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Research Article

The Effect of Environmental Education Learning on Students at University

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Abstract: The commitment to environmental improvement through education has been included in the agenda this century. One formulation state that education plays an essential role in achieving a shared vision of realizing sustainable development. The specific steps are taken from Agenda 21 formulated in Education for Sustainable Development. The specific objectives to achieve from this research are as follows 1) Identifying the effect of environmental education on environmentally friendly attitudes of students; 2) Identifying the effect of environmental education on environmentally friendly behavior of students. The number of samples used in the study was 216 respondents. The data analysis technique used in this study is the Confirmatory Factor Analysis (CFA). From the results obtained for the energy conservation variable, the behavior towards conservation shows that there is still a lack of students conserving energy in their daily lives. An attitude of caring for the environment is a willingness that arises from internal encouragement to declare caring action for the environment, improve or maintain the environment's quality. Environmental care is intended as a change in the behavior of learning outcomes shown through understanding, experience, and mental readiness of students in applying the knowledge they learn through social processes to respond consistently to particular objects in a direction that supports or rejects and agrees or disagrees with an object.

Keywords: Attitudes, Behaviors, Confirmatory Factor Analysis (CFA), Education for Sustainable, Environmentally Friendly.

1. Introduction

Humans have abilities that can and need to be developed through experiences formed in interacting between individuals and the environment in which they live, which can affect behavior, growth, development, and the process of living their lives through their physical and social environments. Education is a human effort to cultivate and develop innate potentials, both physical and spiritual, following the values in society and culture. Therefore, education needs to be supported by an excellent educational environment because the educational environment is everything that is around humans in interacting both in the form of inanimate objects, living things, and things that happen and as a place to channel the abilities to shape everyone's development, which has a strong influence on the individual.

Environmental education plays a vital role in preserving and improving the world's environment, in realizing sustainable living. A primary aim of environmental education is to make individuals and society understand the complex nature of nature and the built environment resulting from the interaction of their biological, physical, social, economic, and cultural aspects, and to acquire the knowledge, values, attitudes, and practical skills to participate. Responsibly and effectively in anticipating and solving environmental problems and managing environmental quality. The importance of environmental education for a sustainable living so that

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environmental education must be applied in society starting from an early age. Every school must be able to invite and introduce students to understanding natural conditions and current natural problems. It aims to increase students' awareness to be more sensitive to current natural conditions.

Globally, there are five goals for environmental education that were agreed upon after Tbilisi in 1977 by the international community. According to Fien [1]–[3], the five objectives are as follows.

1) Knowledge area: helping individuals, groups, and communities to gain various experiences and gain knowledge about what is needed to create and maintain a sustainable environment.
2) Awareness field: helping social groups and individuals to gain awareness and sensitivity to the environment and its accompanying issues, questions, and problems related to the environment and development.
3) Behavioral field: helping individuals, groups, and communities to obtain a series of values of feeling caring for the environment and motivation to participate in environmental improvement and protection actively.
4) Skills area: helping individuals, groups, and communities to acquire skills to identify, anticipate, prevent, and solve environmental problems.
5) The participation area provides opportunities and motivation for individuals, groups, and communities to create a sustainable environment.

Environmental education is needed to manage our resources wisely and foster a sense of responsibility for future generations' interests; knowledge, attitudes, and skills or behavior are needed that make our resources sustainable or sustainable use. Environmental education studies environmental problems, especially problems and pollution management, environmental damage, and resources and conservation. Environmental changes are happening more quickly; various disasters come and go; it is a phenomenon that jolts our minds. Some disasters are caused by a decrease in the environment's quality, making us think backward and relate the incident to the educational process. Environmental education is a process to build a human population in the world who is aware of and cares about the total environment and all the problems related to it, and people who have the knowledge, skills, attitudes, and behavior, motivation, and commitment to work together, both individually or collectively, to be able to solve various current environmental problems and prevent new problems from arising [4].

The commitment to environmental improvement through education has been included in agenda 21. Agenda 21 is a world action program for sustainable development programs at the 1992 Earth Summit. It has produced several formulations. One formulation state that education plays a vital role in achieving a shared vision of realizing sustainable development. The concrete steps of Agenda 21 are formulated in Education for Sustainable Development (ESD). Education for Sustainable Development is an educational concept whose primary objective is to provide support for sustainable development efforts through education. The expected outcome of Education for Sustainable Development is that people are knowledgeable, creative in problem-solving, have knowledge and social sensitivity, and have commitment and responsibility. The meaning of commitment and responsibility in Education for Sustainable Development is the formation of environmental ethics and attitude implemented in individual behavior towards the environment and lifestyle. Environmental care is in the affective domain of learning outcomes and can be induced through learning designed to provide specific learning experiences. Specific learning designs are one way to increase environmental care effectiveness within the framework of Education for Sustainable Development. Field-specific learning designs to bring out environmental care attitudes in learning must be applied in the classroom to materials related to the environment [5].

Referring to the opinion [6], many people say that they are "environmentalists," but they do not translate their attitudes into pro-environmental behavior. One reason may be that the choice between acting in a pro-environmental manner and not doing so often involves a conflict between immediate individual interests and long-term collective interests. The individual benefits obtained from traveling by car, buying food and other products without considering negative environmental impacts, not recycling, and not saving energy in the household are of immediate interest. In contrast, negative environmental impacts, such as the behavior mentioned above, lead to uncertain situations. in the future [7]. [8], [9] said that traveling by car saves time and is more comfortable and enjoyable but has many negative impacts on the environment such as air pollution, noise, and high consumption, against the energy that is not renewable.

In several studies' car owners feel that a car is better and superior to a bus or a bicycle when it comes to individual interests but harms environmental impacts. They also feel that the benefits for individuals are more important than benefits for people [7]. This is true if we look at city people's tendency to use a car when going to work, campus, or supermarkets. They feel the benefits of a car, besides being practical, it also saves energy and time compared to taking a bus or bicycle. Using a car can carry

more personal needs and do not need to absorb the scattered air pollution; on the contrary, it contributes to the increase in air emissions produced by their car. This condition will be exacerbated if each person has one car and one driver, and there is no local government policy to limit private car ownership. This is different if people use public transportation more often, such as buses, busway, taxis, or trains, which will reduce the number of carbon emissions into the air. However, using public transportation for some people is impractical and takes much time, and reduces the comfort, especially if you must use a bicycle that does not emit air and the rider must sweat before he reaches his destination.

2. Research Methods

2.1. Research Approach

In a study, of course, it is necessary to prepare a research design so that the research runs as expected and does not go out of the way that has been determined. In this research, the research approach used is quantitative. A quantitative approach is a research approach that primarily uses a post-positivistic paradigm in developing science (such as thinking about cause and effect, reduction to variables, hypotheses, and specific questions, using measurement and observation, and theory testing), using research strategies such as experiments and surveys that require statistical data.

This research's research type is survey research, namely research, without making changes (no special treatment) to the variables studied. According to Kerlinger, the characteristics of survey research are as follows:

a) The research object is carried out in large and small populations, but the data studied is data from a sample taken from that population so that the relative incidents, distribution, and relationships between sociological and psychological variables can be determined. Survey research is conducted to generalize in-depth observations.
b) The survey method does not require a control group as in the experimental method.

2.2. Research Variable

Variables construct whose properties have been assigned a value in the form of numbers or concepts with two or more values on a continuum. The value of a variable can be expressed in numbers or words. Variable can also be interpreted as a symptom of something that will be the object of research. Based on the variable relationship, it can be divided into the following two:

a) Independent variables are variables that affect or become the cause for other variables. The independent variables in this study are environmentally friendly attitudes and behavior.
b) The dependent variable is the variable that is influenced or caused by other variables. The dependent variable in this study is environmental education.

2.3. Population

The population is all individuals who are intended to be researched and subject to generalization later. Generalization is a way of concluding a wider group of individuals based on data from a small group of individuals. According to [10], the population is a generalization area consisting of objects or subjects with specific qualities and characteristics determined by researchers to be studied and then conclude. In this study, researchers have determined the population that is the study's subject, namely all students of the Universitas Negeri Makassar postgraduate program.

2.4. Samples

The sample is part of the number and characteristics of the population. If the population is large, researchers cannot study everything in the population, for example, because of limited funds, personnel, and time. Then the researcher can use a sample taken from that population. From the sample becomes the conclusion that will be applied to the population. For this reason, the sample taken from the population must be genuinely representative (representing). The technique of determining the number of samples can be categorized into two types: the number of known populations and the unknown population. In this study, the researcher already knows the population size, so that the researcher uses the technique of determining the sample whose population is known. The number of samples used in the study was 216 respondents.

2.5. Instruments

A research instrument is a tool used to measure observed natural and social phenomena. Specifically, these phenomena are called research variables. The questionnaire used in this study aims to classify students based on environmental attitudes and behaviors. The scale of measurement in this questionnaire uses a Likert scale guideline, a scale used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena.

Researchers have specifically determined this social phenomenon, from now on referred to as research variables. In this case, the variables in question are students' environmentally friendly attitudes and behavior. With a Likert scale, the variables to be measured are translated into variable indicators. These indicators are

then used as a starting point for arranging instrument items, which can be statements or questions. Each instrument item's answer has a gradient from very positive to very negative, which can be in the form of words. In this instrument, the answers used are Strongly Agree, Agree, Disagree, and Strongly Disagree. This study used an instrument from an article entitled Environmental attitudes and behaviors of college students: a case study conducted at a Chilean university [11] modified by the researcher.

Table 1. Research Instruments

Variable	Indicators
Pro-environmental attitude scale	I want to tell people about the importance of pollution and environmental problems. (SPL1)
	When I must decide between buying two similar products, I tend to choose the one that is less damaging to people or the environment. (SPL2)
	I do not want to save energy if I limit the use of appliances like TV or air conditioning. (SPL3)
	I do not care to leave the tap unnecessary; for example, brush my teeth or let it run after use. (SPL4)
	When I recycle, I feel good. (SPL5)
	I am willing to reduce unnecessary product consumption and severe packaging degradation. (SPL6)
	I do not want to throw the residue in a different bin depending on the type (i.e., organic, paper, plastic, or glass). (SPL7)
	I want to take an active role in finding solutions to problems that come from pollution. (SPL8)
	I am willing to use a bicycle or take a bus to the university, to reduce air pollution. (SPL9)
Pro-environmental Behavior scale	I take part in activities that care about the environment (PPL1)
	I talk about the importance of the environment with other people. (PPL2)
	I prefer drinking bottles that can be returned. (PPL3)
	I buy organic products. (PPL4)
	I avoid using products made by companies that pollute the environment. (PPL5)
	I use recycled or certified paper. (PPL6)
	I walk or use my bicycle when I go to places near my house. (PPL7)
	I usually travel to the university by subway, bus, or on foot. (PPL8)

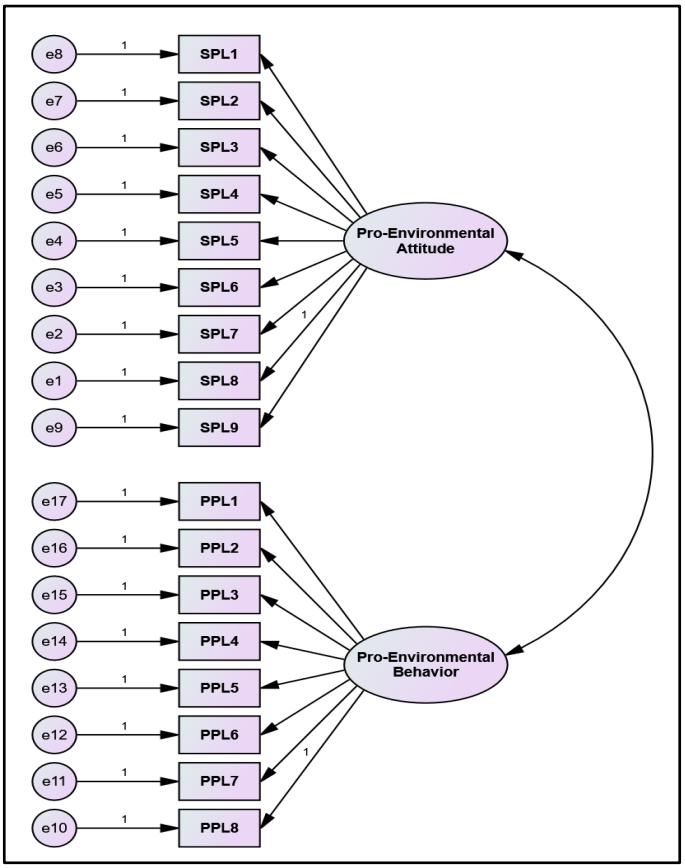

Figure 1. CFA Research Model

2.6. Data Analysis

Based on the measurement scale, this research scale is an interval scale. The interval scale is a scale that results from measurements in which the measurement is assumed to have the same measurement unit. The measurement scale is an agreement used as a reference to determine the length and shortness of the intervals in the research measurement tool. With a measurement scale, the value of the variables measured by specific instruments can be expressed in numbers so that the results obtained will be more accurate, efficient, and communicative [12].

After all the necessary data sources have been collected in quantitative research, the next step is to analyze the data. The data analysis technique used in this research is the Confirmatory Factor Analysis (CFA). Confirmatory factor analysis is an analysis that aims to find several indicator variables that form variables that are not directly measurable based on theoretical foundations [13]–

[15]. CFA analysis will be processed using the AMOS 22 program.

3. Result and Discussions

3.1. Confirmatory Factor Analysis (CFA)

The results are findings of data analysis for empirical studies that answer research questions. The discussion interpreted the findings and explained the results and their associated implications by explaining the results of the study and its relationship with the related literature [16]. The quantitative data analysis in the study used Confirmatory Factor Analysis (CFA), which aims to find several indicator variables that form variables that are not directly measurable based on a theoretical basis. Thus, CFA has two focus studies: (1) whether the indicators are conceptualized un-dimensionally, precisely, and consistently; (2) what indicators are dominant to form the construct under study.

3.2. Goodness of Fit

Fit's goodness is an indication of the comparison between the specified model and the covariance matrix between indicators or observed variables. If the Goodness of Fit produced by a model is right (fit), then the model can recommend and vice versa. If the Goodness of Fit produced by a model is wrong (not fit), then the model must reject, or the model modified. Overall, there are three types of Goodness of Fit measures as follows:

Table 2. Goodness of Fit

No	Goodness of Fit	Cut-Off Value	Value	Result
	Absolute fit measures			
1	Probability (p)	≥ 0.050	0.998	*Fit*
2	Chi-Square (CMIN/DF)	< 2.000	0.02	*Fit*
3	The goodness of Fit Indices (GFI)	> 0.900	0.948	*Fit*
4	Root Mean Squared Error of Approximation (RMSEA)	< 0.080	0.000	*Fit*
5	Akaike's Information Criterion (AIC)	AIC Def. < Sat & Ind	227.909 < 420.000 & 353.271	*Fit*
6	Consistent Information Akaike index (CAIC)	CAIC Def.< Sat & Ind	491.550 < 1312.977 & 638.316	*Fit*
	Incremental Fit Indices			
1	Tucker Lewis Index (TLI)	> 0.900	1.459	*Fit*
2	Comparative Fit Index (CFI)	> 0.900	1.000	*Fit*
3	Incremental Fit Index (IFI)	> 0.900	1.267	*Fit*
	Parsimonious Fit Indices			
1	Parsimony Normed Fit Indices (PNFI)	> 0.500	0.521	*Fit*
2	Parsimony Comparative Fit Indices (PCFI)	> 0.500	0.779	*Fit*

Table 3. Regression Weights & Loading Factor Model

Construct		Variable	Estimate	S.E.	C.R.	Prob.	Estimate
KE1	<---	Energy Conservation	0.754	0.228	3.307	0.003	0.743
KE2	<---	Energy Conservation	0.452	0.324	1.395	0.432	0.648
KE3	<---	Energy Conservation	0.243	0.244	0.996	0.462	0.572
KE4	<---	Energy Conservation	0.523	0.143	3.657	0.000	0.695
MT1	<---	Mobility and Transportation	0.635	0.536	1.185	0.324	0.431
MT2	<---	Mobility and Transportation	0.525	0.635	0.827	0.776	0.284
MT3	<---	Mobility and Transportation	0.238	0.342	0.696	0.832	0.184
MT4	<---	Mobility and Transportation	0.462	0.762	0.606	0.947	0.391
PL1	<---	Waste Prevention	0.763	0.655	1.165	0.158	0.440
PL2	<---	Waste Prevention	0.434	0.281	1.544	0.134	0.200
PL3	<---	Waste Prevention	0.338	0.433	0.781	0.734	0.230
PL4	<---	Waste Prevention	0.583	0.221	2.638	0.012	0.832

Construct		Variable	Estimate	S.E.	C.R.	Prob.	Estimate
DU1	<---	Recycling	0.573	0.215	2.665	0.011	0.587
DU2	<---	Recycling	0.752	0.452	1.664	0.131	0.270
DU3	<---	Recycling	0.717	0.471	1.522	0.162	0.450
DU4	<---	Recycling	0.665	0.443	1.501	0.172	0.300
PK1	<---	Behavior towards Conservation	0.586	0.213	2.751	0.001	0.716
PK2	<---	Behavior towards Conservation	0.678	0.931	0.728	0.857	0.350
PK3	<---	Behavior towards Conservation	0.481	0.817	0.589	0.853	0.270
PK4	<---	Behavior towards Conservation	0.586	0.661	0.887	0.984	0.620

Many energy conservation efforts can be made for a small fee, even without cost. Often all it takes is changing our perspective/attitude and applying a little discipline that will not make us suffer but will have a significant macro impact. Allowing energy consumption to proliferate and wasteful is very detrimental. Because the disease caused by neglecting energy conservation in the country is quite severe (fuel subsidies, in-efficiency, decreased air quality in big cities) while our energy conservation potential is enormous, energy conservation as a necessity cannot be delayed any longer. How to "half force" or build awareness of the government and society to make energy conservation a new culture must be done. With conservation, the negative impact on the environment is reduced, even now - through the Clean Development Mechanism (CDM) scheme, and pollution reduction can be sold to the world emission market. A clean environment improves health status. The government also reaps profits from energy conservation. With the fuel subsidy, which is now "extraordinarily large," the cost of supplying fuel and electricity, building energy infrastructure, the cost-reducing environmental impact can be reduced. Thus, the ability to carry out energy conservation strengthens industrial competitiveness and national productivity. The potential for "energy saving" from doing energy conservation in Indonesia is tremendous. A World Bank study concluded that industrial energy consumption in Indonesia could be saved by 8 percent without additional costs. With a little investment, energy consumption savings can be reduced by up to 23 percent. A study conducted by the Ministry of Energy and Mineral Resources of the Republic of Indonesia estimates that the national energy conservation potential is between 20-30 percent: in the industrial sector 15-30 percent, transportation 25 percent, household, and commercial 10-30 percent.

The understanding of energy conservation as a practical action has not yet been developed in the community due to the scarcity of information dissemination or campaigns regarding energy conservation techniques. The government is still too little or too slow to pay attention to the energy conservation movement. The government is still implementing wrong energy pricing policies, making energy conservation an option that people should make. Doing energy conservation provides benefits. With conservation, if we find a new source of energy. If Indonesia can save about 10 percent of its fuel consumption, this means "finding for free" a new oil field that produces around 150,000 barrels per day. The industry can lower production costs if using energy economically is practiced. Likewise, the operating costs of office buildings, hospitals, schools, hotels, malls, supermarkets, and households could be lower if energy efficiency was applied. Changing the way, you drive and improving traffic management can significantly reduce fuel consumption. In addition to reducing costs, energy conservation means increasing service capacity and access to energy. The energy saved (fuel oil, electricity) can be expanded its use for other communities. Energy conservation has a positive impact on the environment. For example, burning fossil fuels by transportation and coal power generation produces various pollutants (COx, NOx, SOx) and dust.

Some environmental experts such as [17]–[20] mention that recycling waste is a necessary form of solid waste management, but often people say garbage is something dirty and takes time to manage, so they are reluctant to do it [7]. Recycling requires someone's effort to sort household waste and transport it to several recycling facilities. Recycling also involves reusing and repairing equipment, such as clothing and furniture [21]. Households are preoccupied with extra effort if all household waste is disposed of in the same place. Recycling, however, has a positive impact on the environment and long-term positive social impacts such as saving resources and reducing the use of goods in waste management [17].

Environmentally responsible consumption is another form of environmental behavior. Consumers can choose to buy non-use goods to buy goods that are produced ecologically. Some products may be avoided because they are harmful to the environment, such as plastic barrels used for chemicals that must be cleaned before using. Environmentally responsible consumption can reduce the

amount of household waste. Being a responsible consumer may come at a cost as these items are often more expensive and not always readily available in stores. Modern society depends on energy consumption. This evidence of excessive consumption of non-renewable energy requires us to reduce the amount of energy consumed. However, reducing energy use may result in what many consider a low standard of living [22].

Pro-environment is an action that is useful for minimizing environmental damage or improving environmental conditions [23]. The relationship between pro-environmental attitudes and behavior will be vital when individuals have knowledge in the environmental field and show it to others, making it easier for people to act in line with the goals they want to set [24]. Place attachment is a positive emotional bond between an individual and a place [25]. Waideman and Anderson stated that this emotional bond was not only positive but also negative [26]. Many other researchers, such as Hummon, state attachment to place as a cognitive and emotional bond that involves place and is mostly positive [27].

This study is also in line with research conducted by pro-environmental relations [28]. Place attachment consists of place dependence, place effect, place identity, and social ties. With data from 452 visitors to the Dandenong Rangos National Park, Australia, this study investigated the four dimensions of place attachment and their relationship to place satisfaction and pro-environmental behavior. Research shows that it is necessary to consider pro-environmental behavioral intentions as a 2-factor structural construction, namely high and low pro-environment.

Place attachment is a symbolic relationship formed by someone who culturally provides an emotional understanding of a land space that is based on a person or group of people in understanding their relationship with the environment [29]. Pruneau states that place attachment is the result of emotional, cognitive, social, cultural factors, behavior, and a positive attitude towards a place, extensive knowledge, or the result of someone's frequent visits to a place [30], [31]. Place attachment is a condition of attachment between humans and the environment in which they live, the relationship between humans and the conditions of their surroundings, which makes them feel at home and enjoy their environmental conditions [31]–[33].

4. Conclusion

In everyday life, people often face choices where their decisions have a positive impact on themselves and a negative impact on the environment or a negative impact on themselves and a positive impact on the environment. A better understanding of the psychological factors that influence their desire to act in a pro-environmental form and manner is essential to stimulate people's environmental behavior. Environmental education needs to get attention, support from all parties, the government, and teachers' seriousness to run as expected, namely building a community that cares about the environment and can play an active role in solving environmental problems. In the learning process of environmental education, students must be actively involved.

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