The Effect of Knowledge and Attitude of Student towards Save Energy Behavior in Makassar City

Andi Zulfikar Syaiful, Mulyadi, Faisal Amir, Ahsan Mandra and Gufran Darma Dirawan

Makassar State University

Abstract

This study aims to determine the variables of knowledge and attitude of students in the dominant influence on the behavior of energy saving in Makassar. Sampling procedures respondents using probability sampling technique with incedential simple random sampling method. Based on the data obtained from a questionnaire containing structured-questionsinstrument to the 208 student respondents. Then the data were analyzed using multiple linear regression which is expected to influence between variables, energy-saving knowledge variable (X1), the attitude of energy saving (X2) and energy-saving behavior (Y). From the analysis results obtained by the model equations with variable coefficients coefficients and constants yields the equation Y=49.831+0.476 X1 + 0.471 X2. Value variable to variable knowledge of the behavior of the positive 0.185 and the Sig. obtained for 0.005 is smaller 0.05 then H0 received. Based on these results, which means energy saving knowledge is positive and significant impact on energy-saving behavior. Value variable attitudes toward positive behavioral variables for 0.544 and the Sig. obtained for 0000 is smaller 0.05 then H0 received. Where the energy saving attitude positive and significant impact on energy-saving behavior. From the description means that there is a trend of energy-saving attitude variable more dominantly affect the energy-saving behavior, than the knowledge variabel.

Keywords: Energy Saving Behavior, Student

INTRODUCTION
Humans are one of the creatures who always try to maintain and develop its existence. Has become a nature that all dwelling creatures of the earth, requires energy to sustain and develop life. Without energy that has been provided by the Creator, all that is on earth will experience a stagnation in its development, and will eventually end in death.

Energy available on earth can be either primary energy is energy that can be directly utilized and has not undergone further processing, and secondary energy is the primary energy that has undergone a process of change (conversion) into other energy forms, for converting primary energy into secondary energy needed tools and processes or specific mechanism.

Based sustainability, the Law no. 30 of 2007 on energy, energy split on 2 namely renewable energy and non-renewable energy[1]. Renewable energy is energy generated from sustainable energy resources if managed properly, such as geothermal, wind, bioenergy, sunlight, water flow and waterfall, as well as motion and temperature differences in the ocean layer. Non-renewable energy is the energy produced from energy resources will be exhausted if exploited continuously, such as petroleum, natural gas, coal, peat and oil shale.

The increasing number of people, would have implications for increasing the amount of needs and mobility. It is undeniably a direct impact on the use / consumption of energy in meeting the needs and activities. The evidence suggests that the most energy reserves are used for human consumption of fuel oil and electrical energy. Every day millions of barrels of crude oil exploited and spent for the purposes of our everyday life, we realize that without depleting its reserves and will not be back again. Related to energy, the basic statement associated with it is the "law of conservation of energy" which states that "energy can not be created and can not be destroyed, but can be transformed from one form of energy to another to forms of energy". So basically, the energy that exists in nature is fixed, but the problem is how to transform the energy that has been decomposed it into energy that is ready to use or source of energy in return. For example, as noted above, petroleum after being processed into fuel and used oil then stir motor vehicles, will turn into a wasted gas into thin air. Changing the exhaust gas into petroleum or oil fuel back, it is has yet to be done. It is why fuel energy resources are classified into non-renewable.

There is a statement that we often hear is the statement that "we must be energy efficient," a short statement, but at least it contains two questions. The first question is, why should we be saving energy (what benefits will we get), second how should our behavior so that the energy consumption so saving.

Save energy should be done for several reasons, the first reason is because most of the energy reserves are in the form of non-renewable and limited in number, so that after use, the amount or reserves will also be reduced. Based on data from EMR (2012), Indonesia's oil reserves around 7.4 billion barrels, which consists of ready petroleum exploration at 3.7 billion barrels and a potential of 3.7 billion barrels. With a daily average production of 830,000 barrels per day, then Indonesia's oil reserves will be exhausted within 24 years. That time will become shorter if the pattern of fuel consumption society is not done wisely from now. The second reason why we should be sparing in the use of energy is that energy saving will save money (expenses) we, for example, replace the use of incandescent lamps with energy-saving halogen bulbs, will save on our electricity bills 30-80% per month. The third reason is, to save on energy consumption will give a good impact on the environment. Largely existing energy reserves is a natural resource that is not renewable, meaning that if we use it, it can cause something missing from nature / environment, which may be able to disrupt

the balance. Another environmental impact is the emergence of pollution due to fuel combustion processes. Besides the three reasons above, another reason is the energy saving can boost a country's economy, improve national security, and improve the quality of human life[2].

Saving energy giving time and opportunity to rechange non-renewable energy sources with renewable energy sources. Saving energy is the most economical way in dealing with the energy crisis, and a more environmentally friendly way than to increase production.

The energy-saving behaviors can be done by individuals, community groups and institutions that will eventually culminate in individual behavior. Knowing the patterns of behavior of individuals in consuming energy, is needed primarily to be considered in drafting regulations on energy policy, energy conservation, and energy savings. In addition, to support the dissemination of energy-saving behavior launched by central and local government.

According Fatmawati (2012), which conducts research on power-saving behavior among students in the city of Yogyakarta through attitudes and intentions said the electricity saving behavior among students is still low. Students who are in this age groupdoes not care about the efforts to save electricity. They feel responsible for payment of electricity, and the students did not know the reason why it had to downsize electricity. Another cause is that they take the behavior of energy saving electricity would reduce the comfort and pleasure, they also considered the issue of energy scarcity politicized issues and scarcity of energy due to the government's failure to manage energy[3].

Students as a group in a society of beings candidate intellectuals, young scholars and future leaders, are expected to have concern and energy saving behavior that can be transmitted to other community groups at the present time. In the future, if they have become leaders or policy makers are expected to favor energy savings. By knowing the behavior patterns of students in the use of energy, in this case the government through the Ministry of Research, Technology and Higher Education is expected to formulate a policy that is directed towards the development of higher education curricula charged matter to energy, thus forming a student's behavior is efficient in energy use.
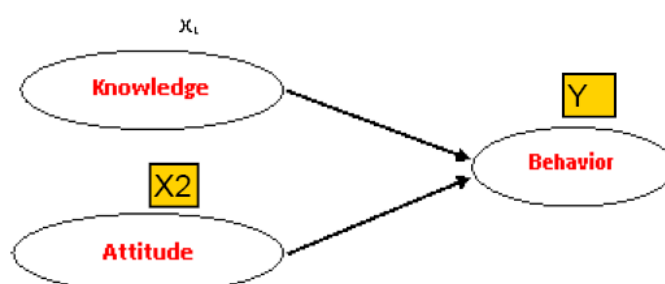

RESEARCH METHODS

This research was conducted in May - August, 2015 by the entire student population was enrolled and active in the departmentsmechanical engineering at the university in Makassar. Basic data in this study includes data related to the student's characteristics of energy-saving behavior, the attitude of energy saving, energy-saving knowledge. Primary data was obtained from a questionnaire containing instruments structured questions to the respondents / students. Determination of the number of samples was done by using probability sampling with simple random sampling method, because the population is homogeneous, therefore the sample was selected randomly to reach the number of 208 students from the mechanical departments.

This type of research in terms of method, this study classified as research surveys and ex post factor. Mantra (2000), the expression of that type of survey research is so large its use, as the unit of analysis is individual and done in a planned and systematic, with each other to be mutually supportive[4]. Research survey said as research that takes a sample of the population and the questionnaire as a data collection tool staple (Singarimbun, 2006)[5]. In addition Babbie (in Creswell, 2010) survey research purposes to generalize a population of some samples that can be made conclusions / allegations while on the characteristics, behaviors, or attitudes of the population[6].

If the terms of the kind of research is classified according to the purpose of applied research, the research aimed to obtain information that can be used to solve problems of practical life[7]. While the types and categorized data analysis in quantitative research[8].

This research aims to find the dominant variables that influence the saving-energy behavior of students in Makassar city. Based on the data, information and facts obtained, then the data were analyzed using multiple linear regression analysis to determine the condition of each of the variables studied, which is expected to note the effect of one variable to another variable. The variables in this study consisted of the independent variable is the variable energy-saving knowledge (X1), energy saving attitude variables (X2) and the dependent variable is the behavior of energy saving (Y).

Figure 1: Research Design

RESEARCH RESULT
Descriptive analysis
To describe the general conditions based on the data and information obtained in accordance with pre-defined categories of variable energy-saving knowledge, attitude, energy saving and energy-saving behavior.

Table 1: Distribution of respondents by Knowledge Variable Energy Efficient

	Frequency	Percent	Cumulative Percent
Low	15.00	7.21	7.21
moderate	61.00	29.33	36.54
High	132.00	63.46	100.00
	208.00	100.00	

Table 1 above shows the distribution of research data by variable energy-saving knowledge which is divided into three levels of categories in describing the condition of the student's knowledge related to energy saving.

Categories of respondents with a low level of knowledge acquired by 7.21% (15 of 208 total respondents), the level of knowledge being gained by 29.33% (61 of 208 total respondents), high level of knowledge gained by 63.46% (76 of 208 total respondents).

From these results it can be concluded that the trend of energy-saving knowledge level of respondents in this study is the high percentage of 63.46%.

Table 2: Distribution of respondents by Variable Data Attitude Save Energy

	Frequency	Percent	Cumulative Percent
Strongly Disagree	5.00	2.40	2.40
Disagree	20.00	9.62	12.02
Less Agree	47.00	22.60	34.62
Agree	93.00	44.71	79.33
Strongly agree	43.00	20.67	100.00
	208.00	100.00	

Table 2 above shows the distribution of research data by variable energy saving attitude which is divided into five levels categories in describing the condition of energy-saving attitudes of students.

Categories of respondents with an attitude strongly disagree obtained for 2.40% (5 of 208 total respondents), disagreement gained by 9.62% (20 of 208 total respondents), a lack of agreed obtained amounted to 22.60% (47 of 208 total respondents), attitude agreed obtained amounted to 44.71% (93 of 208 total respondents) and the latter attitude strongly agree acquired 20.67% (34 of 200 total respondents).

From these results it can be concluded that the tendency of the rate of energy-saving attitudes of respondents in this study is the attitude agrees with the percentage of 44.71%.

Table 3: Distribution of respondents by Variable Data Behavior Save Energy

	Frequency	Percent	Cumulative Percent
Never	18.00	8.65	8.65
Rarely	35.00	16.83	25.48
Sometimes	89.00	42.79	68.27
Often	43.00	20.67	88.94
Always	23.00	11.06	100.00
	208.00	100.00	

Table 3 above shows the distribution of research data is based on energy-saving behavior variables which are divided into five levels categories in describing the condition of energy saving student.

Category respondent behavior is never gained by 8.65% (18 of 208 total respondents), the behavior is rarely obtained by 16.83% (35 of 208 total respondents), the behavior is sometimes obtained by 42.79% (89 of 208 total respondents), the behavior is often obtained by 20.67% (43 of 208 total respondents) and the latter's behavior is always obtained 11.06% (9 of 208 total respondents).
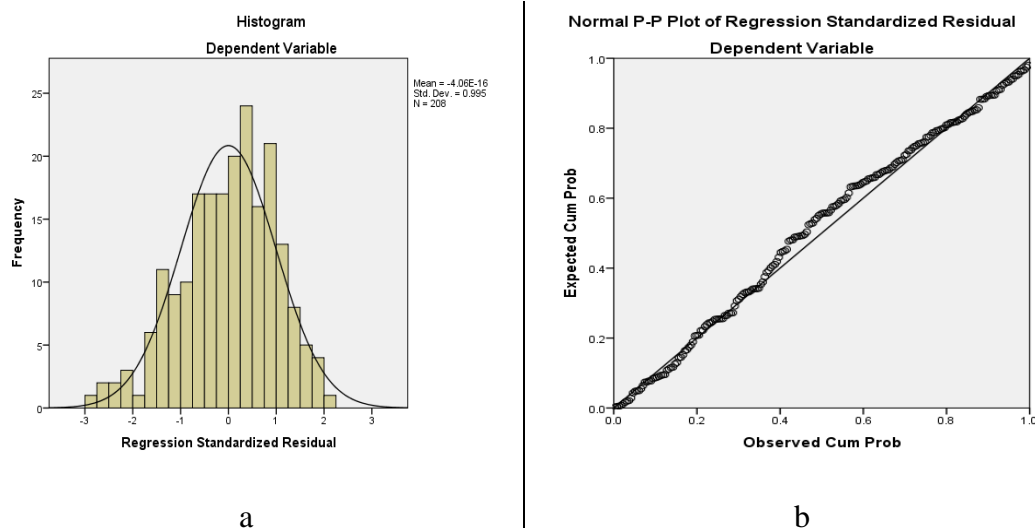
From these results it can be concluded that the trend of energy-saving behavior of respondents in this study is the behavior sometimes with a percentage of 42.79%.

Classic assumption test

To determine whether the resulting model is a model that produces a linear estimator bias is not the best it is necessary to test the assumption of the classical model of irregularities symptoms. Classical assumptions that must be met to get a good model is normality, non multicolinearity, non heteroscedasticity.

Normality

One of the easiest seeing residuals normality is to look at the histogram graph that compares the observation data is approximately normally distributed. But sometimes see this histogram can be misleading, especially to the small sample size. Criteria for decision making with analysis chart (normal probability). If the data is spread around the diagonal line and follow the direction of the diagonal, then the model meet the assumption of normality. If the data are spread far from the diagonal line, the model did not meet the assumptions of normality[9].

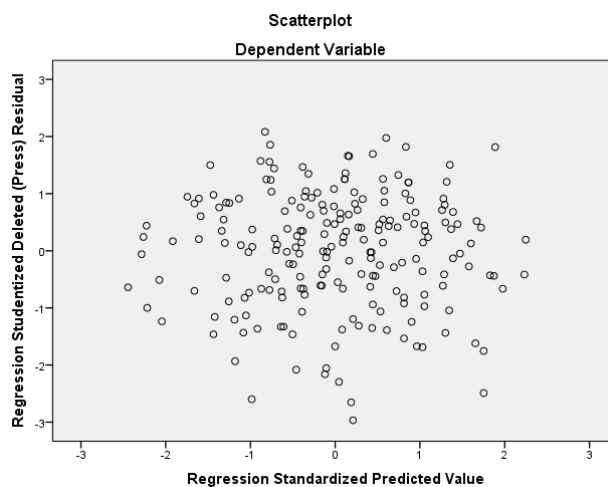a   b

Figure 1: a) Graph Histogram Normality; b) Graphics Normal P-P Plot

By viewing a histogram graph or chart can be concluded that the plot normal histogram graph gives data on the distribution patterns or the residual value shows a normal distribution (bell form). While in the normal graph plots the data visible (in the form of dot) spread around the diagonal line and follow the direction of the diagonal, then the model meet the assumption of normality. If the data are spread far from the diagonal line, the model did not meet the assumptions of normality. Both graphs show that the regression model to meet the assumptions of normality or residue of the model can be considered normal distribution.

Heteroscedasticity

Heteroscedasticity test aimed at testing whether the variance of the model occurred inequality residual one observation to another observation. If the variance of the residuals of the observations to other observations that remain, it is called and if different Heteroscedasticity called heteroscedasticity. A good model is the Heteroscedasticity. If there is a specific pattern, such as dots that no particular form regular patterns (wavy, widened and then narrowed), then the indicate has occurred Heteroscedasticity. If there is no clear pattern, as well as the points spread above and below the number 0 on the Y axis, then it does not happenHeteroscedasticity.

Figure 2: Scatter Plot heteroskedastisitas

Based on the results of the scatter plot seems that the plot formed spreads do not have a specific pattern or spread above and below zero on the Y axis as well as on the right and left on the X axis This indicates that the model is not happening with the relationship between the independent variables residual value. Thus the assumption of non heteroscedasticity models are met.

multicollinearity

Multicolinearity shows the relationship between the independent variables in the model. Good model did not show any symptoms multicollinearity. The detection of the presence or absence of multicollinearity done by looking VIF and Tolerance. If the value of VIF<10 and the value of Tolerance> 0:10 then the model is free from multicollinearity[9]. Here is a VIF and Tolerance produced:

Tabel 4: Collinearity Statistics

Model	Tolerance	VIF
Energy-saving knowledge	.918	1.089
Energy-saving attitude	.918	1.089

From the table above shows that the VIF of all independent variables in the model above is less than 10 and Tolerance value greater than 0.10. So it can be said to be free from Multicollinearitymodels. Thus the assumption of non Multicollinearityon the model has been fulfilled.

Multiple Linear Regression Analysis
Correlation Coefficient (R) and the coefficient of determination (R-Square)

Correlation Coefficient (R) indicates how much the linear relationship and the direction of the relationship between the independent variables (X1, X2, ...Xn) simultaneously to the dependent variable (Y). The correlation coefficient (R) ranges from 0 to 1, the value closer to 1 means that the relationship is getting stronger, otherwise the value 0, the closer the relationship is getting weaker. The coefficient of determination (R-Square) shows how much influence the independent variables are able to explain the change in the dependent variable in a research. These values can be seen in Table 5 below.

Table 5: Summary Model of Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.608	.370	.365	8.46416

Table 5 above shows the correlation coefficient (R) and the coefficient of determination (R-Square) obtained from analysis using SPSS program.The correlation coefficient (R) obtained for 0.608, which means that the independent variable is the energy-saving knowledge and attitude toward dependent variable is the energy-saving behavior has a linear relationship is moderate.

The coefficient of determination (R-Square) obtained for 0.370 or 37.00%. This indicates that the independent variable is the energy-saving knowledge and attitude toward dependent variable is the energy-saving behavior has the effect of 37.00%

while the remaining 63.00% influenced by other variables or factors outside of research.

Furthermore, to see if all the independent variables included in the model have influence together on the dependent variable is usually called simultaneous testing. Simultaneous testing done by looking at the value of Sig. provided that if the Sig. <0.05 means that the model has influence jointly on the dependent variable, and vice versa, the value can be seen in Table 6 below.

Table 6: ANOVA Dependent Variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	914.126	2	457.063	4.640	.011
Residual	20192.869	205	98.502		
Total	21106.995	207			

Therefore, to perform partial test or test of regression coefficients that aims to determine which variables are significant or not used to the regression model obtained, this partial test can be done by looking at the value of Sig. (P-value) provided that if the Sig. <0:05 means that the variable of the model in use is significant and vice versa, the value can be seen in Table 7 below.

Table 7: Coefficients Dependent Variable

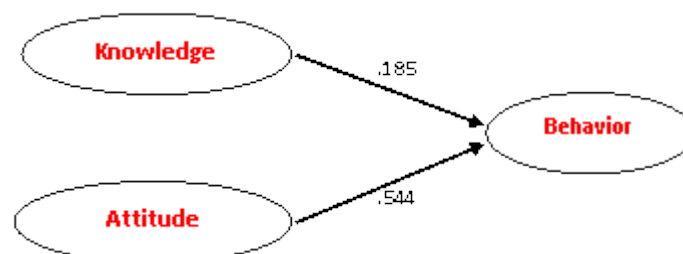| Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	49.831	6.565		7.590	.000
Knowledge of save energy (X_1)	.471	.164	.185	1.985	.005
Attitude of save energy (X_2)	.476	.077	.544	8.485	.000

Table 7 above shows of the analysis of the independent variables on the dependent variable in this study was obtained with a coefficient equation model constants and coefficients of the variables in the column unstandardized Coefficients B produces the following equation:

$$Y = 49.831 + 0.476 X_1 + 0.471 X_2$$

Spesification :
Y   = Bevahior of save energy
X_1 = Knowledge of save energy
X_2 = Attitude of save energy

Then, as shown in Figure 3 in the form of a research model by using multiple linear regression analysis and its influence between independent variables are knowledge and attitudes towards energy saving variable dependent variable is the energy-saving behavior.

Figure 3: Multiple Linear Regression Model Research

From Figure 3 shows that the obtained effect of 0.185 between the variables knowledge of the behavior of energy saving and then obtained an impact for 0.544 of attitudinal variables to variable energy-saving behavior.

Research Hypothesis Testing
Effect of Knowledge Towardsave Energy behavior On Students
Hypothesis:
H_0: Knowledge effecton the save energybehavior On Student
H_1: Knowledge does not effecton the save energybehavior On Student
Base Decision:
H_0 is rejected if the Sig. > 0.0, H_0 accepted if the Sig. <0.05

The analysis of effect of saving-energy knowledge variable toward saving-energy behavior yield the standardized coefficient beta values positive 0.185 and significance 0.005 (<0.05), then Ho rejected and H1 received.
Based on these results, which means knowledge of energy saving and a significant positive effect on energy efficient behavior in students who can be interpreted that if the energy-saving knowledge to the students the higher the energy saving behavior in students getting higher.

Effect of Attitudes Toward save Energy Behaviour On Students
Hypothesis:
H_0 :Attitudeeffect on the save Energy behavior On Student
H_1 :Attitude does not effecton the save Energy behavior On Student
Base Decision:
H_0 is rejected if the Sig. > 0.0, H_0 accepted if the Sig. <0.05
The analysis of the effect of saving-energy attitude variable toward saving-energy behavior yield the standardized coefficient beta values positive 0.544 and significance 0.005 (<0.05), then Ho rejected and H1 received.

Based on these results, which means energy saving attitude positive and significant impact on energy-saving behavior in students who can be interpreted that if the energy saving attitude in students the higher the energy saving behavior at the higher student or otherwise.

DISCUSSION

Effect of Knowledge Towardsave Energy behavior On Students

Effect of community attitudes towards behavior that is obtained in the research for 0.185. Thus the influence of knowledge inclined weak in energy-saving behavior change in students in Makassar. Energy Efficient Knowledge of all what is known students who obtained through the process of thinking, information, or experiences of facts, concepts, and procedures regarding energy and how to use them more sparingly. According Notoatmodjo (2003), knowledge is the result of "know" that occurred after the person concerned did sensing to a particular object. Sensing occurs through the human senses: sight, hearing, smell, taste and touch. Of the five senses, the majority of human knowledge is obtained through the eyes and ears[10].

Effect of Attitudes Toward save Energy Behaviour On Students

Effect ofof community attitudes towards behavior that is obtained in the research for 0.544. Thus the effect of attitudes inclined dominant (being) in energy-saving behavior change in students in Makassar. The attitude is a constellation of cognitive components (related to mind), affective (associated with feelings), and conative (related to the tendency to act) that integrate with each other to understand, feel, and behave towards something.

Based on these results when linked with the theory of reasoned action (Ajzen, 2005) said that attitudes influence behavior through a decision making process that is thorough and reasoned, and the impact is limited to just three things: (1) the behavior is largely determined by the general attitude , but by a specific attitude towards something; (2) behavior is influenced not only by the attitude, but also by subjective norms, namely beliefs about what others want us to behave; and (3) attitudes toward a behavior shared norms of subjective form an intention or intention to behave[10].

CONCLUCION

From the analysis of the independent variables on the dependent variable in this study was obtained with a coefficient equation model constants and coefficients of the variables produces the equation Y=49.831 + 0.476 X1 + 0.471 X2. Standardized Coefficients Beta value of knowledge variable to behavior variable is positive 0.185 and significance 0.005 (<0.05), then Ho rejected and H1 received.

Based on these results, which means energy saving knowledge is positive and significant effect on the behavior of energy saving which can be interpreted that if knowledge of energy-efficient the higher the energy saving behavior at the higher student or otherwise.Coefficients Beta Standardized value of variable attitude towards

behavioral variables is positive for 0.544 and the Sig. obtained for 0.000 is smaller 0.05 then H_0 is accepted and H_1 rejected.

Based on these results, which means energy saving attitude positive and significant effect on the behavior of energy saving which can be interpreted that if the attitude of the higher the energy-saving energy-saving behavior at the higher student or otherwise. From the description means that the tendency of energy saving attitude variable is dominant affected behavioral variables by variable energy efficient than knowledge.

REFERENCES

[1]   The Law. 2007. Undang-UndangRepublik Indonesia Nomor 30 Tahun 2007 tentangEnergi. Jakarta: DeputiMenteriSekretaris Negara BidangPerundang-Undangan.

[2]   Menteri Energidan Sumber Daya Mineral Republik Indonesia (EMR). 2012. Peraturan Menteri Energidan Sumber Daya Mineral Republik Indonesia Nomor 14 Tahun 2012 tentang Manajemen Energi. Jakarta: Kementerian Energidan Sumber Daya Mineral.

[3]   Fatmawati, I. 2012. Pengaruh Pembingkaian Pesan, Informasi Kelangkaandan Perbedaan Individual Pada Sikap, Niatdan Perilaku Hemat Energi Listrik.

[4]   Mantra, Ida Bagoes, 2000. *DemografiUmum*. Yogyakarta : PutakaPelajar.

[5]   Singarimbun M, Effendi S. 2006. *MetodePenelitianSurvai*. Jakarta: LP3ES Indonesia.

[6]   Creswell, J. W. 2010. Reseach Design. Sage Publication: Thousand Oaks California.

[7]   Suriasumantri, Jujun S.2010. *FilsafatIlmuSebuahPengantarPopuler*. Jakarta: PustakaSinarHarapan.

[8]   Sugiyono. 2012. *StatistikauntukPenelitian*. Bandung:Alfabeta Bandung

[10]   Notoatmodjo, S. 2003. Pendidikandan Perilaku Kesehatan. Jakarta : Rineka Cipta

[9]   Santoso, Singgih. 2014. *SPSS 22 from Essential to Expert Skills*. Jakarta: PT. Elex Media Komputindo

[11]   Ajzen, I. 2005. *Attitudes, Personality and Behavior, (2ndedition), Berkshire, UK*: Open University Press-McGrawHill Education