Non-Curricular Strategies in the Implementation of Education for Sustainable Development in Three Prominent Green Schools in Indonesia

Puguh Karyanto
Research Group of Human and Environment Interface,
Department of Biology Education, Universitas Sebelas Maret, 36 A Ir. Sutami Street,
Surakarta, Central Java 57126, Indonesia

Corresponding email: puguhkaryanto@staff.uns.ac.id

Abstract. Non-curricular strategies have been qualitatively studied towards three leading green schools in Indonesia. These strategies have made those the three green schools reach an amazing success story in achieving national green school award from the government of Indonesia. This study follows a qualitative research paradigm. Content analysis was used to interpret the main pattern of the data resulted from the performed in depth interview upon three school principals. Evidences also collected to confirm the result of interview. According to the analysis, three patterns of strategies can be easily identified. Those the three strategies were related to character building. These non-curricular strategies were habituating Javanese culture to enhance positive ethical attitude, reinforcing student’s Islamic spiritual value to raise the respects towards nature and, strengthening student’s environmental literacy trough engaging student in research and project-based activities.

Key words: ESD, Green School, Non-Curricular Strategies

1. Introduction
Education plays importantly underpinning the success in achieving the state of sustainable world as mentioned in the UN concept of sustainable development. Indeed, education can make a crucially important contribution to progress towards the achievement of SDGs in the sustainable development idea [1]. The UN Seventeen Sustainable Development Goals (SDGs) noted a specific goal in education. Target of 4.7 (SDG-4) is implicitly stated the importance of building good quality of education.

It is arguable to say that environmental education is one of central topics in the discussions of education that noted in the SDGs. A specific concept of education has been introduced following the SDGs implementation namely the education for sustainable development (ESD) [2], [3]. Nowadays, ESD had been widely implemented in countries that ratified the UN Agenda 21. The government of Indonesia applied this education concept by promoting green school pilot project that firstly initiated in Java in 2005 [4]. Nowadays, this project is still ongoing with varieties of implementation.

Moreover, environmental education is known as critical in addressing the challenge of sustainable development. Yet, some important aspects of environmental education i.e. environmental curriculum [5], [6] and, teaching and learning process [5], [7] should be taken into account in the discussion of ESD. Curriculum design and, teaching and learning strategy are important in the ESD since they can be of good determinants in the achievement of environmental literacy [8].
Achieving environmental literacy is the main goal of environmental education implementation. Literacy implies that the outcomes in ESD is not purely cognitive area but also, entering the domain of affective [9]–[11]. Yet, it is important to scrutinize some critical variables forming the affective area. Non-curricular strategies in a form of particular school activities may play importantly in habituating student’s behavioural intention to perform environmentally-friendly behaviour in the green school [9]. Hence, this research aims to draw the pattern of aforementioned strategies used by three prominent green schools in Indonesia. The result of this research will recommend useful choice of common strategies as a model in the green school management.

2. Methodology
This study follows a qualitative research paradigm. This study was conducted towards three prominent green schools in the Districts of Sragen namely the SMP 1, SMP 2 and SMP 1 Miri. These three junior high school had received Adiwiyata Award from the Indonesian Government for their commitment in applying ESD into their educational system consistently. Together with Surakarta Municipal, the District of Sragen was also awarded the Adipura award for its commitment to adopt the concept of green and sustainable city [12]. In depth interview was chosen as a technique of data collection procedure in order to gain a deep qualitative information towards particular strategies applied by these three schools’ manager. Content analysis was used to interpret the main pattern of the information resulted from the performed in depth interview upon three school principals. Content analysis is chosen with consecutive careful steps namely data preparation, organization and reporting to ensure the trustworthiness of the data [13]. Evidences also collected to confirm the result of interview. Interview towards student participant and photograph of real activities were also used to triangulate information gathered from the conducted interview towards school manager.

3. Results and Discussion
3.1. Results
General pattern observed during the research found three non-curricular strategies that are related to character building. These non-curricular strategies were habituating Javanese culture to enhance positive ethical attitude, reinforcing student’s Islamic spiritual value to enhance respects towards nature and, strengthening student’s environmental literacy trough engaging student in research and project-based activities. Summary of strategies are given in the Table 1 below:

| Strategy of character building | Main Action |
|-------------------------------|-------------|
| **SMP 2 Sragen**             | Habituates student with Holy Qur’an recitation and daily prays before study to refresh the faith. School manager uses Islamic motivation written on banner that placed in public area to motivate to perform good habit. |
| **SMP 1 Sragen**             | School manager engaging student in simple environmental research projects. School manager promote environmental literacy projects. |
| **SMP 1 Miri**               | School manager uses Javanese motivation and slogan written on banner to sharpen emotional feeling of being a good people. School manager habituates Javanese culture and tradition into student’s daily habit and extra-school activities. |
Below Figures 1-3 are also given to serve evidences of action of strategy performed by school manager.

Figure 1. Using Islamic value in reinforcing environmental ethics. This is a figure of when school manager uses the word of God in the Holy Quran written on banner that placed in public area. This banner (An Nisaa’: 58 urges people to perform injudicious action towards other people and environment as well.

Figure 2. Examples of creative environmental products. This figure shows samples of student’s product of creativity. Student is challenge to possess attitude, knowledge and concern towards the environment through simple laboratory experiment and research project during the non-curricular activities.

Figure 3. Example of using Javanese value. The Javanese wise word ‘pawiyatan sajroning taman’ implies that studying activities will be effective if our surrounding environment is kept in beauty and green.
3.2. Discussion

3.2.1. Linkage between the Success of ESD and Culture-based education

Education is a tool in transferring knowledge [14] and also value [15]. As pertained to environmental education, environmental literacy that consist three constructs namely knowledge, attitude and concern becomes the main learning outcome to be achieved [9]. Environmental attitude and concern are two important constructs affecting readiness to perform behaviour or behavioural intention as according to the Theory of Planned Behaviour [16], [17]. Indeed, change of behaviour is the best goal in environmental education. And this affective domain can be reinforced through systematic habituation. Culture can be potentially engaged in a systematic habituation in the teaching and learning process and school environment. Culture sharpens people emotional feeling and an affective domain of learning [18], [19] and, making environmentally friendly behaviour is possibly to induced.

Javanese culture of Indonesia bears many indigenous values that can be easily adopted and adapted in the culture-based teaching and learning in environmental education [20], [21]. Seven elements of Javanese culture may break the obstacle of value transformation as these can potentially strengthen moral, value and ethics [20]. Yet, the adoption of Javanese culture in green school non-curricular activities may ensure the enhancement of student’s emotional feeling towards the truly mean of life and devotion which in turn, affects their respect towards nature and the environment.

Seven elements of Javanese culture are language, knowledge system, religion and faith, livelihood system, art, social organization and living system of equipment and technology [20]. All of these elements play importantly in reinforcing environmental ethics and literacy. School principal of SMP 1 Miri has chosen this Javanese culture to educate student. Javanese language and art are used daily in combination with Javanese philosophy of people interaction in the social and environmental setting [22]. Language and art serve as means of gush ensuring student to live with good character and environmental attitude respectively.

3.2.2. Linkage between the success of ESD and Implementing Islamic Value

It is in the Holy Quran that stated Islam was send to bring love and peace for all the entire universe. This religion ensure the harmony of human life in living with society and nature [18], [21], [23]. According to Islamic value, we human are the actor responsible for maintaining the quality of nature to be able to sustainably sustain human life. Islamic value regulates for not to destroy the nature’s balance. The Islamic approach to the environment is holistic and unequivocal. Qur’anic verses describing nature and natural phenomena, outnumber verses dealing with commandments and sacraments. Centrality of the environment in the Islamic rules and values and the Islamic injunction to command right and forbid wrong are suggestive of an affirmative sustainability agenda [24]. Islamic values are strictly regulate behaviour, moral and ethics towards nature by serving rewards and giving punishment [21], [25], [26]. Yet, people will act in a more careful manner. As Islamic values also deals with moral and ethics, this concept is considered in line with those the aforementioned Javanese culture.

School manager in SMP 2 Sragen has chosen Islamic value to reinforce student’s respect towards nature. Daily Quran recitation before teaching and learning process brings student to engaged in an emotional feeling strengthening student believe and faith. This condition will affect their mind to stay in a great obedience which in turn improving their ethics and morality [21], [23]–[25]. The following student action will be directed into good attitude including their behavioural attitude to perform environmentally friendly behaviour.

3.2.3. Linkage between the success of ESD and Environmental Literacy

Linkage between ESD and environmental literacy is clear. Environmental literacy is constructed by environmental knowledge, attitude and concern [9]. Attitude and concern are important learning outcomes in environmental education. These two constructs are also importantly determining the readiness to perform environmentally-friendly behaviour as according to the Theory of Planned Behaviour [17]. Environmental attitude and concern are induced by the existing environmental
knowledge. The NEP scale [27] implies that environmental knowledge is critically determined particular degree of environmental behaviour. Yet, focusing on efforts to ensure the effectivity of environmental education is important.

Various teaching and learning strategies can be used to make sure the effectivity of teaching and learning of environmental subject. Ausubel’s assimilation theory [28] tells the importance of self-concept reconstruction in the learning process. Student-centered learning with contextual process of learning [29], [30] may facilitate student to understand the environmental concept. In the context of this research, evidence of Ausubel’s assimilation theory has been shown by SMP 1 Sragen. The school manager creates an opportunity to student to be involved in the simple environmental research and project. The participation of school student to the project provided by school could improve student environmental knowledge and understanding [31]. This cognitive domain will in turn affects student’s concern and attitude.

4. Conclusion
The main learning outcome of environmental education stated in the ESD concept and MDGs is environmental attitude and concern. These two constructs will affect the behavioural intention determining the environmental behaviour. According to this research, attitude and concern that are closely related to moral and ethics can be reinforce through implementing Javanese culture as one of examples of culture-based teaching and learning. In addition, this moral and ethics can also reinforce by implementing Islamic spiritual value. In the cognitive domain, strategy of engaging student to actively participate in the simple research and projects can also effective in enhancing student environmental literacy and behavioural intention. These three strategies are of a good models for green school management in Indonesia towards the success of ESD and SDGs.

5. References
[1] S. Sterling, “A Commentary on Education and Sustainable Development Goals,” J. Educ. Sustain. Dev., vol. 10, no. 2, pp. 208–213, 2016.
[2] L. Sauvé, “Environmental Education and Sustainable Development: A Further Appraisal,” Can. J. Environ. Educ., vol. 1, no. Spring, pp. 7–34, 1996.
[3] B. Venkataraman, “Education for Sustainable Development,” Environ. Sci. Policy Sustain. Dev., vol. 51, no. 2, pp. 8–10, 2010.
[4] Warju, S. Prawiro, Soenarto, and M. D. Hartmann, “Evaluating the Implementation of Green School (Adiwiyata) Program: Evidence from Indonesia,” Int. J. Environ. Sci. Educ., vol. 12, no. 6, pp. 1483–1501, 2017.
[5] J. Stanišić and S. Maksić, “Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training,” J. Environ. Educ., vol. 45, no. 2, pp. 118–131, 2014.
[6] M. Erdogan, “The effect of summer environmental education program (SEEP) on elementary school students’ environmental literacy,” Int. J. Environ. Sci. Educ., vol. 10, no. 2, pp. 165–181, 2015.
[7] Y. C. Chou, H. Y. Yen, H. W. Yen, Y. L. Chao, and Y. H. Huang, “The effectiveness of teaching aids for elementary students’ renewable energy learning and an analysis of their energy attitude formation,” Int. J. Environ. Sci. Educ., vol. 10, no. 2, pp. 219–233, 2015.
[8] R. A. K. Wardani, P. Karyanto, and M. Ramli, “Analysis of high school students’ environmental literacy,” in Journal of Physics: Conference Series, 2018, vol. 1022, no. 1, p. 12057.
[9] H. L. Al-dajeh, “Assessing Environmental Literacy of Pre-Vocational Education Teachers in Jordan,” Coll. Stud. J., vol. 46, no. 3, pp. 492–507, Sep. 2011.
[10] J. R. Ehrenfeld, “Environmental Literacy in Science and Society: From Knowledge to Decisions,” J. Ind. Ecol., vol. 18, no. 1, pp. 156–157, Feb. 2014.
[11] S. Pe’er, D. Goldman, and B. Yavetz, “Environmental Literacy in Teacher Training: Attitudes, Knowledge, and Environmental Behavior of Beginning Students,” J. Environ. Educ., vol. 39, no. 1, pp. 45–59, 2007.
[12] I. A. Fakhrudin, P. Karyanto, and M. Ramli, “Behavioral intention and its relationship with
gender: a study of green school students in Behavioral intention and its relationship with gender: a study of green school students in Surakarta, Indonesia,” J. Phys. Conf. Ser., vol. 1022, no. 012043, 2018.

[13] S. Elo, M. Kääriäinen, O. Kanste, T. Pölkki, K. Uttriainen, and H. Kyngäs, “Qualitative Content Analysis,” SAGE OPEN, vol. 4, no. 1, p. 215824401452263, 2014.

[14] D. N. Perkins and G. Salomon, “Teaching for transfer,” Educ. Leadersh., vol. 46, no. 1, pp. 22–32, 1988.

[15] R. Brouwer, “Environmental value transfer: State of the art and future prospects,” Ecol. Econ., vol. 32, no. 1, pp. 137–152, 2000.

[16] I. Ajzen, N. Joyce, S. Sheikh, and N. G. Cote, “Knowledge and the Prediction of Behavior: The Role of Information Accuracy in the Theory of Planned Behavior,” Basic Appl. Soc. Psych., vol. 33, no. 2, pp. 101–117, 2011.

[17] I. Ajzen, “The theory of planned behavior,” Organizational Behav. Hum. Decis. Process., vol. 50, pp. 179–211, 1991.

[18] Z. Baidhawy, “Building harmony and peace through multiculturalist theology-based religious education: An alternative for contemporary Indonesia,” Br. J. Relig. Educ., vol. 29, no. 1, pp. 15–30, 2007.

[19] I. Meliono, “Understanding the Nusantara Thought and Local Wisdom as an Aspect of the Indonesian Education,” TAWARIKH Int. J. Hist. Stud., vol. 2, no. 2, pp. 221–234, 2011.

[20] G. Adilah and S. Saputra, “Enhancing Local Wisdom Through Local Content of Elementary School in Java, Indonesia,” in Proceeding of the Global Summit on Education, 2013, vol. 2013, no. March, pp. 614–620.

[21] R. A. Lukens-bull, “Teaching Morality: Javanese Islamic Education in a Globalizing Era 1,” J. Arab. Islam. Stud., vol. 3, pp. 26–47, 1995.

[22] S. W. Rahayu, “Implementation of Character Education Through Culture 5S (Senyum, Sapa, Salam, Sopan dan Santun) At State Junior High School 2 Ngawi (Smpn 2 Ngawi) East Java Indonesia,” Int. Res. Based Educ. J., vol. 1, no. 2, pp. 130–135, 2018.

[23] S. Lisnawati, “The Habituation of Behavior as Students’ Character Reinforcement in Global Era,” J. Pendidik. Islam, vol. 2, no. 3, p. 413, 2016.

[24] R. R. Rizk, “Islamic environmental ethics,” J. Islam. Account. Bus. Res., vol. 5, no. 2, pp. 194–204, 2014.

[25] R. Kamla, S. Gallhofer, and J. Haslam, “Islam, nature and accounting: Islamic principles and the notion of accounting for the environment,” Account. Forum, vol. 30, no. 3, pp. 245–265, 2006.

[26] D. Ghernaout, “Environmental Principles in the Holy Koran and the Sayings of the Prophet Muhammad,” vol. 6, no. 3, pp. 75–79, 2017.

[27] R. E. Dunlap, K. D. Van Liere, A. G. Mertig, and R. E. Jones, “New Trends in Measuring Environmental Attitudes: Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale,” J. Soc. Issues, vol. 56, no. 3, pp. 425–442, 2000.

[28] J. Novak, “Meaningful Learning: The Essential Factor for Conceptual Change in Limited or Inappropriate Propositional Hierarchies Leading to Empowerment of Learners,” Sci. Educ., vol. 86, no. 4, pp. 548–571, 2002.

[29] M. V. Vedishenkovka, E. V. Efimova, and E. V. Ryabova, “Student’s research work as the condition of continuity of general and professional education,” Int. J. Environ. Sci. Educ., vol. 10, no. 4, pp. 533–542, 2015.

[30] S. M. Al-Buslpsi and S. S. Al-Aamri, “The Effect of Environmental Science Projects on Students’ Environmental Knowledge and Science Attitudes,” Int. Res. Geogr. Environ. Educ., vol. 23, no. 3, pp. 213–227, 2014.

[31] N. M. Al-Rawahi and S. M. Al-Balushi, “The effect of reflective science journal writing on students’ self-regulated learning strategies,” Int. J. Environ. Sci. Educ., vol. 10, no. 3, pp. 367–379, 2015.