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Developing Environmental Education Model Based on Local Wisdom

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Abstract

This article discusses the development of environmental education model based on local wisdom. The study is motivated by the existing conditions in secondary schools, where environmental education merely focuses on students' cognitive level and does not touch affective and psychomotor aspects. Students only understand the concept of climate changes, but they do not change their daily behavior in solving it. This study was conducted using mixed approach to analyze the need. It was continued with the development of educational models. This model tried to integrate the environmental education with the existing subjects at school. Therefore, the result can be applied in accordance with the local content. Several experts have reviewed the model and it is further tested in schools to be the pilot project.

Keywords: *environmental education model*

INTRODUCTION

This article will explain the stages in developing environmental education model based on local wisdom. This model will be implemented as a local-content subject and can also be integrated within a subject; in this case it would be limited in sociology subject. This study is motivated by the increasing condition of the environmental damage caused by human actions which no longer consider human needs of sustainable development. Because of this, the educational institutions also have an important role in instilling values for environmental care awareness in students.

Reflecting to the existing conditions in the capital city, Jakarta, the factor of public awareness on environmental preservation is evidently still low. This situation can be seen from their low awareness of people dealing with waste and thei increasing non-environmentally friendly behavior. The external factor for such damage is the conversion of forest land into residential and industrial areas. In addition, at the local level, the overflow of streams and gutters from household waste becomes another problem. This environmental damage has reached alarming level (Chawla and Cushing 2007; Eames, Cowie and Bolstad 2008; Haigh 2006; Willard 2012). Even some of them have reached a harmful level to human survival such as forest fires that occur annually in Sumatra, Kalimantan and Papua. Apart from the natural factors, human being activities are also responsible for such damage. Not only occurring on land, this environmental damage also occurs in coastal areas where there have been large-scale of sand mining as it occurs in the Coastal area of Tanjung Burung, Tangerang, Banten (Agus 2011). This sand mining makes the land to be narrower and the citizens lose their jobs as farmers of prawn. All of these are caused by lack of awareness on the importance of protecting the environment from destructive human activities.

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For all this time, there are many Non-Governmental Organizations (NGO) that have been doing environmental education to society. These institutions perform their duties independently to empower society. The existing NGO's advocacy in education is mostly not yet integrated with the curriculum of school. And the educational role that should be done within a family and school as a place of building children's behavior becomes less significant because the existing curriculum does not directly contain important substances for the integration of environmental education for sustainable development. As a result, environmental issues have become elitist and only focused on certain groups. Ideally, the concern on environment should also be mainstream that are grown in everyday social behavior (Jickling and Wals 2008; Kudryavtsev 2012; Payne and Wattchow 2009; Reser and 2005; Bentrupperbäumer; Stevenson 2007).

Several similar studies about the similar theme were made by Hilary Inwood who elaborated the development of eco-art education in the art of integrating learning and education. The teacher's role here is important as an innovator in developing knowledge and curriculum (Inwood 2009; Reyes-García 2010; Sauvé 2005; Smyth 2006).

To conduct this study, the author refers to several studies that have been done before on a theme related to sociology and environmental education. Among those, the authors did the survey in 2009 entitled: *Pengaruh Pengetahuan tentang perubahan Iklim dengan Perilaku Peduli Lingkungan* (Jahja 2009) which shows that environmental education has been integrated in schools such as in Geography, Sociology and Biology subjects. However, its application is limited to the cognitive aspects. Students basically have the knowledge of climate change but it has not been reflected in their daily behavior. Therefore, it can be concluded that students' knowledge and understanding about global warming have no impact on their daily life. As a result, environmental education is not yet to shape the character and habits in students. If such condition still keeps on going, environmental education in school will be irrelevant to the current learning needs because the demands of learning to the curriculum 2013 now actively asks students to seek knowledge for themselves with information obtained from books and internet.

Another study that has been done is *Pengembangan Model Pembelajaran Tematik Sekolah Dasar Diintegrasikan ke Dalam Mata Pelajaran Sosiologi* (Jahja et al. 2013). In this research, a theme-based learning on the subject of sociology is developed. The basic idea is to move the development of thematic learning model that is developed prior to the primary school level. This study obtains several central themes that can be used as materials in sociology learning materials in high school. The central themes in sociology lesson for instance: A discussion of social institutions, values which can be used as starting points to get into the theme of the environment due to social institutions especially schools and families to become important agents of socialization in instilling the values of being environmentally friendly.

Next research is on *Model Pengelolaan Sampah Rumah Tangga Untuk Higiene Lingkungan* (Hamid et al. 2013). This research results in household waste management model that can be used as a forum for community empowerment through handicraft products or farming from waste. The study which was done under environmental education idea was also conducted by Athman and Monroe in their article titled "Elements of Effective Environmental Education Programs" which was published in Journal of Interpretation Research. Athman and Monroe do the analysis on the effective environmental education. This effectiveness refers to the environmental education based on the result of Declaration, containing the elements of; 1) Awareness, 2) Knowledge, 3) Attitudes, 4) Skills and 5) participations (Athman and Monroe 2004, p.38). This paper will answer the following questions: How is the development of environmental education model based on local wisdom? How is the integration model of environmental education in the social sciences, especially in sociology?

In the discussion on environmental

education model, the author uses Instructional Design theory proposed by Dick and Carey. This model is one of the procedural models which suggests that the implementation of instructional principles design is adjusted with the steps in sequent order (Dick and Carey 2009, p.9).

RESEARCH METHODS

In uncovering this problem, the authors used a mixed method research to obtain the data used for the development of learning model. Quantitative method with data collection survey was conducted to obtain needs analysis of the needed learning materials. The author conducted interviews with 100 respondents and conducted a descriptive analysis of the research findings. While the qualitative data obtained from in-depth interviews and several other environmental education material obtained from the syllabus and curriculum in some countries.

RESULTS AND DISCUSSION

Indonesia is very rich with local wisdom in managing nature. One of them is *Kanekes Sundanese* people. *Sundanese* people always maintain a harmonious relationship between *Jagat Alit* and *Jagat Ageung* (micro-cosmos and macro-cosmos). Moreover, they recognize the term "*Uga*". *Uga-uga* is revealed in the words pointing to a link with the surrounding natural environment such as water, soil, trees, forests, mountains and the other places or landscapes (Indrawardana 2012).

Developing instructional design of environmental education based on local wisdom begins from the analysis of learning needs. The result of the needs analysis shows that environmental education in schools has not been comprehensively integrated within subject materials. Students only understand the lesson on the cognitive aspects and the needs of passing the exam, but they do not perform an environmentally friendly behavior in everyday life. Such behaviors are for example still using a large amount of plastic, not filtering and managing the trash.

The curriculum design includes a pattern of organizing the elements or components of the curriculum. The curriculum design model can be reviewed from teaching focuses, namely: (a) Subject centered design, a design curriculum which is centered on teaching materials; (B) Learner centered design, a design curriculum that promotes the role of the student; and (c) Problem centered design, a design curriculum which is centered on the problems encountered within society

This development of environmental education emphasizes on the problem centered design where the teaching materials within the environmental research is taken from the problems found in students' daily life. In designing the model of environmental education, three forms of designs are developed namely conceptual design, system design and physical products design.

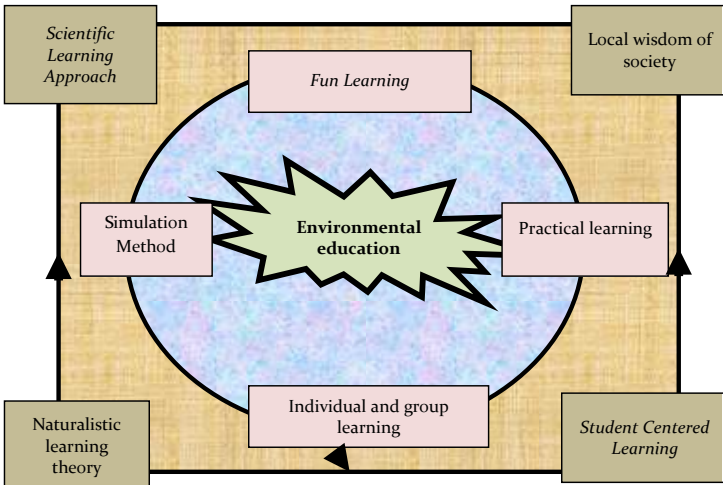

Chart 1. Conceptual Design of Environmental Education Based on Local Wisdom

Conceptual design

Chart 1. is the scheme of conceptual design of environmental education that is developed.

The System and Physical Appearance of Product Design

The design of environmental education makes the students as learning subjects. The emphasis is not only in theoretical aspect but also in practical aspect where students can be more aware of the importance of protecting the environment as reflected by their passing grade on the test. The picture of the applied learning system model is described as follows Chart 2.

The physical product from the environment education model generates a GBPP (Outline Planning of Education) and RPP (Lesson Plan) which is completed with the steps of learning implementation in each meeting. In the development of GBPP and RPP, several stages are conducted.

First Stage, General Instructional Objectives (TIU) and Specific Instructional Objectives (TIK) are formulated. The development of TIU and TIK are based on the results of needs analysis of environmental education. TIK is the goals of learning derived from more specific and targeted TIU. The following is the formula of TIU and TIK for the environmental education model;

Second step, TIU and TIK are implemented within the subjects. The content of the subject within the environmental education model based on local wisdom is drawn from the directed TIK. The subjects that are developed are; 1) The demographic characteristics and geographical region of residence, 2) The concepts of alternative

Chart 2.The Model Design of Environmental Education System

Goal The knowlede on the environmental education based on local wisdom and the mitigation on environmental problem	**Condition** Eradicating abstract learning to be more concrete through handson activities and simulation as well as environmental problem mitigation individually and in group
Specific Goal Shaping students' behavior who love preserving nature from daily activities and following the values and norms in society which is related to nature preservation	**Study Experience** Changing the view of book as the only learning resources with their natural surroundings to mitigate the natural problem contextually
Evaluation And Development The data of duscussion result and experts discussion of environment education baed on local wisdom	**Media and Tools** Laptop and Infocus Module

Table 1.the formula of TIU and TIK for Environmental Education Model

General Instructional Objectives (TIU) : Students are expected to apply the concepts of the environmental education in everyday life
Specific Instructional Objectives (TIK) : To describe the demographic and geographic characteristics in order to understand the environmental conditions in the region of residence To apply the concepts of alternative energy which is used to understand the importance of energy saving To analyze the environmental problems caused by waste To analyze and provide alternative solutions for the problems that occur related to the condition of the water and air pollution To analyzing the environmental conservation efforts through a cultural approach

energy use, 3) The environmental problems caused by waste, 4) The problems that occur related to the condition of the water and air and 5) The cultural approach to environmental preservation. These basic selections for the subject can be seen from several environmental sociology books that discuss the role of community-related aspects of the above environmental management (more in Pimentel 2008; Murphy 1997; Ballet 2007).

Third step, the topics that have been developed from TIK is implemented into a concept map. Concept map should reflect the interrelationship between the subjects with other topics. The following scheme presents a concept map of environmental education model based on local wisdom;

Fourth stage is the creation of ABCD. ABCD stands fot *Audience*, *Behaviour*, *Condition* dan *Degree*. *Audience* is related to the target individuals of learning or learning subject. *Behavior* is related to the observable behavious as learning result. *Condition* is related to the expected condition to indicate that students have acieved the targetted goals. Lastly, *Degree* is related to the accepted phisical level. After creating ABCD, competence map is made using operational instructions which reflect ABCD formula.

The next step is to make a competency map using the operational instruction to be used as GBPP and RPP. GBPP or syllabus is an overall plan of environmental education programs based on local wisdom in one semester. The contents of GBPP include the identity of subjects (Name Subject, Instructional Objectives General (TIU), Brief Description of subjects), Specific Instructional Objectives (TIK), Topics, Sub-Topics, Learning strategy (Methods, Media and Time), allocation of practice using theory and literature review.

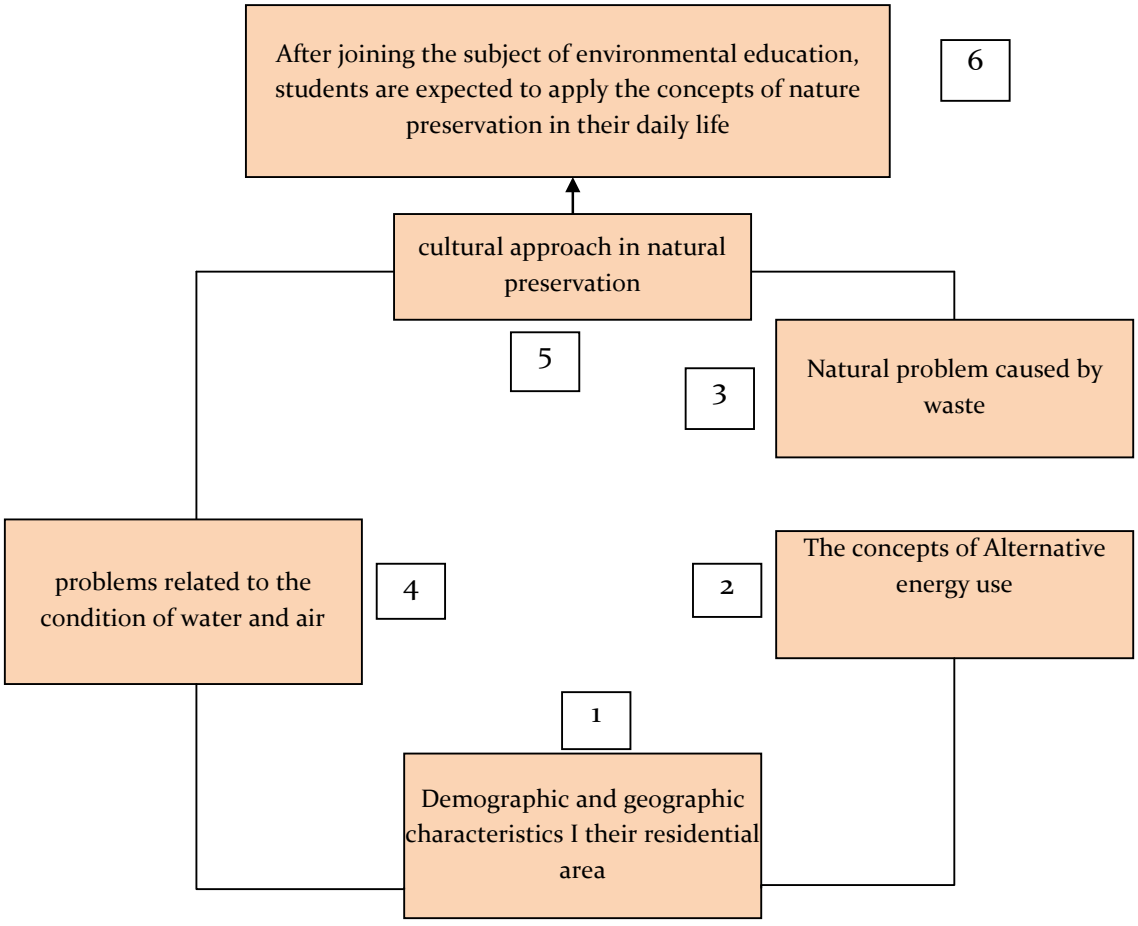

Chart 3. Concept Map of Environmental education Model Based on Local Wisdom

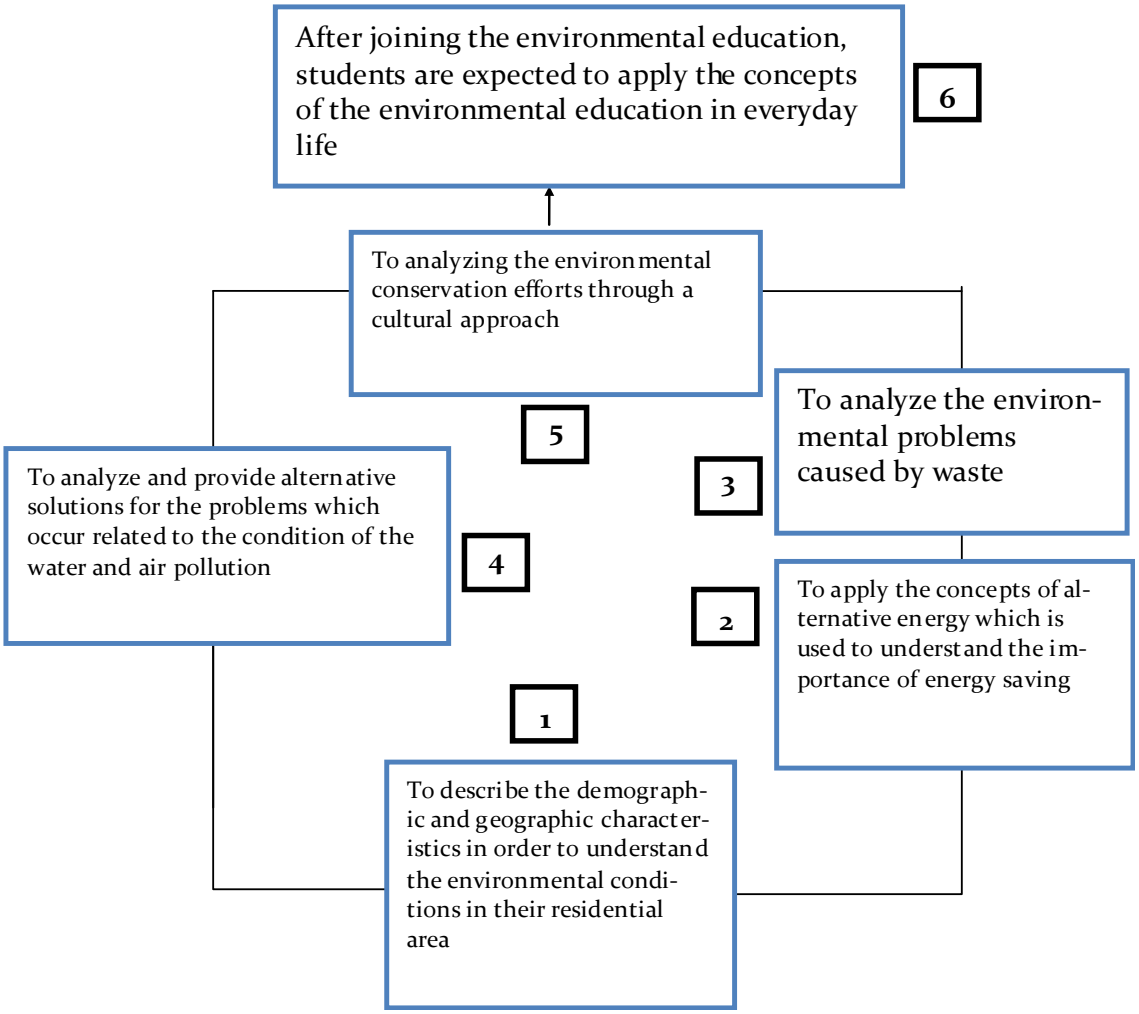

Chart 4. Competence map of environmental education based on local wisdom which has used operational instructions

Evaluation of Products

The product of this research is the design of environmental education model based on local wisdom. This design produces the learning instruments for environmental education subject based on local wisdom. To assess the results of this research product, several indicators from the Ministry of the Environment relating to Environmental Education in Schools through several programs such as Adiwiyata is developed. This is intended to meet the material and assessment of the implementation of environmental education in schools. Then, the analysis of instructional technology from experts is used to look at the aspect of teaching and learning model design.

An assessment of the material and implementation in schools, the aspect of compatibility between environmental learning model based on local wisdom with the policy side is emphasized. From the policy domain, environmentally friendly policies in the area of education must include compulsory subjects, local content, self-development policy related to environmental protection and management. Another empowerment is about the urgency taught in school on environmental education through the Act No. PPLH 32, 2009 in which the protection and management of the environment (PPLH) is a systematic and integrated efforts made to preserve the environmental life function and prevent pollution and/or damage to the environment that includes planning, utilization, control, maintenance, supervision and law enforcement. The provision of environmental subjects in schools

is as a form of control and maintenance of environmental damage.

In 2004, the Environmental Education Policy was issued by four institutions, one of which involves the Ministry of Education and Ministry of Environment. The contents of the policy on environmental education is to encourage and give opportunity to the people to acquire the knowledge, skills and attitudes which in turn can foster a commitment to protect, improve and utilize the environment wisely, help create new patterns of behavior that is friendly to environment, develop environmental ethics and improve the quality of life (Hisham 2013). Based on some of the above policies, the subject of environmental education in schools is indispensable. The aspect of curriculum development should be based on several components such as fostering local and global issues related to the environment. Therefore, in developing the design of environmental education, this study focuses on the values of local wisdom by raising local issues.

For the assessment of the instructional design, the experts involved in this study are Prof. DR. Nurdin Ibrahim, M. Pd, the lecturers of Education Technology, State University of Jakarta who assessed the product for learning competency development and learning strategies indicators of environmental education based on local wisdom. The instruments which are made as instructional design assessments are used in the activities of PLPG set by Kemendikbud and so they have been tested before.

Based on the results obtained by the results of expert assessment expert assessment, learning instruments that are developed earn a total score of 83. With reference to the assessment using a scale of A, B, C, D, E where the scoring;

A : 80 – 100 B : 70 -79 C : 60 - 69
D : 56 – 59 E : < 55

The above range scores above follows the calculation of the learning outcomes at the Jakarta State University. The total score obtained for environmental learning device products based on local wisdom score is 83, which means in the category A. However, this product still needs some improvements. Furthermore, based on the learning instruments that have been rated in the top, it can be used as a reference in making environmental education learning modules based on local wisdom.

Several experts state that the overall results of the study have been constructed systematically although it still needs some improvement. Improvements needed are the ABCD formula with component C does not really reflect the expectation of teachers. Condition is essentially created by teachers to facilitate students to learn more quickly and efficiently. Therefore, in developing aspects of the condition not only explain the material, but there are other activities undertaken by students like giving tests or providing worksheets to students.

Integration Model of Environmental Education in Sociology

Environmental education subjects based on local wisdom can be integrated into other subjects that already exist within the structure of the curriculum at the school. Environmental education subject has been widely applied in some schools. However, most of the positions of these subjects are as local subjects which means that they are subjects outside the core subjects and reflect peculiarities of an area or tailored to the needs of learners. The materials in environmental education subject are illustrated within the scheme of connectedness of environmental education with sociology subject.

Based on scheme 6, the environmental education materials based on local wisdom can be integrated within subjects at schools; one of the subjects is sociology. In the scheme, some materials in sociology that can be attributed to environmental education based on local wisdom are illustrated. Learning goals in practice can be modified accordingly so it contains environmental education aspects. In sociology subject, teachers can teach about disaster mitigation as part of the implementation of social interaction and socialization material. Learning method can be implemented in the form of simulation methods or conducting socio drama about disaster-prone areas and how student

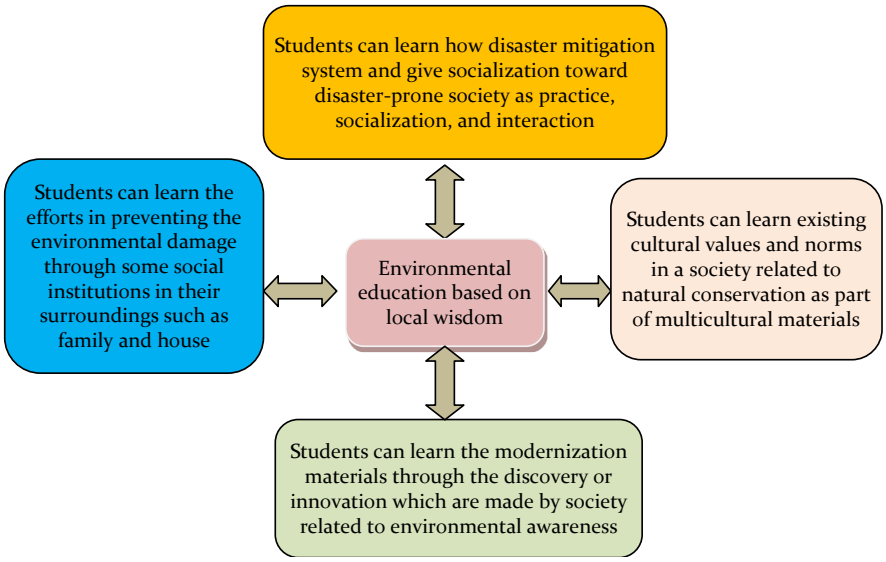

Chart 5. Illustration of Connectedness of Environmental Education with Sociology at school.

provide disaster mitigation knowledge to these communities. Then, of environmental conservation efforts are conducted through existing social institutions in society such as school institutions and families.

Source: http://billyshare99.blogspot.co.id/ 2013/12/ all-about-sampah.html

Figure 1. Trash Created By Type Waste in Schools

Schools can also function as an agent of socialization to instill the values of environmental conservation. Now there are programs like Adiwiyata managed by the ministry of environment and forest so that schools can apply the principles of environmental management. Some activities that can be done include: developing cross-subject learning model, developing environmental problems material that exist in the surrounding communities, developing educational methods based on environment and culture, and developing curricular activities to improve students' knowledge and awareness about the environment.

Schools can apply the waste bank by placing trash in different cans according to the type of garbage. Residual waste plastic and packaging can be crafted while plastic bottles and cans can be sold to waste collectors. The following is the examples where school institutions can play a role in environmental conservation.

Based on picture Figure 1, in a school, students can also learn about the environmental awareness in waste sorting. In this case, the teacher can also develop values of entrepreneurship by utilizing garbage that has been collected. The non-organic waste around the school like water bottle and plastic wrap can be crafted as artworks such as vase, flower and bag that can be sold to the public. Besides, organic waste can also be converted into useful compost for the plants in the school garden or sold to the public.

From this, in addition to the knowledge that students can practice their environmental awareness, they can also learn to save from the garbage product. The aspects that are developed not only cognitive but also affective and psychomotor aspects. The

affective aspect is accommodated through the implementation of environmental awareness attitude and appreciation on value of the waste which they put aside. The aspect of psychomotor skill is empowered through skills in managing waste and also the skills in making handicrafts for gaining financial capital from the people and to increase their entrepreneurship skill. From here we can integrate the lessons of Sociology with the economy, for example with how they increase the economic value of a product and provide creative ideas that t could be done to open up access and marketing for a product.

On the content of values and norms, teacher can also state the purpose of learning about traditional values in Indonesian society who still hold on belief to environmental preservation. This has become a component of local knowledge in environmental education. The example is the values value of indigenous people of *Baduy*. One of the values that can be adopted is by holding firmly the value of the preservation of the river which is strictly forbidden to throw garbage in the river upstream as it will damage downstream. Then, the *Kesepuhan* custom people in Lebak, Banten who live around the Halimun National Park - Salak adapt to the environment changing by adjusting their planting schedule. Traditional leader mentions that *Olot* determines the time of planting and predict when long dry season will happen so they are never failed to harvest. (Kurniawan 2012)

In addition to the values and norms in the sociology subject materials, cultural values in environmental conservation can be integrated into learning objectives of multiculturalism. It can be connected with regard to horizontal diversity of Indonesian society seen as the diversity of ethnicity, race, religion and ethnicity which are not only physical features but also in their variety of values and norms that indigenous people believe in. People use customary law as social control which is closely associated with their belief. Environmental education can be integrated with the material of sociology of the modernization. Modernization itself is marked by the innovation created by the community.

CONCLUSION

Schools in this case should serve as agents of social change that is capable of changing the structure of society. The agent of change can be viewed individually e.g. teachers and students in changing the structure of school policy, or in the broader area of school that alters the structure of government policy. Schools should instill habit (Bourdieu in Ball 2004, p.15-25) within the community by utilizing a variety of capital what they have. With social capital, schools can partner with the government because this is currently implemented in Jakarta Government and they are campaigning for the utilization of waste bank in every village in Jakarta. Other networks can be maximized through partnerships with private companies that have environmental programs or waste banks as its Corporate Social Responsibility (CSR). In partnership like this, the ability to maintain the trust of the agreement that is already predetermined is very important. Social capitals are treated so it can be turned into economic capital that directly or indirectly help providing income for schools. One of schools that have been practicing this for example is early childhood education (PAUD) of Mas chef in Depok, West Java. Students do not need to pay for school, but only to deposit their waste in the school garbage banks and then give them to collectors and partly processed.

To the cultural capital, the school can be an inventory of local culture and religious values that can be integrated within learning activities for the formation of students' character. It is implanted through affective learning that asks students to explore their own desired knowledge. For students who live in coastal areas, for example, the ability of fishermen in reading the wind direction and take the fish in the sea with makeshift equipment actually aims to keep marine ecosystems from overexploitation. However, the inclusion of fisheries technology that lets people take large amounts of it is eventually upset the balance of nature. Students who live in agricultural areas can learn about the agricultural calendar, for example in the Javanese community to determine the planting and harvest seasons. With global climate change is happening, environmental adaptation is also difficult for farmers to

determine which the planting season due to drought and erratic arrival of the rainy season. Therefore, the systemic changes that have occurred are not within a short time, but long process. Students who live in cities are also instilled the values of saving and prevention from hedonist life which spend a lot of money to buy consumptive goods. Behavior that can be implanted in a simple example: when they shop, they do not use plastic bags and bring their own bags. They can also bring their own food and drinks from home to avoid package of food and bottled water. Eventually, they can use mass transportation to save energy fuel, turn off the power after use, and so forth.

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