

## **The Integration of Environmental Education (EE) in Science Materials by MOTORIC Learning Model to Improve Environmental Attitude for The Student At Kupang City**

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**Abstract:** *In this article the authors introduce a learning model which is designed to introduce the environmental attitude instilled early to generations. This learning model can be used as an alternative learning for Environmental Education (EE) is performed on the integrative science subjects. This model is named MOTORIC which stands for Motivation, Observation, Talking, Orientation, Reinforcement, Implementation and Confirmation that shows seven components in the learning process MOTORIC models. The learning model is based on the three approach are character, contextual and multimedia approach. The application of the MOTORIC model is implemented with a sample of class VII students of junior high school 13 Kupang Indonesia. One aim is to improve the environmentally attitudes of students as indicated by the positive attitude of students towards the environment around the school. The test is done with a sample of the Environmental Education (EE) material covering several themes i.e. garbage, pollution and environmental conservation there are inserting in the science material of class VII junior high school in the System Life Energy subject. Student environmentally attitudes were measured using a Likert scale attitude instrument. The study was designed as a pretest-posttest one group design. Data were analyzed by using frequency (proportion). The results showed that the integration of environmental education (EE) materials in Science subject by the MOTORIC model effectively increases the environmental attitudes of individual junior high school students up to 21.1% and 21.6% in group.*

**Keywords:** *Integration, Education, Environment, MOTORIC, Attitude*

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### **I. Introduction**

Government efforts to save the environment have long been implemented, among the country through formal education subjects integrated to the Environmental Education (EE) it is taught both monolithic and integrated approach. But the fact remains that to this day in a growing sense of awareness to preserve the natural environment remains low. Starting from the smallest things, such as littering, barren school yard without green plants to burning and logging of exploration. Hence, the need to embed environmental attitude imparted to children at an early age through formal education at school and informally in the family environment. Therefore, as an educator we must care about environment and participate to assist the government in an effort to address the environmental issues in conjunction with the awareness of the student to preserve the environment. One way is to dialogue with improving students knowledge about the environment through the integration of Environmental Education (EE) in each subject of school curriculum.

Basically the outcome of environmental education is not knowledge, but rather lead to changes in attitudes awareness to behavior change. Attitude is a reaction or response to someone who is covered to a stimulus or object (Notoatmodjo,2003:23)<sup>[1]</sup>. Meanwhile, according to Sukadi (2002:21)<sup>[2]</sup> the attitude is willingness or tendency of a person's to behave in particular when he faced certain stimuli. This attitude can happen to objects, situations, people group, and the values of all the things that are around humans. Regarding the direction of inclination can be positive or negative attitude. In a positive attitude then the tendency is to like, approve, approach, attention and expect anything good from the object. But otherwise there is a tendency to stay away from negativity, do not agree, hate, do not care, and avoid special problems.

Therefore, in environmental education, the emphasis was on the need for implanted a character that someone has a positive attitude towards the environment. In environmental education, cultivation of character is more important than just the provision of information in the form of knowledge. Therefore, domain knowledge is mind (way of thinking), while the character is domain knowledge (how to think) and attitude. As revealed by Rohman (2012:142)<sup>[3]</sup> character is a way of thinking, attitudes and behavior which is characteristic of each individual to live and work together, both within the family, community, nation and state. The individuals of good character who can make decisions and be ready to account for any consequences of decisions he made. Thus, invested in environmental education is not knowledge about the environment, but rather leads to the formation of the character of the students to be environmentally. The goal is to have an insight into the environment not only as just information (nature of knowledge) but the concept of environmental insight characterizes (as character) of each individual student . Associated with a good time to start a character

education, Masnur (2011:96)<sup>[4]</sup> says that the cultivation of character should be started at an early age and family environment contributed greatly as the foundation stone of character education for children. Related to that, past the age of kindergarten, elementary and junior high school is the right age span to infuse character education. Considering most of the time at this age they interact with the environment of the school, the teacher's role as an instructional designer in the strategy becomes very important.

In connection with it, then in instilling environmental character to students, the more necessary in learning is an example and a model to be emulated student attitudes. Thus, in this environmentally friendly character education, teachers are not only limited as a motivator in learning but also as examples of exemplary student in attitude. The role of the teacher becomes more widespread and responsible for almost every environmental attitudes of teachers should be a source of inspiration and role model for students to act intelligently participate in conserving the environment. Learning the environmental character must be contextual. That is, the teacher must be able to present a real atmosphere in the classroom related to environmental damage as a student reflection enormity of environmental significance for their future survival. Contextual learning is learning concepts that the teaching and that help the teachers link between the material taught students with real-world situations and encourage students to make connections between the knowledge possessed by its application in their lives as family members, citizens and workers (Komalasari, 2011:6)<sup>[5]</sup>. Thus, the contextual approach to character education is one of the approach that can be used to embed the teacher to the student environmental attitudes.

Environmental attitudes as indicated by the presence of a positive attitude towards the environment is not a talent or innate attitude, but is the result of a process of education in the broadest sense. Planting environmentally wrong attitude to the younger generation will bring a negative impact on the environment. Conversely, if a positive attitude towards the environment is instilled early on to the younger generation will also have a positive impact on the efforts to save the environment. Therefore, the cultivation of environmentally attitude to the students is one form of the process of formation of positive attitudes the young generation through formal education (Hamzah, 2013:42)<sup>6</sup>.

Research in an effort to raise awareness of environmental protection for junior high school students ever undertaken by Dyah Puspari (2008) by applying Contextual Teaching and Learning (CTL) on the learning of environmental education to students of SMP Negeri 1 Balikpapan. Research results show, among others, (1) Environmental Education in the learning students need to gain direct experience or at least see the real student-related materials that are being dibelajarkan environment, (2) the students began to realize the importance of environmental sustainability, (3) application of learning Contextual Teaching and learning models in Environmental Education (EE) able to optimize the appearance of intellectual potential, creativity, emotional intelligence and student adversity (Puspari, 2008:28-30)<sup>[7]</sup>.

To be more attractive learning, the teachers can use visual and audio-visual media to display the phenomena related to the environment. The media is very supportive to the creation of the image in students that environmental damage will have an impact on the future of their lives in the future. Describe the phenomena of nature such as flood damage caused by indiscriminate waste disposal, landslides, droughts and other disasters that occur because of damage to the environment very precise aired on environmental education learning process. Based on the above description, and then one of alternative that can be offered early on to instill knowledge and a positive attitude that is environmentally friendly with the students collaborate on three main points that underlie efforts to overcome the obstacles in the process of environment learning that is (1) environmentally approach to character life, (2) a contextual approach and (3) multimedia learning, making it an integral and mutually support each other. The learning model is named *MOTORIC* which stands for *Motivation, Observation, Talking, Orientation, Reinforcement, Implementation* and *Confirmation* that shows 7 *MOTORIC* learning component in the learning process of Environmental Education. Accordingly, the application of the *MOTORIC* learning model has been tested on Science subjects of junior high school students in the Kupang city by sample VIIC-class students of junior high school 13 Kupang city.

The goal of this study is to instill students' environmental attitudes characterized by the positive attitude of students in participating conserve the environment around them. Through the results of this study are expected to be useful to enhance the students' knowledge and positive attitudes towards lingkungan, so the rescue efforts and environmental preservation in the city and particularly in the province in general can be implemented at an early stage, collaborative, continuous and sustainable.

## **II. Research Methodology**

The implementation of *MOTORIC* learning model had been done at VIIC grade students of junior high school 13 Kupang. Implementation of the *MOTORIC* model is focused on the integration of material Environmental Education (EE) in Material Science Class VII junior high school based Curriculum 2013. Principal material is trialled with material Chapter 6 about Energy in Life Systems. The trick is to do the insertion (*inserting*) the environmental material on each concept in Sain material that has to do with the material

environment. Material Environmental Education (EE) is integrated in the sample of material science include three topics, there are pollution, trash and environmental conservation. Tests carried out through the implementation of the MOTORIC model by One Group Pretest-posttest design. In this study, environmental attitude variables measured through test attitudes of students in a Likert scale, amounting to 30 grains statement. Research data that students' positive attitudes towards the environment are analyzed by using frequency analysis (proportion).

### III. Results And Discussion

MOTORIC learning model is one of the learning model that collaborate by three learning approach, namely character approach, contextual approach and instructional media. MOTORIC designed in 7 learning components, namely Motivation, Observation, Talking, Orientation, Reinforcement, Implementation, implementation and Confirmation. Implementation of MOTORIC learning model on students of class VII of junior high school 13 Kupang implemented by a teacher as a model and two observer. Before being implemented, carried out socialization and mentoring to teachers models and observer.

The implementation of MOTORIC learning model begins with a pre-test that is environmental attitudes test. The implementation of the MOTORIC model on the material Energy in Life Systems (Chapter 6) performed a total of 15 Hour Lesson as reference syllabus on Curriculum 2013. The learning process which still refers to expected approach by the Curriculum 2013 that is the saintific approach. However, the learning model of applied is MOTORIC models which consists of 7 components, namely Motivation, Observation, Talking, Orientation, Reinforcement, Implementation and Confirmation. One of learning source that students and teachers used in the implementation of this model in the class is specifically designed materials that contain inserting Environmental Education (EE) material for each concept in science that it is possible to associate with environmental messages. One of MOTORIC component which will train students and instill a positive attitude towards the environment is a component of *Implementation*. The stages of attitude implementation is done by giving Attitude Implementation Guide (AIG) environmentally friendly to students for discussion and filled individually. The goal is to stimulate the students' positive attitudes through environmental phenomena that occur in everyday life. To balance the character of student learning, so when students fill Attitude Implementation Guide (AIG) video about the effects of environmental damage had been displayed. Implementation of the MOTORIC model ended with the attitude Post-Test. The goal is to see the impact of the implementation of the MOTORIC model to increased environmental attitudes of students.

Environmental attitudes of students indicated a positive attitude of students towards the environment. A positive attitude towards the environment is expressed through three components namely cognitive, affective and conative. Environmental Education (EE) material is integrated by inserting environmental messages in science material with material sample that is Energy in Life Systems, proportionately have a positive impact for the environment positive attitude of students. The impact of students' positive attitudes towards the environment can be grouped in two categories, namely individu and groups category. Based on the proportional analysis of attitude instrument statement numbered 30 with 4 option favorably with a score of 4 to 1 were tested on 21 respondents, the initial step in analyzing the data recorded by the instrument attitude is the attitude determines the classification table for individual categories and groups as shown in Table 1.

#### The Environmental Attitudes Students for Individuals and Group Category

If the number of statement items as much as 30 points, so the maximum score (choice = 4) which may be obtained by students is 120, while the minimum score (option = 1) which may be obtained student is 30. Length range of the data from the data favorably to unfavorably is 90 with the width of each classification interval is 22.5. Based on these data, environmental attitudes of students in this study can be classified into 4 classification as Table 1 below.

**Table 1.** Classification of environmental attitude scores of students in a individuals and groups category

Total Score		Mean Score	Classification of Environmental Attitudes
Individuals	Groups		
97.80 s/d 120	2049 s/d 2520	>3.25 s/d 4.00	very good
75.20 s/d 97.70	1576 s/d 2048.5	>2.5 s/d 3.25	Good
52.60 s/d 75.10	1103 s/d 1575.5	>1.75 s/d 2.5	Not Good
30 s/d 52.50	630 s/d 1102.5	1.00 s/d 1.75	Is not very good

Based on the results of the analysis indicate that the environmental attitudes of students beginning a trial sample implementation MOTORIC learning model in individual categories including well classification with a total score of 75.6 , while the environmental attitudes of students after the implementation of the model in the classroom becomes 91.4. Based on the classification categories of attitudes in Table 1 above, the results of the data analysis showed that students' environmental attitudes both before and after the implementation of the

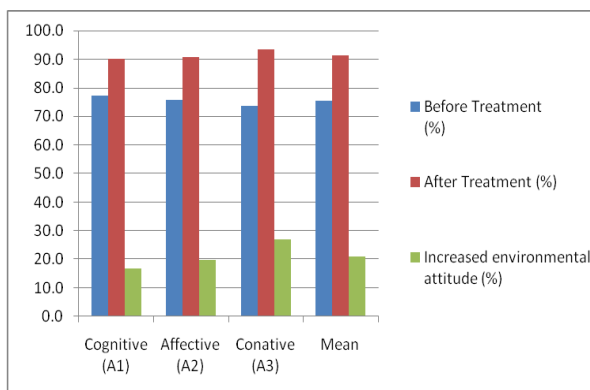
model are in good classification . However, it is interesting to see is that the implementation of the *MOTORIC* model through the Attitude Implementation Guide (AIG) of environmental able to raise the level of agreement (Favorably) students' positive attitudes towards the environment of 21.5 %. These results indicate that the *MOTORIC* model individually effective in instilling a positive attitude towards the environment. The effectiveness of the *MOTORIC* model in improving environmental attitudes of students for each category of cognitive attitude, affective and conative as indicated in Table 2 below.

**Table 2.** The Environmental Attitudes Table on Individuals Category

Aspect	Before Treatment (%)	After Treatment (%)	Increased Environmental Attitude (%)
Cognitive (A1)	77.4	90.3	16.6
Affective (A2)	75.8	90.7	19.6
Conative (A3)	73.5	93.4	27.0
Mean	75.6	91.4	21.1

The data in Table 2 above shows that the integration of EE material on Science learning through the application of *MOTORIC* learning models on junior high school students individually effective enough to improve the environmental attitudes of students by 21.1% . Associated with attitudes, Anwar (2012:20)<sup>[8]</sup> states that the attitude structure consists of three components that are mutually supportive of each other, namely: (a) the cognitive component, a representation of what is believed by the individual owner's attitude or in other words, the cognitive component contains one's beliefs about what is true or assumed to be true for the attitude object; (b) the affective component, an aspect related to emotional feelings. The emotional aspect is what most commonly rooted in the attitude component and is the deepest aspects as components of attitude and is the most enduring aspect of the effects that might change the attitude of a person; and (c) conative component, containing a particular tendency or inclination to behave or react to something in a certain way according to one's own attitude. Based on the results of the analysis as showed in Table 2 above, it appears that the increase in positive attitudes towards the environment occurs in both the cognitive, affective and conative aspects. The improvement of environmentally friendly attitude conative aspects (A1) of 16.6% with regard to knowing the good of the environment is growing in students. This increase represents that the information about the environment that is integrated in the materials science students make the student belief that environmental damage will affect their future lives. While the increase in environmental attitudes on aspects Apektif (A2) of 19.6% shows the loving feeling good for the environment and that is how to feel emotionally loving environment. In this affective aspects of students' feelings of love for the environment began to grow and flourish. The role of media supplements on *MOTORIC* learning model that shows the effects of environmental degradation on human life began to grow emosiaonal students to love the environment.

Similarly, an increase in environmental attitudes of students from conative aspects (A3) indicates that the tendency or propensity of students to positive environmental bertidak increased by 27.0%. Increasing students' positive attitudes towards the environment from the conative aspect of the role of implementation guidance that is given to the student attitudes to learning *MOTORIC* the implementation phase. The results are quite interesting indicated by an increase in the percentage of conative aspects greater than both cognitive and affective aspects. This indicates that environmental messages are integrated in science lessons students can arouse students' positive attitudes towards a better (more Favorably). This means that the integration of Environmental Education (EE) material on Science learning through *MOTORIC* models effectively improve students' environmental attitudes. Trend of increasing students' positive attitudes on *MOTORIC* model implementation on an integrated Environmental Education (EE) material on Science subject matter as indicated by the following chart.



**Figure 1.** Graph of Percentage Rate Favorably Environment Attitude Students in the *MOTORIC* Learning

**The Environmental Attitudes Students for Group Category**

Analysis of students' environmental attitudes group category is basically the same as the analysis of the individual categories. The difference is the attitude of the analysis group category is influenced by a variable number of respondents. In this study, students test samples were 21 people. Minimum score (if the respondents' attitudes unfavorably = value-1) that may be achieved for the entire group statement which amounts to 30 grains attitude is  $21 \times 30 = 630$ . Meanwhile, the maximum score (if the respondents' attitudes Favorably-value = 4) groups that may be achieved for entire statement which amounts to 30 grains of attitude is  $21 \times 120 = 2520$ . Based on the existing range of scores, then the width of the interval is equal to 473. Based on the values of these attitudes can be determined as a group category in Table 1. The results of the analysis showed that the proportional scores pilot group before the implementation of the *MOTORIC* model is 1900 that included in the classification of good attitudes towards the environment. While the attitude of the students after the application of the *MOTORIC* model treated group showed attitude in the classification is very good with a score of 2311. Based on the results of this analysis show that in the category of groups, the integration of Environment Education (EE) materials in science learning through *MOTORIC* models able to increase the level of agreement (Favorably) students' positive attitudes towards environment increased by 21.6%. The complete data of environmental attitudes of students in the group category, as listed in Table 3.

**Table 3.** The Environmental Attitude Student for Group categories

Clarification	Total Score	Classification of Environmental Attitudes
Before treatment	1900	Good
After treatment	2311	Very Good
Increasing of Positive Attitudes (%)	21.6	

Based on the results of the individual and group attitudes analysis described above shows that the integration of materials for Environmental Education (EE) in junior science subjects through *MOTORIC* learning model can be said to effectively improve students' positive attitudes towards the environment by 21.1% (in individually) and 21.6% (in group). Increased positive attitude is the case considering *MOTORIC* learning model is a learning model that collaborate on three learning approach that is environmentally approach, contextual learning and multimedia learning as the application of technology in learning. The three approaches, which approaches the character, contextual and multimedia approach to learning is a learning approach forms appropriate and in line with the learning component in the curriculum in 2013, known as the 5M is watching, asking, gather information, Associating and Communicating (Minister of Education and Culture of Indonesia, 2013:5)<sup>[9]</sup>.

The contextual approach in *MOTORIC* learning model to helps students realize that the environment as part of their quality of life now have started to decline. Through a contextual approach, students will significantly see that environmental damage will have an impact on their future lives. Approach to bring real-world learning in the learning process is what foster and instill positive attitudes of students towards the environment. As said by Komalasari (2011:6)<sup>[5]</sup> contextual learning is the concept of learning where teachers are taught to associate the material with real-world situations so that students encourage students to make connections between their knowledge with the application in their lives everyday. The concept of a contextual approach is then cultivate students' positive attitudes towards the environment in *MOTORIC* learning model had been applied this research. Meanwhile, increasing the positive attitudes students' towards the environment individually by 21.1% in this study can not be separated from the role of a character approaches environmental components that exist in the *MOTORIC* learning model. This component is instill that positive attitude of students who have grown contextual characterizes the attitude for each individual student to interact with the environment. As explained by Rohman (2012:142)<sup>[3]</sup> that the character is a way of thinking, attitude and behavior that is characteristic of each individual to live and work together, both within the family, community, nation and state. Further explained by Rohman (2012:142)<sup>[3]</sup> that character education should involve three aspects, namely knowledge (cognitive), feeling (feeling) and action (action). Without these three aspects, it will not be effective character education. Increased individual attitudes on conative component by 27.0% indicated that students' positive attitudes towards the environment tends to be characteristic of the individual student and will become a habit for every student in our daily life.

The increasing of positive attitudes students' towards the environment either individually or in groups was not separated from the role of multimedia into the *MOTORIC* learning model supplements. Implementation of the characters concept and the contextual approach in to *MOTORIC* learning model increasingly impacting learning is more factual. Environmental problems that was presented on supplements media which happened around students, have a positive impact on embedded attitudes of students to participate in saving the environment. Media especially multimedia, according to research Gulsen Hussein (2010:14)<sup>[10]</sup> can motivate students to behave and act.

Thus, the learning of Environmental Education (EE) can not be separated from the role of the media, especially the four media, visual media, audio-visual media, media people and media settings. Impressions through photographs and audio-visual recordings of how miserable people in the stricken area residence floods, landslides, droughts and crop failure due to water stress as a result of the green area that serves as a water catchment has been broken and the like events, students are expected to arouse feelings to help preserve the environment. This is in line with the opinion of Sanjaya (2011:199)<sup>[11]</sup> which says that the media almost absolutely indispensable in the learning process, because through the medium of the things that the previous narrative, informative and nuanced abstract for students would be to be real and factual. So, based on the analysis of the attitude data as described above, it can be said that the integration of materials for Environmental Education (EE) in Science subjects for junior high school by implementation of *MOTORIC* learning model is effectively improve the environmental attitudes of students, both in the individual category attitudes and the group category attitude.

#### **IV. The Conclusion**

Based on the analysis and discussion as described above, it can be concluded as follows:

1. Integration of Environmental Education (EE) materials in Science subjects by inserting environmental messages in the individual category effectively improve the students' positive attitudes towards the environment by 21.1%,
2. Integration of Environmental Education (EE) materials in Science subjects by inserting environmental messages in the group category effectively improve the students' positive attitudes towards the environment amounted to 21.6%,
3. Accordingly, it can also be concluded that the integration of Environmental Education (EE) material in the Science subjects with *MOTORIC* learning model effectively increases the environmental attitude of junior high school students in the Kupang city.

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