ATLANTIS PRESS

Advances in Social Science, Education and Humanities Research, volume 178

1st International Conference of Innovation in Education (ICoIE 2018)

The Effects of Knowledge about Ecology, Biospheric and Egoistic Values toward New Environmental Paradigm

1st Suama, I Wayan
Environmental Education on Postgraduate Program
Univeristas Negeri Jakarta (UNJ)
Jakarta, Indonesia.
wasudewa09@gmail.com

2nd Nadiroh
Environmental Education on Postgraduate Program
Univeristas Negeri Jakarta (UNJ)
Jakarta, Indonesia.
nadirohdr@yahoo.com

3rd Amos Neolaka
Environmental Education on Postgraduate Program
Univeristas Negeri Jakarta (UNJ)
Jakarta, Indonesia.
aneolaka@unj.ac.id

Abstract—**The purpose of this research is to find out whether the knowledge about Ecology, biospheric and egoistic values have a direct effect toward new environmental paradigm (NEP) students. This research is a hypothesis verification through survey method. Respondents are determined with simple random sampling of 145 university students in faculty of teacher training and education, Halu Oleo University. The path analysis noted that: 1) knowledge about ecology has a positive direct effect on biospheric values and on NEP students, otherwise negative effect on egoistic values, 2) biospheric values have a positive direct effect on NEP students and 3) egoistic values have a negative effect on NEP students. Contributions knowledge about Ecology towards biosphereic values and NEP students are 79% and 29% respectively, while the contribution of biosphereic values to NEP students is 90%. Biospheric values serve as an intervening variable between knowledge about ecology and NEP students.**

Keywords—ecological knowledge, biospheric, egoistic, NEP

I. INTRODUCTION

In terms of sociology, the development of global environmental issues drives the development of research on the environment. Two years after the launching of Earth Day (1970), an environmental international conference was held in Stockholm (1972) which meant that the community in carrying out development did not destroy environment [1]. The environment must be preserved. It must also be able to function optimally on an ongoing basis for the continuity of life from generation to generation. We all certainly don't want the environment to get worse all the time. In this perspective, the activities that are harmful to the environment should be avoided [2].

The environmental crisis is largely determined by human activities, especially for people with a frontier mentality [3]. There are three characteristics of frontier mentality: a) that nature and the earth have not limitations in supporting natural resources for humans, b) seeing that humans are outside of the natural system, it's not part of nature; and c) looking at nature is something that must be conquered/ mastered, with technology as a tool. Because of that, perspective of frontier mentality must be abandoned and should be replaced with a more advanced and adaptive mindset towards environmental protection which experts call new environment paradigm (NEP) [4, 5].

NEP is a new paradigm for the environment with three main benefits: a) human is being only one species among many who are interdependently involved in the biotic community that shapes our social life; b) The complex relationships of cause and effect and feedback in nature produce many unintended consequences from human actions aimed at; c) The earth is limited, so there is a physical limit and a strong biological hinder the progress of economic growth and other social phenomena [2, 6]. This perspective positions humans is not superior to other ecosystem components (biotic and abiotic components) but as an integral [2, 4].

Shifting mindsets about the environment requires changes in attitudes and additional insights/knowledge [4, 7]. One theoretical approach to studying environmental attitudes is basic value theory. This theory proposes that environmental attitudes are formed by considering prominent aspects of some objects of attitude and the importance of the object's relevance to values. The meaning contained in the statement is the orientation of one's value in an environment based on a value system that is egoistic, altruistic and biospheric.

Related to knowledge, Hegel stated that scientific knowledge and human thinking in general, is a change process from Think-In-Itself, into Think-For-Us, from the nature of materials into something useful for us. It means that what has been not understood at one stage will be explainable [8].

In general, knowledge becomes the basis of one's thinking in dealing with and solving various problems in the environment. De Cecco said that "knowledge is the result of the human thinking process obtained from its environment, in the form of the concept of the creative action of thought as an effort to see and establish relationships/ interactions with its environment".

Through knowledge and its interaction with the natural environment, then there will be a person's outlook on life and of life as well as in relation to the natural environment more holistic and integrative [2, 3, 9, 10].

Based on the description above the question arises whether knowledge about ecology, biospheric and egoistic values positively direct effect toward the NEP students.

II. METHODS

This research is hypothesis verification without treatment of the variables studied. The survey was conducted on university students who have passed environmental knowledge courses and set as many as 145 university students like a simple random sampling. The research aimed to determine the direct effect of knowledge about ecology, biospheric and egoistic values toward NEP students. The hypothetical model of the study refers to causal modeling of path analysis, which NEP student as endogen variable, knowledge about ecology as excogen variable, biospheric and egoistic values as an intervening variables.

III. RESULTS AND DISCUSSIONS

A. *Result*

Summary of statistics data of each variables, can be seen in the following table 1:

TABLE 1. SUMMARY OF STATISTICS DATA.

Statistics					
		Knowledge	Biospheric	Egoistic	Nep
N	Valid	145	145	145	145
	Missing	0	0	0	0
Mean		16.0000	24.2966	27.0276	49.7724
Std. Error of Mean		.20529	.17456	.27298	.36195
Median		16.0000	24.0000	27.0000	50.0000
Mode		15.00	24.00	28.00	48.00
Std. Deviation		2.47207	2.10200	3.28706	4.35849
Variance		6.111	4.418	10.805	18.996
Range		12.00	13.00	23.00	24.00
Minimum		8.00	18.00	12.00	39.00
Maximum		20.00	31.00	35.00	63.00

Summary of hypothesis testing through phi coefficient and t-test, can be seen in the following table 2

TABLE 2. SUMMARY OF HYPOTHESIS TESTING.

No.	Phi coeffisien	values	t-call	t_{table}	
				α 0,05	α 0,01
1.	ρ_{21}	0,38	26,07**	1,645	2,326
2.	ρ_{31}	-0,33	-16,29	1,645	2,326
3.	ρ_{41}	0,12	7,00**	1,645	2,326
4.	ρ_{42}	0,50	13,97**	1,645	2,326
5.	ρ_{43}	-0,25	-9,91	1,645	2,326

Ketr. **: significant on α =0,01

Based on the constellation between variables according to the hypothetical model of the study, causal modeling obtained path analysis as shown in the following figure:

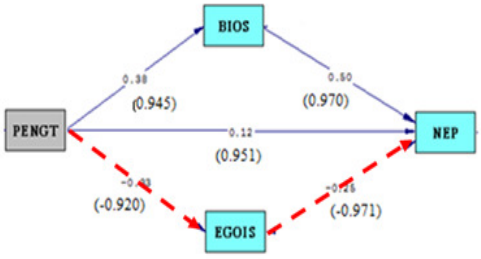

Figure 1.
Phi coefficient of the model hypothetical of the research.

Based on Figure 1 above, there are two *Phi coefficient* that are negative so the hypothetical model of the research needs to be improved on the path analysis (trimming model), so there two substructure equations are produced as follows:

a. Model of substructural equation for variable of Biospheric values:

$$X_2 = 0{,}38\ X_1 + 0{,}17\varepsilon$$

From this equation model, it can be note that knowledge about ecology (X_1) has a positive direct effect to biospheric values (X_2) of the research.

b. Model of substructural equation for variable of the NEP students:

$$X_4 = 0{,}23X_1 + 0{,}44X_2 + 0{,}05\varepsilon$$

From this equation model, it can be noted that: knowledge about ecology (X_1) and biospheric values (X_2) directly affect the NEP students (X_4).

B. *Discussions*

Further descriptions related to the results of this study are explained as follows:

1. Direct effect knowledge about ecology toward biospheric values

Knowledge about ecology has a positive direct effect toward biospheric values. The knowledge is an exogenous variable that important in activating biospheric values. The result of this research also has a match with the result of research conducted by Thomas A. Arcury [12] which shows that environmental knowledge is consistent and positively correlated with environmental attitudes, even though the relationship is not too strong.

A survey study in the United Kingdom found that the best discriminator environmental care and indifferent teens are the amount of environmental knowledge about the specific issues them have, even though the teenagers concerned also have more scientific knowledge than adolescents do not care [2, 9, 12].

The results of testing the hypothesis of influence Knowledge of the basic concepts of Ecology on Biosphere Value shows the standardized value of the path coefficient of 0.38 and the t-value of 34.501. The positive value of the standardized path coefficients produced shows that the causal relationship Knowledge of the basic concepts of Ecology to Biosphereic Value has a direct effect on developing and increasing concern for the environment. The results of further testing with the t-test show that t-count is 34.501 greater than t-table whose value is 2.3263. The results of this t-test confirm that the direct influence of Knowledge of the basic concepts of Ecology on Biosphereic Values is very significant.

The description above further clarifies the causal relationship of knowledge about ecology to biospheric values, in which the high level of knowledge about ecology will be able to increase the concern of the student's environment based on biospheric values.

2. Direct effect on knowledge about ecology toward egoistic values

Knowledge about ecology has not a positive direct effect on egoistic values. The knowledge is not used as a basis for thinking in dealing and solving various complexities of existing environmental problems. This condition is contrast with what was stated by Gagne that "knowledge is a framework of information about facts organized regularly so that it has meaning and can be applied".

Testing the research hypothesis the influence of knowledge about the basic ecological concept of Egoistic Values shows the standardized value of the path coefficient of -0.33 and the t-value of -27.985. The negative value of the standardized path coefficients produced shows that knowledge of the basic concepts of ecology negatively affects Egoistic Values. The results of further testing with the t-test show that t-count (-27,985) is much smaller than the t-table (1.6449). This result confirms that there is no positive direct effect of knowledge about the basic ecological concepts on egoistic values or it can be interpreted that knowledge of the basic concepts of ecology has a negative effect on egoistic values that need to be excluded from the hypothetical model through a trimming model.

In this context, his attitude towards the environment seems pragmatic and the implication lack of relationship/ interaction with his environment. It can also be said that knowledge has a negative effect on egoistic values. The higher a person's knowledge is, the more likely the values underlying his egoistic attitude will decrease, and vice versa.

They do not see themselves as interconnected with others or with the natural environment, and so for that, caring for environmental problems will be motivated by gifts for themselves or avoiding harmful consequences (in this context the choice-rational model of theory applies).

3. Direct effect on knowledge about ecology toward NEP students.

Knowledge about ecology has a positive direct effect toward the NEP students. It means that knowledge about ecology used as a basis for one's thinking in dealing and solving various complexities of problems that are present in the surrounding environment. It also be said that knowledge has important meanings for human and needed to solve various environmental and life problems.

In line with the above opinion, Gagne stated that "knowledge is a framework of information about facts arranged regularly so that it has meaning and can be applied". In line with Gagne, De Cecco said that "knowledge is the result of thought process obtained from its environment and establish relationships/ interactions with the environment" [10]. Through interaction human with their environment, new things/information will be emerged.

A survey research of knowledge in the US finds very high level of knowledge about environmental problems (for example, what renewable resources, where waste goes, what causes habitat destruction), but the level of "discouraging" of knowledge (for example, climate change, energy production and water quality) [2, 12]. As the authors say, making informing pro-environment is a difficult choice if we have not enough scientific knowledge.

Putrawan, I Made concluded that NEP can be explained through knowledge about ecosystems, therefore some statements can reflect students' knowledge of ecosystems as an indicator that they have a frame of mind in terms of NEP students [8].

Testing the hypothesis of the influence of research Knowledge of the basic concepts of Ecology on NEP students shows the standardized value of the path coefficient of 0.12 and the t-value of 6.557. The positive value of the standardized path coefficients produced shows that Knowledge of the basic concepts of Ecology has a positive direct effect on student NEP. The results of further testing with the t-test show that t-count (6.557) is greater than t-table (2.3263). These results confirm that the positive direct effect of Knowledge of the basic concepts of Ecology on student NEP is very significant.

From the description above and based on the results of the research, this study further strengthens the results of other studies about the effect of knowledge about ecology on the NEP students.

4. Direct effect on biospheric values toward NEP students

Biospheric values have a positive direct effect on the NEP students. The biospheric values are important variable for increasing the NEP students.

The results of this research were in accordance with the study conducted by Kean Boon Chua (2015) of 277 rice farmers in the area of the Young Agricultural Development Authority in Malaysia who concluded that

biospheric values positively and significantly affected the NEP [1]. Likewise with the research conducted by Schultz (2001) and Schultz et al, (2005) [6] which states that there is a positive correlation with self-improvement (increasing personal self-interest) and self-reliance with nature (biospheric concern).

Schultz (2001) states that the problem of the biospheric values, that is individual concern for plants, animals, marine life, and birds, predicts pro-environmental behavior [6]. That is concern for the environment (ie, other oriented tendencies of environmental concern, empathy, and feelings for nature) promotes involvement in pro-environmental attitude tendencies.

Biospheric values show a positive correlation pattern with self transcendence (r = 0.24) and environmental behavior (r = 0.21; n = 949; p <0.001). People who have more self-transcendence and biospheric values are more caring and environmental friendly, and vice versa apply to those who hold self-improvement and egocentric values [3, 5, 6].

Testing the research hypothesis of the effect of Biosphere Value on student NEP shows the standardized value of the path coefficient of 0.12 and the t-value of 6.557. The positive value of the standardized path coefficients produced shows that Biosphereic Value has a positive direct effect on student NEP. The results of further testing with the t-test show that t-count (6.557) is greater than t-table (2.3263). These results confirm that the positive direct effect of Knowledge of the basic concepts of Ecology on Biosphere Value is very significant.

Respect for nature requires that we accept that all living things have intrinsic values. This will be reflected in the same respect (both for ourselves and for all living things) [13]. Underlying the attitude of respect for the natural environment is a belief system which Taylor refers to as a "biocentric view of nature" or an ecological view.

5. Direct effect of egoistic values on NEP students.

Egoistic values have not a positive direct effect on the NEP students. In this context the egoistic values factor is not an exogenous variable that important in increasing the NEP students. The results of this study turned out to be in line with the result of research conducted by Schultz (2001) and Schultz et al, (2005) which showed that the egoistic concern is negatively correlated with self-transcendence (beyond the selfish concerns of individuals and contribute to the welfare of others) [6].

Egoistic values influence people to protect environmental aspects that affect them personally, or oppose environmental protection if personal costs are considered high Egoistic concern is negatively correlated with self-transcendence (r=-0.28) and positively correlated with self-improvement (r= 0,16). This result indicates that egoistic concern is negatively related to environmental behavior (r = -0.26; n = 949; p <0.001) [10].

Testing the research hypothesis of the influence of Egoistic Values on NEP students shows the standardized value of the path coefficient of -0.25 and the t-value of -8.00. The standardized value of the negative path coefficient indicates that the effect of Egoistic Value on student NEP is negative. This is further clarified through the results of further testing with the t-test showing that t-count (-.800) is much smaller than the t-table (2.3263) which means that there is no positive direct effect of Egoistic Value on NEP students or may It is interpreted that Egoistic Value has a negative effect on student NEP so it needs to be removed from the hypothetical model through a trimming model.

Furthermore, Stem & Dietz (1994) say that although egoistic values are often seen as opposed to the environmental movement, but in certain situations those who are very egoistic (highly egoistic) are very likely to be concerned about environmental problems when they consider environmental damage as a threat to themselves [3].

This can be expressed as follows: although selfish values are often seen as contrary to the environmental movement, it is important to show that in situations where people with high egoism see threats to themselves from environmental damage, they can show his concern about environmental issues.

IV. CONCLUSION

In general, the research can be concluded that knowledge about ecology and biospheric values have a positive direct effect toward NEP students both individually and jointly. While egoistic values show negative effect toward NEP students.

Specifically, the research can be concluded as follows:

1. Knowledge about ecology has a positive direct effect toward biospheric values.
2. Knowledge about ecology has not a positive direct effect toward egoistic values.
3. Knowledge about Ecology has a positive direct effect toward NEP students.
4. Biospheric values have a positive direct effect toward NEP students.
5. Egoistic values have not a positive direct effect toward NEP students.

REFERENCES

[1] Kerstin Weimer, Richard Ahlström, Jan Lisspers, Jari Lipsanen. (2017). Values, attitudes, moral judgment competence, locus of control and sense of coherence as determinants of proenvironmental behaviors and behavioral intentions. JMEST ISSN: 2458-9403 Vol. 4 Issue 5.

[2] Hosseinnezhad, F. (2017). A Study of the New Environmental Paradigm Scale in the Context of Iran., European Journal of Sustainable Development Research, 1:2 (2017), 14.

[3] Stern, and Dietz Thomas. (1994). Values Orientation, gender and Environmental Concern. Journal of Social Issues, Vol. 50. No. 3, 1994, pp. 65-84.

[4] Ayça Berfu Ünal, Linda Steg, and Madelijne Gorsira. 2017. Values Versus Environmental Knowledge as Triggers of a Process of Activation of Personal Norms for Eco-Driving. Environment and

Behavior 1–27 © The Author(s) 2017 Reprints and permissions: sagepub.com/journals

[5] Orjan Wiidegren, The New Environment Paradigm and Personal Norms, http://journals.sagepub.com/doi/pdf/

[6] Schultz P. Wesley, Valdiney V. Gouveia, Linda D. Cameron, Geetika Tankha, Peter Schmuck, Marek Franek. (2005). Values and their Relationship to Environmental Concern and Conservation Behavior. Journal of Cross-Cultural Psychology, Vol. 36 No. 4. http://journals.sagepub.com/

[7] Joachim Schahn and Erwin Holzer. (1990). Studies of Individual Environmental Concern.The Role of Knowledge, Gender, and Background Variables. Environmental & Behavior. http://journals.sagepub.com

[8] Putrawan, I Made. (2015). *Measuring New Environmental Paradigm Based on Students' Knowledge About Ecosystem and Locus of Control.* Eurasia Journal of Mathematics, Science & Technology Education, 11(2), 325-333

[9] Erdogan N. (2009). Testing the new ecological paradigm scale: Turkish case. African Journal of Agricultural Research Vol. 4 (10), pp. 1023-1031 http://www.academicjournals.org/

[10] Snelgar, Rosemary S. (2006) Egoistic, altruistic, and biospheric environmental concerns: Measurement and structure. Journal of Environmental Psychology, 26 (2). pp. 87-99

[11] Thomas A. Arcury. Environmental Attitude and Environmental Knowledge. Human Organization Journal. Issue: Volume 49, Number 4/Winter 1990. Page 300-304.

[12] Anderson M. (2014). New Environmental Paradigm Scale, European Journal of Sustainable Development Research, 1(2), 14. http://www.lectitopublishing.nl/viewpdf/

[13] Noa Kekuewa Lincoln and Nicole M. Ardoin (2016). Cultivating values: environmental values and sense of place as correlates of sustainable agricultural practices. Agric Hum Values (2016) 33:389–401.