

Characteristics of Environmental ESD in the Adiwiyata Program and Changes of Teachers: A Case of Adiwiyata Schools in East Java, Indonesia

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Abstract

The rapid progress of economic development and urbanization has brought serious environmental problems to Indonesia, and there is no doubt that countermeasures are urgently needed. Similarly, there is a need to implement effective environmental education policies and deepen education on sustainable development centered on EE in school and non-formal education. The Adiwiyata program is an environmental education policy undertaken by the Ministry of Environment and Forestry, Indonesia. Launched in 2006, the program has been promoted as encouraging students to be environmentally friendly. It has been 10 years since the program started, but it is hard to say that the students' knowledge and awareness of the environment and their behavior toward the environment have been sufficiently improved. There are also significant gaps depending on the school / region, and some are skeptical about the effectiveness of the program. This essay first outlines the history of environmental education in Indonesia. Secondly, it describes the characteristics of environmental ESD in Indonesia, centering on the Adiwiyata program. In addition, it considers the effectiveness and challenges teachers face in conducting programs on environmental ESD in Malang of East Java.

Keywords: environmental ESD, Adiwiyata School program, PBL

Introduction

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The rapid progress of economic development and urbanization has brought serious environmental problems to Indonesia, and there is no doubt that countermeasures are urgently needed. Effective environmental policies need to be formulated and implemented throughout Indonesia. Similarly, it is extremely important to increase knowledge and awareness among citizens who actively and independently impact local and global environmental problems. Therefore, it is necessary to deepen education on sustainable

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development (hereinafter referred to as environmental ESD) centered on environmental education in schools and non-formal sectors.

One of the environmental education policies in Indonesia is the Adiwiyata school (Green School Award) program by the Ministry of Environment and Forestry. However, environmental knowledge and awareness and resulting behavioral changes among students and parents have not been sufficiently improved through the program. There are skeptics about the effectiveness of the program, as it varies widely by school and region.

Meanwhile, Matsumoto et al. [2017] have tried PBL on environmental ESD programs at non-Adiwiyata schools in Malang and Batu, East Java, and found changes in the knowledge and consciousness of students and teachers. Particularly, there were remarkable changes among teachers. There were also activities to devise teaching materials according to the current situation of the students, and the improvement of the lessons brought about changes in the students.

This paper reveals changes in teachers who have attempted to improve and develop environmental ESD programs, based in the regional context of Malang and Batu in East Java. First, the history of environmental education in Indonesia is outlined. Secondly, the Adiwiyata School program and environmental ESD in Indonesia is described. In addition, the case studies of schools in Malang, East Java are examined to reveal the changes and challenges among teachers working on environmental ESD programs.

Methods

The data used in this survey were obtained from qualitative surveys in November 2018 and March 2019, and syllabuses and textbooks were also used as materials for the survey. In conducting this survey, the authors communicated the purpose and content of the research to the participants and explained the following points:

- 1) individual names are not specified,
- 2) participation in the survey is voluntary,
- 3) there is no disadvantage to refusal to participate.

After the explanation, consent was obtained from the participants. There are no conflicts of interest in this study.

1. History of environmental education in Indonesia

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In 1975 the implementation of Environmental Management in Indonesia was first held by the Jakarta Teacher Training Institute (IKIP). In 1977/78 the pilot outlines of the Environmental Teaching Program were trailed at 15 Jakarta Primary Schools. In 1979 under the coordination of the Office of the State Minister for Development and Environmental Supervision (Meneg PPLH) a Center for Environmental Studies (PSL) was formed in various public and private universities.¹⁾

In 1984 the Directorate General of Primary and Secondary Education of the Ministry of National Education (Ditjen Dikdasmen Depdiknas), determined that teaching subjects on population and environment are integrative outlined in the curriculum by incorporating population and environmental education materials into all subjects at the general and vocational secondary level.²⁾

From 1989/1990 to 2007, the Directorate General of Primary and Secondary Education of the Ministry of National Education, through the Population and Environmental Education Project (PKLH) implemented the Population and Environmental Education program. On February 19, 2004 the Environmental Education Policy (EE) was agreed by 4 (four) departments, namely the Ministry of Environment (KLNH), the Ministry of Education, the ministry of Religion and the Ministry of Home Affairs.

In 1996 the first collaboration was agreed between the Ministry of Education and the Ministry of Environment, which was renewed in 2005 and 2010. As a follow up to the 2005 agreement,

In 2006 the Ministry of Environment developed an environmental education program at the level of primary and secondary education through the name is ADIWIYATA Program. This program was implemented in 10 schools in Java as a model school involving universities and NGOs engaged in the field of Environmental Education.

In its development, currently in 2017 the number of schools participating in the Adiwiyata program has been very increase and spread throughout Indonesia, the largest number of Adiwiyata schools are in the Malang city of East Java province.³⁾

Development of environmental education curriculum in Indonesia. The Ministry of Environment (KLH) in 2004 issued an environmental education policy outlining that Environmental education could be implemented through formal, non-formal and informal education channels. Zelezny (1999) referred to in Darner (2009)⁴⁾ states that generally formal environmental education is more effective than informal environmental education. formal environmental education is educational activities in the environmental field which are carried out through schools, consisting of basic education, secondary education and higher education and carried out in a structured and tiered approach to an integrated curriculum approach or a monolithic / separate curriculum (KLH 2004). In the next curriculum development in 2006, which is referred to as the Education Unit Level Curriculum (KTSP) of environmental education becoming a local

content subject, In 2007 the Governor of West Java issued a policy that encouraged the implementation of formal environmental education in schools more intensively, thereby further increasing the role of teachers in the application of environmental education in schools⁵⁾. To support environmental education learning, environmental education textbooks are needed which are a source of learning material for teachers and students. Environmental education subject aims to form students who have the character to maintain the environment. One effort to achieve the objectives of the Environmental education subject is the local Environmental Education Textbook Based on Local Potencies. This research was aimed at producing textbooks of environment-based education subject Environmental education based on local potentials. This research and development using the Borg & Gall model (1983)⁶⁾. At this time, teachers and principals can choose environmental education learning textbooks for use in their respective schools. In Indonesia, textbooks used in schools are decided by the policy of school principals and subject teachers but based on guidance from the local Education department. Likewise, with the use of environmental education books, environmental education teachers choose textbooks to be used, based on recommendations.

Legal textbooks can be used to produce superior human resources as stated in the Government Regulation No. 19/2005 on National Education Standards of Textbooks including educational facilities needed to set quality standards.⁷⁾

Current condition of environmental education textbooks in Indonesia. Learning Materials (material). The learning material is the substance that will be delivered in the teaching and learning process, which is realized in the form of textbooks as a learning resource.⁸⁾

Teachers 'perceptions about the environment will be passed on to their students, while teachers' perceptions about the implementation of Environmental education as a teaching program will influence teachers in choosing methods and media to deliver material to students, which in turn will affect student learning outcomes.

Because it's like what the Environmental Education textbook is used, more or less will influence students to understand children's knowledge, attitudes and behavior related to the environment.

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2 The characteristics of environmental ESD focusing on the Adiwiyata program

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1) The Adiwiyata School program and curriculum for Environmental ESD

The 2006 national curriculum in Indonesia revised introduced new subjects for local contexts to be implemented through 2013. The Adiwiyata School program (green school award program) was started by the Ministry of Environment and Forestry in 2006. Ten schools with the cooperation of universities and NGOs were selected as model schools to launch the program.

Adiwiyata is a Sanskrit word consisting of Adi (prefix meaning grand or ideal) and Wiyata (suffix meaning a place to learn knowledge and ethics). According to the guidelines, Adiwiyata School is "an ideal school for acquiring all the science, norms and ethics that can be the basis for human well-being and the creation of sustainable development models" [Guidelines, 2013]. The guidelines set the criteria for accreditation as an Adiwiyata School. Schools are evaluated by the National Adiwiyata Team, which is made up of environmental and educational experts. Adiwiyata School is certified at three levels. The Green Campus Practice (Level I) is a certification given to schools that meet the standards of infrastructure and extracurricular activities. The Green Curriculum (Level II) is a certification given to schools that meet the criteria for environmental ESD curriculum and stakeholder collaboration. The Green schools (level III) are those that meet the standards in all four elements. For schools to be recognized as sustainable "ideal schools," they are required to meet four areas of criteria: school policy, curriculum, environmental activities, infrastructure. There are 3871 national schools certified as Adiwiyata schools, of which 727 are Adiwiyata

Mandir, which means the highest level (certified in 2018). According to the Ministry of Environment and Forestry, the Adiwiyata school program has been implemented in 1-4% of schools in Indonesia. Due to the influence of the professors of the University of Malang who contributed to the creation of the Adiwiyata program, many schools in Malang tend to adopt the program with the support of the University of Malang.

There are three approaches to environmental ESD curriculum development. The first is to incorporate environmentalism into existing subjects such as science and social studies. The second is a cross-curricular approach. Environmental education to create an "ESD calendar" implemented in Japanese schools falls under this category. The third is to create an independent subject.

Many schools in Indonesia incorporate environmental content into existing subjects. Ikhfan [2016] points out the reasons as follows:

- ① It can be applied even if the curriculum is not formalized.
- ② It does not require teacher replenishment.
- ③ It does not require additional time to teach.
- ④ There is a lack of knowledge and methodology of teachers' own environmental problems

The 2013 curriculum revision no longer allows the discretion regarding the curriculum at the local level. Teaching environmental content in existing subjects and frameworks is less variable and relatively easy for teachers. Many teachers use that approach even with a lack of environmental knowledge and methodologies, which can hinder the progress of environmental ESD.

On the other hand, some schools have been certified as Adiwiyata schools and have formulated and implemented a curriculum based on the policy of working on environmental ESD as well as greening and environmental activities at the school itself. In order to teach environmental ESD effectively, these schools have established environmentalism as its own subject, a syllabus is created for each grade, and textbooks are used. Furthermore, teachers are holding workshops on educational ideas. In some areas, the Environmental Commission has taken the initiative to encourage more schools to become certified as Adiwiyata schools and to have a monolithic curriculum. Schools in those areas collaborate with universities and NGOs to enhance teaching materials and environmental activities.

Non-Adiwiyata schools in Malang use a curriculum that is generally incorporated into existing subjects, and environmental ESD is implemented through science and social studies. On the other hand, in Batu, environmental learning activities are carried out even in non-Adiwiyata schools, and environmental ESD is carried out as a monolithic curriculum.

This study takes into account two national elementary schools in Malang, which are certified as Adiwiyata schools. One is A National Elementary School, which implements the environmental ESD

curriculum created by the school, and the other is B National Elementary School, which tried PBL in the environmental ESD program proposed by the authors.

The schools for the study were selected in consultation with collaborators at Malang University. In November 2018, we went to 6 elementary schools to conduct questionnaires and interviews with principals and teachers, observe classes, and hold workshops for teachers to perform PBL in environmental ESD at 4 elementary schools. We decided to have 5th grade elementary school students work on two themes (water and waste). In March 2019, a supplementary interview survey was implemented, a video recording of class observations was recorded, and an interview survey with teachers was conducted. In conducting the survey, the author communicated the purpose and content of the study to the participants and obtained ethical approval of the survey and the consent of the participants.

2) Environmental ESD at Adiwiyata School: Two Elementary Schools in Malang

Profiles of two national elementary schools



Picture1



Picture2

Picture1 • 2 A National Elementary School and B National Elementary School in Malang

A National Elementary School is a school located in the lush green suburbs of Malang. In the greenhouse, medicinal herbs such as turmeric are grown. There are 18 classes, and the Adiwiyata school has four elements: school policy, environmental activities, environmental education curriculum, and environmental infrastructure.

B National Elementary School, located in Malang City, is a little smaller than A National Elementary School. There are 12 classes, and under the school policy, the environmental infrastructure is enough and environmental activities are carried out, but there are problems with the environmental education curriculum.

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Picture3



Picture4

Picture3 • 4 Compost and botanical gardens for growing herbs

In both elementary schools, color-coded garbage containers are placed in the school, and teachers teach students to sort garbage according to the type and throwing it away.

Class observation and syllabus

In each case, we observed a water class held in March 2019. Classes at A National Elementary School were conducted using syllabi and textbooks created based on the school's environmental ESD curriculum. The development was to hold group discussions and present opinions on how water permeates the soil. After the teacher explained the knowledge and instructed the following activities, the students had a discussion in groups of 5-6. During the discussion, the teacher approached and advised the students in each group. This is a common procedure in elementary school classes in Japan.



Picture5(ANES)

Picture5 classes of environmental ESD (5th grade students)

1 semester		
Basic competencies	Learning experience	Main teaching materials
4.1 Briefly explain water quality management at water sources	Water and water quality monitoring	<ul style="list-style-type: none"> • Indicate the origin of various types of water • Identify and classify the types of good quality water
4.2 Understanding the impact of wastewater treatment on water bodies		<ul style="list-style-type: none"> • Explain the impact of wastewater treatment on rivers through observation
4.3 Explain the impact of water pollution on people's lives		<ul style="list-style-type: none"> • Conduct inspections for several illnesses caused by contaminated water • Observe aquatic animals in contaminated rivers

table 1 Environmental ESD Syllabus (A National Elementary School)
KURIKULUM MUATAN LOCAL PENDIDIKAN LINGKUNGAN HIDUP[2018/2019]

Table 1 is a part of the environmental ESD syllabus (5th grade). The goal of learning about water quality is to "understand the effects of water quality / clean water sources, water use, and pollution on people's lives." It is set as the content of a four-class study plan for 35 minutes each.

This syllabus was created in collaboration with the University of Malang. Environmental ESD professors provide teachers of the school with appropriate advice. The elementary school has abundant environmentally friendly facilities. Students at this school grow herbs, and they process herbs into turmeric juice with the help of teachers and counterparts for environmental ESD. Students try to "clean up" at least while at school, and they also dump their trash where it should be. Students are learning environmental knowledge in the "green environment".

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Picture6



Picture7

Picture6 • 7 Workshop for PBL of environmental ESD

On the other hand, at B National Elementary School, teachers learned PBL methods at a workshop in November 2018, and classes were held in March 2019. The class consisted of putting soil, stones, and cotton of different grain sizes into a simple filtration device made of PET bottles and observing how the water poured into the container was filtered. The PET bottles were already completed. With the container, the students gathered in the washroom. The teachers directed the activity and the students began filling the soil. They worked at their own pace, so some finished early and waited for the next instructions, but some took time to put in the soil. Two teachers attended the class and one provided support. After everyone could observe the muddy water filtering cleanly through the soil, they moved to the classroom. Another teacher and the students who finished the observation early cleared up. The students were actively working, but the pace of each individual was different, and it took a long time overall, so there was not enough time for the final reflection.

The environmentally friendly facilities at this school meet the Level I criteria of the Adiwiyata Program but are not as abundant as other high-level Adiwiyata schools. In addition, "the curriculum and teachers' methods are inadequate" to promote environmental ESD (interview with the principal of B Elementary School). Therefore, the research team, including the authors, held PBL workshops for teachers, provided environmental ESD materials, and advised on their use.



Picture8(BNES)



Picture9(BNES)

Picture8 • 9 classes of environmental ESD (5th grade students)

When conducting this type of class at an elementary school in Japan, it is important to plan the schedule for sufficient time and a flexible timetable are essential. In addition, it is easier to support students' learning activities with a team of multiple teachers team-teaching the lesson. Ensuring enough teachers will also support the promotion of PBL.

Elementary schools in Japan, "cleaning the place used by the students themselves" is one of the actions that the students repeat through classes and extracurricular activities. This behavior is inherently in a different context than environmental education, and what it can do is rather set as an educational goal as a moral value. In order to reach the goals of education, teachers first give instructions many times, students follow them, and eventually many students think and act on their own without the advice of teachers.

When planning lessons, teachers in Japan think about some activities for "behavior that is not directly related to the content of the subject." Parts of the lessons are used as activities for adaptation and discipline. When the classroom is cluttered because of the learning activity, cleaning the area by the students is also included in the learning activity. "Cleaning up" in that case is certainly an environmental consideration, but more than, it is consideration for the group to which the students belong. On the other hand, "keeping the environment clean" is one of the educational values of environmental ESD. When conducting environmental ESD in science and social studies, students often tidy the messy after classes. Through learning activities, students give meaning to behavior of tidying not only as a value for maintaining good human relationships, but also as an environmental value as one of the actions of environmental preservation.

After the environmental ESD class at B Elementary School, a remarkable difference from the learning activities in Japan was observed. The learning area and its surroundings were left cluttered, and the students returned to the classroom following the teacher's instructions. Then, a school janitor and a teacher, who

supported the lesson, cleaned up the place. Environmental ESD in Japan involves tidying up after learning as part of the lesson, but at B Elementary School, "cleaning up" was separated from the lesson. This difference is a kind of the hidden curriculum that teachers in Indonesia cannot fully master in workshops on environmental ESD materials and methods.

3. Discussion

1) Differences in curriculum and strategies for ESD environmental education

While schools in Malang work on environmental ESD in existing subjects such as science and social studies, schools in Batu provide time for environmental learning and a monolithic curriculum for environmental ESD. Because of the different frameworks of acquired knowledge, there are also differences in the use of subjects, teaching methods, textbooks, and environmental ESD teaching materials when teachers plan and practice lessons. In the case of a cross-curricular curriculum such as the "ESD Calendar," it is necessary to formulate an overall plan that positions environmental learning, and then considers effective use of teaching materials in each class. There are not very many schools in Indonesia that offer this type of curriculum, but if they are not organized from a rational perspective at the stage of overall planning, individual teachers may feel burdened. In the process of conducting environmental ESD, teachers raised the need for an overall plan, including a comparison table for related subjects and environmental ESD teaching materials. Teachers felt this is necessary in addition to effective methods to participate in an environmental ESD. Teachers also requested the program proposals include a model. This is an advanced and difficult task that must consider the formulation of the overall plan and the formulation of the comparison table between the main teaching materials (textbooks) and other teaching materials as well as the professional creativity of the teacher, and it is beyond the scope of individual teachers.

2) Changes in teachers that performed environmental ESD by PBL

The interviews revealed two points of change in teachers' awareness and behavior regarding professional development. That is, (1) whether or not the school where one works is certified as Adiwiyata school affects the teacher's awareness of environmental ESD, and (2) the teacher's awareness of professional development includes knowledge and information on environmental ESD before the program is implemented. There was a high level of need for the acquisition of teachers and improvement of teaching skills, but the position of environmental education in the educational course has an effect on teachers' awareness during the implementation process.

Whether or not the school where the teacher works is certified as an Adiwiyata school makes a

difference in the pre-existing awareness of environmental ESD before the program was implemented. Some non-Adiwiyata school teachers said that being certified by Adiwiyata is a prerequisite for promoting environmental ESD. Teachers give such opinions based on the existence of facilities and equipment capable of environmental activities, but there is a considerable difference in environmental ESD activity budgets between Adiwiyata schools and non-Adiwiyata schools, and budget shortages are not certified. This is an issue for the implementation of environmental ESD, which involves principals of certified and non-certified schools. To be certified by Adiwiyata, there are four factors to the criteria (environmentally friendly school education policy, environmental learning curriculum, participatory activities, and environmentally friendly facility development), but on a national level, Adiwiyata Mandiri spends 20% of its school budget on Adiwiyata educational activities and facility development, and in fact there are differences in environmental ESD costs between certified and non-certified schools (Jamaluddin et al. [2018] et al.).

In addition, in order to promote environmental ESD, it is important not only to improve the conditions but also to make efforts throughout the school, including the leadership of the principal. However, in the case of a non-Adiwiyata school, environmentalism is not always actively incorporated into the school management policy, so there are differences in the organizational culture that tackles environmental ESD.

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