs which are at the mercy of the beastly earth, according to (*R. Ries, December 1974*), the hawk's "Wings hold all creation in a weightless quiet."<sup>2</sup> When a man struggles through the mud on the ground, the hawk shows his strong will against the rain and against the violence of the wind. So, while in the case of the persona, there is a desperate struggle for survival, there is on the side of the hawk a comfortable and confident assertion of the existence.

The persona's predicament has no end because he lacks the concentrated and pointed assertion of the energy symbolized by the hawk's eye. He is thus incapable of responding with hawk-like confidence and ease to violent nature. As a participant in the "war between vitality and death", he lacks determination and coherence. Being devoid of any meaningful assertion of vitality, he is helpless before the life devouring elements. The hawk exists at a high and superior level than the persona. The hawk's "still eye" finds its "other equivalents" in the poem in "the diamond point of will" that "polestars/ the sea drowner's endurance" and "the master - fulcrum of violence." The hawk possesses what is lacking in those, like the persona, who are the products of the modern civilized world. As (*R. Ries, December 1974*) observes, "... man is seldom capable of such comprehension, but at rare times achieves one of these qualities, as when he abandons consciousness in a purely instinctual attempt to hold on life."<sup>3</sup> Certainly the hawk is in complete harmony with the elements while man is not. But we should not lose sight of the fact that serious doubts have been raised in the second stanza about the mystery of

the hawk over elements. It is, as per (R. Ries, December 1974), "steady as a hallucination in the streaming air."<sup>4</sup> Its mastery is not permanent :

... The ponderous shires crash on him,  
The horizon traps him; the round angelic eye  
Smashed, mix his heart's blood with the mire of the land. (HR-I)

According to (Keith Sagar., 1978) the poem obviously recognizes that "both man and hawk shall die."<sup>5</sup> Man's death is determined by the external circumstances while, says (Calvin Bedient., 1974) "the hawk's time is up only by an internal clock."<sup>6</sup> The difference between the two is not that the hawk has permanent mastery over elements or it is immortal, rather it lies in the fact, according to (Keith Sagar., 1978), that the hawk "can accommodate itself to those forces that threaten its survival."<sup>7</sup> Man's consciousness has burdened him with the fear of death and this makes his efforts at survival look more clumsy and awkward. Both, the hawk and man have to die, but the former through its instinctual inner harmony and self-possession lives its brief existence with dignity, the latter drags on clumsily in his prosaic existence.

"The Hawk in the Rain" pitches us into the thick of a battle between vitality and death, which Hughes claimed was his only subject. It is, in this poem as in many, a one-sided battle. Three of the four elements seem to be in alliance with death. Earth, even the earth of plough land, is not fertile but to convert earth to down-dragging mud and to hack to the bone any head that presumes to raise itself. Air manifests itself only as wind that kills any stubborn attempts at life.

In this poem the hawk is as close to the inviolability of an angel as a living creature can be, but he too is domed at last to "mix his heart's blood with the mire of the land." Yet the effect of the poem on the reader is far from depressing. If the man trying to cross a ploughed field in a cloud burst cannot be the "master- Fulcrum of violence", the same man later sitting at his desk making a poem of the experience can. (Ekbert Fass, 1980) comments "I turn every combatant into a bit of music, then resolve the whole uproar into as formal and balanced a figure of melody and rhythm as I can. When all the words are hearing each other clearly and even stress is feeling every other stress, and all are contended - the poem is finished."<sup>8</sup>

The poem also shows hawk's superiority over man in terms of will power and the power of endurance. It also shows that hawk is not immortal or invulnerable. To a man, the hawk appears as an absolute inviolable. We know that like man the hawk will enter the same grave as the man 'the mire of the land.' But the modes of death in the two cases are different. In the former it is meaningful sacrifice while in the latter case it is sheer dissipation and exhaustion. The hawk does what he programmed to do. Even as he plummets to a last suicidal case, he believes that by relaxing his will, he has let the earth fall upon his head. In this poem "The Hawk in the Rain" Hughes sees human beings as predatory not so much when they fight or kill as when they love. The poem moves straight from animals to lovers. This kind of love is hard to be distinguished from hate. But another critic, Geoffrey Thorley is of the view that "The Hawk in the Rain" illustrates Hughes's penetrating power and energy. Commenting on The Hawk In The Rain (1957) Sylvia Plath in a letter written home states that Ted Hughes in his poetry combines intellect and grace of complex form, with lyrical music, male vigor and vitality, and moral commitment and love and awe of the world.

Hughes himself has explained in his interview to The London Magazine (January 1971) that he thinks of the hawk as a symbol of nature, the Darwinian nature, "red in tooth and claw", and blind to everything else except its own purpose. Were it not so, the claims of the hawk would sound rather magniloquent and purely out of place; for the hawk, despite its predatory nature, is after all a creature subject to change and death. But as Hughes made it clear, it is nature speaking through the hawk. This fact makes the hawk describe itself as the centre and the sole concern of all creation, as if the earth, the sky, the water, and all the creatures were made for the hawk. There is, however, an irony underlying the hawk's self-centredness as well as its belief that everything is for its convenience. Nature and hawk think in the same terms but to different effects. The hawk itself is a part of the ruthless nature it claims to symbolize. Commenting on this aspect of the poem, (Terry Gifford & Neil Roberts, 1981) write:

Thus while 'Nature' in the last three lines is speaking in the simple certainly that it services only itself, the hawk is rehearsing its own necessary blindness: what the hawk sees as a straight line with himself intact at each end of it is really, of course, a cycle, that includes his own death.<sup>9</sup>

The hawk's victorious moment of triumph - might without mercy, conquest without effort, privilege without responsibility, energy without consciousness of end - remains the embodiment of one possible mode of being.

*I kill where I please because it is all mine.  
There is no sophistry in my body;  
My manners are tearing off heads - The allotment of death.*

"The inside of the hawk is a perfect replica of the outer, active predator,"<sup>10</sup> says (Thomas West, 1985). But it is an interesting paradox to observe that Hughes endows Hawk, the anti-human creature, with a kind of human consciousness. The poem is full of violence. But different critics held different opinions regarding the theme of violence. A.E.Dyson says that in this poem the poet also enters imaginatively into the hawk's victory, this time as it rides "effortlessly at height" above the storm. But here, he remains conscious also of the "habit of the dogged grave" which keeps him earth-bound, and which in the end will smash the bird to submit to its fate, and so snatch a martyr's triumph in destruction. This poem shows an agitation in the poet as well as in the protagonist.

The ecological disasters have awakened the poet to a suffering nature. But this nature in Hughes's poetry is not a passive sufferer. It retaliates and has the capacity to unsettle our civilized outlooks and modern world. Hence, his celebration of animals is not an endorsement of crude violence as taken by many critics. It is a protest against what we have made of ourselves and this universe which belongs to all the creatures, flora and fauna. Ted Hughes is a poet of violence only because violence is an unavoidable factor in explaining the atrocities that rationality and humanism have inflicted upon nature. He wants to rescue nature as well as mankind.

His animal poems depict the cruelty, the fierceness and the violence which are inseparable from the world of nature. Ted Hughes's poems of violence are certainly genuine and we enjoy reading them. Even the normal reader can find a certain degree of pleasure in them, especially because they are perfectly realistic in their depiction of the distinct life form of animal world. Hughes shows great interest in the animal world. Hughes's a number of the poems are about animals and about the ferocity of those animals. The poem "The Hawk in the Rain" presents a contrast between the steadiness, stability and strength of a hawk and the unsteadiness and sense of danger of a human being. We find the most vivid picture of the hawk being hurled down by a furious dream, and dashing against the earth, to be killed that instant. "The Hawk in the Rain" illustrates Hughes's vision of power and energy.

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## ALLOCATION OF LAND FOR PADDY FARM IN MATARAM MUNICIPAL - INDONESIA

*Tajidan,*

Lecturer in the Faculty of Agriculture,  
Department of Agricultural Economics,  
University of Mataram, West Nusa Tenggara  
– Indonesia

### ABSTRACT

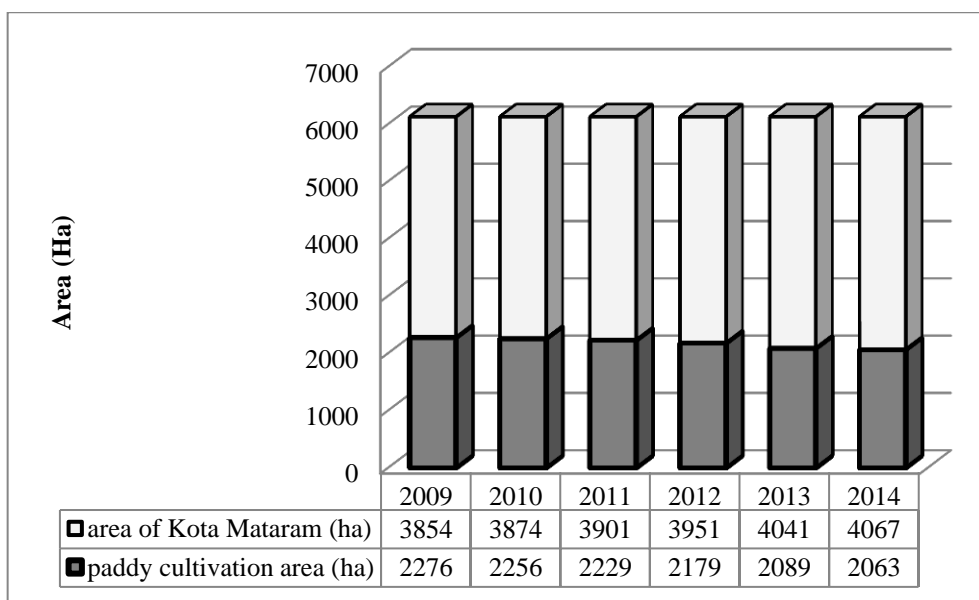
*The intended purposes are: 1) recognizing the decrease rate of land area devoted for paddy cultivation in Mataram Municipal, 2) recognizing the effects of the decrease of land area devoted for paddy cultivation towards the availability of local rice, and 3) formulating a solution to increase local rice production in Mataram Municipal. The research was conducted using descriptive method and secondary data. The data were analyzed by using trend ratio method. The conclusions obtained from research result are 1) the land area devoted for paddy cultivation in Mataram Municipal decreased with rate of 23.06 ha/year which can cause the reduction of agriculture product production, 2) the decrease of land area devoted for paddy cultivation from 2009 – 2014 does not have an impact yet on the decrease of rice production and the availability of local rice, the availability of local rice increased as the effect of the increase of cropping index and the increase of rice paddy farming; and 3) the production of local rice in Mataram Municipal still has a chance to be increased through the increase of farming index and the increase of rice paddy farming.*

**Keywords:** farming index, land area devoted, rice production, paddy farming, trend ratio method.

**INTRODUCTION:**

The problem faced by municipal government is a land use conflict – a conflict between the land use for agriculture for achieving regional food security and land use for non-agriculture in order to fulfill the need for settlement, trading, office complex, roads, and other public facilities. The conflict causes land use conversion process from agriculture to non-agriculture land occurrence which can threat regional food security (Iqbal & Sumaryanto, 2007)

Land use conversion from agriculture to non-agriculture is difficult to avoid (Santosa, Adnyana, & I Ketut Kartha Dinata, 2011) due to the increase demand of land request for non-agriculture purposes meningkat (Kubankova, M.Hajek, & A.Votavova, 2016). The increase causes land price become more expensive and land rent price for farming increases as well (Kirchweger, J.Kantelhardt, & F.Leisch, 2015). Due to this situation, farmers who have land and cultivate it tend to sell their land instead of cultivating it (Buday & Tatiana, 2015). This cause the farming land which was owned by farmers becomes non-farmers property.



**Figure 1.1: The development of land area devoted for paddy cultivation in Mataram Municipal in year 2009 - 2014**

**Sources:** Food Security Agency and Executive Agency for Agriculture and Fishery of Mataram Municipal *cit.* Usman, A., *et al.*, 2015.

Indonesia Republic policy which is written on laws no. 41 year 2009 pertaining Protection of Sustainable Food Crop Area has not been effective yet (Anita Widhy Handari, 2012) in many cities in Indonesia. One of the cities is Mataram Municipal. There is a massive land use conversion in Mataram Municipal because there is no Local Regulation following up the laws. In 2009, the land area devoted for paddy cultivation was 2,276.12 ha and it decreased into 2,063.36 ha in 2014. The decrease rate is 1.98%/year (Figure 1.1).

Mataram Municipal government faces difficult situation in which the government has to choose between keeping the land area devoted for paddy cultivation of 2,089.05 ha to support the availability of rice and granting the demand of land use conversion. This contradictory situation has hampered the ratification of Local Regulation Design of Mataram Municipal pertaining Sustainable Productive Agriculture Area. The reason is the absence of academic study that can be used as the base consideration in determining the land area devoted for paddy cultivation and recognizing its effects towards the availability of local rice.

The availability of local rice which was coming from rice field production is relatively small compared to the need of Mataram Municipal citizens. The local rice production contributed 46,25% (20,067 ton) out of the total need of 44,192 ton in 2013 and decreased into 43,45% in 2014 (Tajidan, Usman, GLP.Tanaya, & Wuryantoro, 2015). The decrease directly increases the import of rice, and weakens the position of Mataram Municipal as contributor of national rice reserve.

Because land use conversion from agriculture to non-agriculture purposes is difficult to avoid, the ratio of land area devoted for paddy cultivation towards region area will have a dynamic change; meanwhile the need of rice keeps increasing year to year, thus there is a concern that the ratio of local rice production in fulfilling the rice

need of citizen will decrease. This concern still needs to be proven by reviewing the development of the land area devoted for paddy cultivation and estimating its effects towards the availability of local rice.

Mataram Municipal government through the chief of Agricultural Fishery and Livestock Office of Mataram Municipal wants an existence of optimal ratio between the land area devoted for paddy cultivation towards the municipal region area as the proportion of open green space of 35% from the area of municipal region. The agricultural economists are challenged to find a ratio formula of the land area devoted for paddy cultivation towards municipal region area that has not been available yet.

The alternative for solving the problem is by projecting the land area devoted for paddy cultivation and estimating its effects towards the availability of local rice. To date, the agricultural economists in trend linear projection analysis always use existing data, however in this research the ratio data was used.

Therefore, there is a need to project the land area devoted for paddy cultivation and its effects towards the availability of local rice, and formulate a solution to fulfill the rice need of citizen by paying attention on the case in Mataram Municipal. In the future, this model can be applied in other cities in Indonesia.

**PURPOSE OF THE STUDY:**

The purposes of this study are:

- a. Recognizing the decrease rate of land area devoted for paddy cultivation in Mataram Municipal
- b. Recognizing the effect of the decrease of land area devoted for paddy cultivation towards the availability of local rice
- c. Formulating a solution to increase local rice production in Mataram Municipal

**APPROACH FRAME WORK:**

Projection is making approximation about number, condition in the future. One of the analysis tools used in the projection is trend analysis:

$$Y_t = \alpha + \beta X_t \dots\dots\dots (2.1)$$

$$\alpha = \frac{\sum_{t=1}^n Y_t}{n} \dots\dots\dots (2.2)$$

$$\beta = \frac{\sum_{t=1}^n Y_t \cdot X_t}{\sum_{t=1}^n X_t^2} \dots\dots\dots (2.3)$$

**Notes:**

Y<sub>t</sub> = data projected in year-t

X<sub>t</sub> = time index in year- t

α = average Y<sub>t</sub>

β = trend coefficient

In deciding the need of rice, the researchers multiplied the need of rice per capita with citizen population. The need of rice per capita was standarized of 0,105 ton/capita/year, while the citizen population was projected using formula as follows:

$$P_t = P_o (1+r)^t \dots\dots\dots (2.4)$$

**Notes:**

P<sub>t</sub> = the citizen population in year-t

P<sub>o</sub> = the citizen population in initial year

t = time period

r = growth rate average.

Municipal region area is consisted of land area devoted for paddy cultivation and non-farming land area. Mathematically it is as follow:

$$LK_o = LSt + LNt \dots\dots\dots (2.5)$$

**Notes:**

LK<sub>o</sub> = Municipal region area (ha)

LSt = the land area devoted for paddy cultivation (ha)

LNt = the land area for non-paddy cultivation (ha)

The projection of the land area devoted for paddy cultivation was done by using relative approach meaning using the ratio of the land area devoted for paddy cultivation towards the municipal region area (LSt/Lko). Equation (2.5) was changed into:

$$LKo/LKo = LSt/LKo + Lnt/LKo \dots\dots\dots (2.6)$$

Trend linear equation of the land area devoted for paddy cultivation using ratio approach is as follow:

$$LSt/LKo = a + bXt \dots\dots\dots (2.7)$$

**Notes:**

a = mean ration of local rice production towards municipal citizen rice need  
 b = trend coefficient.

The rice need of citizens is an accretion between local rice production and rice import. The calculation is as follow:

$$KBt = BLt + BIt \dots\dots\dots (2.8)$$

**Notes:**

KBt = number of municipal citizen rice need  
 BLt = number of local rice production  
 BIt = number of rice import

To project the number of local rice production, ratio approach was applied:

$$KBt/KBt = BLt/KBt + BIt/KBt \dots\dots\dots (2.9)$$

$$BLt/KBt = c + dXt \dots\dots\dots (2.10)$$

**Notes:**

c = mean ration of local rice production towards municipal citizen rice need  
 d = trend coefficient.

Equation (2.7) and (2.10) reaches equilibrium if:

$$LSt/LKo = BLt/KBt$$

$$a + bXt = c + dXt$$

$$(b-d)Xt = c - a, \text{ thus}$$

$$Xt = (c - a)/(b - d) \dots\dots\dots (2.11)$$

If Xt is subtituted on equation (2.7), the result is the projection of land area devoted for paddy cultivation:

$$LSt/LKo = a + b Xt$$

$$LSt = (a + b Xt) LKo \dots\dots\dots (2.12)$$

The impact of projection result of land area devoted for paddy cultivation on equation (2.12) was used to estimate local rice production. The way is the projection of land area devoted for paddy cultivation (LSt) multiplied with rice cropping index (IPt) multiplied with rice paddy farming productivity (vt) and the conversion from rice to grain (0.65).

$$BLt = LSt x IPt x vt x 0,65 \dots\dots\dots (2.13)$$

**RESEACH METHODE:**

**RESEARCH DESIGN:**

This research was designed using time series data provided by Statistics Indonesia of Mataram Municipal, Executive Agency for Agriculture, Fishery and Forestry of Mataram Municipal, and Agriculture Offcie, Fishery Office and Livestock Office of Mataram Municipal. The data collected were the area of Mataram Municipal, the development of land area devoted for paddy cultivation, the area of rice harvest, the productivity of rice farming, rice production, the number of citizens, the conversion of rice plant to rice, the consumption of rice per capita, and relevant information to the purposes of the study.

**DATA ANALYSIS:**

To achieve the first purpose of study, trend liniar analysis was used as formulated on equation (2.12); for the second purpose, equation (2.13); and for the third purpose, descriptive ananlysis of equation (2.12) and (2.13) was applied.

**RESULTS AND DISCUSSIONS:**

**The Projection of Standard Farming Land:**

The result of linear trend analysis with the land area devoted for paddy cultivation ratio approach towards the

municipal region area is shown in Table 4.1 below:

**Table 4.1 The development of land area devoted for paddy cultivation and its ratio in Mataram Municipal 2009 - 2014**

No	Year	Land area devoted for paddy cultivation (LSt)	Area (LKo)	LSt/LKo	Xt	Xt <sup>2</sup>	LSt/LKo.Xt
1	2009	2,276.12	6,130	0.37131	-5	25	-1.8565
2	2010	2,256.13	6,130	0.36805	-3	9	-1.1041
3	2011	2,229.21	6,130	0.36366	-1	1	-0.3637
4	2012	2,179.90	6,130	0.35561	1	1	0.3556
5	2013	2,089.05	6,130	0.34079	3	9	1.0224
6	2014	2,063.36	6,130	0.33660	5	25	1.6830
<b>Total</b>				<b>2.13602</b>		<b>70</b>	<b>-0.26335</b>

$$a = \frac{\sum_{t=1}^n LSt/LKo}{n} = \frac{2.13602}{6} = 0.35600333$$

$$b = \frac{\sum_{t=1}^n LSt/LKo.Xt}{\sum_{t=1}^n Xt^2} = \frac{-0.26335}{70} = -0.00376214$$

Linear trend equation of land area devoted for paddy cultivation is:

$$\underline{LSt/LKo} = 0,356 - 3,76^{-3} \underline{Xt} \dots\dots\dots (3.1)$$

Because the area of Mataram Municipal is = 6.130 ha, therefor Linear trend of land area devoted for paddy cultivation is:

$$\underline{LSt} = 2.182,3 - 23,06 \underline{Xt} \dots\dots\dots (3.2)$$

By using equation (3.2), it can be projected that standard farming land area in Mataram Municipal is:

**Table 4.2: Projection result of land area devoted for paddy cultivation in Mataram Municipal 2009 – 2014**

No	Year	Land area devoted for paddy cultivation (Ha)*	Area of Mataram Municipal (Ha)**	LSt/LKo	Xt	<u>LSt/LKo</u>	Projection <u>LSt</u>
1	2009	2,276.12	6,130	0.37131	-5	0.37481	2,297.61
2	2010	2,256.13	6,130	0.36805	-3	0.36729	2,251.48
3	2011	2,229.21	6,130	0.36366	-1	0.35976	2,205.36
4	2012	2,179.90	6,130	0.35561	1	0.35224	2,159.23
5	2013	2,089.05	6,130	0.34079	3	0.34472	2,113.11
6	2014	2,063.36	6,130	0.33660	5	0.33719	2,066.98

**Source:** \* Executive Agency for Agriculture, Fishery and Forestry of Mataram Municipal

\*\* Statistics Indonesia of Mataram Municipal

The projection result of land area devoted for paddy cultivation (Projection LSt) in table 4.2 shows that a declining linear trend. The average decrease rate of land area devoted for paddy cultivation ratio towards area of Mataram Municipal is 23.06 ha/year from 2009 – 2014. The average ratio of land area devoted for paddy cultivation towards area of Mataram Municipal is 0.356 or land area devoted for paddy cultivation is 35.6 percent of Mataram Municipal area. Analysis results are 0.356 almost the same with the results of scaling up is 0.3503 or standard acreage of farmland paddy amounted 35.03 % ( 2,147.49 ha ) of the area of 6,130 ha Mataram ( Tajidan , et al. , 2015 ).

**THE PROJECTION OF LOCAL RICE AVAILABILITY:**

The availability of local rice is determined by rice harvest area and the productivity of rice plant, meanwhile harvest area is a total of land area devoted for paddy cultivation multiplied with rice cropping index. The data of rice harvest area, rice plant productivity and production in Mataram Municipal is shown in Table 4.3.

**Table 4.3: The development of Rice Production in Mataram Municipal 2009 - 2014**

Year	land area devoted for paddy cultivation (Ha)*	Rice cropping index***	Rice aarvest area (Ha)**	Productivity (Ton/Ha)**	Rice production (Ton)**
2009	2,276.12	1.834	4175	5.475	22,859
2010	2,256.13	1.968	4440	5.459	24,236
2011	2,229.21	2.291	5107	5.329	27,217
2012	2,179.90	2.346	5115	5.343	27,328
2013	2,089.05	2.628	5489	5.625	30,873
2014	2,063.36	2.595	5355	5.782	30,960

**Source:** \* Executive Agency for Agriculture, Fishery and Forestry of Mataram Municipal

\*\* Mataram Municipal in Numbers 2013 and 2015

\*\*\* Division result of rice harvest area with land area devoted for paddy cultivation

The increasing of rice production is dominantly caused by the increasing of rice cropping index and productivity (Table 4.3). The highest rice cropping index was in 2013, meanwhile the highest rice plant productivity and production was in 2014.

In an effort to increase rice production , the strategy can be implemented is an increase in harvest area through increased indices of agriculture , and increase productivity through technological improvements , including through the use of improved seed hybrids , balanced fertilizer , control of plant pests , irrigation efficiency, and utilization of agricultural machinery . The use of chemical fertilizers and excessive pesticide is a poison that is harmful to human health (Laary & Joseph, 2012) . Therefore the use of agrochemicals must be wise.

**Table 4.4: The ratio development of local rice production towards the rice need of citizens from 2009 - 2014**

No	Year	Rice Production (Ton/Ha)*	The Availability of Local Rice (Ton)**	Population (person)*	The Rice Need of Citizens (Ton)	BLt/KBt
(1)	(2)	(3)	(4)=0.65*(3)	(5)	(6)=(5)*0.105	(7)=(4):(6)
1	2009	22,859	14,858.35	375506	39428.13	0.37685
2	2010	24,236	15,753.40	404502	42472.71	0.37091
3	2011	27,217	17,691.05	413622	43430.31	0.40734
4	2012	27,328	17,763.20	422673	44380.67	0.40025
5	2013	30,873	20,067.45	431876	45346.98	0.44253
6	2014	30,960	20,124.00	441064	46311.72	0.43453

**Source:** \* Mataram Municipal in Numbers 2013 and 2015

The availability of local rice is increased and it is in line with the increasing of rice production. The need of rice is also increased along with the increase of citizen number. The growth rate of citizen number is higher than the increase of local rice availability; therefore there was an increase on the availability of local rice towards citizen rice need. The highest ratio was in 2013.

The result of linear trend analysis shows that the availability of local rice contributed 40.54 percent towards the citizen rice need with increase rate of 0.71 percent/year. Increasing food supply of local rice irrigation made possible by the availability of surface water and ground water through the utilization of irrigation wells pampa. Available surface water irrigation in rainy season and dry season-1 . Most standard acreage irrigated rice area planted with rice make possible three times a year . This opportunity has been exploited by the farmers, to cultivate rice crops throughout the year , but have a negative impact on the environment , because the life cycle of pests and diseases are not interrupted. The use of pesticides is a crucial production factor (Basorun, O., & Julius, 2012).

**Table 4.5 The projection of the availability of local rice in Mataram Municipal 2009 – 2014**

No	Year	BLt/KBt	Xt	Xt <sup>2</sup>	BLt/KBt.Xt	BLt/KBt	Proyeksi BLt
1	2009	0.37685	-5	25	-1.88423	0.36996	14586.73
2	2010	0.37091	-3	9	-1.11272	0.38413	16315.25
3	2011	0.40734	-1	1	-0.40734	0.39831	17298.83
4	2012	0.40025	1	1	0.40025	0.41249	18306.58
5	2013	0.44253	3	9	1.32759	0.42667	19348.08
6	2014	0.43453	5	25	2.17267	0.44085	20416.29
<b>Total</b>		<b>2.43241</b>		<b>70</b>	<b>0.49621</b>		

$$c = \frac{\sum_{t=1}^n LSt/LKo}{n} = \frac{2.43241}{6} = 0.40540167$$

$$d = \frac{\sum_{t=1}^n LSt/LKo.Xt}{\sum_{t=1}^n Xt^2} = \frac{0.49621}{70} = 0.00708876$$

**Table 4.6: Estimation result of harvest area, rice production, and the availability of local rice in Mataram Municipal 2009 - 2014**

Year	The projection of land area devoted for paddy cultivation (Ha)	Rice cropping index	Rice harvest area (Ha)	Rice productivity (Ton/Ha)	Estimation of rice production (Ton)	Estimation of local rice availability (Ton)
2009	2,297.61	1.834	4,214.42	5.475	23,074.82	14,998.64
2010	2,251.48	1.968	4,430.85	5.459	24,186.05	15,720.93
2011	2,205.36	2.291	5,052.36	5.329	26,925.81	17,501.78
2012	2,159.23	2.346	5,066.50	5.343	27,068.87	17,594.77
2013	2,113.11	2.628	5,552.22	5.625	31,228.57	20,298.57
2014	2,066.98	2.595	5,364.39	5.782	31,014.32	20,159.31

The use of ratio data is an alternative that can be used in projection analysis, such as land area devoted for paddy cultivation towards municipal region area and the availability of local rice ratio towards citizen need of rice. Rice production or the availability of local rice is dominantly determined by the increase of farming area and productivity than the decrease of land area devoted for paddy cultivation. The decrease of land area devoted for paddy cultivation in 2009 – 2014 did not cause the decrease of rice production and the availability of local rice, because the decrease could still be handled by the increase of rice cropping index and productivity.

**THE SOLUTION OF THE INCREASE OF LOCAL RICE PRODUCTION IN MATARAM MUNICIPAL:**

The decrease of land area devoted for paddy cultivation has been anticipated by the increase of cropping index (Nazam, Sabiham, Pramudya, Widiatmaka, & Rusastra, 2011). The increase of cropping index has been able to prevent the decrease of rice harvest area (table 4.6). The increase of cropping index and productivity altogether has been able to prevent the decrease of rice production and the decrease of grain production due to the decrease of land area devoted for paddy cultivation.

Therefore, the solution proposed to increase the rice production and raise the number of local rice availability is: increasing the cropping index and rice farming productivity. The increase of cropping still has a chance to be increased from 268% to almost 300%. The increase of cropping index can be done by using superior short-lived rice seed varieties, increasing the availability of water irrigation through irrigation system refinement (Mahananto, S.Sutrisno, & Candra, 2009) and utilizing boreholes and water pump engine so that rice field can be planted three times until four times a year.

The increase of rice farming productivity can be achieved through new technology application such as using balanced fertilizer, applying double row planting system, using agriculture tools and machines, controlling pests, preventing the yield lost on harvesting time and post-harvesting time. Meanwhile to optimize the use of farming land, it is suggested to allocate the utilization of optimal production factor by adding workers, reducing the use of seed, reducing the use of SP-36 fertilizer (Asminah Herawaty Sinaga, 2012); (Idris, ?).

## CONCLUSIONS:

1. The land area devoted for paddy cultivation in Mataram Municipal encounters a decrease with a rate of 23.06 ha/year which can implicate on the shrinking of farming production potention.
2. The decrease of land area devoted for paddy cultivation from 2009 – 2014 has not affected the decrease of rice production and the availability of local rice. The availability of local rice increased as a resut of the increase of rice paddy cropping index and the increase of rice farming productivity.
3. The production of local rice in Mataram Municipal has a chance to be increased by increasing farming index and increasing rice farming productivity.

## SUGGESTIONS:

1. The increase of rice production in Mataram Municipal is suggested to be done by increasing cropping index until almost 300%, and increasing productivity through balanced fertilizer, applying double row planting system, using agriculture tools and machines, controlling pests, preventing the yield lost on harvesting time and post-harvesting time.
2. The use of ratio data on trend linear analysis gives more realistic result. Therefore, it is suggested that other researchers and practioners use ratio data when they conduct trend linear analysis.

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## WAHABISM: PADRI MOVEMENT IN MINANGKABAU TO THE ISLAMIC DEFENDER ORGANIZATION IN INDONESIA

*Ristapawa Indra,*

College of Teacher Training and Education  
(STKIP) Pesisir Selatan  
Jln. Lime Sundai Hall Tuesday, Coastal  
District, Coastal South City,  
West Sumatera Province, Indonesia

### ABSTRACT

The purpose of the study was to identify the foundation and strategy of Padri religious movements in Minangkabau in the 19<sup>th</sup> mid century and the religious movement of the Islamic Defenders Organization or *Fron Pembela Islam* (FPI) in Indonesia in early 21<sup>st</sup> century. Phenomenology and Social constructivism approaches were used where the researcher tried to understand the world around and developed meanings in any particular point on certain object. The research finding showed that both the Padri movement and the Islamic Defenders Organization have the same foundation in the Islamic movement, and carried out the mission through a conservative approach. The movement was begun in the form of religious and social perspectives which had the same ultimate goal that empowered community life and political institutions. The Padri movement was led by Peto Syarif, a Moroccan immigrant which is known as *Tuanku Imam Bonjol*. Meanwhile, the movement of Islamic Defenders Organization was a purification movement of Islamic law led by a descendant of Yemeni migrants who came to Indonesia in 1935. From Perspectives of *Pancasila* and the 1945 Constitution, Wahabi ideology that accumulated through Frugal Defenders of Islam was seen as a potentially damaging community organization of Islam and unity on ideology of Republic of Indonesia which is well-known as *Pancasila* as the foundation of the highest constitution in the life of nation and society in Indonesia. The rise of radical acts by the Islamic Defenders Organization reflects the structure of religious life in the public sphere which is worse than in the new era. Finally, the Islamic Defenders Organization personifies their leaders as *Imam* and the Qur'an. For them, an Imam is the Qur'an which is called as silent Imam. The interference with Imam means to disturb the Qur'an, and the followers would rise up to defend without reservation.

**Keywords:** Minangkabau, Radical Islam, Padri movement, the Islamic Defenders Organization or *Fron Pembela Islam* (FPI).

## INTRODUCTION:

There are similarities between the movement of purification implementation of Islamic law in early 21<sup>st</sup> century committed by Islamist groups organized in mass organizations (society organization) of Islam which calls itself as Islamic Defenders Front, Jamaah Salafi / Wahhabi, Hizbut-Tahrir, Jama'ah Tabligh, Laskar Jihad, Jamaat Al Muslims (Jamus), and the other with a purification movement implementation of Islamic law committed by Padri in the early 19<sup>th</sup> century in the highlands of central Sumatra island, commonly known as Minangkabau. Leaders of both these religious movements at different times wear the same white turban, the style of dress of the mullahs like in the Middle East. Leaders of the two movements are both derived from the outside, the Padris led by a migrant Moroccan named Peto Syarif later known as Tuanku Imam Bonjol who has long been settled in Bonjol, so that the paramilitary Jihad in 21<sup>st</sup> century such as the Islamic Defenders Organization or *Fron Pembela Islam* (FPI) also led by the son of a migrant of South Yemen, Habib Risyiq who came to Indonesia in 1935 (Azra, 2004); (A'la, 2008). If the Padri movement was aimed at organized society in governance of Minangkabau region, in the early of 21<sup>st</sup> century, this religious movement occurs in people who are in the frame of Indonesia's National unity governments.

Both act radically in solving various problems of people who are not in accordance with Islamic law. According to (Elira, 2004); (Damayanti, Thayibi, Gardhiani, & Limy, 2012), radical Islam understands which want to do social and political change and replace it with Islamic law. Then, from the study of (Dobbin, 2008) on economic changes in Minangkabau is as a factor in the emergence of the Padri movement from 1784 to 1830. It can be explained that every movement made by radical is not just a mission to participate in solving various problems of the nation, but it also has economic mission and politics in disguise. The same view was also expressed by (Mubarak, 2015) that the reversed religious missions also accompany economic and political missions. Such as Padri movement in Minangkabau, it is at an early stage aims to purify the implementation of Islamic law for public life behavior seen already far away, but in the end it also aims to participate in the customary density Council of Nagari (district) or nagari government council (Azra, 2006). Then, it is also in line with the results of (Dobbin, 2008) that the Padri movement in the subsequent development of economics also aims to take control on coffee commodity trading center that thrives in the highlands of Agam. Along with the economic slowdown in kingdom of Pagarruyung which was initially dependent on the gold trade and pepper, the economic power shifts to the coffee commodity centralized in Agam has been a struggle for influence between the Ulama community with the consuetude community (Zed, 2011). The ulama want to control the coffee trade traffic between the mainland region (darek) of Minangkabau with Dutch merchants who concentrate in the important ports in Muara Padang, Pariaman, and Tiku. Then, the movement of Ulama, commonly called Padri, where its influence had largely spread out for more extensive rather than the influence of the Consuetude Community. Around the region wanted to participate in the government political institutions of the nagari (district) which is also called the Council of Consuetude Deliberation (Abdullah, 1966).

## LITERATURE REVIEW:

A historical phenomenon that occurred in the early 19<sup>th</sup> century in Minangkabau has returned through the process of reincarnation in the early 21<sup>st</sup> century. If that happened in the 19<sup>th</sup> century, religious movements of Padris in the end was not only dealing with the government of Nagari but also face the Dutch colonial government that defeating the Consuetude Community people for the sake of political and economic interests of Dutch colonialism. Then, the religious movements at the beginning of the 21<sup>st</sup> century against the government, which incidentally is the Unitary Republic of Indonesia (NKRI) from among the nation itself (Azra, 2006).

Coinciding with the presence of the reforms era, after the fall of the Soeharto regime, Abdurrahman Wahid was elected as the first President of the reform era that has given opportunity to the Islamic groups who are not satisfied with the political pressure of the new order. It manifests itself in various forms of religious movements and performed with various symbols, packaging, and ideology respectively. Indonesian political scene enlivened by the rise of Islamic parties with different logos and also accompany the splendor of the missionary movement, fronts, and the camps seemed to appear suddenly and enlarged and very phenomenal. As noted above, people suddenly know and hear names like Jamaat-Salafi / Wahabi, Hizbut-Tahrir, Tablighi Jamaat, Laskar Jihad, Jamat Al Muslims (Jamus), and the Islamic Defenders Organization or *Fron Pembela Islam* (FPI). The interesting point to note here, is that their performance often appears even more Islamic, more humility and more committed to Islam than the group that emerged and large early as Nahdlatul Ulama (NU) and Muhammadiyah which ironically often seems slack in holding matters of principle such as this by granting the raising of Liberal Islam and the Ahmadiyah in our country. The political situation of President Gusdur

before the issue of the riots in Ambon, Poso, and Tertate which nearly dragged the two faiths: Islam and Christianity have pushed Islamist group Jihad increasingly showing its existence to come to compete in the Civil War (Turmudi & Sihbudi, 2005); (Rahmat, 2005); (Mubarak, 2015); (Hashim, 2016).

In the next journey, issues of Islam jihad have shifted towards Islamic movement of Jemaah Islamiyah and transnational Islamic movement called ISIS. Civil society was also involved to respond to the ISIS phenomenon. The phenomenon of radical Islamic movements from various groups and ISIS issues has become a hot national debate among scholars or intellectuals of Islam, both institutionally and personally. Indonesian civil societies view the behavior of Muslim organizations and ISIS far away from Islamic rule. (Galamas, 2015) argued that ISIS is more dangerous than radical groups ever. The birth of a radical Islamic group in Indonesia after the reform has also been polemical and hot national debates, between which the view that the act is considered too radical affected by Wahabi.

Basically, there have been many studies done about radicalism and Islam, as a study conducted by (Van Bruinessen, 2002); (Rahmat, 2005); (Turmudi & Sihbudi, 2005); (Umam, 2006); (Zaki, 2008), which discusses public attitudes about the pros and cons of Islamic radical. Likewise as (Fanani, 2013); (Azra, 2013); and (Maarif, 2013) respectively in the same journal examines the phenomenon of radicalism among youth and sociological reflection on the phenomenon of radicalism of young Muslims in Indonesia after the new order era. There are also studies focused on religion, theorists, and the role of the country. Some of the studies that have been conducted by academics and leaders of Islam and radical Islam, in general, can be argued that the study gives more attention to the process of radicalization and the consequences of radicalism. In this approach, determining the factors that cause individuals or groups act radically and verses of the Qur'an which is a cornerstone principle an act radically. Their views on belief, educational background, social and economic conditions are the main factors that make up the process of radicalization. Besides, radical action is often viewed as a rational choice for a group of people. Involving the mobilization of resources and political opportunities is framed with a specific framework, such as religion. A study of radicalism has a tendency to give more weight to the relationship between religious radicalism. Radical action always looks for its roots in the religious dimension. Radicalism among Muslim is always supposed to be associated with the ideology of jihadist. Radicalism is seen in a constitutive dimension at most fundamental aspects of human life as a religious belief. This view was causing difficulties to overcome. Confidence is a dimension of human life that is very difficult to intervene. Radicalism in the social dimension which can only be reduced and counter reacted with other social phenomena, namely the anti-radicalism. The response of religious leaders above is an expression of counter radicalism. Wide Attention by both government and society about radicalism, reflecting that radicalism is a serious problem. In the context of radicalism actors, the growing discourse is understood as a group of people who most educated of pesantren education. As a result, there is a view among public who meant that the boarding school is a place of education for potential terrorists. The issue of radicalism linking it to boarding school has made public opinion against the pesantren to be bad. On the other hand, the massive government action on Islamic radical groups that can worsen the image of the anti-government against Islam. Not only that, even other issues have been spawned such as Indonesia is American stooges who want to destroy the political power of Muslims in the eastern parts of the world. The charge stating the involvement of radical Islamic boarding schools as a network is not only in the realm of discourse in the media.

Countries also respond to the situation in the form of the need for the strict supervision of the existence of schools in the community. But the state response was groundless because, according to data from the Ministry of Religious Affairs in the 2000s, there are pesantren indicated as radical, ten years later increased to 300 schools indicated as radical. Therefore, the government through the Indonesian Vice President Muhammad Yusuf Kalla during the administration of President Susilo Bambang Yudhoyono gave statement that the activity of schools spread across the country will be closely watched. According to some acts of terror among the Bali bombing did not rule out the possibility, the actors are students of boarding school were spread across the country. From the above views, it can be concluded that few studies that look at the relationship between the root causes of radical with Wahabism in Indonesia.

The discussion is developed as the relation of boarding school with radicalism. In this view, the pesantren education pattern is developed in Java is seen as an good initiative imported from the Middle East influenced by the ideas of Sayyid Qutb, Hasan al-Bana and others who were suspected to be the cause of the proliferation of radicalism in Indonesia. Based on this background, the researchers were interested in studying about jihad and radicalism and correlation between Wahabi with Islamic radical and Wahabi influence on the growth of various radical movements in Indonesia. History has recorded that the relation between the Wahabi religious, radicalism has taken place in this Nusantara in the beginning of 19<sup>th</sup> century in Minangkabau. Is the radical movements that

occur today also has a strong relationship with the Wahabi? This research is expected to reveal similarities between Padri radicalism with radicalism era of reform and country views about radicalism. Then also revealed Wahabi relations with the Padri movement and radical Islamic groups today. The study will also reveal whether the schools have widened the fortress Wahabi in Indonesia.

#### **METHODOLOGY:**

This study used phenomenology constructivism approach developed by (Crotty, 1998); (Lincoln & Guba, 1985); and (Schwandt, 2007). Social constructivism presents the assumption that individuals are always trying to understand the world around where they live and they develop meaning in any particular point on the certain object. Then the researchers tried phenomenological approach to explore and capture the characters' views with regard to understanding about wahabi and radical Islam in Indonesia through the interviews, references provided in the form of documentation in the library, as well as journal articles published online and other social media. The views of community leaders that are capable of explaining Islam are identified and analyzed to obtain primary data and secondary used to reconstruct phenomenon which occurred on Wahabi and radical Islamic movements in Indonesia.

While the subject of study and the source in this study were (1) scientific works or writings of religious leaders from various cross-ideology, (2) the articles of university academics who publish in journals of national and international printed and on line, (3) Interviews with religious leaders and policy makers in this country, (4) the experiences of the actors of conflict religion presented through printed and online media as well as other social media.

#### **FINDINGS AND DISCUSSION:**

##### **Wahabi ideology or stream?**

Today we often hear the term of understanding (-isms) and ideology, the meaning understood by (Mubarak, 2008); (Rubaidi, 2014) and (Munawar, 2015) more connotes a line of thought that adheres to certain principles, not organized and has no central leader, although he has become a central figure in the familiar figure. Further explained that usually the followers of a particular understanding are critical ones, like to think, open and welcoming the dialogue, though it is not the case always. Meanwhile, the word of “-isms”, put more pressure on an understanding that is organized, there was the chairman, board and members, have certain rules and usually members can only blindly follow and affirm all that is said leaders without reserve. The followers of a particular school are usually the ones who have doctrine their mind, not like dialog, all-dogmatic, anti-criticism and tend to feel the most correct. From the second term, it can be explained that the word ‘understand’ is more directed to the static nature, an idea that is still in the framework and understanding for adherents. While the meaning of the word of ideology is more dynamic in nature in the form of understanding which is implemented in the form of behavior and action. For this study, researchers prefer the meaning of both the understanding and ideology, but for the importance of this study is to understand the meaning of the word sect found by Muhammad bin Abdul Wahab (1703-1792) is more familiar in Indonesia. This sect got into Indonesia under three Minangkabau who backed Hajj from Makkah that led to the birth of the Padri movement in Minangkabau (Azra, 2004).

In its development in Indonesia, Wahabi demanded a change in the enforcement of shari'ah by violence or coercion by a group that is unwilling to accept this view understood by way of radical change (Azra & Al-Jauhari, 1996); (Delong-Bas, 2008). Then the ones who impose their will on other groups were also conducted with the path of jihad. Da'wah and jihad is obligatory for Muslims. With the two methods outlined by Allah, the Muslims could achieve glory. Jihad is an attempt to reach safety. It is the guidance of Allah leads man to go to heaven (Hasan, 2008).

##### **The Wahabi and Salafi:**

Various studies and the views of experts and historians thought the idea was rooted in the teachings of Salafi Wahabi or Wahhabism. These schools encourage Muslims to return to the Qur'an and Sunnah, cleanse Muslims from misleading of *heresy* and *superstition*. Wahhabism ideology was built by Muhammad Ibn Abdul Wahhab (1703-1792), a scholar from Najd, in the eastern part of the Arabian Peninsula. Hence the term of Salafism or ideology of Salafi often synonymous with "Wahhabism", although the followers of Salafism itself reject this view, because they consider the term "Wahhabism" connotes harassing, and Muhammad Ibn Abdul Wahhab repudiated establishing this new mazhab, and not also regards him as such. Salafis also considered adopting or leaning towards thinking Taymiyyah, scholars ahead of Abd al-Wahhab in promoting Puritanism. Therefore, the Salafi da'wah activists generally put a high respect to Ibn Taymiyah. Although some Egyptian Ulama in

19<sup>th</sup> century, Muhammad Abduh, Jamal al Afgani and Rashid Rida are known as Puritanism activists, but some Salafis rejected their thinking, because it is considered a rational Islamic reform groups and receive "modernism". The followers of Salafi also identify themselves as a group of Ahlus Sunnah WA al-Jama'ah, caused by their consistency in adhering to the Quran and Sunnah and united on it.

**Wahabi and Padri movement in Minangkabau:**

Padri radical movement inspired by the social conditions of a society that they see far deviated from the implementation of Islamic law, particularly concerning the behavior of Consuetude Community as a local leader in Minangkabau (Abd Ala, 2008). This violence which was done by Padri through a purification movement against the implementation of Islamic law by (Galtung, 2002) is the structural violence to marginalize people who are not willing to follow their ideology and also impose direct and cultural violence. Direct violence committed by Padri occurred in 1809 against the royal family and their superiors. In 1815, the same event occurred again led by Tuanku Lintau, Padris massacred the royal family of Pagaruyung (Radjab, 1964).

This movement initially occurred in Luhak Agam led by Tuanku Nan Renceh. Luhak Agam as one of Luhak Nan Tigo high plateau region fertile island of Central Sumatra, at the beginning of 19<sup>th</sup> century which was famous as regional suppliers of coffee commodity traded by local merchants through the way of the steep valley of Anai and continues towards Muara Padang (Graves, 2007); (Zed, 2011).

Minang as the center of political upheaval of Padri, according to Tambo Alam, Minangkabau consists of two areas, land area (Darek) called Luhak Nan Tigo consisted of Luhak Tanah Datar, Luhak Agam, and Luhak 50 Koto and neighborhood Rantau Coastal along a narrow lowland the west coast of Sumatra (Zed, 2011). Ethnic Minangkabau who inhabit the two regions at the beginning of 19<sup>th</sup> century split the two major groups of Muslims who still cling to the traditional long tradition commonly called Consuetude Community (the prince), and the Muslims who wanted to purify the implementation of Islamic law, commonly called the Padri. The birth of the two communities of this stems from the inclusion of Wahabi for Minangkabau through the return of three pilgrims from Makah in 1803 (Azra, 2013). Three figures pilgrimage to the holy land of the Minangkabau concurrently Mecca being under control of Wahabis. Therefore, according to (A'la, 2008); (Azra, 2004); (Azra, 2013); (Dobbin, 2008) is quite reasonable if they; Haji Miskin, Haji Sumanik, and Haji Piobang were thought to be influenced by Wahabi ideology.

The same view was also expressed by (Khatib, 1991); (Jahroni, 2007); (Haeda Nasir, 2008); (Kurniawan, 2013) that the interaction between Wahabi ideology with the Indonesian people began to be identified at the 19<sup>th</sup> century in Minangkabau with the returning of three leaders from Makah. Wahabi ideology inspired Ulama of West Sumatran known as the next wave of the Padri led by Tuanku Imam Bonjol. Next, in the 20<sup>th</sup> century, the influence of Wahhabi ideology massively entered Indonesia through the role of the Indonesian Islamic Propagation Council (DDII), founded by Muhammad Natsir. Through the financial support of Saudi Arabia, the agency sends many students to the Middle East to study Islam (Jahroni, 2007); (Muzakki, 2014).

Wahhabi movement or commonly known as the Salafi movement is a movement based in Saudi Arabia, was born and flourished there since the 18<sup>th</sup> century. A characteristic of this ideology was invited to return to Islam in accordance with al-Salaf al-Salih, al-Quran, the Sunnah of the Prophet, his companions and the teachings of previous great Ulamas. For many authors, (Kovacs, 2014) and (Aswar, 2016) state that the term Wahabi was used to describe the thoughts of salafi which were in Saudi because the use of the word is also used by many Salafi movement apart from Arabia as the Islamic reform movement brought by Muhammad Abduh (1849) and Jamaluddin al-Afghani (1839-1897). Meanwhile, salafi in Saudi Arabia started thinking to bring back Muhammad bin Abdul Wahhab. The word of Wahabi is commonly used to express the thought which is carried out by followers of Abdul Wahhab despite the followers actually do not like being called a Wahhabiyyun or followers of the Wahhabi movement.

Returning to the role of three-Haji and supported by Tuanku Nan Renceh and Padri accepted jihad against other Muslims who do not follow their doctrine. As a result, civil war was happened, Consuetude Community went to the wall and then sent 14 Consuetude Community leaders to request assistance to the Netherlands and through meetings of Simawang, February 21, 1921, the Dutch colonial did intervention and the Padri war was ended in late 1830s. Bukit Marapalam 1933 agreement was signed between the Consuetude Community and Ulama community which was an important moment that has been a silent witness to the uncompromising attitude of the two communities. An attitude that has determined upon agreement of both the mutual acceptance and respect both the order of values: traditional and modern Islam values. Hence, this was the origin of principle of combination of the two foundations of the life of the Minangkabau called "Consuetude is shaped by religion (*Adat basandi syarak*), Religion is shaped by Al-Quran (*syarak basandi Kitabullah*); Consuetude tells, Religion uses (*Adat mengato syaraq mamakai*)". This means that traditional values that need to be maintained by the

community should be values based on Islamic doctrine in accordance with the Qur'an and hadith Rasullullah. Bukit Marapalam agreement in 1833 has become a deadline for the civil war between Padri with Consuetude Community and turned into Minangkabau war against Dutch colonialism. Minangkabau people's resistance was ended in 1837 after the Dutch successfully captured the last fort of Padri in Bukit Tajadi in Bonjol.

The civil war between the two communities of this Minangkabau in 1833 turned into Minangkabau people's resistance against Dutch colonialism has spawned debate and differing views among historians and academics (Khatib, 1991); (Dobbin, 2008); (Santi, Sukardi, & Ermarita, 2016). There is a view of radical Padri movement in Minangkabau end without a clear purpose since the stronger influence of Dutch colonialism in Minangkabau with coffee cultivation system until 1908 (Zed, 2011). But also there is an opinion, Padri movement has spawned a model of the spread of Islam that compromise occurs in matrilineal Minangkabau society that upholds the values and democratic egalitarian. Both of these values have managed to reduce conflict in society through Bukit Marapalam agreement 1833 (1964). Radical movements and the ambiguous attitude of the Padri is based on Wahabi was successfully suppressed by the attitude of mutual acceptance and respect between the two communities. Padri with Wahabi which they profess, actually also is an integral part of the Consuetude Community. They are also part of the elite Minangkabau, part of the consuetude children's niece. The difference occurs because of the differences in addressing the problems that occur in society. As stated by (Abdullah, 1966) that religion conflict in Minangkabau can be considered as one of the three models of the spread of Islam in the archipelago. According to (Boechari, 1971) states that the process of Islamization in the archipelago, there are three patterns of Islamization; *First*, the pattern of Islamization in Aceh; *second*, the pattern of Islamization in Minangkabau; and third, the pattern of Islamization in Java. Confirmed by (Boechari, 1971), Islam was spread by traders from Gujarat, India among the public and put the Ulama as an influential public figures. Then the Ulama announced themselves as not only as a religious leader but in the subsequent development also managed to form a political force with the birth of the Islamic kingdom in the archipelago (Boechari, 1971); (Hasymy, 1989); (Azra, 2004).

State of Aceh is a model of the spread of Islam as (Effendi, 2012); (Maarif, 2009) states that Islam was moving from the public to the Palace. This means that in Aceh, the political power of government which is reflected through the palace was founded by Ulama. This process spawned foundations of their society respectful attitude towards the Ulama. The people of Aceh are very obedient and subservient to the Ulama and Sultan. The palace is symbolic power of the Ulama, the people are obedient to the Palace but not necessarily obedient. Power do not lies in the hands of the Sultan but the Ulama, though the palace was occupied by the Dutch, but the fight against the Dutch persists because it actually means people's power in the hands of the Ulama (Hasymy, 1989).

Model spread of Islam next is happening on the island of Java, a process that occurs after the fall of Majapahit 1478 M by experts caused by the growing political power of Islam along the northern coast of the island of Java, and finally as one political force to speed the process of the collapse of the Majapahit empire, The ulama on the northern coast of Java island have succeeded in building a kingdom of Demak as the first Islamic kingdom in the archipelago (Kartodirdjo, 1987). Political institutions of this kingdom eventually became the instrument that drives Islam was moved from the Palace to the public to make the process of Islamisation. The consequences of this model of the spread of Islam, making the people very docile and obedient to the ruler of the palace or also the Ulama. For the Javanese, the palace is the symbol of the supremacy of the power of Islam, people obedient and submissive to the commands of Ulama as well as the king. Resistance against Dutch colonialism was continued without interruption until the last drop of blood, as long as they think the Palace is still subject to and controlled by the Dutch. However, if the court had first surrendered to the Dutch, then the strength of the community is also not surrendered. Unlike in Aceh, even if the court had surrendered to the Dutch, but people will still move to take the fight led by the Ulama, and the resistance of the people of Aceh have ended after the Dutch issue the moment the war with a system of forts stelsel on the advice Snouck Hurgronje, an architect of political Islam Indies who understand cells of the Acehnese people (Effendi, 2012).

While the process of Islamisation in Minangkabau, conducted by the Ulama radically ended with a compromise through Bukit Marapalam agreement in 1833. Compromise resulted blended Islamic values and custom value through "Consuetude is shaped by religion (*Adat basandi syarak*), Religion is shaped by Al-Quran(*syarak basandi Kitabullah*).

Besides the social, cultural and political issues intertwined causal factors Conflict of Consuetude Community and Padri, it is also caused by the economic problems as an important aspect that cannot be ignored. Luhak Tanah Datar known as gold and pepper producer country in the 17<sup>th</sup> century was under control of Pagaruyung Kingdom through the role of the king. Meanwhile, the Consuetude Community run out of natural resources and shifted to coffee as a commodity export trade in the 19th century. Luhak Agam, which is fertile plateau, was

famous as the largest coffee producer in Minangkabau region. This area had been fought over influence by both communities. Apart from the socio-political and religious factors, a geographical factor in the form of control over Luhak Agam was also used as one of the main capitals for the Padri movement to strengthen their interest in the economic field. For example, through the controlling over Luhak Agam and Tanah Datar, Padri community can access and control of a large number of coffee plants, surplus crops of rice, fruits, and vegetables from a number of markets they conquered (Dobbin, 2008). The economic factor was clearly evident when Padri expanded powers to the north. According to historian Gusti Asnan as reported by *Tempo*, when their forces in the south began to be squeezed as a result of occupation of the Netherlands, they headed to Pasaman and Tapanuli because this area has a wealth of very high base. In addition, by taking control of the area, the Padris can resume trade relations with the outside Minangkabau society, particularly in Aceh, through the river (Tempo Magazine, 2007). As already explained, the trade, especially coffee, is one of the main factors that would allow for the emergence of fundamentalist religiosity in Minangkabau; and at the same time, through such religiosity, Padri also trying to secure the coffee trade lane as their main economy.

Concretely, conflict and civil war as a result of Padri radicalism espoused by Taufik Abdullah is not solely rooted in the principles of religion, but also because of economic problems and political power (Robert E Lucius). In fact, sometimes the last two issues have become so prominent although they are always covered with religious symbols.

### **Track Record of Radical Islam until the collapse of the Suharto regime in 1998:**

In a later development, dakwah movement of Islam based on *Amar ma'ruf nahi munkar* in the early 20th century, result two groups of people called the elderly and young people. From some of the literature review, young people are more colored by the Muhammadiyah movement, while the elderly are more colored by the Islamic movement who gathered in Nahdatul Ulama (Azra & Al Jauhari, 1996).

Next in the context of a larger movement centralized on the island of Java, in the early 20th century Dutch colonial political conditions have encouraged national consciousness born marked by the birth of a group of organizations that are social and, eventually developing into a political movement. Muslim community groups are also involved with the establishment of the United Islamic Trade (*Serikat Dagang Islam*) in Solo in 1911. In the political Islamic movements in the archipelago was also marked by the birth of political parties as a means of struggle for the independence of Indonesia (Kartodirdjo, 1987).

There are three forces community groups that play a role in the independence movement, fought based on religion, nationalism based on the struggle, and that struggle is based on communism. Struggle of religious-based group had spawned some Muslim political parties, such as the Islamic Party of Indonesia (PSII), the Union of Tarbiah (Perty), and Masjumi, and others. The third force this community succeeded in realizing independence from the Netherlands in 1945, but in the subsequent development of the communist-leaning group that unilateral movement by a coup in 1948, and the last of the communist coup in 1965 through September 30 PKI Movement. While the Islamic parties, Masjumi was dissolved before the outbreak of the G30S / KPI for allegedly sponsoring PRRI in Central Sumatra (Kahin, 2009). Masjumi was also been polemical because another parties suspected Masyumi influenced by Wahabi (Ricklefs, 2005).

Following the fall of the Sukarno regime and the beginning of the New Order regime under Soeharto's leadership, the remaining two social and political forces in the community life of the nation are a religious group and anationalism group with the mission of implementing Pancasila and the 1945 Constitution purely and consistently. National groups represented by *Golongan Karya* (Golkar) tried to lead the political forces and Islamic organizations jointly ran is based on Pancasila and the 1945 Constitution. The efforts of escorting to Pancasila as the sole principle by new order regime managed to set Pancasila as a struggles principle in political life in 1983 (Ricklefs, 2005).

Securing the Pancasila as the state and the only principle of struggle, the government started to act massively with the label "Command Jihad" to groups of people who did not accept Pancasila as the basis of political struggle. People who are not satisfied with the unification principle by the New Order regime, monitored and suspected as anti group to NKRI based on Pancasila and the 1945 Constitution. Keeping silence this group, the New Order government diverted the issue by making the command of jihad, as the radical Islamic movement. Komando Jihad is a potential political instrument of accession by Ali Murtopo to destroy Islamic political after the destruction of communism. According to (Busyro Muqoddas et al, 1992) struggle of Sekarmadji Maridjan Kartosuwiryo who dreamed an Islamic state in Indonesia actually has been completed in 1962. But, the group was revived by the intelligence in the form of "Komando Jihad" as part of a strategy to win Golkar and strengthening the powers of the new order.

Was the New Order government successful to keep silence this radical Islam or Komando Jihadin this

Republic? Actually not! the history proves after the collapse of the New Order in 1998, Islamic groups who have done hoist secretly since the 1980s began to move more freely. Four years after Suharto stepped down Rizieq proclaimed the founding of the Islamic Defenders Organization or *Fron Pembela Islam* (FPI) in Jakarta. As the Hisham views at 2010, in a study of anatomy of Salafi propaganda conflict in Indonesia explained that even though the new order to suppress Islamic groups of the structural aspects of politics, it does not mean the radical Islamic movement was halted its dak'wa. They are still struggling through the motions dak'wa, live clustered in a small exclusive community and preaching in a restricted environment, impressed quietly and in a way that almost be called a closed (Hasan, 2008). Those who named his group the Salafi Da'wa movement managed to establish a boarding school, where they teach and spread its religious ideology. After the collapse of the New Order, the Salafi Da'wa is very important change, dak'wa previously done secretly, now they do openly and even spectacularly founded the paramilitary movement, and they called Laskar Jihad. As it was stated by (Rubaidi, 2014) that the Laskar Jihad movement is one variant of the Islamic movement that existed during the reform era. Financing its movement, they established a foundation that usually use the word *sunnah* or words associated with it, like *Difa an al Sunnah*, *Ihya 'al Sunnah*, *Ihya' al Turath* and the like. In this reform era Salafi Da'wa is progressing very important.

#### **Wahabi and Islamic Radicalism in Reform Era:**

Having elected a charismatic figure of Nadhatul Ulama Abdul Rahman Wahid as the President of the Republic of Indonesia through the proceedings of the MPR tough and compromising in 1999 with accompanied by Megawati as vice president, this was an important milestone as the process of transition from an era of autocratic to the reform era. Despite of relatively short reign of about two years, but the leadership Gusdur has brought a fundamental change to the people of Indonesia (Ricklefs, 2005).

Changes in the social life of the community mainly ethnic Chinese was no longer barriers to commemorate a wide variety of important days and display a wide variety of cultural art forms Bronsai that Suharto was strictly prohibited. The results showed that the Chinese community in various areas, such as Chinese ethnic who live in residential areas in the city of Padang cottage has been involved in art and culture featuring Baronsai the celebration of the independence of Indonesia on August 17, 1945. Then structurally politics through the 1945 amendment agreement, and parliament through electoral law has given freedom to the growth of political parties. There are 48 political parties involved in the reform era of the first elections in 1999. Moreover, the institution of Indonesian National Police (Polri), which during the New Order regime under the command of the Commander of the Indonesian Armed Forces (ABRI commander) is separated into a stand-alone institution headed by Chief of Indonesian National Police (Chief of Police) is equivalent to the Armed Forces Commander which was later renamed Commander of Army of the Republic of Indonesia (TNI Commander). And granting of authority from central to local government through the City and District Law No. 32 of 1999

On the other hand, according to the context of this research is the radical, fundamentalist, trans-national Islamic moving underground of Soeharto regime were popping up to the surface. Results of research (Eliraz, 2004); (Azra, 2006); (Delong-Bas, 2008); (Hasan, 2008); (Ahmad Fuad, 2013); (Galamas, 2015); (Afandi, 2016); (Hashim, 2016) also describes the beginning of the reform era is empirically characterized by the proliferation of radical social movements of Islam among young people has become an important record for the general public, students of history, academics, the media and policy makers. The results of this study indicate that there are five radical Islamic movements that exist and well-organized violence to make the change in the aspect of religious life, dak'wa, and social; Islamic Defenders Front, Laskar Jihad (LJ), Jamaah Islamiah (JI), Al Qaeda, and the Indonesian Mujahedeen Council (IMC). There is a civic organization (Ormasy) of Islam does not promote violence to do dak'wa but have a target of radical wanted modifiers philosophical basis of the Republic of Indonesia (NKRI), namely, the movement Hizbut-Tahrir Indonesia (HTI). The academics try to understand this phenomenon through theoretical and empirical approaches, the rise of radical social movements is an articulation of certain political groups' crunch rooted to dissatisfaction with the ruling regime of Soeharto authority in this country for 32 years.

Next the results of this study also reveal a radical social movement that spearheaded by young Islamic groups which were genealogically rooted in the early period of independence. For those young people of Islam, the phase of reform is an opportunity for the opening of political opportunity structures that is relatively under an authoritarian regime. As the approach to social theory put forward (Sydney Tarrow, 1998), the availability of the political opportunity structure became one of the important variables of social mobilization, one of which intangible Islamic movement. This view is also supported by (Martin van Bruinessen, 2002), that a number of radical Islamic movements were rampant in the reform era has historical roots in Masjumi and Darul Islam (DI) / TII. Besides the factor of political opportunity structure, also caused by the economic crisis conditions in

transition has spawned unemployment rate is quite high. As stated by (Noorhaidi Hassan, 2010) that another important factor to explain the rise of radical Islam in those days was the high level of unemployment among young people in Indonesia around 72.5% in 1997 came from the youth-only edged to number 70 % ten years later. However it is important to note that the rise of radical social movements of political Islam in the transition period was an accumulation of many factors, including, according (Hosen, 2002) the rise of the radical movement after the new order is more due to the repeal of the Anti-subversion by President BJ Habibie.

Islamic social movements which were rampant in the political transition were the beginning of the reform era at least can be grouped into three variants of Islamic social movements. According to (Hasan, 2002) there are variants of Islamic activism movement *jihadi* ; variant *pious / salafi*, and variants *politics*. *First* , the Islamic movement *jihadi* has characteristics justify the use of violence and terrorism to achieve political goals, namely to enforce Islamic governance structures. Those include among others: Jemaah Islamiyah and the various sub-variants of Darul Islam (DI), the Islamic State of Indonesia (NII), and so forth. The first variant includes the Islamic movement that dared to plunge into religious conflict communal in East Indonesia, such as Ambon and Poso. Personal from Islamic groups is widely seen crossroads in the towns of Sumatra and Java were asking for the public's helping hand volunteer/ social contribution that they use to conduct jihad in Ambon and Poso.

*Second* , Variants movement *pious / salafi* has focused on the characteristic dimensions of law by improving the morals of the people, the purity of faith and Islamic identity and are not so keen to achieve political power. They are included in this variant is the Wahabi-Salafi movement with various sub-variants such as the FPI. While the third variant, the Islamic movement *politics* has the characteristics involved in the political process, either directly or indirectly, as well as working within the framework of the constitution of the state.

The third variant, is already seen movement in the decade of the 80s through the campus and the defendants' motion member recruitment done by individuals and style clothes the women were different from the others with the characteristic width of the veil that covers the entire back. If the first and second variant (variant of *jihadi* and *salafi*) have a stand against politics and against democracy, activism *political* Islam actually been politically active. According to them, participate in the political process under a democratic system is legitimate and necessary, including strive towards Islamic law. Even the Islamic group of *variants* of this third became the main mentor in the House of Representatives to control people's behavior through enforcement Regional Regulation (Perda) immorality or any other name (Rubaidi, 2014).

Although ultimately, communal-religious conflict in Ambon and Poso has subsided and can be solved through socio-cultural approach in era of government packages Susilo Bambang Yoedoyono (SBY) and Jusuf Kalla, but there are no signs that the trend of radicalism also experienced low tide phase. Until this time, the Islamic variant of *jihadi*, still making a communal-religious conflict in Ambon and Poso as a means of mass mobilization and make the area (post) conflict as a base of the Islamic movement *jihadi*. They also continue to carry out acts of violence and terror in the outside areas of conflict, as seen in the action sequence Bali Bombing (2002) and Bali II (2005) as well as other terrorist acts ( Rithy, 2015 ). Equally with the *jihadist*, Islamic movements' *salafi* also take advantage of the momentum of the mobilization of jihad as an opportunity to expand and extend the area of influence. In the post-jihad, for example, they succeeded in making Ambon as the 'capital' of the Salafi movement in the eastern region of Indonesia (Jahroni, 2007). The same was done by Islamic activism *politics*, where political progress they expanded. Interestingly, while most of the votes of Islamic political parties has decreased since the 2004 elections, but the *Partai Keadilan Sejahtera* (PKS), which is categorized as a variant of Islamic activism movement managed to boost her voice and become an Islamic political party with the largest vote totals (Machmudi, 2005).

#### **Wahabi and the Islamic Defenders Organization or *Fron Pembela Islam* (FPI):**

Islamic Defenders Organization or *Fron Pembela Islam* (FPI) is a hardliner Islamic organizations based in Jakarta and was founded by Mohammad Habib Rizieq Shihab bin Hussein, famous with Rizieq. FPI declared on August 17, 1998 (24 Rabiutsani 1419 H) on yard of Pondok Pesantren Al-Um Kampung Utan Ciputat, South Jakarta by a number Habib, Ulama, preachers, and Muslim activists who witnessed the hundreds of students who come from Jabodetabek (Van Bruinessen, 2002); (Saleh, 2013); (Rubaidi, 2014). The establishment of this organization just four months after President Soeharto resigned, because at the time president of the New Order government will not tolerate extremism in any form.

Rizieq claimed purpose of the FPI is for the establishment of the implementation of Islamic law in secular. The hardliner Islamic groups saw Muslims as the majority population have not received fair treatment from the ruling regime. The long-suffering Muslims of Indonesia in the form of human rights violations committed by powerful individuals as well as their bad and immorality are rampant in all sectors of life has become a major factor for them to enforce enjoining good and forbidding wrong for the sake of the dignity of Islam and Muslims.

Such Padri movement in Minangkabau, it also started by social conditions of Minangkabau when it did not carry out Islamic law in accordance guidance of the Qur'an and Hadith. Public behavior such as; drinking wine, risking chicken, gambling is getting out of control. The economic development is getting better with the emergence of coffee as an export commodity to make people live full eporia and deviated from Islamic law. These conditions have pushed Tuanku Nan Renceh to form a rival government under the name "the Eight Tiger Council" (*Dewan Harimau Nan Salapan*). It means that there are eight Ulama who play an important role in enforcing Islamic syariat through the Padri movement (Radjab, 1964); (Abdullah, 1966); (Mansoer, 1970); (A'la, 2008).

Then, the movement of FPI also has a strong attitude towards those who underestimate the Quran, the Islamic Shari'ah, or Islamic laws against those who want to undermine the faith of Muslims. Assertion is shown in the form of more radical action than other radical Islamic movements in the country. Based on the record Wahid Institute (WI) Jakarta, exclusiveness and radicalism of FPI have a variant manifest very diverse, ranging closure of places of worship to the use of violent means. From 2001 to 2006, FPI has done violence to the various places in Jakarta. On August 27, 2001 incorporated in the future of hundreds of FPI staged a rally at the House of Representatives or *Dewan Perwakilan Rakyat* (DPR) and the People's Consultative Assembly or *Majelis Permusyawaratan Rakyat* (MPR).

They demanded the DPR and MPR to restore Pancasila according to the Charter of Jakarta. This demand was clearly revealed FPI wants to restore the role of Islamic groups in formulating the Jakarta Charter clearly states that the first base of Pancasila on God by running the Islamic Shari'a for its adherents. Then on October 9, 2001 FPI made a fuss in a demonstration in front of the US embassy to tear down barbed wire barricades and security forces fired tear gas and water cannons. Followed by October 15, 2001 Police of Metrojaya lowered about 1000 officers from four battalions in the police to surround the office of the FPI in Jalan Petamburan III West Jakarta and ended with clashes between the two groups. On March 15, 2002 Commander Lasykar FPI, Tubagus Muhammad Siddiq affirmed, sweeping action against places of entertainment which proved that sin is the right of society. On May 22, 2003 Field Coordinator of FPI, Tubagus Siddik, along with 10 members of Islamic Defenders Front paramilitary troops beat a man on the road toll. On 9 and July 15, 2005 Hundreds of people wearing FPI ront attributes led by Habib Abdurrahman Assegaf attacked Jamaah Ahmadiyah in Parung-Bogor, and forced to emptied the entire complex of buildings and forcing the police put a police line.

In 2006 there were four times the acts of violence by FPI, including on April 12, 2006 FPI attacked and damaged the office of Playboy magazine. May 20, 2006 Date of FPI raids at 11 locations assessed as immoral place in Kampung Kresak, Jatisampurno, Pondok Gede. Resumes on May 21, 2006. FPI seal Fahmina Institute office in Cirebon and dated May 23, 2006 FPI expel KH Abdurrahman Wahid from Interfaith Dialogue Forum in Purwakarta.

From a series of FPI above, it can be concluded that FPI action is directed to enforce enjoining good and forbidding wrong to make efforts to prevent and eradicate public behavior that is contrary to the doctrine of Islam. Enforcement actions Islamic requirement is done from year to year, especially during the holy month of Ramadan. Almost a kind of becomes a tradition, every Ramadan always appear FPI are packed with the slogan "anti-vice operation". Some forms of FPI in the month, among other things, forced the closure of entertainment venues, closing the diner that is open during the day, sweeping liquor raid Commercial Sex Workers (CSWs), and even beat people who did not fasting.

However, during the administration of President Joko Widodo, FPI went increasingly out of control. FPI will no longer focus on efforts to enforce Islamic law, but has begun to come into contact with the political sphere. Medium Jakarta governor election has become a political arena for the FPI to indicate the existence of the attitude of the FPI who does not feel unpleasant careful look lunge Jakarta Governor, Basuki Purnama Tjahaya, in building Jakarta. Governor that is likely to progress back in the second period is a threat to the existence of FPI.

Ahok negligence in a speech said during a working visit to the thousand islands has become a cornerstone of action to FPI to confront issues Ahok by throwing Ahok have done blasphemy, Surah Al Maidah, verse 51. FPI try to bring up the issue of defamation of religion Ahok into the realm of law, that the Governor patahana Basuki Purnama Tjahaya thrown in jail. This work is done by holding two rallies FPI stages. First phase carried out on 4 November 2016 and December 2, 2016. The second were able to bring a million people in Jakarta with the major issue of blasphemy by Jakarta Governor Basuki Cahaya Purnama or famously called Ahok.

The results showed whether both Padri movement and FPI are equally included into hardliner Islamic groups and try to resolve the problems of a society that does not fit to Al Qur'an and hadith radically. Both movements also have ties with the Wahabi ideology. As explained by (Azra, Jaringan ulama: Timur Tengah dan kepulauan

Nusantara abad XVII & XVIII: akar pembaruan Islam Indonesia, 2004); (Azra, 2005); (Azra, 2006) and (A'la, 2008), if Padri movement is the beginning of the return of three of the Minangkabau pilgrimage in Makah who at that time was going reform movement by Mohammad bin Abdul Wahab then FPI as a movement for standing Islamic Shari'a which is also strongly rooted with Wahabi. Although FPI organizational-structural is not explicitly stated part of the Wahhabi, but in terms of similarity orientation, ideology, and the target movement genealogically no kinship closely between the movement of radical Islamic groups in Indonesia with Wahabi (Hasan, 2008); (Damayanti, Thayibi, Gardhiani, & Limy, 2012); (Hartono Ahmad Jaiz, 2012); (Hilmy, 2014); (Hashim, 2016).

It also includes that FPI is also genealogically affinity meeting with the Muslim Brotherhood and the Wahabis. Ikhwan al-Muslimin as transnational movements which "operate" in Indonesia, in the decade of the 80s exist initially through institutions which later became the campus proselytizing movement of Tarbiyah Movement. The group then founded the Prosperous Justice Party or Partai Keadilan Sejahtera (PKS), Hizbut-Tahrir (HT) with the idea of Pan-Islamism who wants to enforce Islamic Caliphate throughout the world, and put Indonesia as one part in it. According (Jamhari & Jahroni, 2004); (Hasan, 2002); (Mubarak, 2008); (Mubarak, 2015); (Mudzakkir, 2016) radical Islam contemporary is identified into five groups, the FPI, Laskar Jihad Ahlussunnah wal Jamaah, the Indonesian Mujahidin Council or Majelis Mujahidin Indonesia (MMI), Hizbut-Tahrir Indonesia (HTI), and the movement of the Islamic State of Indonesia (ISI).

If during the Padri movement, there was only one variant of the Islamic movement, then during the reform era, variants of the Islamic movement that was born with different demands. FPI for example, its activities more extensively leads to other forms of destruction against what they call places of vice. Laskar Jihad concentrate far more on a kind of military activity, which is doing the exercises of war and armed themselves with sharp weapons. Following up, in the realm of politics, efforts to revive the demands of the past, the formalization of Islamic Shari'a as positive law, though not to make Islam the basis of the state, has voiced again by Islamic political parties, for example, Partai Persatuan Pembangunan (PPP), Partai Bulan Bintang (PBB) and the Partai Keadilan Sejahtera (PKS). As a little touched on above, that the fall of the New Order empirically a blessing for the Islamic group. How not, throughout the history of the reign of the new order (Order), Islamic groups (especially in the political sphere) as if nothing ever find "comfort" of its existence, and even tend to suspect and neutered. (Mohtar Mas'ood, 1989) says that the paradigm of New Order era was oriented to modernization and economic development (economic as commander) with suspicion seeing Muslim political forces, mainly Islamic parties as a stumbling block which at any time can become a time bomb for the programs of New Order development.

Substantially, the idea of the movement promoted by the Islamic movement (read: radical Islam) remain the same, namely the issues that the threads of the spirit of Puritanism and boiled down to "Islamic law". The final aim of all ideas of this movement is nothing but the "Islamic State" or various forms of derivatives, such as the Muslim Brotherhood of Hasan al-Banna), the Jama'at-i Islami of Abu Bakar Ba'asyir, Hizb an-Nabhani Taqiyuddin premises), Majelis Mujahidin Indonesia (MMI), Laskar Jihad (LJ), and the FPI. Some of the organizations mentioned above are some of the parent of a growing organization since its inception. It is still not calling or fractional part of the parent organization above. For example, the Muslim Brotherhood (*Ikhwanul Muslimin*) was fragmented into pieces while in Indonesia. Tarbiyah and Majelis Mujahidin Indonesia (MMI) is an ideology based on the doctrine of the Muslim Brotherhood (MI). Tarbiyah question here is none other than the birth of Islamic Organizations Justice Party (PK) which finally changed again to the Partai Keadilan Sejahtera (PKS).

## CONCLUSION:

Interaction between Wahabi thinking with the Indonesian people began to look at the 19th century in Minangkabau through the returning of three leaders from Makah. Wahabism considered inspired the West Sumatran origin known as the next wave of the Padri led by Tuanku Imam Bonjol. Next the 20th century the influence of Wahhabi thought massively entered Indonesia through the role of the Indonesian Islamic Propagation Council, founded by Muhammad Natsir. Through the financial support of Saudi Arabia, the agency sends many students to the Middle East to study Islam (Jahroni, 2007); (Muzakki, 2014).

Padri movement in Minangkabau in the 19<sup>th</sup> century and radical Islamic movements in Indonesia through the FPI have a leader who comes from Arab migrants. If the Padri movement led by Peto Syarif, Tuanku Imam Bonjol, who is Morocco's Arab migrants then FPI is also led by Arab migrants of Yemen. Starting from the religious movement to purify the implementation of Islamic law and led to a political movement that wants to position the doctrine of Islam as a way of life high above the country's constitution.

From the point of view of a country that is based on Pancasila and the 1945 Constitution, the Wahhabi movement is considered potentially damaging the religiosity of Muslims in Indonesia. The process of Islamization in Indonesia with fixed keeping religious traditions considered heretical and deviant by Wahabi environment. The doctrines of the Wahhabi circles in the form of actions carried out by the radical FPI. The government period of Widodo- Jusuf Kalla was showing increasingly radical shown through the action of 4 November 2016 and December 2, 2016. Behind the public morals repair mission, FPI is also veiled conflict stuck in Jakarta Governor election arena that representative interests channeled through partner FPI candidate for Governor Anis Baswedan - Uno. Countries have undertaken massive approach towards the radical Islamic movement that has a network of trans-national Islamic movement, but the presence of a radical Islamic ormas required a special approach. Keep in handling the door of pesantren education institutions in aspects of the curriculum in order to make that schools of educational institutions do not become fortress of Wahabi in Indonesia.

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# NAHDLATUL ULAMA AND IT'S ROLE IN THE DEVELOPMENT OF ISLAMIC RELIGIOUS EDUCATION IN CENTRAL TAPANULI

*Dr. Sarmadan Nur Siregar,*

Alumni,

Islamic Educational Doctoral Programme  
North Sumatra State Islamic University  
Postgraduate Programme, Medan, Indonesia.

## ABSTRACT

*Branch Manager of Central Tapanuli Nahdlatul Ulama's Maarif Education Board (PC LP Ma'arif) develop professional skills-based life skills according to the needs, abilities, interests and talents of learners. Nahdlatul Ulama of Central Tapanuli generated an innovative finding in Islamic Religious Education learning management, namely the process management of interactive social learning which cover a dynamic system with community environment as a system of social environment as well as a laboratory of Islamic religious education. Based on the field findings was suggested in the development of Islamic religious education as follows: (1) Central Tapanuli Nahdlatul Ulama branch executive can improve public education about policies, programs, budgets, systems approach, and monitoring, (2) Ministry of Religious Affairs of the Republic of Indonesia, particularly the Directorate of Education On Madrassa can increase the procurement of facilities and infrastructure, textbooks, adequate library, equipment, and instructional media, (3) To improve the knowledge of the religious idea of Aswaja NU's education as a religious faith in the social struggle according better social conditions in Central Tapanuli.*

**Keywords:** learning, development, Islam, organization.

## INTRODUCTION:

History of Nahdlatul Ulama (NU) as a long history of movement of Muslims in Indonesia which involves the process of institutionalization of education as an important part of it. Education, for leaders and members of NU is the most strategic agency to embody the spirit of "*al-muḥāfaẓah al-Qadim al-Salih wa al-akhẓu bi al-Jadid al-aṣlah*" (preserve it past the good and implement new and better). Through education, the treasures, religious affinity and strengthening the people could be done continuously from generation to generation (Salim, 2003).

As a socio-religious organization that handles many fields, NU has several agencies that deal with various problems. One of them is Maarif Education Board which serving in education field. In 1936 (1356 H<sup>1</sup>), NU's educational commission succeeded to arrange regulation about NU's Madrassas Structure that should be done after it had already been approved (Hasbullah, 1999).

The education units of Central Tapanuli NU are still not optimally managed according to the modern organizational perspectives. For that reason in today's competitive era, NU Central Tapanuli realized that the demand to develop a more organized education quality to be a certainty.

Among the problems faced by the Nahdlatul Ulama of Central Tapanuli in efforts to develop Islamic Religious Education (IRE) in formal education is still in its weak capacity of madrasa<sup>2</sup> / school management theory and practice from most NU's Madrasa / School Principals; and still lack the ability to formulate strategic policy to achieve the standard of content, process, educators and education personnel, and evaluation in the development of IRE.

The phenomenon of the problems of Islamic religious education above in accordance with what is described by (Daulay, 2004), that the implementation of religious education is very complex, involving various aspects, because of the success is also related to various aspects, such as students, teachers, curriculum, management, methods, evaluations and so forth. To enhance the effectivity of it's implementation needs any evaluations to these aspects.

Research on the development of Islamic Religious Education at the Central Tapanuli NU is very necessary because although NU in Central Tapanuli Regency as an isolated area, but Central Tapanuli Nahdlatul Ulama Branch Executive (PCNU) able to achieve the development of IRE and their educational institutions most nearly equal to Nahdlatul Ulama Branch Executive Padang Sidempuan as the biggest Nahdlatul Ulama Branch Executive in North Sumatra. Moreover, in the history of NU in North Sumatra, Sibolga-Central Tapanuli is the second NU spreading areas after the beginning from Padang Sidempuan.

## RESEARCH FOCUS:

This study focused on the problem: (1) How Islamic education development policy is implemented by the Central Tapanuli Nahdlatul Ulama Branch Executive? (2) What is the role of Central Tapanuli Nahdlatul Ulama branch executive in the development of Islamic religious education which includes various components such as educators, students, curriculum, interest, and the learning management? (3) What is the role of Central Tapanuli NU Maarif Education Board (LP Maarif NU) in the development of Islamic religious education within the framework of organizational behavior?, which includes: consolidation of organizational and institutional patterns of education, increase religious awareness through formal education, development of Ahlussunnah wal Jama'ah educational institutions. (4) What are the factors supporting and inhibiting the Nahdlatul Ulama and its role in the development of Islamic religious education in Central Tapanuli regency?

## STUDIES/LITERATURE:

NU movement history is actually a history of archipelago Islamic education. The NU organization tree is very lush by educational institutions such as schools, taklim majelis, diniyah, and madrassas / schools and colleges; and supported strongly by many Nahdliyin<sup>3</sup> roots in the community. Actually, rather than its *jamiyat* (organization), NU *jamaat* (pilgrim) was first born. Meanwhile, Nahdliyah Jamaat have *khidmat al-ummat* tradition through various channels. Therefore, the organization is a phase of formalization of archipelago Muslim cultural that was built on the basis of Ahlus-Sunnah wal-Jama'ah (Thoha, Arifin, Syukur, Arifin, & Mufti, 2006).

NU as one of the locomotives of educational reform in Indonesia. Its role is a set of expected behaviors in accordance with the person's social position given either formally or informally. NU ulama further develop aswaja understanding, not only compile the scientific frame as religious teachings, but also to formulate practical attitude from a religious perspective (Anoname, 2002). Based on this view, they formulate the

<sup>1</sup> H abbreviation from *Hijriyat* calendar = Islamic lunar system calendar

<sup>2</sup> madrasa = Islamic school in Indonesia

<sup>3</sup> Nahdliyin = members of Nahdlatul Ulama

behavior of Muslims formed by four aswaja principles that characterize NU, both as a *jamiyat* and as a *jamaat*, as follows:

*First, tawasuth* and *i'tidal* (moderate and justice) with the core which upholds on the principle of life must be fair and straight in the middle of a life together.

*Second, tasamuh* (tolerant). This *tasamuh* attitude means providing place and equal opportunities to everyone regardless of any background.

*Third, tawazun* (balanced). Balancing attitude in social works / charity activities (*khidmad*). Harmonizing the dedication to Allah and the dedication to human beings and the environment. Harmonizing the interests of past, present, and future.

*Fourth*, commanding the good and forbidding the evil. Always have a sense of involvement and responsibility to encourage good deeds, useful, and beneficial to the common life and reject and prevent all the things that can plunge and lowered values of life.

Based on Chapter I of the General Provisions, Section 1 in (The Indonesian Government Regulation No. 55, 2007) on Religious Education and Religiousity Education, the religious education can be described as an education that provides knowledge, forming attitudes, personality, and skills of learners in practicing religion carried out at least through the subjects / courses in all lines, level and type of education.

Chapter II on religious education, article 2, paragraph (1) described religious education has a function to make realize the Indonesian as a human being who has faith and fear on God Almighty and noble and capable of maintaining peace and harmony and the inter relationship among religious believers; (2) Religious education aims to develop the capacity of students to understand, appreciate and practice the values that harmonize religion mastery in science, technology and art, Article 5, paragraph (1) Curriculum religious education conducted in accordance with the National Standards; (2) Religious education is taught according to the stage of psychological development of learners; (3) Religious education encourages students to obey the teachings of his religion in everyday life and make religion as the foundation of ethics and morality in private life, family, community, nation, and state; (4) Religious education embodying the harmony and respect one another among the religions followers from the different religions; (5) Religious education develops a mental attitude of learners to act and behave honest, trustworthy, disciplined, hard-working, independent, confident, competitive, cooperative, sincere and responsible; (6) Religious education fosters critical attitude, innovative, and dynamic, so that it becomes the driving factor behind learner's competence in the area of science, technology, art, and / or sports; (7) Religious education is held in an interactive, inspiring, fun, challenging, encouraging creativity and independence, as well as the motivation for a successful life.

#### RELEVANT RESEARCH ACCOMPLISHED:

The previous research conducted by (Sobandi, 2011) in research on *The Development of Islamic Religious Education in Public Higher Education Case Study in Bandung Institute for Teachers Training and Education Year 1966-1999* concludes that there are external and internal support to the success of IRE in Bandung Institute for Teachers Training and Education.

(Ghazali, 2012) in research on *Islamic Religious Education Perspective for Religious Harmony (Study on Islamic Religious Education Curriculum Matter In State Senior High School)* concluded that IRE-minded religious harmony has three orientations, namely: (1) self-orientation through understanding of the students; (2) the orientation of the school through the curriculum contain, syllabus and teaching materials; and (3) social orientation, namely an atmosphere where students can experience firsthand the diverse religious life.

#### RESEARCH METHODS AND DATA ANALYSIS:

This research method is qualitative research. *The qualitative research can reveal the real events in the field, can reveal hidden values, are more sensitive to information that is descriptive as well as trying to maintain the integrity of the object under study.*"(Strauss & Corbin, 1997).

The respondents interviewed amounted to 26 people, consisting of Member of Advisory Board (*Mustasyar*), Secretary of Islamic Rule Board (*Katib Syuriah*), Chief and Secretary of Executive Board (*Tanfidziyah*), Chief of Central Tapanuli Nahdlatul Ulama Maarif Education Board, the Head of Organization Development Department and 1 person of low level manager of Central Tapanuli Nahdlatul Ulama Maarif Education Board, 7 principals of NU's madrassas and schools, 10 teachers of NU's madrassas and schools, and 2 NU's elders members in Central Tapanuli who are to be respondents in this research.

Collecting data and information through observation activities in the field followed by interviews and studies conducted on Central Tapanuli Nahdlatul Ulama documents in the secretariat office of Central Tapanuli Nahdlatul Ulama Branch Executive and Central Tapanuli Nahdlatul Ulama Maarif Education Board.

In this research, 7 (seven) NU's madrassas and schools in Central Tapanuli are taken as sample:

1. NU's Sibabangun Bintang Sembilan Private Yuniior High Madrassa (*Madrassa Tsanawiyah*).
2. NU's Pandan Mu'allimin Private Elementary Madrassa (*Madrassa Ibtidaiyah*).
3. NU's Pasar Sorkam Private Elementary Madrassa (*Madrassa Ibtidaiyah*).
4. NU's Pasar Sorkam Yuniior High School.
5. NU's Pasar Sorkam Senior High School.
6. NU's Sorkam Kanan Private Elementary Madrassa (*Madrassa Ibtidaiyah*).
7. NU's Sorkam Kanan Private Yuniior High Madrassa (*Madrassa Tsanawiyah*).

The 7 NU's madrassas and schools were taken as samples because they represent geographical distribution, ie in the west, central, and eastern districts of Tapanuli Tengah area that extend from West to East and the area itself is wide. In addition, these 7 NU's madrassas and schools represent the scattered quality of education that it could be shown from the differencies accreditation status from these are madrassas / schools ie with status accreditation A (excellent), B (good), and C (enough).

The study was conducted from May 25<sup>th</sup>, 2015 to August 11<sup>th</sup>, 2016. The data collection steps used in this study as follows: (1) develop general questions about the topic, namely by using interview techniques. The data obtained by using interview guidelines are descriptive, (2) collecting data by observing infrastructure, teaching preparation, learning media and learning resources, teaching strategies, and teaching and learning activities of Islamic religious education; pictures / photos (Walgito, 2001), and documents studies on the Decree, Central Tapanuli Nahdlatul Ulama Branch Executive Bureaucracy, meeting minutes, work agenda, regulations / legislation, etc. relating to the development of Islamic religious education to gain a more perfect understanding (Arikunto, 2007), (3) modify, revise, and develop questions when questions are collected, (4) develop adequate information.

After data is collected, then these data are processed (data processing). According to (Sukmadinata, 2007), in qualitative research, data processing is the presentation of data that has been analyzed by using activity analysis, that is filtered (only taken essential or important only), grouped (searched equation and difference), connected and combined one with another in order to know deeply about the role of Nahdlatul Ulama in the development of Islamic religious education.

The justification regarding the development of Islamic Religious Education in Central Tapanuli postscript done by Nahdlatul Ulama as a social organization based on Islam in Indonesia, such as al-Washliyah, Muhammadiyah, Persatuan Islam, Syarikat Islam, Nahdlatul Wathan, al-Ittihadiyah Islamiyah, and so on. Then, in this qualitative research, the data analysis and the discussion of the research results certainly are partially subjective from the perspective of the Ahlus-Sunnah wal-Jama'ah religious understanding, but for others, especially in the form of data analysis and discussion of the research results on the materials and methodologies that are scholarly / scientific necessarily the truth from the perspective of science it is objective.

## FINDINGS:

In order to support the achievement of organizational goals through the implementation of its programs and the purpose of enhancing the role, social responsibility, and the wealth of Central Tapanuli NU members, Central Tapanuli Nahdlatul Ulama Branch Executive prioritize education for the development of the organization. Central Tapanuli Nahdlatul Ulama Branch Executive believes that through education, treasures and religious understanding of Ahlus-Sunnah wal Jama'ah (Aswaja) and strengthening efforts to Nahdliyin members in Central Tapanuli can be done continuously from generation to generation.

Central Tapanuli Nahdlatul Ulama Branch Executive develop the education as strategic sector because: (1) NU's Madrassas and Schools are potential institutions for cadrerization, (2) the application of operational license for NU's Madrassas and Schools in Central Tapanuli is easy for NU because they already has the Decree of the Minister of Justice and Human Rights of the Republic of Indonesia No. AHU-0007505.AH.01.04 2015 on Approval of Legal Body Establishment of Central Tapanuli Nahdlatul Ulama Maarif Education Board, (3) construction of the building or a new class of madrassas and schools is the responsibility of the government through the provision projects of government grants to both public and private educational institutions. Thus, Central Tapanuli Nahdlatul Ulama Branch Executive simply provide landscape for construction of the madrassa and school building, which ever for its development fund will be assisted by the government, (4) Education services user are always available and growing, namely by increasing the number of school ages children, (5) NU's Madrassa and school is able to contribute funds

for the organization, (6) With the opening of NU's new madrassas and schools in Central Tapanuli, creating jobs for Nahdliyin who work as educators and education personnel.

Nahdlatul Ulama contributions in the development of Islamic Religious Education in Central Tapanuli is quite large which can be seen from the percentage of students (22%) in Central Tapanuli NU's Madrassas Ibtidaiyah and Tsanawiyah. The data was cited in 2015 from Islamic Education Section official Madrasah document at Ministry Of Religious Affair Central Tapanuli Regency Office. The high interest of the community to send their children to NU's Madrassas Ibtidaiyah and Tsanawiyah indicate that Central Tapanuli NU can respond to the needs of the people there for the quality of Islamic Religious Education.

Nahdlatul Ulama Contributions in the development of Islamic Education in Central Tapanuli including through:

1. Central Tapanuli Nahdlatul Ulama Maarif Education Board give instructions to the Principals of NU's madrassas and schools in order to give a mandate to their students who excel in the field of the Qur'an to open the *Bait* (House) of the Qur'an for the people in the environment around them, so as to reduce the number of community members who are blind Quranic script. This information was received from Secretary (*Katib*), B. H. Siregar at Central Tapanuli Nahdlatul Ulama Branch Executive Office on December 1<sup>st</sup>, 2016.
2. Central Tapanuli Nahdlatul Ulama Maarif Education Board give instructions to the Principals of NU's madrassas and schools in order to give a mandate to their students who excel in Islamic Jurisprudence / Worship to participate as a team *Bilal / Rubiah*<sup>4</sup> in the implementation sacril bathing for *mayyit* or assist / to be *zakat* comittee when collecting and distributing *Zakat Fitrah* in Ramadan in their communities. Assignment to these students is a form of Islamic Religious Education development that touches cognitive, affective, and psychomotor as well through practical activities / exercise science and interact directly with the public as part of the real life of students everyday. This information was received from the Head of Organization Development Department, A. S. Hutagalung at Central Tapanuli NU Maarif Education Board Office on December 14<sup>th</sup>, 2016.
3. Establish madrassas / schools NU in Central Tapanuli as places for the development of Islamic Religious Education and cadrerization. This information was found from the Document of 2013-2018 Khidmat Period Work Program at Central Tapanuli Nahdlatul Ulama Branch Executive Office.

The success of Central Tapanuli Nahdlatul Ulama in the development of Islamic Religious Education is shown by the success in founding the process management of interactive social learning which is an innovation in efforts to develop Islamic Religious Education, namely the management of the Islamic Religious Education learning process in Central Tapanuli NU's Madrassas and Schools which includes a dynamic system with the learning culture in it, the availability of sufficient resources, society environment as a social system environment as well as a laboratory of Islamic Religious Education, and the teachers are professionals with various procedures therein are used in assimilate, internalize, use, and create an enabled, creative, effective, and fun learning to achieve the goal of Islamic Religious Education effectively.

### **Central Tapanuli Nahdlatul Ulama Branch Executive's Policy and Role in the Development of Islamic Religious Education:**

Central Tapanuli Nahdlatul Ulama Branch Executive's Policy and Role in the development of Islamic Religious Education include:

#### **Development Policy of Educators Aspect:**

Recruiting teachers who master a variety of Islamic Religious Education learning perspectives and strategies at NU's Madrassa and School. I. Sihombing, also served as Head of Islamic Religious Education Study Program at Central Tapanuli Pandan Bahriyatul Ulum Islamic Religious College (STAI) 2014-2018 Academic Year which generates Islamic Religious Education professional teachers in Central Tapanuli. He played a role in recommending Islamic Religious Education Teachers who are able to teach effectively to be employed in NU's Madrassas and Schools.

Islamic Religious Education Teachers at NU's madrassas and schools are implementing the IRE learning with system approach and teaching in accordance with lesson plans that have been drawn. The lesson plans includes learning domain / gradation which includes attitudes, knowledge, and skills are translated into its basic competencies, until the establishment of its competence achievement indicators. The lesson plans also contain Objectives Learning, Learning Materials, Methods / Learning Strategies, Media / Tools of Learning, Learning

<sup>4</sup> *Bilal* = men who has duty as clerk in sacril bathing for the died man (*mayyit*) & *Rubiah* = women who has duty as clerk in sacril bathing for the died woman (*mayyit*)

Resources, and its Learning Steps. This information was found from the Document of NU's Sibabangun Bintang Sembilan Yuniior High Madrassa (*Madrassa Tsanawiyah*).

**Development Policy of Students Aspect:**

In educational practice, Central Tapanuli Nahdlatul Ulama Branch Executive's put Students as the subject of knowledge seeker and forming theirselves, through the development entire of their intelegencies, while teachers have more responsibility as educators who are responsible to the development of the child's personality, not just as teachers of subjects. (Wahid, 1984) wrote, education is an attempt to facilitate children to be themselves who will live and build a future society in civil society life diversity. Therefore, the national education system should be operating to strengthen the education of democracy, giving recognition to multiculturalism, facing local education, and removing the dichotomy between religion and public education.

**Development Policy of Curriculum Aspect:**

Islamic Religious Education as one of the subjects in public schools, including public schools managed by Central Tapanuli Nahdlatul Ulama Branch Executive, whose contents contain the teachings of Islam and the value system of life and behavior of Islamic life, pursued through the development IRE model which can lead selection, decision, and the development of learners life. Educators developed an educational process geared to equip students with the knowledge, understanding, appreciation, and the practice of Islamic teachings. For Central Tapanuli Nahdlatul Ulama Branch Executive, IRE learning should be able to put the teachings of Islam as an object of study who see Islam as a system of values and moral system that is not only known and understood, but also perceived and used as guidance real behavior in student's life.

**Policy Development of Educational Objectives Aspect:**

Religious education aims to develop the capacity of students to understand, appreciate and practice the values that harmonize religion mastery in science, technology and art.

Learning planning is an integral part of the professional work process as an educator in NU's Madrassa and School of Central Tapanuli, and not only meant as a complement to the administration. The planning was prepared as a guideline for the learning implementation in accordance with the goals and objectives will be achieved. In the plan learning activities, educators here determine the learning objectives to be achieved through the learning process. (Dahar, 2006) have defined, lesson planning is the process of making a rational decision about how to achieve the goals and specific learning goals in the form of changes in the behavior of students who desired after learning through a variety of efforts. Here means teachers realize planning with making the Learning Programme Plan.

Islamic Education in NU's Sibabangun Bintang Sembilan Yuniior High Madrassa (*Madrassa Tsanawiyah*) interlinked with other subjects. In this madrassa religious education is integrated and synchronized with non-religious education. Religious education here does not stand alone, but walking alongside and cooperate with non-religious educational programs, so there is relevance to the social changes taking place in society.

**Development Policy of Islamic Religious Education Learning Management Aspect in Central Tapanuli Nahdlatul Ulama Environment:**

Islamic Religious Education learning system approach is a collection of many components that integrate with each other, to work cooperatively with each other and influence each other in order to realize the generations of faith and piety (Syah, 2007). From some of the components, teachers are the most important component in learning, because the teachers manage and drive the other components. IRE teachers at Central Tapanuli NU's madrassas and schools through behaviors, values, and their skill greatly affect to student learning activities. They did student centered learning.

Problems of Islamic Religious Education in Central Tapanuli Nahdlatul Ulama Environment as follows:

*First*, in many NU's Central Tapanuli Schools / Madrassas, Islamic Religious Education in that the material consists of religious knowledge such as monotheism / Aqeedah, Fiqh, Qur'an, worship, and morals are still not truly aim to produce students who have religiosity spirit that have been seen from their strong faith, compliance in conducting worship, noble moral, high social concern, and likes to read the Qur'an. This religious attitude then became the basis for a variety of activities in the social, economic, cultural, etc. Here, as well as (Irawan, 1996) described, Islamic education shifted into teaching, so that religion is only a matter of reading, memorization, and not become deeds and personality. This religious attitudes that contains the vulnerability and weakness in the face of challenges in the field of culture such as Western culture which secular patterned and hedonistic.

*Second*, the absence of a clear policy from the policy makers in Islamic Religious Education, in this case of Central Tapanuli Nahdlatul Ulama Maarif Education Board, especially about the religious education learning management in their environment.

Third, they still lack the necessary facility and infrastructure to conduct Islamic Religious Education, as a result of Central Tapanuli Regency Government policy that has not supported yet to the implementation of religious education.

### **Role of Central Tapanuli Nahdlatul Ulama Maarif Education Board in the Development of Islamic Religious Education:**

The Islamic Religious Education development effort by the Central Tapanuli Nahdlatul Ulama Maarif Education Board 2015-2020 Period is the behavior of individuals in Central Tapanuli Nahdlatul Ulama Maarif Education Board to organize, manage, and develop optimally formal educational institutions according all of government in educational field, like Government Regulation Number 19 Year 2005 about Educational National Standard, Government Regulation Number 55 Year 2007 about Religious Education and Religiosity Education, and the implementation of School Based Management covering:

### **Central Tapanuli Nahdlatul Ulama Maarif Education Board Organization Consolidation and Educational Institutions Pattern:**

Organizational consolidation and educational institutions pattern between the Central Tapanuli Nahdlatul Ulama Maarif Education Board with the organizers of the educational unit under the auspices of their supporting.

*Khaira Ummah Mabadi* pointed out that socialization was started by the Central Tapanuli Nahdlatul Ulama Branch Executive officials and from NU members themselves. This *Khaira Ummah Mabadi* movement is first directed to the Central Tapanuli NU internal consolidation itself by emphasizing two aspects, namely: organization governance development and socio-economic forces development (Azis, 2007).

Central Tapanuli Nahdlatul Ulama Branch Executive do *bahs al-masa'il diniyah*<sup>5</sup> at branch level with thematic (*maudlu'iyah*) or casuistic (*waqi'iyah*) material by proposing a problem first both from the Branch Executive, Board Assembly Deputy Branch, Branch Managers, and the Lowest Administrators according to their respective areas or equal to the branch. Conduct and encourage continuing critical studies of religious teachings understanding and Islamic Thought was generated by *madzhabul arba'ah*<sup>6</sup> founders and their followers and others as well as had written by (Effendi, 2010).

A. S. Hutagalung, who served as Head of Private NU's Sibabangun Bintang Sembilan Junior High Madrasa , he gave an example how to apply the model of character education in his madrasa as part of the development of IRE in NU's Central Tapanuli Schools / Madrassas. Character education model here emphasizes: (1) internal motivation fostering to be a competitive and resilient personal through the Performing Arts, Pagar Nusa Karate, Nasyid, Drum Band, Football, Scouting, and Nature Lovers, (2) Scientific guidance through Islamic Classical Study, Local Study, and Preaching Friday Practice on Friday Safari activity, (3) Development of skills to grow and develop a spirit of entrepreneurship and self-reliance through Catfish Aquaculture, Livestock Goat In the village Anggoli, Barber Skill, Dressmaking, and Self Development activities, (4) Provision of good judgment and rewards to build excellent character, including through the activities of the Bintang Sembilan Medal Embedding conducted by the Chief of Lumut Sector Police.

### **Improvement of Religious Awareness Through Formal Education Line:**

According to A. S. Hutagalung as Head of Organizational Development at Central Tapanuli Nahdlatul Ulama Maarif Education Board, Islamic Religious Education in Central Tapanuli NU's Madrasa / School, not only emphasizes the cognitive aspect but also with affective and psychomotor aspects.

S. B. Hutabarat won the Islamic Education Appreciation Award in 2015 as the first champion of IRE Teacher on Junior High School category on national level through his writings on the development of NU's IRE learning in Central Tapanuli. He is the Chairman of the Human Resources Development at Central Tapanuli Nahdlatul Ulama Maarif Education Board and principal of Central Tapanuli Tukka 3 Public Junior High School looks how to develop IRE in schools both quantitatively and qualitatively into school culture and it is positioned as a foothold values, spirit, attitude, behavior for school actors such as principals, teachers, administrators, parents, and students themselves.

### **Educational Institutions Development of Ahlussunnah Wal Jama'ah Learning in Central Tapanuli:**

NU's Madrasa or School in Central Tapanuli is an educational unit in formal education. While *Ahlussunnah Wal Jama'ah* (Aswaja) conceptually, contextually and comprehensively can be translated as a religious faith in the social struggle based on the principle *tawasuth*, *tawazun*, *i'tidal*, and *tasamuh*<sup>7</sup>. According to this view, the Board of Nahdlatul Ulama leaders formulate behavior of Muslims that was formed by the four Aswaja principles that characterize NU in Central Tapanuli (Anoname, 2002).

<sup>5</sup> *bahs al-masa'il diniyah* = the discussion and assessment forum to seek the exactly solution for daily religiosity problematics.

<sup>6</sup> *madzhabul arba'ah* = the major Islamic Law streams

<sup>7</sup> *tawasuth* = moderate, *i'tidal* = justice, and *tasamuh* = tolerant

## Supporting and Inhibiting Factors Role of Central Tapanuli Nahdlatul Ulama in the Development of Islamic Religious Education:

### Supporting Factor:

At least there are three major contributing factors that facilitate role Central Tapanuli Nahdlatul Ulama Branch Executive in the development of IRE, namely:

*First*, *baḥs al-masa'il* activities play an important role in the development of Islamic Religious Education as a strategic path to overcoming religious and social issues that are found in people's lives in Central Tapanuli.

*Second*, the presence of cultural heritage in the development of IRE in Central Tapanuli NU's Madrassas in play a role as educational institutions which maintain continuity of the traditional Islamic educational institutions, but at the same time opening up for social change and development communities.

*Third*, the presence of Muslim figures among Central Tapanuli Nahdliyin which plays a role not only as a religious leader and education, but also community leaders.

### Obstacles Factor:

Obstacles faced by Central Tapanuli Nahdlatul Ulama Branch Executive and Central Tapanuli Nahdlatul Ulama Maarif Education Board in the Development of Islamic Religious Education include:

1. Lack of awareness of parents towards Islamic Religious Education for children.
2. The majority of parents prefer public education rather than Islamic Religious Education.
3. Lack of accessibility of agencies dealing with Islamic Religious Education for the community.

Other inhibiting factors in the development of IRE in the environment of Central Tapanuli Nahdlatul Ulama Maarif Education Board is the lack of mutual relationship between NU's education units one another so they have not made yet a unity integrated system.

The main obstacle is perceived by Principal of NU's Pasar Sorkam Elementary Islamic Madrasa (MIS), Nelpiani for the development of IRE in her madrasa is the lack of infrastructure and inadequate building. She sends a proposal of aid to Central Tapanuli Regency Government, Ministry of Religious Affairs Office of the Central Tapanuli, and the Office of Religious Affairs of North Sumatra Province to overcome the obstacle. This information was received from Nelpiani on Mei 26<sup>th</sup>, 2016.

## DISCUSSION OF RESULTS:

### Nahdlatul Ulama Central Tapanuli and their Role in the Field Propagation and Education in Organizational Behavior Perspective:

The personnels who sit in the Central Tapanuli Nahdlatul Ulama Branch Executive management think analytically and conceptually. They think analytically to break down any problems that arise in its components - and then they analyze the components, and find the right solution. They also think conceptually with regard to all the tasks that exist in abstraction and connect them with other tasks, although there are many among the personnels Central Tapanuli Nahdlatul Ulama Branch Executive still have low education level, then think about the specific tasks in relation to it's implications in the wider area is still a very difficult thing. However, with the present of the good cooperation among the personnels, they are able to work well enough towards achieving the objectives of NU Central Tapanuli, either as a whole, as well as toward the individual specific goals like that had been explained by (Winardi, 2015).

### Interactive Social Learning Process Management:

Islamic Religious Education Learning management in Central Tapanuli NU's Madrassas and Schools using thematic pattern that is aligned with the pattern of children psychological development. Central Tapanuli NU's Madrasa and School sought to integrate subjects, for example: education religious materials such *aqidah-akhlaq*, *fiqh-ibadat*, and *Qur'an - Hadith* are taught integratedly with other education material.

Learning management at NU's Sibabangun Bintang Sembilan Yuniior High Madrasa is an interactive social process system management that is focused on an attempt to determine the factors that contribute to effective learning, to understand the dynamics of the these factors operation and set with a view to achieve the desired learning effectiveness. The interactive social process system management was developed from learning process management concept by (Pareek, 1996). The various elements involved in the learning process here is:

1. Central Tapanuli NU's Madrasa and School as the educational unit has its own culture and dynamics of which is intended as a foundation to increase the learners ability to learn on their own. The people involved - who study, who facilitates, study groups, organizations, and educational institutions - all of them played important roles. Learning management is a dynamic process. The main function of this system maximizes motivation to learn by creating a culture and an atmosphere that brings the motivation.

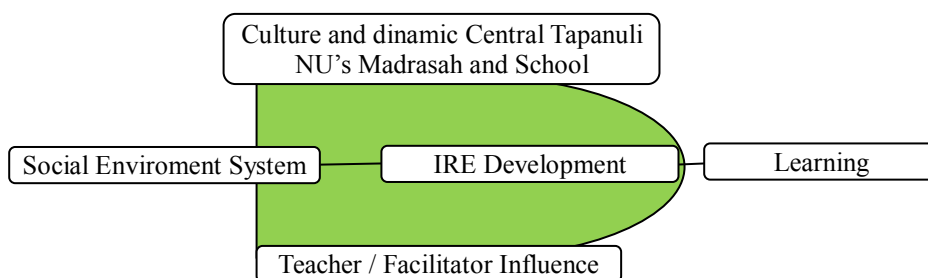
S. B. Hutabarat, Head of Human Resources Development of Central Tapanuli Nahdlatul Ulama Maarif

Education Board. He ever won the Islamic Education Appreciation Award in 2015 as the first national champion to see how a school culture that includes foothold values, spirit, attitude, behavior for principals, teachers, administrators, parents, students, and the community around the school can be generated from the development of IRE in school.

Central Tapanuli Nahdlatul Ulama Branch Executive give attention to what important values prevailing in society. The process of self "awareness" have been done by Central Tapanuli Nahdlatul Ulama Branch Executive at the community level bringing attention to the problems of this value.

(Muhaimin, 2009) cited Deal & Peterson, school culture is a whole psychological experience of the learners who absorbed while in the school environment. Daily psychological response of students to things like the teachers ways and other school personnels act and behave, the implementation of school policy, school shop conditions and services, structuring the beauty, cleanliness and comfort of the school environment, are all shaping the culture of the school.

2. The system of social environment is the intricacies of the implementation *Fardlu Kifayah*<sup>8</sup> for example or other worship related to the community aspects, such as opening a Qur'an House as a place to learn how to read the Qur'an for the people who are still Qur'an illiterate, became a *Bilal / Rubiah* member when there are people in their community who died, and became *Amil Zakat Fitrah* which means all the learning activities of students outside school hours can help mastering the Islamic Religious lessons, the strengthening of faith, noble morality, hard work, and growing tolerance in self-learners. The direct practice methods in the centre of the society religiosity life can help mastery of the various aspects of IRE lessons by learners, in addition to the community also benefited greatly from the activities of preaching and education. The main function of this system is to help assimilate and establish mastery of subjects in the IRE group through practice and application. IRE development in NU's madrassas and schools in Central Tapanuli strived to develop education programs based on life skills that had been stressed by (Muhaimin, Pendidikan Kecakapan Hidup (Life Skill) dalam Perspektif Islam, 2002). Sibabangun Bintang Sembilan Yuniior High Madrassa is NU's Madrassa as a pilot project or pioneer for the entire NU's Madrassas / Schools in Central Tapanuli oriented to the future which is to educate students to have the knowledge and skills that will foster character which faithful and devoted, akhlaqul karimah, healthy, knowledgeable, capable, creative / productive, independent, responsible, and democratic in accordance with national education goals.
4. Teacher is certainly an important person in this whole cycle. He became a role model for the students in terms of knowledge in the field of Islamic Religion and their worship, behavior, values, and skills. Teachers are attempting actively to influence their students in order to learn effectively (Pareek, 1996). Teachers in Central Tapanuli NU's Madrassa and School has a very important role in improving the spiritual and religious mental which exist on students personality.
5. The last element but it is definitely the most important element is that the students themselves. Students who are in Central Tapanuli NU's Madrassa and School who already have a learning culture, the availability of adequate facilities, community environment that supports the development of IRE, and teachers who have personal competence, pedagogical, social, and professional who is able to educate learners in creativity and their daily lives, then they will be able to follow the learning process of IRE in a dynamic system with various procedures therein are used in assimilate, internalize, use, and create Active, Creative, Effective, and Fun Learning. Therefore, the system as a whole can be called a system of interactive social process. Figure 1 shows an interactive social learning process management and the relationship between the four elements.



**Figure 1. Interactive Social Learning Process Management**

<sup>8</sup> *Fardlu Kifayah* = the worship that was obligated upon all of the Muslim in one area, but if the worship had been done although just by a part of Muslim in there, so all of the Muslim in that area are freed from the obligation.

Problems of Islamic Religious Education in Central Tapanuli Nahdlatul Ulama Environment as follows:

*First*, in many NU's Central Tapanuli Schools / Madrasahs, Islamic Religious Education in that the material consists of religious knowledge such as monotheism / Aqeedah, Fiqh, Qur'an, worship, and morals are still not truly aim to produce students who have religiousity spirit that have been seen from their strong faith, compliance in conducting worship, noble moral, high social concern, and likes to read the Qur'an. This religious attitude then became the basis for a variety of activities in the social, economic, cultural, etc. Here, as well as (Irawan, 1996) described, Islamic education shifted into teaching, so that religion is only a matter of reading, memorization, and not become deeds and personality. This religious attitudes that contains the vulnerability and weakness in the face of challenges in the field of culture such as Western culture which secular patterned and hedonistic.

*Second*, the absence of a clear policy from the policy makers in Islamic Religious Education, in this case of Central Tapanuli Nahdlatul Ulama Maarif Education Board, especially about the religious education learning management in their environment. *Third*, they still lack the necessary facility and infrastructure to conduct Islamic Religious Education, as a result of Central Tapanuli Regency Government policy that has not supported yet to the implementation of religious education.

## CONCLUSION:

Based on the discussion above, it can be inferred as follows:

Nahdlatul Ulama Branch Executive Central Tapanuli Policy in the development of Islamic Religious Education which includes:

- a. Recruitment of teachers who master a variety of IRE perspectives and learning strategies in NU's madrasah and school.
- b. Placement of learners as a seeker of knowledge and forming the subject itself, through the development of their whole intelligents.
- c. Development of curriculum contains the teachings of Islam and the value system of life and behavior of Islamic life through IRE models that can guide the choice, decision, and the development of learners life.
- d. Developing the ability of learners to understand, appreciate and practice the religion values that harmonize mastery in science, technology, and art.
- e. IRE learning management application to its components that integrate with each other, to work cooperatively with each other and influence each other in order to realize the generations of faith and piety.

*Mabadi Khaira Ummah* Movement was directed toward internal Central Tapanuli NU consolidation which priority to two aspects, namely: organization governance development and socioeconomic forces development. Nahdlatul Ulama Central Tapanuli introduce finding innovative in Islamic Religious Education learning management, namely the process management of interactive social learning which is the learning process management of the Islamic Religious Education in Central Tapanuli NU's Madrasah and School which includes a dynamic system with the learning culture in it, the availability of adequate facilities, community environment as a social environment system as well as a laboratory of Islamic Religious Education, and the teachers are professionals with various procedures therein are used in assimilate, internalize, use, and create Active, Creative, Effective, and Fun Learning to achieve the goal of Islamic Religious Education effectively.

The role of Central Tapanuli Nahdlatul Ulama Maarif Education Board in the development of Islamic Religious Education which includes:

- a. NU's school / madrasah makes Mabadi Khaira Ummah, namely mutual cooperation, and *istiqamah*<sup>9</sup>, and willing to work hard, upholding the values of work charity and achievements as part of the worship of God.
- b. The increase in religious awareness through formal education that not only emphasizes the cognitive aspect but also with affective and psychomotor aspects.
- c. Establishment of NU's madrasahs and schools and IRE development therein are directed to build strong character and to generate qualified cadres.

The application of the character education model in Central Tapanuli NU's madrasahs and schools stressed: (1) Parenting foster internal motivation to be a personal competitive and tough, (2) Guidance science, (3) Development of skills to grow and develop the entrepreneurial spirit and self-reliance, (4) the award for fostering excellent character.

<sup>9</sup> *istiqamah* = consistent

The supporting factors that facilitate Nahdlatul Ulama Branch Executive Central Tapanuli role in the development of IRE, namely:

- a. Attendance figures of Islam in Central Tapanuli Nahdliyin among the educated who are concerned with the development of IRE.
- b. Sufficient number of formal institutions personnels 2015-2018 period which oversees religious, social, and education are among Nahdliyin in Central Tapanuli.
- c. The awarding of the appreciation of Islamic Education by the Ministry of Religious Affairs has also increased the motivation of all elements within the community academic madrassa in Central Tapanuli to excel.
- d. Central Tapanuli Regency Government Support through *Tilawatil Musabaqah*<sup>10</sup> Qur'an and Arts Festival *Nasyid*.

Obstacles have been encountered by Central Tapanuli Nahdlatul Ulama Branch Executive and Central Tapanuli Nahdlatul Ulama Maarif Education Board in the Development of Islamic Religious Education include:

- a. Lack of awareness of parents towards Islamic Religious Education for children.
- b. The majority of parents prefer public education rather than Islamic Religious Education.
- c. Less in accessibility to the agencies that related to Islamic Religious Education for the community.
- d. The lack of infrastructures and facilities as well as the persistence of the buildings that are already inadequate.
- e. How to provide the qualified of Human Resource and Non Human Resources at the same time that can complement each other so that the quality of education in Central Tapanuli NU's Madrassa or School can be achieved.

#### **SUGGESTION:**

Based on the field findings was suggested to the various parties in the development of Islamic Religious Education in Central Tapanuli as follows:

1. For the Nahdlatul Ulama
  - a) Central Tapanuli Nahdlatul Ulama Branch Executive can reaffirm the position of the field of education to be a priority NU program.
  - b) Central Tapanuli Nahdlatul Ulama Branch Executive can improve the ability of NU's madrassas and schools Principals in the development of Islamic Religious Education.
  - c) Central Tapanuli Nahdlatul Ulama Branch Executive can improve Muslim personality development through the development of IRE.
  - d) Central Tapanuli Nahdlatul Ulama Branch Executive can improve public education in Central Tapanuli about policies, programs, budgets, systems approach, and monitoring in the development of Islamic Religious Education made by Central Tapanuli Nahdlatul Ulama Branch Executive.
  - e) Central Tapanuli Nahdlatul Ulama Maarif Education Board can apply the achievement contract for NU's madrassas and schools Principals in their environment, so there is a performance standard setting for that madrassa / school principals.
  - f) Nahdlatul Ulama Grand Executive (PBNU) establish and implement the concept of the development of Islamic Religious Education related to the paradigm changing in their educational institutions.

#### **For Government:**

- a) Ministry of Religious Affairs of the Republic of Indonesia, particularly the Directorate of Education On Madrassa can increase the procurement of facilities and infrastructure, textbooks, adequate library, equipment, and instructional media.
- b) Ministry of Religious Affairs Regional Office of North Sumatra Province through their Department Head of Madrassa and Islamic Religious Education can improve the implementation of training to improve the professionalism of IRE teachers.

#### **For the Community:**

- a) To improve the knowledge of the religious idea of Aswaja NU's education as a religious faith in the social struggle according better social conditions in Central Tapanuli.

<sup>10</sup> *Tilawatil Musabaqah* = Reading and Comprehension Festival

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**THE TEACHING OF ENGLISH FOR ACADEMIC PURPOSES  
IN NIGERIAN UNIVERSITIES AN APPRAISAL OF  
COMMUNICATION IN ENGLISH PROGRAMME IN  
THE NATIONAL UNIVERSITIES COMMISSION (NUC)  
NEW BENCHMARK MINIMUM ACADEMIC  
STANDARD 2014 DRAFT**

*Emmanuel C. Sharndama, PhD*

Faculty of Humanities,  
Management and Social Sciences  
Federal University, Wukari, Nigeria

*Mrs. Blessing Ijem,*

Department of English and Literary Studies  
Federal University, Wukari, Nigeria

**ABSTRACT**

*This paper appraises the content of Communication in English Curriculum in Nigerian Universities. English for Academic Purposes is taught in tertiary academic settings world-wide. It is, however, known by varieties of labels such as freshman's composition or writing within Disciplines in America, and communication skills in Ghana. In Nigeria, it is called the use of English, or communication skills, and communication in English in the draft of the NUC new bench mark. The result of the appraisal carried out revealed that the branch of EAP taught in Nigerian universities is English for General Academic Purposes(EGAP) This branch of EAP caters for the general linguistic needs of the students rather the needs of students of a particular discipline as in English for Specific Academic Purposes(ESAP). In addition, the syllabus is not based on formal needs analysis of the learners but on the informal which is highly subjective. This study recommends the integration of discipline specific tasks into EGAP contexts in order to meet both the general and specific English language needs of students in Nigerian universities.*

**Keywords:** English, Teaching, ESP, EAP, EGAP and ESAP.

## **INTRODUCTION:**

English language today is the medium of instruction in institutions of learning in many countries of the world especially in the UK, USA and the former British colonies. The demand for English language has resulted to the emergence of different approaches to its teaching. The communicative approach to teaching English language particularly brought a shift from the teaching of English as a subject to English as means of communication. The contents of English Language curriculum in tertiary institutions of learning in many countries have witnessed a dramatic change of focus. One of the obvious changes of focus is from the teaching of English as an abstract system, which is from the teaching of grammatical structures and language skills to the teaching of learners' communication needs. The advent of information and communication technologies which has shrunk the world to a global village with English language playing the principal role has also led to more demands for English language across the globe. It has especially, accelerated the spread of the teaching-learning of English for specific purposes of which EAP is a strand to many countries of the world. The teaching of English for specific purposes (ESP) which began after the Second World War in 1945 in order to meet the demands of the Brave New World has diverse branches today (Hutchinson & Water, 1987). This was illustrated by Hutchinson's and Waters' ELT tree as including English for Specific Purposes( ESP),English for Science and Technology (EST), English for Occupational Purposes(EOP),English for Business purposes(EBP), English for Academic Purposes (EAP) English for Medical Purposes (EMP) etc.

According to (Mark & Nathaniel, 2014), English for Academic Purposes occupies a central role in English-medium universities and universities across the globe. They further asserts that the growth of EAP is derived from the awareness of ESP practitioners that tertiary level students possess different learning needs which cannot be met by teaching them the same type of English language. (Mark & Nathaniel, 2014) also identify two branches of ESP as English for Academic Purposes and English for Occupational Purposes. EAP which is the focus of this paper has two divisions, English for General Academic Purposes (EGAP) and English for Specific Academic Purposes (ESAP). EGAP focuses on general communicative needs of students in formal education settings irrespective of disciplines. ESAP on the other hand focuses on discipline specific communicative needs of the students for such as English for legal purposes, English for engineering purposes, English for Agricultural purposes, English for business purposes, English for Economics purposes among others.

EAP in Nigeria is known by different labels such as 'the use of English, Communication skills and recently in the draft of the new NUC benchmark as 'communication in English.' Irrespective of nomenclature, EAP aims to improve the students' proficiency in English language in order to study and conduct research in English effectively. Proficiency refers to the ability to speak and write English effectively; interact effectively with English texts and explain scientific or technical concepts. EAP in Nigerian universities is presently known as communication in English (NUC NEW BENCH MARK 2014). It is a four unit course taken by the first year students of Nigerian universities in the first and second semester respectively. It is designed to improve the students' proficiency in English language having been exposed to English right from kindergarten to secondary school level.

## **MATERIALS AND METHOD:**

The study was based on secondary data. The new NUC Bench Mark Minimum Academic Standard 2014 was obtained from the internet. Qualitative approach was adopted to scrutinize the contents of Communication in English Programme designed for the first year students of Nigerian universities. The contents were scrutinized to ascertain whether the programme is English for General Purposes or English for Specific Academic Purposes. In order to support claims in the discussions, detailed review of some ESP and EAP concepts deemed relevant to the study were carried out. Conclusion and recommendations were final drawn from the outcome of the review secondary data and the appraisal of the programme.

## **OBJECTIVES OF THE STUDY:**

The study appraises the NUC New Benchmarks Minimum of Academic Standard 2014 draft. The following objectives were formulated to guide the researcher:

- (i) To review basic concepts in ESP and EAP deemed Relevant to the topic of study.
- (ii) To scrutinize the contents of the Communication in English Programme in the New NUC Bench Mark Minimum Academic Standard, 2014 draft.
- (iii) Draw Conclusion as to whether the Programme is EGAP OR ESAP oriented and make recommendations.

## **A BRIEF OVERVIEW OF THE HISTORY AND DEFINITION OF EAP:**

The history of English for Academic Purposes is inseparable from the history of English for Specific Purposes which emerged immediately at the end of the Second World War in 1945 based on three reasons: They are demands of the Brave New World (expansion of science, technology and economic), a revolution in linguistics, (placed new emphasis on language in the real world, a shift from traditional teaching of English language as an abstract system using audio-lingual approach to communicative approach), and a new focus on learners (studies in psychology placed emphasis on the learners and their attitudes such led to the recognition of the learners' needs and interests).

Hutchinson and Waters (1987) identify EAP and EOP as two branches of EAP but pointed out that there is no clear cut distinction between them. They observed that people can work and study simultaneously and it is likely also that in many cases, the language learnt for immediate use in a study environment will be used later when the student takes up, or returns to work. The history of EAP is traced to the English language demands in the 1950s and 1960s. (Hamp-Lyons, 2001), for examples, asserts that in the 1950s and 1960s, Britain began to receive increasing numbers of international students funded by the British Council as part of the government policy of aid to developing countries. At the same time, Britain was responding to the rapid growth in many countries of English as a common language for business and science, and there was an explosion of need for English teachers to deliver language teaching at fairly low levels. ESP seemed to be the answer in the second context, while EAP seemed as the answer for the minority of these language learners who progressed to study in Britain. On the distinction between ESP and EAP, (Strevens, 1977) concludes that given the parallel history and close relationship between ESP and EAP, it is not surprising that for many years, EAP was seen by many as a sub-set of ESP. Issues of audience—or customers—may have seemed the only reason for differentiating ESP and EAP early on, but as time went by other explanations for different trajectories emerged.

EAP is an approach to the teaching of English language with the specific aim of assisting learners to study in higher/tertiary institutions effectively. This approach to English language teaching varies according to Geographical domain or situations. (Flowerdew & Peacock, 2001) presented four geographical domains which exhibits different characteristics and purposes of EAP.

- (i) It is practiced in the major English speaking countries(UK, USA, Australia, Canada, New Zealand) where large number of oversea students, whose first language is not English come to study.
- (ii) It is conducted in former British colonies (and less importantly the United States) where English is second language and is used as the medium of instruction at the university level.
- (iii) It is conducted in countries which has no historic links with English but which needs to access research literature in English (the countries of Western Europe, Japan, China, Latin America, Francophone Africa and others)
- (iv) It is now increasingly being offered in the countries of former soviet bloc as they seek to distance themselves from the influence of Russia and its language and position themselves as participants in the increasingly global economy and academic community

In situations i & ii above, EAP programme is designed to improve the learners' proficiency in English, while in iii & iv, it is designed to prepared the students to study in English.

The development of EAP as an approach to language teaching in Academic setting is associated with developments in applied linguistics which took place in Great Britain. (Flowerdew & Peacock, 2001) point out that at the time English was trying to establish itself as a World Language in newly independent countries of Africa and Asia, following pioneer work by Firth, British linguists (most notably Halliday) began to view language and language teaching in a new way. In contrast to theoretical linguists who traditionally saw as an abstract system, these applied linguists started to consider it as a resource for communication, a resource which varied in its application according to the context or situation in which it was produced. This new approach to language teaching which brought revolution in linguistics was based on the notion that language varies according to situation of which the distinctive features can be identified and made the bases of a syllabus. The revolution in linguistics resulted to a new development in applied linguistics that had its roots from the works of (Halliday, McIntosh, & Strevens, 1964). The point stressed here according to Pilar (1998/1999) is that language varies in relation to people who speak it and is in relation to the different purposes to which it is put. They considered language as a resource for communication, a resource which varied in application according to the context or situation in which it was produced. This was in contrast with the traditional approach which considered language as an abstract system. The approach was based on audio-lingual approach which was popular in the 1960 but could not prepare learners to communicate in a situation they find themselves.

The shift away introduced new approach to language teaching based on the descriptions of the language as used

in the context of situation. The rationale was set out in a seminal publication by (Halliday, McIntosh, & Strevens, 1964) entitled “*The Linguistic Sciences and Language Teaching*”. The concept of register analysis concentrated on the description of language varieties used in particular discipline or occupations based on statistical differences in lexis and syntax.

(Zohoorian, 2015) opines that English for Academic Purposes is a subdivision of ESP which is often associated with text analysis from various disciplines. The texts analyzed are either drawn from existing texts on a discipline or developed by the EAP practitioner in collaboration with expert in the discipline. The texts are either selected or developed based on the identified language needs of the students. EAP programme is designed to assist students to prepare for study in English or to pursue academic goals in higher institutions of learning. It is an approach to the teaching of English language based the students’ needs of it for pursuing academic objectives. All the contents, methods, materials and tasks are based on the results of needs assessment conducted by a practitioner or specialist on the field.

(Hamp-Lyons, 2001) describes EAP as a research field as well as an area of English language teaching. HE asserts that there is a significant body of research into its effective approaches, methods of analysis of the academic language needs of students, and analysis of the linguistic and discourse structures of academic texts. The language structure (syntax), vocabulary, and language skills that the students learn, are all based on the academic content of a specific discipline such as law, Business, political sciences, Economics etc. (Brown, 2001) cited in Jouybar (2013) defines EAP as a term broadly applied to any course, module, or workshop where learners are taught to deal with academically related language and subject matter. He asserts that EAP is common at the advanced level of pre-academic programs as well as in other institutional settings. This definition considers EAP as an approach to language teaching that is prompted by the desire to assist the students of tertiary institutions to acquire English language competency. It can be at the initial stage to prepare them for their studies in English especially students from non-English countries that want to study in English. It could be geared towards building upon the general English of students from English speaking countries or ELS countries.

English for Academic Purposes as the name implies is defined from academic perspective. It is an English Language teaching programme designed to improve the learners’ proficiency in English language in order to enable him/her to study effectively. (Jordan, 1997) describes EAP as the teaching of English language with the aim of facilitating the learner’s study or research in that language. In a more elaborate definition, (Hyland, 2002) refers to EAP as a programme designed to focus instruction on the cognitive, social, and linguistic demands of specific academic disciplines. This takes practitioners beyond preparing learners for study in English to developing new kinds of programme that will equip the students with the appropriate communicative skills to participate in particular academic and cultural context.

EAP as could be drawn from the diverse views on its history and definitions is an approach to the teaching of English Language that is determined by the linguistic needs of students studying in academic institutions. The teaching programme is designed to assist the students to study and conduct research effectively in English Language. The demand for EAP in academic settings is based on linguistic need of the students and the institutional or sponsor’s needs. As pointed out earlier, the linguistic needs of students from non-English speaking countries studying in English speaking countries differs from that of students who are native speakers of English or who speaks English as a second language. Those from non-English Speaking Countries studying in English speaking countries needs pre-study English. It is usually one year programmed designed to equip them with rudimentary communication skills to enable them interact with English Prints effectively. Those from English speaking countries may need discipline specific English to enable them study and conduct research on the discipline. It is practiced in the major English speaking countries (UK, USA, Australia, Canada, New Zealand) where large number of overseas students, whose first language is not English come to study. Examples are students from countries that have no historical link with English but which needs to access research literature in English (the countries of Western Europe, Japan, China, Latin America, Francophone Africa and others (Flowerdew & Peacock, 2001).

### **STRANDS OF EAP:**

EAP is an approach to English language teaching designed to meet language needs of learners in academic setting. It is a branch of ESP which is a more approach that focuses on language teaching to meet the English Language needs of learners in any field of study or professional setting. EAP has two immediate division based on the level of specificity-English for General Academic Purposes and English for Specific Academic Purposes. On the level of specificity, (Flowerdew, 2016) relates that there is a long- standing debate within the field of EAP concerning the degree of specificity that should be the target of endeavor. He asserts that proponents of

English for General Academic Purposes(EGAP) argue for a broader–brush or wider angle approach, seeking to prepare students who have English as an additional language(EAL) in a general way for their academic studies, whatever, their field of study. Advocators of ESAP, in contrast promote more specific, or narrow angle, approach, taking into the particular disciplines that their students will be studying and preparing them with the specific language and skills needed in those disciplines.

(Dudley-Evans & St. John, 1998) point out that the EGAP presupposes that there are general skills and forms of language that are shared or common across disciplines. This entails that EGAP curriculum focused towards effective communication in specific discipline or professional setting. EGAP according to (Jordan, 1997) consists of “ a large proportion of the common core element usually known as ‘*Study skill plus other elements of a general academic English register, incorporating a formal, academic style, with proficiency in the language use*” He adds that these skills include areas such as effective lecture listening comprehension and note-taking, writing in the appropriate academic register, reading effectively for study purposes ,participation in discussion and library research. EGAP as Jordan further points out is not a subject –specific type of English and its objective is to equip learners with the necessary skills to complete tasks in a general academic setting.

English for Specific Academic Purposes focuses on local or specific needs of students a particular academic programme. In this case, the content and the materials are discipline-specific. (Sabariah & Rafik-Galea, 2005) opine- that the differences between the EGAP and ESAP lies in the level of specificity and the assumption made about them. They further explain that, in EGAP, student’s performance, whether good or bad, is not dependent on the topics(s) related to his/her discipline, while in ESAP, student’s performance will be different depending on the nature of the topic(s) included in the course. Similarly, (Dudley-Evans & St. John, 1998) are of the view that ESAP courses focus on the actual task that the students have to carry out, while EGAP courses select more general contexts. (Blue, 1988) makes a very clear distinction by referring to EGAP as English language teaching programme which deals with the language and practices common to all EAP students, whereas, ESAP is concerned with the specific needs of the students in particular discipline.

EGAP and ESAP are two distinctive approaches to the teaching of EAP. Whichever is focused depends on the situation and the needs of the learners. There are some situations in which EGAP fits better, while there are some in which ESAP Fits better. Lyanage & Birch (2001) for example note that because of the variety of academic backgrounds of the students entering these courses, classes take the form of English General Academic Purposes (EGAP), which mostly comprise study-skill based approaches. They also point out that it is often difficult to relate such EGAP content to students’ academic disciplines or to address their academic needs in the classes which contain students from a range of academic background. In order to address this problem, discipline specific tasks were integrated into an EGAP context and the effects evaluated.

English for General Academic Purposes as the name implies is based on national situations rather than discipline specific. In Nigerian situation, English is an official language and language of instruction in schools (National policy on Education). The need for English at tertiary level is not to prepare students to study in English or to study particular discipline but to improve the students’ proficiency (the ability to speak and write English effectively). The course content is normally geared towards enhancing proficiency in the use of English language. In Nigeria, EAP is labeled the use of English and Communication Skills (current curriculum) and communication in English in the 2014 draft of the NUC Bench Mark Minimum Academic Standard). The course content is geared towards enhancing proficiency in both spoken and written English. Language skills and elementary grammar that enhances effective communication constitute the course content. EGAP courses are designed based on general assumptions of the needs of the students. ESAP courses on the other hand are designed based the needs assessment of students of a specific discipline. The program of study is usually designed in collaboration with specialist in the discipline. The aim is to assist interact with the texts on their discipline and carry out required tasks effectively.

#### **AN APPRAISAL OF EAP SITUATIONS IN NIGERIA:**

Nigeria was one of the British colonies in West Africa. It is a plain fact that one of the legacies inherited from British colonial masters in the country is English language. The English Language which was entrenched in the Richard’s constitution of 1945 as official language maintains its status till today. This is because the country has no active and adequate language policy. The sketch of language policy in the National Policy on Education (NPE) and the 1979 constitution as amended in 2011 did not favour the indigenous languages of Nigeria. Though the policy statement specifies Hausa, Igbo and Yoruba or language of the immediate community as language of instruction at the initial levels in primary schools, it has never been made practicable. English is used as a medium of instruction in the country from the kindergarten to the university levels. Nigerian students

are exposed to English as a subject and medium of instruction from primary school to tertiary levels (National Policy on Education, 1981/2011). It is also one of the two basic requirements (English and Mathematics) for admission into Nigerian universities irrespective of programme of studies.

The designing and teaching of EAP courses in tertiary institutions of the world are based on the linguistic situations or language policy of a country. (Dudley-Evans & St. John, 1998) outline four types of EAP situations at the tertiary level: (1) An English Speaking country such as UK or USA; (2) An ESL situation, such as in former British colonies in Africa or in South East Asia; (3) A situation where certain subjects are taught in English and the remaining in the national language; (4) A situation in which all subjects are taught in the national language and English plays an ancillary role. These situations are synonymous with what (Flowerdew & Peacock, 2001) describe as domain.

English for Academic purposes is offered in almost all English medium tertiary institutions of the world especially in the universities. (Afful, 2007) points out that EAP is literally located in English-medium universities worldwide with different labels. He says 'it is Freshman Composition or General Composition and lately a variant called writing in the discipline USA, while in the UK and Canada, it is usually referred to as English for Academic Purposes. He also notes that universities in Africa generally use labels such as communicative skills, communication skills, or the use of English, while many universities in India use the label communication Skills. At present, it is labeled use of English and communications in Nigeria. The NUC 2014 draft which is the focus of this study is labeled communication in English.

The EAP in Nigeria is geared towards enhancing effective communication rather than preparing students for a study in English as in the case of students from non-English speaking countries studying English medium universities. The emphasis, therefore, is on improving the students' proficiency in English by building upon the English for General purposes taught to them at primary and secondary school levels. In other words, the aim is to equip the students with macro language skills to function effectively in English during their study period and later on the job. The English language taught at the primary and secondary school levels is called English for General Purposes. It is often referred to as TENOR (teaching English for no obvious reason). The content and materials are geared towards passing school examinations and social purposes such as communicative situations. According to (Jordan, 1997), the purpose of such courses are not specific pointed out that the question of specificity generated heated among scholars on the Field of EAP.

(Flowerdew, 2016) points out that there is a long-standing debate within the field of EAP concerning the degree of specificity that should be the target of the endeavor. He is of the view that Proponents of English for General Academic Purposes (EGAP) argue for a broad-brush or wide-angle approach, seeking to prepare students who have English as an additional language (EAL) in a general way for their academic studies, whatever their field of study. Advocates of ESAP, in contrast, promote a more specific, or narrow angle, approach, taking into account the particular disciplines that their students will be studying in the future or are already studying and preparing them with the specific language and skills needed in those disciplines.

The adoption of either of the two strands depends on the linguistic situations of the place of study. (Flowerdew, 2016) observes that there may be conditions where ESAP is not suitable and EGAP is the preferred alternative. This might be the case where there are no enough students in any single discipline or field of studies to make ESAP feasible from a resources point of view. It might also be the case that EGAP is to be preferred because the teachers involved are not adequately prepared or willing or able to put in the extra time necessary to target specific disciplines, or there may be problems of access to the relevant content courses. Nigerian situation at present cannot guarantee the use of ESAP. Many teachers of English particularly at the grassroots (primary and secondary school levels) do not have the knowledge of ESAP as an approach to English Language teaching. The teachers are trained in teaching EGAP which does not aim at discipline or occupational specific communication but proficiency in the use of English in general. The diverse academic, linguistic and cultural background of students entering Nigerian universities also constitutes serious problem meeting their needs.

By linguistic background or situations, Nigerian students only need additional English since it is taught in Nigeria as a second language. The English that they need for study at the university level is to complement their competence in the English they learnt at the primary and secondary school levels. The availability of teachers and resources and their cost implications do not guarantee the adoption ESAP at present. Implementing the teaching of ESAP in Nigerian universities requires training of EAP specialists. It also requires development of materials based on the language needs of the students of specific disciplines. These are some of the major factors militating against the teaching of English for specific Academic Purposes in Nigeria.

## THE COURSE CONTENTS OF THE COMMUNICATION IN ENGLISH COURSES:

Communication in English as labeled in the 2014 NUC new benchmark is four credit units spread over two semesters in the first year of study and it is coded GST 111&122) and titled communication in English 1 &2 respectively. They are core courses -they are basic requirements for the award of degrees in Nigerian universities. The primary objective of teaching communication in English in Nigerian universities is to equip the students-with both spoken and written communication skills that would enable them to interact with academic discourse successfully and function effectively when the job after graduation. English language plays two major roles in Nigeria. It is the official language of the country and language of instruction. It is taught as compulsory subject at the primary, secondary schools and the first year in universities. The idea is to help students to acquire proficiency in the language, that is, the ability to listen and comprehend spoken discourse as in lectures, speak and write good English with minimal grammatical and spelling errors, and generally function effectively in English during studies and while on the job after graduation. In order to achieve the above objective, the National Universities Commission (NUC) innovate the course to equip students with the required communication skills in order function effectively in both spoken and written English. The following are the course structures as provided in the NUC bench mark of 2014.

**GST 111:** Communication in English 1(2unit:LH 30)

Effective communication and writing in English, Language skills, Writing of essay answers, Comprehension, Sentence construction, Outlines and paragraphs, Collection and organization of materials and logical presentation, Punctuation(NUC Bench Mark Minimum Academic Standard, Draft 2014)

**GST 122:** Communication in English II (2 Units: LH 30)

Logical presentation of papers, Phonetics, Instruction on lexis, Art of public speaking and oral communication, Figures of speech, Précis, Report writing( NUC Bench Mark Minimum Academic Standard Draft, 2014)

The content of GST 111 as presented above is intended to improve the students' communication skills. The four language skills expose the students to the fundamentals of effective communication in both the spoken and written English. Aside the language skills, elementary syntax (sentence construction) and writing techniques form another level of exposure geared towards enhancing the students' proficiency in English. The objective stated in the NUC bench marks is reflected in 'f' of the General Studies' objectives (Production of graduates capable of communicating effectively (both oral and written). The emphasis as could be inferred from the objective is on effective communication which is the major focus in the teaching of EGAP. According to Liyanage & Birch (2016) EGAP comprise study skills and based on approach which does not cater for specific language needs of the students. The contents of the programme as spread over two semesters are:

**GST 111:** Communication in English 1

Effective communication and writing in English, Language skills, writing of essay answers, comprehension, and Sentence construction, outlines and paragraphs, collection and organizing of materials, logical presentation and punctuation.

Listening skills: listening skills are taught in order to enable the students to distinguish between the main or essential ideas from what a lecturer says. This requires the students to pay attention to the lecturer and apply different listening skills or strategies such as listening for gist of a story or for main ideas as in taking lecture notes.

Speaking skill: Speaking is a primary and practical exercise in the process of teaching and learning. Speaking and writing are two ways of putting linguistic competence (knowledge of a language that one has) into performance (the actual use of language in context). To improve students' speaking skills, oral drills and speech making exercises are very important.

Reading skills: Academic success depends to a large extent on a student's ability to read and interpret texts or materials on their course or field of study. Students are exposed to elementary reading skills and exercises such as skimming, scanning, questioning, modeling, and blank filling, sequencing and reading aloud, silent reading, matching, summarizing, dictionary skills etc. it is expected on mastering the essential reading skills and going through the tasks, the students ability to comprehend and retrieve required information from the print will be improved.

Writing: Writing is an everyday task in the life of university students. Students engage in varieties of writing tasks such as taking notes, dictations, class exercises, compositions, examination among others. The ability to relate ideas or thoughts and present them through visual or graphic symbols is essential for achieving academic success.

**GST 122:** Communication in English II.

The course is focused on the more practical communication skills in English which include: Logical presentation of papers, phonetics, instruction on lexis, art of public speaking and oral communication, figures of speech,précis and report writing. To prepare the students for the exercise, they are exposed to

phonetics of English to enable them have mastery of the sounds of English with the hope that their spoken English will be improved. In addition, the students are exposed to lexis associated different fields or disciplines technically referred to as register. This is also with the hope of improving the students' spoken and written English. More practical aspects of the programme are logical presentation of papers, the art of public speaking, the application of figurative expressions in speech, précis, and report writings.

Communication in English Programme in the new NUC Benchmark Minimum Standard as the appraisal revealed is clearly EGAP oriented. It is not geared towards achieving proficiency in specific discipline but towards language skills common to all EAP students. Scholars on the field of EAP have had heated debates over the benefit of either EGAP or ESAP Syllabus since the early days of EAP (Manning, 2011). (Bethlendy, 2012), similarly notes that the views of researchers in favour of EGAP or ESAP differ considerably in their evaluation of good practice using these groups' expertise in EAP teaching. According to her, (Spack, 1988) expresses doubts that EAP teachers can, or should master the teaching of subject specific features of authentic texts; she argues that these should be taught by subject tutors and consequently calls for an EGAP approach. Bethlendy also points out that Hyland (2006) on his part claims that most subject specialists have neither expertise nor the desire to do so. Rarely do lecturers have a clear understanding of the role that language plays in their discipline or the time to develop this understanding in their students. He thus strongly supports ESAP approach. In contrast, a decade later, Tony Dudley-Evans and Maggie Jo St. John maintained that English for Specific Academic Purposes (ESAP) was of crucial importance in order to address the students local needs. Looking at Nigerian context with students of diverse cultural background, and different local needs, EGAP seems to remain.

(Jordan, 1997) argues that promoters of EGAP would claim that the skills needed to read academic textbooks, articles and other relevant material effectively are common to all academic disciplines. As such, students regardless of their chosen subjects will need practice in skills such as predication, skimming, scanning, distinguishing between factual and non-factual information, important and less important items, and between ideas. (Jordan, 1997) also says that those in favour of ESAP, however, are likely to suggest that subject-specific courses, working with relevant texts, provide a much better source of motivation for students. But he asserts that this is not necessarily the case, a high degree of familiarity with a topic is likely to result in boredom, whereas the exact opposite is likely to prove to be difficult and, as such, demotivating for students.

Looking at different academic, linguistic and cultural diversity of the students in studying Nigerian Universities, EGAP approach seems to be the most appropriate. In order to meet the specific needs of the students. (Liyanage & Birch, 2001) clarify that is not easy to address the academic needs of students in classes containing students from a range of academic background. Considering the problems posed the diverse academic background of students and the need for discipline specific or professional skills, discipline specific tasks as suggested by (Liyanage & Birch, 2001) can be integrated into EGAP contexts.

## **CONCLUSION:**

EAP which was formerly labeled 'Use of English and Communication skills' in Nigerian universities is now labeled 'communication in English' in the 2014 draft of the UNC New bench Mark Minimum Academic Standard. It is a four unit course taught in the first and second semester respectively. English Language is the official language of the country and by extension, the language of instruction from Kindergarten to university or tertiary levels in general. This means that Nigerian students in tertiary institutions or outside the country do not need pre-study English like their counterparts from non-English speaking countries studying in English Medium Universities. English for General Academic Purposes is the type of EAP that is currently taught in Nigerian universities and other tertiary institutions. The curriculum is not discipline-specific because it does not cater for the linguistic needs of the students based on their programme of studies. In other words, it does not cater for the needs of the students of particular discipline such as Mathematics, Biology, Chemistry, computer science, law etc. but on proficiency in general (production of graduates capable of communicating effectively in both oral and written English. The emphasis of the programme is on achieving effective communication in order to enable the students to interact effectively in academic setting and with the texts (print) while on study and on the job after graduation.

## RECOMMENDATION:

This study recommends that EGAP approach be maintained but tutors should endeavor to integrate discipline specific tasks into EGAP contexts. This will enable the tutors to meet both the general and specific academic needs of the students. This entails that stake holders of the National Universities Commission (NUC) should encourage blending of the two approaches to meet both the general proficiency in English and in specific professional settings such as legal or medical fields.

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## THE PERSONS PRONOUNS OF USING LANGUAGE AND ITS USE IN BANYUWANGI SPEECH COMMUNITY

*Imam Suyitno,*

Faculty of Letters,  
Department of Letters,  
State University of Malang, Indonesia.

### ABSTRACT

*This article describes the persons pronouns of Using language that used by Banyuwangi people, especially Using community, in social interaction among them. The description explains the various forms of persons pronouns and its use in the natural speech context of Using community. The subject of research is Using people who are doing spoken activities in the Using language. The research data in the form of Using language speech in which includes the varieties and its use of first person pronouns, second person pronouns, and third person pronouns. From the data analysis, it was found that the persons pronouns in Using language have various forms. The diversity of the forms caused by the demands of speech grammatical context. The forms of pronoun used for the difference purposes according to the surrounding speech context. The diversity of the use of persons pronouns shape depends on the age of speech participants, the closeness of relationship of speech participants, the social status of speech participants, and the speech situation. The findings of this study have important functions as a reference material for Using language research and Using language teaching as local subject mater.*

**Keywords:** persons pronouns, Using language, social interaction, speech community.

## INTRODUCTION:

Banyuwangi is one of the cities that is geographically located at the easternmost tip of Java Island in Indonesia. In the area, live a community that calls themselves as the original tribe of Banyuwangi. The community is called the *Using* ethnic or some of people mention *Osing* ethnic. The *Using* ethnic has and applies *Using* language and *Using* culture in daily life. *Using* people preserves the tradition of *Using* culture from generation to generation.

Based on the above description, can be said that *Using* society is a society that has *Using* language and use it in social interaction. *Using* community applies *Using* language in an effort to maintain and develop their culture. Therefore, *Using* language becomes instrumental in preservation and development of *Using* culture. In this case, *Using* language is one of the strengtheners of social relation within the *Using* community. In line with the views said by (Poespoprodjo, 1987, p. 114), it can be said that the presence of and preservation of *Using* society requires the presence of *Using* language.

In conducting their interaction, the *Using* people are bound by common rules to generate and interpret speech and rules for interpreting a wide variety of language (Hymes, 1972, p. 54). Thus, the language community in speaking bound and restrained by social norms because the language is a system of social institutions (Moeliono A. M., 1985, p. 181). Therefore, according to a statement from (Suwito, 1992), it can be said that in speaking, *Using* society must respect, calculate, consider, and apply the norms, values, and social factors conveyed in the *Using* language and *Using* culture.

*Using* language in Banyuwangi is not the dominant language used in public communication. Based on research findings conducted by (Subhan, 1987), the majority of *Using* speakers is only in 10 districts of 24 districts in Banyuwangi, i.e. the Districts of Banyuwangi City, Giri, Glagah, Kabat, Songgon, Rogojampi, Singojuruh, Srono, Cluring, and Genteng. Meanwhile, in some other districts, the number of speakers *Using* only minority or even no speakers of *Using* language, namely the District of Pesanggaran, Bangorejo, Purwoharjo, Tegaldelimo, Muncar, Glenmore, Kalibaru, Wongsorejo, Sempu, Kalipuro, Siliragung, Tegalsari, Licin, and Gambiran.

Department of Population and Civil Registration Banyuwangi 2015 notes that Banyuwangi has a population of 1,668,438 people. The largest population is in the district of Muncar, as many as 133 009 (7.97%) people, while the smallest population is in the district of Licin, as many as 28 238 (1.69%) people. Based on the condition of population distribution, it can be pointed out that the *Using* language is small language as native speakers of less than 1 million people (Pemerintah Kabupaten Banyuwangi, 2015).

The socio-cultural structure of Banyuwangi is classified as pluralistic society. The plurality can be seen in terms of livelihood, religion, and ethnicity that inhabited the region of Banyuwangi. Livelihoods of the most dominant of Banyuwangi people is farming, which is as much as 75.32%. Seen from ethnic communities who live in Banyuwangi, Javanese is the most dominant community. Other communities such as *Using* ethnic and Madurese are also quite dominant. Most of the Banyuwangi population are Muslim, which is as much as 1,386,633 (95.33%) people. Other than Muslim are Hindu as much as 35 958 (2.47%) people, Protestants as much as 16,503 (1.13%) people, Catholic as much as 9016 (0.62%) people, and the followers of Buddhism including Khong Hu Chu as many as 6471 (0.44%) people (Dinas Kebudayaan dan Pariwisata Kabupaten Banyuwangi, 2015).

Under the conditions of population distribution and socio-cultural structure of Banyuwangi, it is understood that the use of *Using* language in the *Using* speech community has several variants seen from the characteristic narrative style or vocabulary spoken. *Using* language variant occurs because *Using* language speakers are in several different districts, and each district has a plurality of the diverse population, both in terms of culture and languages spoken. *Using* language that is still considered original and has a consistency of *Using* culture are in the district of Giri, Glagah, and a small part of the District of Licin. Meanwhile, *Using* language in other areas has been much affected by Javanese and Madurese so that the pronunciation was different from the original *Using* language (Yuliana, Andianto, & Widjajanti, 2015).

Due to the conditions of *Using* language development, Bartoli (Bolinger, 1975, p. 335) argues that there are four area norms that affect the color of a language, namely (1) the isolation area norm, (2) the edge area norm, (3) the principle area norm, and (4) the young area norm. The first two norms which explain that if an isolated area or located on the periphery, there is a tendency that people in the region will continue to use the old languages. By contrast, the last two norms explained that if the two areas are divided into two parts, a large area will continue to use the old language, while a small part or a young region will use the language that has been developing. In connecting with the norm, it can be said that Banyuwangi is included the isolated area and the edge area. Banyuwangi, geographically, is located at the eastern end of Java. Banyuwangi to Jember region separated by mountains. Thus, it can be said that the *Using* language used by the *Using* people in the

communication still contains many old words.

Based on the above descriptions, it can be said that *Using* ethnic in Banyuwangi is not the majority population. They are communities that coexist with other ethnic communities, especially Javanese and Madurese. One of the dominant markers distinguishing the characteristics of *Using* ethnic with non-*Using* ethnic in Banyuwangi is the language used in social interaction. *Using* ethnic in social interaction with its ethnic groups applies *Using* language.

Research findings conducted by Yuliana, et.al. (2015) reports that *Using* community have two styles of languages that to one another were not interconnected, i.e. *Cara Using* 'Using styles' and *Cara Besiki* 'Besiki styles'. *Cara Using* is speaking style that is used in everyday life and does not know the style of *Ngoko-Krama* (speech styles used for differentiating a social stratification) like in Java language. *Cara Besiki* is a form of "Javanese Krama" which is regarded as the ideal form of speech. However, the use of *Cara Besiki* different with the use of the *krama* in the Javanese language. In daily speech, *Using* ethnic does not like to use *Cara Besiki* but *Cara Besiki* is only used for specific conditions that are in religious and ritual condition.

In the communication in society, *Cara Using* has differences with *Cara Jawa* 'Javanese politnes'. *Cara Using* does not recognize the use of a variety of personal pronouns that distinguish the social status of participants' speech, while the *Cara Jawa* knows a variety of personal pronouns whose use depends on the social status of participants involved in the communication. In order to understand the *Cara Using*, this article describes a variety of personal pronouns and its use in *Using* language speech in Banyuwangi community. The descriptions are intended to explain and provide an understanding of the various pronouns in the *Using* language and its use in social interaction among *Using* people. To understand the knowledge is necessary for researcher as a basis in conducting study relating to other aspects of pronoun in the *Using* language system. In addition, it is also useful for teacher in teaching a local subject matters on variants of the *Using* language and its use in communication.

## RESEARCH METHODS:

This research uses descriptive qualitative design. The subject of this study is the *Using* speech community in Banyuwangi, especially those living in the Gladag village of Rogojampi District. The *Using* society has different socioeconomic, profession, occupational backgrounds, religions, traditions, cultures, and so on. They always do social interaction or communication. This social interaction takes place in a particular social context. That is, participants are always in a social context of interaction or communication situations. This is seen as influencing patterns and forms of interaction, and the forms of language used. Thus the social factors inherent in communication situations also affect the interaction (verbal) conducted by the *Using* language community.

Some of subjects were selected and determined as informants. This informant was chosen and determined by the researcher with the following requirements, namely (1) *Using* ethnic and living in Banyuwangi, (2) normal, and (3) able to speak *Using* (well). As data sources, they are followed, observed, talked to, and interviewed by researchers to obtain research data.

The data of this research is *Using* language discourse used in speech by *Using* people, in which there is use of forms of personal pronouns. In this case, the research data is in the form of pronouns of first person, second person pronoun, and pronoun of third person with various variation of form and context of its use. In this research, there are 5 kinds of data collection techniques commonly used in sociolinguistic and ethnographic research, namely (1) participation or participation techniques, (2) observation or observation techniques, (3) interview techniques, (4) documentation study techniques, and (5) intuitive data reconstruction techniques and introspection (Kartomihardjo, 1987, pp. 27-37); (Stubbs, 1986, p. 246). In conducting research, researchers use the tools (1) guidelines for structured interview observation and (2) format or field note model. In analyzing data, the research adapts analysis models used in (1) ethnographic analysis, (2) discourse analysis, (3) interactional analysis, and or (4) phenomenological hermeneutical. After being adapted and integrated as necessary, these model is used to analyze data. Its use of models appears in the steps of data analysis, which include (1) the review and selection of data, (2) identification and data streaming, (3) categorization or data classification, and (4) interpretation and explanation of data meaning.

## THE VARIETIES OF PERSONS PRONOUNS IN USING LANGUAGE SPEECH:

Based on the terms of meaning, a pronoun is a word used to refer or replace other nouns (Moeliono A. e., 1988, p. 170). For example, in a speech said *Aminah sing gelem Menyang. Iyane njaluk disusul* 'Aminah will not go. She wants to pick up'. Viewed from the function, the pronouns *iyane* can replace the usual functions placed by the noun, ie, the function of the subject, the object, and in particular phrase is also the predicate. Another feature that is also owned by the pronoun is the reference may change as adjusted by the speaker, hearer, and things that are

spoken.

A pronoun can refer to themselves (first pronouns), refer to the addressee (second pronouns) and refer to the third person (third pronouns). Among pronouns that refer to the number of the existing one thing or one person is called the singular pronouns and there are pronouns that refer to the amount of more than one things or some people is called the plural pronouns. In connection with such statement, (van Hell, Verhoeven, Tak, & van Oosterhout, 2005) said that personal pronouns are items used to refer to the speaker–writer (I), the addressee (you), and other persons and objects whose referents are presumed to be clear from the context (he, she, it, they). In line with the statement, the description below will present the variety and the pronoun formation in *Using* language speech.

### The Variety of First Person Pronouns:

The first person pronouns in *Using* language can be grouped into two, namely the first person singular pronouns and the first person plural pronouns. The first person singular pronouns includes *isun* and *kulo* (which is the uptake of the Java language), while the plural pronoun of the first person includes (*e*)*ngkene*, *ngeriki*, (*e*) *ngkene kabeh*, *ngeriki kabeh/sedoyo* and forms uptake as *kito*, or *kito kabeh*.

The first person singular pronoun *isun* in the speech has three variations, namely *isun*, *sun*, and *-nisun/-isun*. Pronouns *isun* remains *anisun* on its own without joining with other forms of the word, whether as a subject or object, either in the directly or indirectly sentence. Being the first personal pronoun *isun* will be transformed into a *sun-* if joined with a verb, which functions to form a passive verb, for example, *Sunjaluk siro nyingkalo disik* "I ask you to plow first". The form of the first person pronoun *isun* will deform being *-nisun/-isun* when joined with other words that the function forms a noun, for example, *kelambinisun* 'my shirt', *sontokisun* 'my blow'.

When the pronoun *isun* attached to word ended with closed syllables, the pronoun *isun* does not change the form, for example: *paculisun* 'my hoe', *umahisun* 'my house', *jaranisun* 'my horse'. However, if pronoun *isun* attached to form ended with opened syllable, the form *isun* will be transformed into *-nisun*, for example, *bukunisun* 'my book', *kacanisun* 'my friend', *rabinisun* 'my wife', *pecinisun* 'my hat'. However, in a speech, there is a minority of people who use this formation: *buku-isun*, *kanca-isun*, *rabi-isun*, *peci-isun*. The formation is said by *Using* native speakers as nonstandard language.

The first person singular pronoun *kulo* 'I am' in the speech of *Using* communities has two variations, namely *kulo* and *-nkulo/-kulo*. Pronoun *kulo* remain as *kulo* if used on its own without attaching to other forms of the word, as exemplified by the formation of pronouns *isun*. The first person pronoun *kulo* will change shape into *-nkulo* if attaching to the word with opened ended syllabic words (eg: *griyankulo* 'my house', *topinkulo* 'my hat'). However, in a public speech, there are some people who use such formations *rabi-kulo* dan *griyo-kulo*. These formations are considered as the formation of nonstandard *Using* language.

The first person plural pronouns (*e*)*ngkene kabeh* 'we all' in *Using* speech community has two variations, namely (*e*)*ngkene*, or (*e*)*ngkene kabeh*. The form of the first person plural pronouns (*e*)*ngkene* commonly occupy the function of the subject and complementary and can mean *kami* (Indonesian language), in English 'we' (I and my friend) or *kito* (Indonesia Language), in English 'we' (you and I). The form (*e*)*ngkene* be coupled with *kabeh* so that it becomes (*e*)*ngkene kebeh* when used in direct communication, whose function is to establish the meaning of utterances.

The plural personal pronoun (*e*)*ngeriki (kabeh/Sedoyo)* in speech has two variations, namely (*e*)*ngeriki* or (*e*)*ngeriki (kabeh/sedoyo)*. It is the same with the formation of (*e*)*ngkene* and (*e*)*ngkene kabeh*. The distinguish between the two kinds of the forms is (*e*)*ngkene kabeh* is the "ngoko" language while (*e*)*ngeriki (kabeh/sedoyo)* is the "krama" language. The first person plural pronoun *kito* is a word that adopted from the Indonesian language. The form *kito* and *kito kabeh* in the use of speech can be varying. *Kito kabeh* is used when the speaker would like to emphasize the meaning of the conversation.

The description above shows that in the speech of *Using* language, there is the first person pronoun that adopted from the first person pronoun of the Java language *kulo* 'I am' and from Indonesian language *kito* 'we are'. The adoption of the pronoun is caused by communication demands of *Using* people in communication. Meanwhile, *Using* language does not have the intended form of pronouns. Therefore, to fulfill the communication needs that is consistent with the intent of communication that is expected, *Using* language adopt the pronouns of language that has a close network of the communications system.

Based on the description above, it can be concluded that the Javanese pronouns used in *Using* conversation because *Using* community are influenced by Javanese culture. *Using* language is not familiar with the vocabulary speech level that distinguishes between the speech for people of high status and speech for people with low status. Talk to anyone within ethnic groups, *Using* people use *Using* language with the same

vocabulary, which is known as a *Cara Using* (Subahianto, 2002). *Cara Using* can't be equated with cultural of *ngoko* in the Javanese language because the *Using* language does not have the separation between language *ngoko* language and the *kramalanguage*.

*Using* language, if it is integrated with a view (Duranti, 1997), can be described as a system of mediation, namely as a tool or medium used by members of the community to meet their needs. Based on that view, the presence of borrowing words in the speech of *Using* language shows that *Using* language requires communication vehicle to meet the needs of communication. *Using* community has the knowledge and experience of the wider culture than the number of mental content that can be reached by the vocabulary of the language. The knowledge and experience that comes from outside of their ethnic cultures that have not been recorded in the vocabulary of the language.

Vocabulary absorption phenomenon not only in the *Using* language but also applies to all the languages that people do cultural contacts with other people of different cultures. This means that no one else of the language can meet the needs of all people. Or, in other words, no one else in the world, people who have a language system as completely as possible to reach all the communication systems owned by other community culture. Every society has its own cultural system that can meet the needs of a limited life of their society. Within these limitations, the culture of a society can't be compared with the cultures of other communities. Therefore, (Sumardjo, 2005) explains that the culture should be seen in juxtaposition, in the sense of the culture side by side with other cultures in a parallel position.

### The Variety of Second Persons Pronouns:

The second person pronoun of *Using* language can be grouped into two categories, namely the pronoun of the second person singular and the pronoun of second person plural. The pronoun of second person singular includes *iro*, *siro*, *riko*, and *diko* (in English 'you'), while the pronoun of second person plural covers all form a single second pronoun is followed by the word *kabeh* 'all': *iro kabeh*, *siro kabeh*, *riko kabeh* (in English 'you all'). The second person singular pronoun *siro* in the speech has only one form, namely *siro*. The pronoun always stands alone and never attached in other words both at the beginning and at the end of words spoke. The second person pronouns: *iro*, *riko*, and *diko* will be transformed into *-niro/-iro*, *-nriko/-riko*, and *-ndiko/-diko* when joined with other words (verbs and nouns) whose functions form a noun. The word *iro*, *riko*, and *diko* remained unchanged when attached to word ended with closed syllables (for example *paculiro* 'your hoe', *umahriko* 'your house', *jarandiko* 'your horse'). However, if the word attached to form ended with opened syllable, the pronouns will be transformed into *-niro*, *-nriko*, *-ndiko* (eg: *bukuniro*, *kacanriko*, *rabindiko*). But in a speech at a minority of people who use the forms *buku-iro*, *kanca-riko*, *rabi-diko*. Such forms by *Using* people generally regarded as non-standard forms. The pronoun of second person plural has the same shape variation with the variation of a single pronoun form. The difference lies in the addition of the word *kabeh*, whose function is to form the pronoun of the second person singular becomes pronoun of second person plural. Based on the description above, it can be argued that in a *Using* language speech, there are various forms of the personal pronoun. The plurality of second person pronoun reflects marker of politeness in *Using* language speech. *Using* community has a code of simple courtesy in conversation, namely the use of personal pronouns both the *siro* and *riko* (Zainuddin, 2001). The pronoun *riko* is used by speakers of lower age or lower status than the spoken partners, while the pronoun *siro* is used by speakers of that age and status equal or higher than the partner he said. Therefore, in a conversation, the *Using* community uses fine words which refer to the form of respecting speech (use the fine word in the manners of Javanese language). The speech is influenced by the speech of Javanese culture, and the words he used is also a vocabulary uptake of the Javanese language (manners).

### The Variety of Third Person Pronouns:

In the *Using* language, the third person pronouns have two forms, namely the singular pronoun and the plural pronouns of the third person. The third person singular pronoun is only one form, namely *iyane* 'he/she'. A third-person plural pronoun is composed of two forms, namely *iyane kabeh* 'we' and *wong-wong kabeh* 'all people'. The shape of the third person singular pronoun has similarity with the third person pronoun in the Indonesian language, namely *ia/dia* 'he/she'. The word *ia/dia* is absorbed and adapted with the *Using* language system into *iyane*. Meanwhile, for the third person plural, *Using* language has no form. Therefore, *Using* language uses the first person pronoun coupled with word *kabeh* 'all'. In another case, to neutralize the designation replaces the third person plural, *Using* language call other people *wong wong kabeh* 'everyone'. Based on the description above, it can be said that the *Using* community has a creativity in *Using* the third form of person pronouns. *Cara Using* does not have a stratification language for differentiating the social status of

speech participants. The Egalitarian attitude of *Using* community in applying *Using* language cause they feel free to use the pronoun and do not feel burdened by a risk of conflict between speech participants. In communication, *Using* people avoid the conflict is not determined by the form of speech used, but is determined more by how the speech delivery and the content of speech. The reality differs from what (Brown & Levinson, 1987) said that the use of politeness closely related to the avoidance of conflict that can be done by the speakers by selecting the forms of speech that can save face hearer.

**THE USE OF PERSONS PRONOUNS IN USING LANGUAGE SPEECH:**

Research findings about the use of persons pronouns, i.e. first person pronouns, second person pronouns, and third person pronouns are summarized in the following table.

**Table the Use of Persons Pronouns in *Using* Language Speech**

Reference		Pronoun	Varieties Form	The Use		
				Age	Status	Relation
First Person	Singular	Isun	Isun, sun-, -isun, -nisun	P1 >= P2	P1 >= P2	P1 “ P2
				P1 > P2	P1 > P2	P1 x P2
	Kulo	Kulo, -kulo, -nkulo	P1 >= P2	P1 < P2	P1 x P2	
			P1 < P2	P1 >= P2	P1 “ P2	
			P1 = P2	P1 >= P2	P1 x P2	
			P1 = P2	P1 >= P2	P1 “ P2	
			00	00	P1 x P2	
Plural	(e)ngkene	(e)ngkene kabeh	P1 >= P2	P1 >= P2	P1 “ P2	
			P1 >= P2	P1 >= P2	P1 x P2	
	(e)ngeriki	(e)ngeriki kabeh (e)ngeriki sedoyo	P1 < P2	P1 >= P2	P1 x P2	
Kito	kito kabeh	00	00	00		
Second Person	Singular	Ira	Ira, -ira, -nira, ira-	P1 >= P2	P1 >= P2	P1 x P2
				P1 > P2	P1 >= P2	P1 “ P2
		Siro	siro	P1 >= P2	P1 >= P2	P1 “ P2
				P1 > P2	P1 >= P2	P1 x P2
		Riko	Riko, -riko, -nriko	P1 >= P2	P1 >= P2	P1 “ P2
	P1 > P2			P1 >= P2	P1 x P2	
	Diko	Diko, -diko, -ndiko	P1 = P2	P1 >= P2	P1 x P2	
			P1 > P2	P1 < P2	P1 “ P2	
			P1 = P2	P1 < P2	P1 x P2	
	Lain-lain	Bapak/Pak, Ibu/Bu, Mas, Mbak, Dik	P1 = P2	P1 = P2	P1 x P2	
P1 > P2			P1 < P2	P1 x P2		
Singular	Pron.Persona II + kabeh/sedoyo	Pron.Persona II + kabeh/sedoyo	P1 < P2	P1 >= P2	P1 x P2	
			P1 > P2	P1 >= P2	P1 x P2	
			P1 < P2	P1 >= P2	P1 x P2	
			P1 > P2	P1 >= P2	P1 x P2	
Third Person	Singular	Iya	iyane	P1 >= P3	P1 >= P3	P1 “ P3
	Plural	Iya kabeh	iyane kabeh wong-wong kabeh	P1 > P3	P1 > P3	P1 x P3

**Keterangan:**

=	:	The same age/status
<	:	The younger of age/The lower of status
>	:	The older of age/The higher of status
>/=	:	The same or older of age/The same or higher of status
“	:	Intimate fellow
X	:	Unintimate fellow
00	:	Neutral/unknown
P1	:	First person/speaker
P2	:	Second person/hearer
P3	:	Third person/other

According to the table above, it can be explained that the singular pronoun of the first person *isun* used in a conversation between (1) P1 which is older than or the same age as P2, in an intimate relationship with social status of P1 is equal/higher than P2, (2) P1 which is older than or the same age as P2 in a relationship is unfamiliar with social status of P1 is equal to or higher than P2, (3) P1 which is older than or the same age as P2 in a relationship is unfamiliar with social status of P1 is lower than P2, (4) P1 which is younger than P2 in an intimate relationship with social status of P1 is equal or higher than P2, (5) P1 which is younger than P2 in a relationship is unfamiliar with social status of P1 is lower than P2, and (6) P1 coeval with P2 in relationships are unfamiliar with the social status of the two are not mutually knowing.

First person singular pronoun *kulo* in *Using* language is used as a softener for the first personal pronoun. The word *kulo* in conversation is widely used especially in conversations that aim to better respect to P2. This pronoun is used in a conversation between (1) P1 which is younger than P2 in a relationship is unfamiliar with the social status of P1 is equal to or higher than P2, (2) P1 which is younger than P2 in an intimate relationship with the social status of P1 is higher than P2, (3) P1 which is coeval with P2 in a relationship is unfamiliar with the social status of P1 is equal to or higher than P2, and (4) P1 which is coeval with P2 in an intimate relationship with the social status of P1 is equal to or higher than P2.

The first person plural pronouns used in the communication consists of the three states of the *(e)ngkene*, *(e)ngeriki* and *kito (kabeh)*. Judging from the level of politeness, the most delicate is *(e)ngeriki*, rather neutral is *kito kabeh*, and the lower of politeness is *(e)ngkene*. The plural of the first person *(e)ngkene* only used in informal conversations with the criteria that P1 is the same age or older than P2, both in terms of familiar and unfamiliar, with social status of P1 is equal to or higher than P2, or in relation unfamiliar with the social status of P1 is equal to or higher than the P2. The first person plural pronouns *(e)ngeriki* is used in conversations between P1 which are younger than P2 in a relationship is unfamiliar with the social status of P1 is equal to or higher than the P2. In addition, this pronoun also is used in a conversation between P1 which is younger than P2 in an intimate relationship with the social status of P1 higher than P2. The first person plural pronoun *kito kabeh* can be used flexibly, either by the young generation to the older or otherwise, in an intimate relationship or are unfamiliar, and in the conversation by different social levels.

Second person singular pronoun consist of four kinds, namely *iro*, *siro*, *riko*, and *diko*. Judging from the level of politeness, *diko* is the most refined form, rather neutral is *riko*, and the lower of politeness is *siro* and *iro*. The pronoun *siro* and *iro* in the conversation can be interchanged. Speakers can use these two forms are varied, without affecting the degree of speech modesty.

In a more respectful conversation, *Using* language speakers do not usually use the personal pronouns such as those mentioned above. P1 often use the pronoun another form, that is *bapak/pak* ‘Mr.’, *Ibu/bu* ‘Mrs.’, *mas/mbak* ‘brother/sister’, and so on, both followed by the name of P2 or not. Meanwhile, the use of second person plural pronouns in the speech of *Using* language almost the same as the use of the singular pronoun of the second person. What distinguishes it is the use of the word *kabeh/sedoyo*.

In *Using* language, the singular pronouns of the third person consists of only one form, namely *iyane*. The pronoun is only used between (1) P1 is the same age or older than P3 in an intimate relationship with the social status of P1 is equal to or higher than P3; and (2) P1 is the same age or older than P3 in the relationship is unfamiliar with the social status of P1 is equal to or higher than P3. In a more respectful conversation, *Using* language speakers do not usually use third personal pronouns such as those mentioned. They often use the pronoun another form as what happened in *Using* the second pronoun.

The description on the use of the person pronouns in the speech of *Using* society as summarized above shows that

the *Using* language commonly used in informal communication. In formal situations, *Using* people mostly use Indonesian and Javanese language. Therefore, the variety and the formation of person pronouns in *Using* language, as described above, is used only in informal conversations. Although it is only used in informal speech, the use of the pronoun is still considering the various components of speech, among which is the familiarity of speech participants, the age of the speaker and the hearer, and the social status of the speech participants.

From the explanation, it can be said that the various forms of pronouns in *Using* language used are varied. Variations in the use of the pronoun forms depending on the situation, place, age, social status, and level of familiarity of participants involved in the conversation. The Javanese language and the Eastern languages generally have strict rules about this. The use of pronouns in spoken form has always played an important role, both directly and indirectly. The research findings conducted by (Suryadi, 2010) showed that the life of Javanese society in society can not be separated by cultural values and Courtesy speak. The continuity between politeness and culture is difficult to separate because it is the actualization of the living culture.

The research findings described above is in line with an early study addressed the issue of variations in the use of pronouns is the study done by (Brown & Gilman, 1970). In his work of *Pronouns of Power*, they noted a pattern *vous/tu* in the public utterances of the Indo-European languages. They found that the use of two forms that have a close relation with two very fundamental social dimensions, the dimension of power and solidarity. In line with the opinion, Gilman dan Brown (Giglioli, 1970, pp. 254-257) further suggests that the dimensions of power and solidarity here marked by specific criteria concerning the relationship, age, social status, and others.

In the use of the pronoun form, there are three parameters that can be used as a measure, namely (1) age, (2) social status, and (3) familiarity (Moeliono, 1988:171). A young speaker will choose a pronoun that milder form for greeting the older partners. He would use the word *panjenengan* (Javanese 'you'), *ndiko*, *beliau* (Indonesian 'he/she'), and so on. Likewise, with people of unequal status, it will use a selection of different forms of pronouns. People in lower social groups will not use word *kamu* 'you' to greet people of a higher social status. The third parameter, familiarity can disappear dividing line of age and social status. Two people familiar since childhood may in certain circumstances use the word *kamu* even though they differ in their social status.

The selection of the speech forms is necessary to consider the other speech components. The speech components that meant are the external factors that influence the of language use in the speech community commonly called the ethnography of communication (Hymes, Toward Ethnographies of Communication: The Analysis of Communicative Events, 1973). According to Hymes, the components of speech are (1) the setting of speech, (2) the participant of speech, (3) the end of speech, (4) the act sequence of speech, (5) the key of speech, (6) the instrument of speech, (7) the norms of speech, and (8) the genre of speech.

In line with the opinion above, the election form of pronouns, (Fishman, 1972) suggests the principle context of socialization speak, which include (1) the context of the regulatory, namely rule authority of the speaker based on the rules of the moral order, (2) the context of instructional, that context should be learned by the speaker of the nature of the objective of objects which require diverse, (3) the context of the innovative, the context that encourages speakers to experience and create his own world in his own way, and (4) the context of interpersonal that drives the speaker to be aware of the status of affective themselves and others.

Another explanation which is in line with the selection of a pronoun in speaking is the work of (Blom & Gumperz, 1972). In these works, they show the selection of higher varieties and lower varieties in the transition between high social status groups with low social status. They see their control of the situation and rather metaphorically. Instead of referring to the situation of formal and informal, while over the metaphorical language selection becomes a symbol or a metaphor for the relationship shown. The fact is in line with the research findings conducted by van Hell, et.al (2005). They said that the present study deals with data from Dutch, and extends our previous work by performing more fine-grained analyses of different types of personal and impersonal pronouns functioning as subject NPs across four different age groups. To the best of our knowledge, this is the first systematic attempt to study the development of different types of personal and impersonal pronouns across two different genres and modalities in Dutch.

## CONCLUSION:

In speech *Using* language, there are a variety of personal pronouns concluding the first personal pronoun, the second personal pronoun, and the third personal pronouns. Each type of pronoun has a form that varies depending on the grammatical context of the use of the pronoun types according to the position and function in the sentence. Various forms of personal pronouns, in their use in speech, consider the surrounding speech context. The speech contexts that meant are the age of the speech participants, the closeness of the participant's

relationship, the social status of the speech participants, and speech situation. The plurality and diversity of the use of the personal pronouns such forms describe spoke culture system of the *Using* community in communicating internally within *Using* society.

The findings of this study have important meaning for the *Using* language teachers. The results of this study can be used as teaching materials, particularly of the various forms and use of *Using* language person pronouns. Even more important is the findings can be used by teachers as basic knowledge for giving an explanation to their students that the diversity of persons pronouns have rules both in word formation and its use. For future researchers, suggested that they may study other aspects of *Using* language, for example: the *Using* expression used in the daily speech, the morphological system of the words of the *Using* language, the differences in speech style of *Using* language according to the geographical location, and/or the impact on *Using* language by other languages.

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