The Effect of Outdoor and Indoor Learning Strategies on Students' Environmentally Insightful Behavior (An Experimental Study on Grade X of SMA 5 Depok)

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Abstrak

The objective of the research is to find out the effect of outdoor/indoor learning strategies on students' environmentally insightful behavior. The research is an experiment. It was conducted at SMA 5 Depok. The results of the research reveal that there is a significant differences on students' environmentally insightful behavior between students taught using outdoor and those taught using indoors strategy. The students' environmentally insightful behavior taught using outdoor strategy is higher than those taught using indoor strategy.

Keywords: Environment, behavior, outdoor learning strategy, indoor learning strategy, students' environmentally insightful behaviour

INTRODUCTION

Basically, humans and nature are interrelated. They have a reciprocal relation where it needs human efforts to keep the balance and sustainability. Some efforts were done to make this possible. One way to increase awareness of the importance of environment is through environmental education taught at schools. It is the purpose of this environmental education to change the behavior of people towards nature. The nature of this attitude changing is relatively permanent so it is hoped to contribute in the reduction of environmental problems (Sumiati, 2009).

Environmentally Insightful Behaviour

The connection between Belief, Attitude, Intention and Behavior is first stated by Ajzen in 1975. Hines, Hungeford and Tomera proposed the responsible environmental behavior and published in 1987 (Annex, 1975). Meanwhile, Lewin's general behavior equation explains that behavior is a function of personal and environment, B = f (P, E). The pro – environmental model is based on the linier development of environmental knowledge which focused on the awareness of environment (environmental behavior), which will in turn, suggest to be focused on pro – environmental behavior. This behavior is called model (information) from the understanding of public and act (Burgess et al., 1998 page 1447).
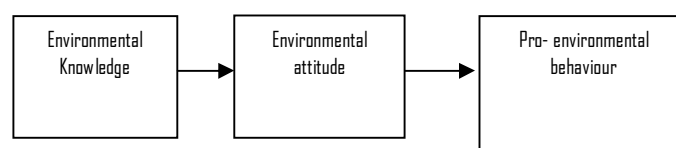
Figure 1.1 : First model of environmental care behavior

Environment scientists divided living environment in three categories, (1) physical environment as all non-living things around us (2) biological environment as living organisms around us and (3) social environment as people (mass) around the first two environments (Joko Subagyo, 2005).

If take a good look on the causes of environment problems, we can say that even without the development of buildings etc., there still always be environment problems. The environment problems can be caused by natural phenomenon and the significantly increasing growth of people (Karden Eddy Sonatang Manik, 2007).

Environmental problems strongly correlated to environmentally insightful behavior. environmentally insightful behavior is an act of a person in his interaction with the environment by (1) well constructing the environment (2) strictly obeying the rules of the environment (3) well controlled using the natural resources (4) choosing and maintaining environmentally friendly technology and (5) sustaining natural resources for the needs of today and future generation.

Environmentally insightful behavior can be done if people understand the concept of environment. One of the basic concepts learnt in basic ecology consists of concept of individual, population, community, ecosystem, energy and biogeochemistry cycle (Eguene, 1971). Ecosystem is a basic unit in ecology, in which consists of biotic community and abiotic environment, each has different characteristic and both need to be taken care of (Eguene, 1971).

Teaching Strategies

According to Gagne and Briggs, teaching is an event which affecting students so that learning process can occur. A set of this event can be conducted by teacher, called teaching, or by students themselves using books, pictures, television programs or the combinations of different media. Both activities should be systematically planned to be called teaching (Gagne & Briggs, 1979).

Teaching is an interaction process between students and their environment so that students can change their behavior to be better. Many factors are affecting this process, including internal and external factors. In teaching, the key role of teacher is to make sure that the environment is supporting the changing behavior process of the students. This conditioned process consists of pre-test, process and post-test (Mulyasa, 2002)

In choosing the teaching strategiy, some criterias to be considered are (1) strategy orientation on teaching task (2) relevance of the content material of teaching (3) techniques and methods used to be focused to the purpose of interest and (4) teaching media used to simultaneously stimulate the students' senses (Hamzah Uno, 2009).
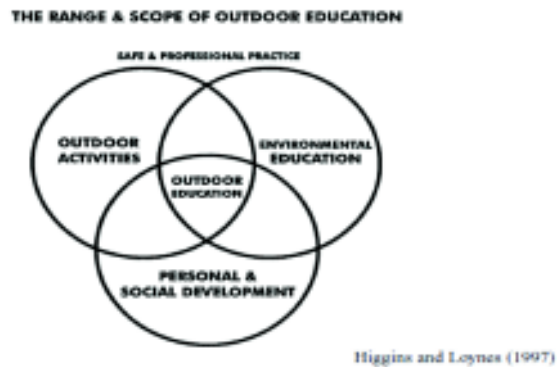
a.   Indoor teaching strategy

Class meeting teaching model firstly initiated by William Glasser. This model consists of six steps : (1) creating conducive environment (2) delivering discussion topic (3) assessing oneself (4) identifying solution (5) making commitment and (6) planning next activities (Hamzah Uno, 2009).

b.   Outdoor teaching strategy

Outdoor teaching strategy is an approach by the teacher to ask the students to study outside the classroom. This is to see phenomenon directly in order for the students to get close to the environment. Teacher acts as a facilitator to guide students to study independently, active, creative and close to nature. The reason to choose this strategy are (1) this strategy allows the usage of outdoor school environment as the source of teaching and learning, (2) this strategy is considered to be effective to be applied in SMA 5 Depok because of its location and also its advantage in increasing students' description in writing, (3) this strategy allows students to see real phenomenon in concrete situation. In conclusion, students can describe an object more clearly and detail. Lastly, teacher facilitates the close interaction between students and their environment using this strategy.

Figure 1.2 : The Range & Scope of Outdor Education

c. **Differences between indoor and outdoor teaching strategies**
    The differences between indoor and outdoor teaching strategies can be seen in the table below.

Table 2.2. The differences between indoor and   outdoor teaching strategies

Indoor teaching strategy	Out door teaching strategy
1. Classroom teaching activity 2. Speech information delivery method, with discussion session 3. No teaching media, if any, only pictures from the teaching material Media 4. Most of the times, students are facing towards the teacher 5. During the class, students sit and listen or write the explanation from teacher	1. Outside classroom activity 2. Information delivered by observing objects 3. Surrounding objects as teaching media 4. Students get along with the teacher 5. During the activity students freely observing objects from the environment

EXPERIMENTAL

Method used in this research is experimental to find out whether there is a difference in behavior of students grouped in indoor teaching strategy and outdoor teaching strategy. Students in this experiment are those from grade X of SMA 5 Depok. Random sampling is used in this experiment. To test the hypothesis, one way ANOVA is used with significance of 5% ($\alpha = 0,05$). Further, whenever there is an interaction between the two groups, Tukey test is used to find out which effect of the interaction is higher.

RESULTS AND DISCUSSION

This research is done using experimental method to describe the effect of teaching strategy and knowledge about the basic concept of ecology on students' environmentally insightful behavior. Teaching strategy is a variable to be tested, outdoor and indoor teaching strategy. Analysis of data is done to find out the effect of teaching strategy on the behavior of environmentally insightful students.

Table 3.1 Observing Data

Respondents Responden	Teaching Strategy Strategi pembelajaran	
	Outdoor	Indoor
	A1	A2
1	51	49
2	51	50
3	54	50
4	54	51
5	55	51
6	55	52
7	55	52
8	55	53
9	56	53
10	56	55
11	58	55
12	60	56
13	62	56

14	62	59
15	64	59
16	64	60
17	65	60
18	65	60
19	65	61
20	68	61
21	68	63
22	70	63

It is known and tested from the data that the data is a normal population with random sampling and also the interval. The total sample used is 22 students. The average of the understanding level of environmentally insightful behavior using outdoor teaching strategy is 59.582 and from the same respondents it is 55.864 using indoor teaching strategy (SDx = 5.818 and SDy = 4.56).

Table 3.2. Data Description

Strategi Pembelajaran (A)						Total	
Outdoor 1			*Outdoor 1*				
n =	22		**n =**	22		**n =**	44
$\overline{X}$	59.582		$\overline{X}$	55.864		$\overline{X}$	57.7727
SX =	1313		SX =	1229		SX =	2542
SX^2 =	40331		SX^2 =	33947		SX^2 =	148166
$(SX)^2$ =	1723969		$(SX)^2$ =	1510441		$(SX)^2$ =	6461764
s =	5.818		s =	4.56		s =	5.5147
s^2 =	33.846		s^2 =	20.79		s^2 =	30.412

Description :

n = total sample   X= knowledge score

s= standard of deviation s^2= variance varians

Students' environmentally insightful behavior using outdoor teaching strategy (A1)
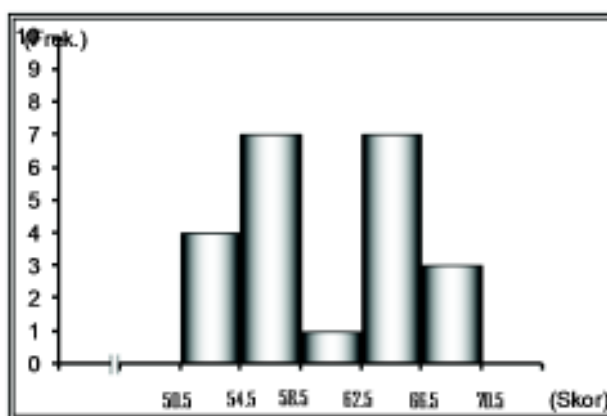
Students' answer scores gathered by questionnaire about environmentally insightful behavior for each student using outdoor teaching strategy can be seen in table 3.1

From the data we can see the secore of students ranges from 51 to 70 with the average of 59.682, SD of 5.818 and variance of 33.846.

Table 3.3: Frequency distribution of students' answer by questionnaire about environmentally insightful behavior using outdoor teaching strategy

No.	Kelas	Batas	Batas	Frekuensi		
Kls	Interval	Bawah	Atas	Absolut	Relative	Kumulatif
1	51-54	50.5	54.5	4	18.18	18.18
2	55-58	54.5	58.5	7	31.82	50.00
3	59-62	58.5	62.5	1	04.54	50.00
4	63-66	62.5	66.5	7	31.82	59.09
5	67-70	66.5	70.5	3	13.63	100.00
				22	100.00	

The next step is to visualize the score of students' behavior into a histogram chart as below.

Figure 3. 4: Description frequency of students' answer by questionnaire about environmentally insightful behavior using outdoor teaching strategy (A)
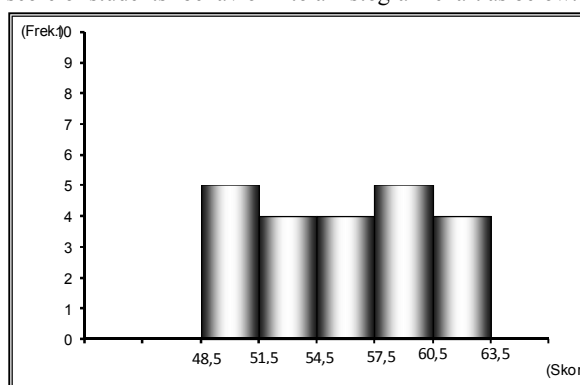
Students' environmentally insightful behavior using indoor teaching strategy (A2)

Data of students's answer score gathered by questionnaire about environmentally insightful behavior using indoor teaching strategy can be seen in tha attachments. Description of data of scores can be seen on the table below. Score of students' answer gathered by questionnaire about students' environmentally insightful behavior using indoor teaching strategy ranges from 49 to 63 with the average of 55.864, SD of 4.560 and variance of 20.790.

Table 3.5: Distribution of frequency of students' answer gathered by questionnaire about environmentally insightful behavior using indoor teaching strategy

No.	Class	Edge		Frequency		
Class interval	Low	High	Absolute	Class interval	Low	High
1	49-51	48.5	51.5	5	22.73	22.727
2	52-54	51.5	54.5	4	18.18	40.909
3	55-57	54.5	57.5	4	18.18	59.091
4	58-60	57.5	60.5	5	22.73	81.818
5	61-63	60.5	63.5	4	18.18	100
				22	100	

The next step is to visualize the score of students' behavior into a histogram chart as below.

Figure 3. 5: Description of frequency of students' answer by questionnaire about environmentally insightful behavior using indoor teaching strategy (B)

Test of Analysis Requirements
Normality Test Pengujian Normalitas
Normality test is used for the group of students learn using outdoor and indoor teaching strategy. Criteria for the test is based on Lcal gathered by Liliefors test on data from the four groups, as below :

$L_{cal} \leq L_{table}$: Data normally distributed
$L_{cal} > L_{table}$: Data not normally distributed

Teaching strategy	N	Statistical Test		Hasil Uji
		L_{cal}	$L_{table\ (0.05)}$	
Outdoor	22	0.19	0.19	Normal
Indoor	22	0.145	0.19	Normal

Homogeneity Test

Sample	Db	1/db	Si^2	logSi^2	db x logSi^2	db x Si^2
outdoor	21	0.048	35.84	1.554362	32.64159409	752.62895
indoor	21	0.048	22.47	1.351623	28.38409176	471.89211
Total	**42**				**61.0256858**	**1224.52**

Step 2 : calculate the variance of the data merger
  (S^2)S^2 =   29.1553

Step 3 : calculate log S^2log S^2 =1.46472
Step 4 : calculate B = sum of db x log S^2B=61.5181
Step 5 : calculate chi square = ln(10) x (B – (jumlah (db x log Si^2))
Step 6 : compare with chi square table
Choose α = 0.05
Free degree = total group – 1 = 44 – 1 = 43
From the chi square table we find 26.509
Step 7 : conclude "reject H0 if chi square calculated > chi square table

H0 : homogeny (same variance)
H1 : not homogeny
Because chi square calculated < chi square table, H0 is accepted.
So, the groups are homogeny (same variance)

Result of hypothesis test
1. Hypothesis test of the effect of outdoor teaching strategy (A1) and indoor teaching strategy (A2) on the behavior os environmentally insightful behavior
The effect of teaching strategy on the bahevior of the environmentally insightful behavior seen based on the score differences between the two groups. To see the difference between the two groups, hypothesis test is used as follow :

Ho   : $\Box_{A1} = \Box_{A2}$
H_1 : $\Box_{A1} > \Box_{A2}$

Criteria for hypothesis test is absed on Fcal and F table from ANOVA table with the assumption :
Ho   : Accepted if $F_{cal} < F_{table}$
H1   : Rejected if $F_{cal} > F_{table}$

ANOVA Table

Variance source Sumber Variasi	JK	Db	RJK	F calculated
Method/ Regression Metode/ Regresi	160.3636	1	160.3636	5.8702
Residual	1147.364	42	27.31818	
Total	1307.727	43		

Db   = Degree of freeness
JK   = Sum of square
RJK   = Average of sum of square
    **   = very significant
    *   = significant

Result of calculation on the ANOVA table in row between columns shows $F_{cal} > F_{table\ (0.05)}$ (5.8702 > 4.17). It fits with the test criteria H0 which stated "There is no score difference on the students by questionnaire about students' environmentally insightful behavior using outdoor and indoor teaching strategies: is rejected and H1 is accepted. There is a significant difference from both groups. Behavior of environmentally insightful students using outdoor teaching strategy is higher compare to indoor strategy.

Tukey Test
Tukey test is usually used whenever data analysis in a research done by comparing data from two same size samples. The comparison using Tukey test is as follow :

H0 : μA = μB
H1 : μA > μB
In which :
μA = average of experiment group
μB = average of control group

The formula is as follow :

$$Q = \frac{\left| X_i - X_j \right|}{\sqrt{(RKD/n)}}$$

Q calculated from the data is 3.51 and Q table (α = 0.05) is 2.95.

Criteria of Hypthesis Test:
-Reject H0 (accept H1) if Qc > Qt
-Accept H0 (reject H1) if Qc < Qt

The calculation result on the above table shows that $Q_{cal} > Q_{table}$ (3.51 > 2.95), so HO is rejected and H1 is accepted. It means that there is a significant difference between the group using indoor and outdoor teaching strategy.

CONCLUSION
There is a significant difference of environmentally insightful behavior of students using outdoor and indoor teaching strategy. The behavior of environmentally insightful students is higher in group using outdoor teaching strategy compare to group using indoor strategy.

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