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CONSTRUCTING ATTITUDE MEASUREMENT TOWARD ENVIRONMENTAL LITERACY: VALIDITY TESTING

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Abstract

The objective of this study was to test the attitude measurement construction toward students' environmental literacy. It was modified from Lingqiong Wu, 2013 who was constructed in China. It was adapted and modified in Indonesia version based on Indonesian culture. As much as three demensions of environmental literacy, they are cognitive, skill, and attitude/behaviour toward environment. Stratified random sampling was used to choose as much as 250 primary school students in Bogor West Java. Confirmatory Factor Analysis (CFA) by using M-Plus was used to analyze the data. Based on the finding showed that the Chi-square was 465.976 with the degree of freedom (df) = 78. The p-value of this result study was 0.0000, and Root Mean Square Error of Approximation (RMSEA) = 0.141, Comparative Fit Index (CFI) = 0.938. It was concluded based on the result above that the model was fit with the data.*

Keywords: *Environmental Literacy, Attitude Measurement, Confirmatory Factor Analysis*

Responding to the technological developments, the Government of the Republic of Indonesia through the Ministry of Education and Culture issued a policy on six basic literacy to foster literacy in Indonesia. The basic literacy types released by the Ministry of Education and Culture are numeracy literacy, scientific literacy, financial literacy, digital literacy, cultural literacy and citizenship literacy. Among the six literacy there is a very high urgency, namely science literacy. Science literacy includes the ability to understand the natural phenomena and the environment. It includes making scientifically appropriate decisions in order to live more comfortably, healthier and better. This literacy has several slices, one of which is environmental literacy which has a direct link to the impact of the technological development.

It is undeniable that the influence of globalization and digitalization seems to be very significant towards the shift in attitude and awareness towards the community, especially care for the environment. It can be clearly witnessed through newspaper and electronic media that environmental damage is very worrying. It really illustrates the changes in people's lifestyles that are indifferent to environmental sustainability. This becomes a problem that has a high urgency so that it invites scientists to conduct research that measures the knowledge, skills

and attitudes of the community in treating the environment or better known as environmental literacy.

Environmental Literacy has been used since decades ago more precisely in the 60s, especially in the world of environmental education. The concept was developed a lot one of them by the Environment Education and Training Partnership (EETAP) as an institution that provides training to environmental educators in the United State of America (USA). Based on the study that someone who is environmentally aware knows what should be done for the beauty of the environment, he/she knows how to do and treat it (NAAEE, 2011).

Environmental literacy can be interpreted as community knowledge of the environment and how to preserve it. (O'Brien 2007, Wright 2006 in Sahin and Uzun, 2017) added that environmental literacy is a unity of habits in understanding, skills, attitudes and opinions related to the environment. (Lugg and Hudgson, 2009) suggest that environmental literacy is very dynamic but at this time it is important to be introduced. Not only by educators but it is everyone's duty to remind the importance of the environment for the life and sustainability of humanity.

Wisconsin Department and Public Instruction (WDPI), (2018) also expressed the opinion on environmental literacy. Someone who cares the environment is someone who has the knowledge and skills to invite individuals or groups to maintain the sustainability of nature and cultural systems. The changes and developments of era affects people lifestyles, mindsets and attitudes towards the environment. An increasingly polluted environment must get the attention of all parties. Awareness of the environment must begin to be moved again early on, bearing in mind the results of research by experts and researchers shows that human knowledge, care and attitudes towards the environment are increasingly becoming increasingly alarming. Even according to (Chu et al. 2007 and Kulemeier, van der Bergh and Lagerwij, 1999) in Fah and Sirisena have shown the fact that only a few attempts have been made so far to assess students from various components related to environmental literacy (Fah & Sirisena, 1985).

Fostering a caring attitude towards the environment is fundamental for elementary schools. Because at the elementary school level students are educated early to have a good attitude towards the environment. In line with the statements above,(Stevensen 2017, Ozsoy, Ertepinar & Saglam, 2012; Ergodan, Marcinkowski & Ok, 2009) in Shamuganatan & Karpudewan announced that building environmental literacy at an early age is very important to meet current environmental challenges and as an effort to educate the public about environmental literacy must start from the early stages of schooling through effective environmental education (Shamuganathan & Karpudewan, 2015). (Cutter & Smith, 2001) assert that the introduction of literacy should be a policy in education.

(Simmons, 1995 in Spínola, 2015) explained that there are seven elements that can be measured in environmental literacy. The seven elements are; attitudes (sensitivity to the environment, attitudes, and morals), ecological knowledge, social political knowledge (related to culture, politics, economics, and all social factors related to ecology and the environment), knowledge of environmental issues, skills related to problems / environmental problems and action strategies, systemic thinking, and being responsible for the environment (locus of control), behavior (various forms of active participation aimed at solving problems about the environment).

The variable measured in this study is the Environmental Literacy Variable in primary education, especially in elementary school students aged 9 to 12 years in the city of Bogor. The concept of developing this instrument is motivated by several research results that measure environmental literacy based on education and strata. The results are varied but show moderate results or tend to be low. The average results of research studies by measuring students' attitudes and awareness of their environment. Mc Beth and Volk, (2010) measure sensitivity to the environment (environmental sensitivity), ecological knowledge (ecological knowledge), attitudes to the environment (environmental emotion (attitudes), issues and skills (issue and action skills), verbal commitment (verbal commitment / willingness to act) and actual commitment behavioral. O 'brein and Piase express that the environmental literacy attitudes of students who were respondents were at moderate levels. (Moody, Alkaff, Garison & Golley, 2015) also produced the same findings done. They stated that the respondents began to be open and began to learn more about the environment.

In this study, the variables measured and developed are environmental literacy variables which include dimensions of knowledge, skills and attitudes towards the environment. (Igbokwe and Blessing, 2012) suggests that attitude must be one of the elements that must be measured in environmental literacy because it is related to a sense of belonging, responsibility and care for the environment.

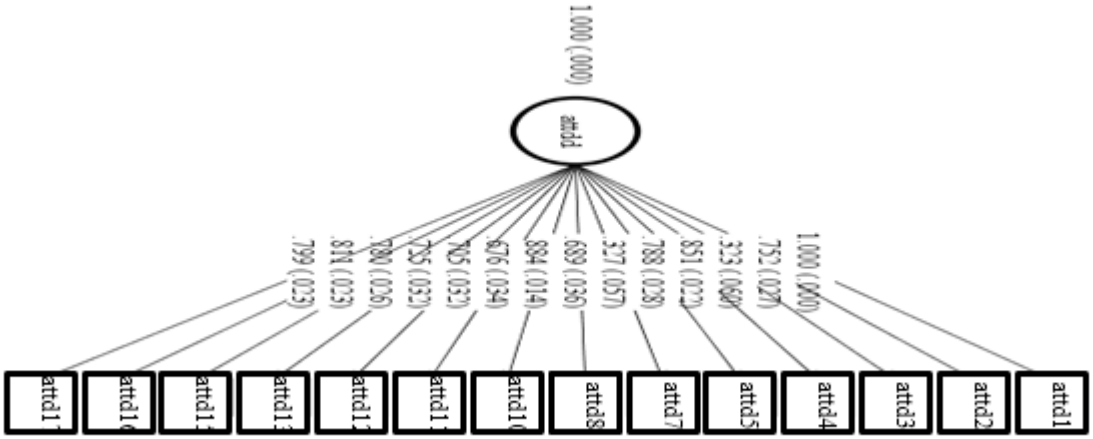
METHOD

Research and development with Confirmatory Factor Analysis (CFA) were used to analyze data. As much as 250 students of state primary school in Bogor had been involved and chosen by stratified random sampling. The data gained were analyzed using M-Plus Software. This study involved 17 statement items as a measurement tool to be tested and analyzed. The items were tested twice in order to get significantly valid items. The items categorized fit model if the comparative fit index > 0.900.

RESULT AND DISCUSSION

As much as 17 items involved in this study based on the dimension used in this study. The dimension used was only one dimension from three dimensions provided. It was intended to be focus on the dimension of attitude/behavior toward the environment. Based on the first testing, as much as 3 items dropped because indicated the relationship with the other items. Thus the comparative fit index was les then 0.900. The items dropped from the first test were number 6, 9 and 14. As much as 14 items were tested back after dropping 3 items which had law value. M-plus was used to analyze empirically the data and the result of Chi-square = 465.976*, degree of freedom (df) = 78, P-Value = 0.0000, Root mean Square Error of Approximation (RMSEA) = 0.141, and Comparative Fit Index (CFI) = 0.938. By dropping 3 items of the statement, the 14 items tested were considered fit model because the CFI value > 0.900.

Based on the result above as much as 14 items statement were considered proven to measure students' attitude/behavior as one of three dimensions of environmental literacy. The items valid based on the final test were number 1,2,3,4,5,7,8,10,11,12,13,15,16, and 17. It was describe in the following figure.



The figure explained 14 significant items. There were 3 items out of the figure. It were dropped because the items were not significantly valid. Besides comparing the comparative fit index, the study compared the t-value for each load factor coefficient. The calculated t-value should > 1.96. The load coefficient factor for the dimension of attitude was described and presented in the following table.

Attitude items of Loading Factor

Items	Estimate	S.E	T-Value	P-Value	Sig.
1	1.000	0.000	999.000	999.000	√
2	0.752	0.027	28.192	0.000	√
3	0.323	0.060	5.421	0.000	√
4	0.851	0.022	37.858	0.000	√
5	0.788	0.028	28.518	0.000	√
7	0.327	0.057	5.740	0.000	√
8	0.689	0.036	19.352	0.000	√
10	0.884	0.014	62.055	0.000	√
11	0.676	0.034	20.096	0.000	√
12	0.705	0.032	22.340	0.000	√
13	0.725	0.032	22.943	0.000	√
15	0.780	0.026	29.565	0.000	√
16	0.811	0.023	35.479	0.000	√
17	0.799	0.023	34.515	0.000	√

Information:

Estimate	*: Coefficient Loading Factor*
S.E.	*: Loading Factor Standard Error*
T-Value	*: Value of t-test*
P-Value	*: Significant Value/Probability*

CONCLUSION

Environmental literacy was a slice of science literacy. It consisted of three dimensions namely cognitive, skill, and attitude. This study was focused on attitude because it was regarded urgent. The urgency of this dimension due to the globalization, digitalization and the change of human lifestyle. The result of empirical analysis toward the data collected from 250 students were produced 14 valid items from 17 items tested. There were 3 items invalid or dropped based on result analysis. The valid items would measure primary school student's level of attitude toward environment in Bogor. The output of the result data could be used as a consideration and input in making the policy.

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