Factors Influencing Senior High School Students’ Environmental Knowledge

Febrianawati Yusup*
Universitas Islam Negeri Antasari Banjarmasin, Indonesia

*Email: febrianawati.yusup@uin-antasari.ac.id

Abstract. The current environmental crisis is the result of human mis-perceptions to the environment. The most important way to educate people about environmental issues is through environmental education. Only individual who has the environmental literacy will contribute in handling environmental problems. One component of environmental literacy is environmental knowledge. Environmental knowledge is formed by many factors, both internal and external factors. This paper explains the relationship between students’ environmental knowledge to gender, duration of environmental education, and parent’s education background. The survey was conducted using “Environmental Biology Cognitive Ability Assessment Instrument” to senior high school science program students (N = 192). It was found that duration of environmental education correlated with environmental knowledge. However, there is no difference between gender and parent’s education background. The learning duration shows the amount of delivered materials. Results suggest that to improve environmental knowledge can be through learning in school by adding learning materials.

Keywords: Factor influencing; Environmental knowledge; Students.

1. Introduction

The environment as a human residence is damaged. Water, soil, and air are polluted and hasn’t shown significant changes and energy and biodiversity resources are decreasing. If this continues to be left, then the earth as a human residence will be further damaged and this can endanger human life itself. Only individuals who have the environmental literacy will contribute in handling environmental problems.

Environmental education is seen as the most important way to educate people on environmental issues [1]. One of the important learning outcomes of environmental education is the knowledge of the environment. The expected knowledge of cultivation will affect people’s attitude to the environment that will be realized in an action [2] so that alteration of knowledge is expected to change the attitude of people in order to change their behavior to the environment. However, environmental knowledge is influenced by many factors. Research on the factors influencing students' environmental knowledge in Europe has been studied for a long time, but in Indonesia, the research has not been done much less especially to high school students. Several socio-

demographic factors affecting the environmental knowledge of students who have been studied, although the results are not the same for every study, among others, are gender, duration of the study, residence, parent’s work, and parent’s education background. This study focuses on gender factors, duration of learning, and parent’s education background.

Gender is still a debate in its influence on environmental knowledge. Some researchers believe that environmental knowledge is not affected by gender [3,4] but on the other hands, environmental knowledge is affected by gender [5,6,7] so this factor needs to be re-investigated in this case.

Another factor that needs to be studied is duration of learning environmental education. The environmental education programs are Adiwiyata School Program, Local Content Pendidikan Lingkungan Hidup (PLH), and integrated in major biology. These programs can influence students’ environmental knowledge [8, 9, 10, 11]. However, the duration of learning is not known for certain whether it influences students’ environmental knowledge or not. In addition, the two factors, parental factors also need to be considered in the environmental impact of students because students are members of the family. The parent’s last education indirectly influences learning outcomes through parental beliefs and parental behaviors [12]. Research on the influence of parent’s educational background factor on environmental knowledge has never been studied before.

At present, there is not much data available regarding the students of environmental knowledge in Indonesia and the factors that influence it. Before improving the students' environmental knowledge, description should be taken now about the knowledge already possessed and to determine the appropriate means of increasing that knowledge, factors related to environmental knowledge should be investigated first. This paper will describe the students 'environmental knowledge and explore the relationship between students' environmental knowledge to gender, duration of environmental education, and parents educational background.

The rest of this paper is organized as follow: Section 2 describes the proposed research method. Section 3 presents the obtained results and following by discussion. Finally Section 4 concludes this work.

### 2. Proposed Method

This research is a quantitative research with cor-relational research design. The population in this study is all students, in one of the Adiwiyata State Senior High School in Bandung that carry out biology learning using the curriculum 2013 and implements the learning of Environmental Education (Pendidikan Lingkungan Hidup/PLH) as the subject of local obligatory content, with number 1327 students. Sampling technique using cluster random. Two classes are randomly selected for each learning group (class). The sample is all students of the selected class, 192 students. The sample description is presents in Table 1.

| Independent Variable | Number of Cases | Percentages (%) |
|----------------------|-----------------|-----------------|
| Gender               |                 |                 |
| Boys                 | 91              | 47.4            |
| Girls                | 101             | 52.6            |
| EE Learning Duration |                 |                 |
| Less than one year   | 61              | 31.8            |
| Already one year     | 77              | 40.1            |
| Already two years    | 54              | 28.1            |
| Father’s Education   |                 |                 |
| Elementary School    | 4               | 2.1             |
| Junior High School   | 26              | 13.5            |
| Senior High School   | 19              | 9.9             |
| Bachelor             | 96              | 50              |
| Magister             | 41              | 21.4            |
| Doctor               | 6               | 3.1             |
| Mother’s Education   |                 |                 |
| Elementary School    | 5               | 2.6             |
The instrument used is instrument of "Student Biodata" to retrieve student's personal information as student’s background variable, such as name, gender, duration of biology learning and PLH, and the last education of their parents, and "Environmental Biology Cognitive Ability Assessment Instrument" cognitive abilities of environmental biology of high school students as environmental knowledge variables. Problem development in this instrument refers to Bloom's Taxonomy to the cognitive process dimensions of C1-C6 and to the dimensions of conceptual, factual, and procedural knowledge. The question consists of 20 multiple choice questions and 2 essay questions. The development of the instrument was carried out by the researchers themselves [13].

3. Result and Discussion
This section presents the results obtained and following by discussion.

3.1. Environmental Knowledge and Gender
The sample description is presented in Table 2.

| Variable                  | Gender | M    | SD  |
|---------------------------|--------|------|-----|
| Environmental Knowledge   | Boys   | 40.24| 12.87|
|                           | Girls  | 43.13| 12.64|

Although the mean scores seen girls higher than boys (Table 2), but the result of t-test shows the value of t -1.565 on Sig. (2-tailed) 0.119 which means that environmental knowledge between boys’ students and girls students makes no difference. This indicates that gender does not affect students' thinking skills [14], because of boys’ brains same with girls’ brains [15,16]. Hence, it cannot be said that women are smarter than men or vice versa.

3.2. Environmental Knowledge and Duration of Learning
Table 3 below shows that there’s difference between environmental knowledge and environmental education learning duration.

| Variable                  | Environmental Education Learning Duration | M   | SD  |
|---------------------------|------------------------------------------|-----|-----|
| Environmental Knowledge   | Less than one year                        | 39.09| 13.63|
|                           | Already one year                          | 40.83| 10.53|
|                           | Already two years                         | 46.12| 13.86|

From Table 3, there is a difference between the student's environmental knowledge between the longest duration of learning and the shortest time. The result of Kruskal-Wallis test shows the value of
χ² 10.848 at significance level 0.004 which means that there is a significant difference between the cognitive ability of environmental biology of students who have not even 1 year of studying biology and PLH with cognitive ability of environmental biology of students who have been 1 year and has 2 years studying biology and PLH. Viewed from the average of each group, the biological cognitive abilities of students who studied biology and PLH for 2 years were highest compared to the cognitive abilities of other students’ environmental biology groups. The results of this study are in line with Ashari’s research that the longer the duration of learning, the better the knowledge of the environment so as to make his attitude towards the environment also improved [8]. However, the study did not prove the relationship.

The duration of education is directly related to environmental knowledge through the cognitive abilities of environmental biology [8]. The longer a person learns, the more experience he gets [17]. Means the longer the learning of environmental knowledge as one learning experience is also increasingly owned by students. This is also because the longer the duration of learning, the more intense is also the quantity of student learning. In addition, learning is influenced by several factors, one of which is the motivation [18]. Motivations are the reason someone does something. Students with the longest learning duration have the highest environmental biological cognitive abilities. The longest duration is occupied by the students of 12th Science Grade. In addition to the quantity factor of learning through the duration of learning, also because of the quality of learning they do. National Exam preparation became one of the motivations that encourage students of 12th Science Grade to learn better so that their cognitive abilities better than the sister level.

3.3. Environmental Education and Parent’s Education Background

Table 4 below shows that there’s difference between environmental knowledge and parent’s educational background.

| Variable          | Parent Educational Background | M   | SD  |
|-------------------|--------------------------------|-----|-----|
| Father            | Elementary School              | 39.84 | 20.63 |
|                   | Junior High School             | 41.35 | 10.98 |
|                   | Senior High School             | 45.23 | 10.33 |
|                   | Bachelor                       | 42.68 | 13.00 |
|                   | Magister                       | 38.64 | 13.60 |
|                   | Doctor                         | 40.63 | 13.26 |
| Mother            | Elementary School              | 47.50 | 8.67 |
|                   | Junior High School             | 42.76 | 14.61 |
|                   | Senior High School             | 41.42 | 12.28 |
|                   | Bachelor                       | 41.10 | 11.90 |
|                   | Magister                       | 42.55 | 14.23 |

From Table 4, the result of Kruskal-Wallis test to know the relationship of father’s educational background with environmental knowledge shows the value of χ² of 4.252 at a significance level of 0.514 whereas to know the relation of the last education of mother with environmental knowledge show value χ² equal to 3.963 at significance level 0.555.

This shows that there is no significant difference between the students’ environmental knowledge and their parent’s last educational background (junior high school, senior high school, diploma, bachelor degree, master degree, and doctoral degree). This happens because they learn about the environmental knowledge not only from family but also from schools and outside schools, such as electronic media, print media, seminars or active discussions [19]. The family also plays a role in providing environment
knowledge, [20] but the contribution is small so that it does not significantly affect its environmental knowledge.

4. Conclusion
The results showed that factors related to environmental knowledge were only the duration of biology and PLH learning, while the sex factor and the last education of the parents were not significantly related to it. The highest environmental biological cognitive abilities are found in students with the longest duration of biology and PLH learning, 12th Science Grade, while the lowest environmental biological cognitive abilities are those with the shortest duration of biology and PLH learning, 10th Science Grade. Our findings suggest that to improve the knowledge of the environment can be through learning in school. The longer the learning duration, indicating the more material you get, the more students know. The addition of materials on the environment can be one of the strategies in improving students’ environmental knowledge. Environmental knowledge is not only derived from learning in schools. Sources of information about the environment on students need to be investigated further. Other factors that may be related to the students’ environmental knowledge, both internal factors from within students and outside factors of the student environment also need to be investigated.

References
[1] Köse, S., Gencer A.S., Gezer, K., Erol, G.H. and Bilen, K. 2011 Investigation of undergraduate students’ environmental attitudes International Electronic Journal of Environmental Education, 12 85–96.
[2] Littledyke, M. 2006. Science education for environmental awareness: approaches to integrating cognitive and affective domains Proceedings of the 2006 Naxos International Conference on Sustainable Management and Development of Mountainous and Island Areas. Thace: Media University of Crete 254–268.
[3] Larson, L.R., Castleberry S B, and Green G T 2010 Effects of an environmental education program on the environmental orientations of children from different gender, age, and ethnic groups Journal of Park and Recreation Administration 28 3 95–113
[4] McCright, A.M. 2010. The effect of gender on climate change knowledge a concern in the American public Popul Environ 32 66–87.
[5] Tikka, P.M. Kuitunen, M.T., and Tynys, S.M. 2000. Effects of educational background on students’ attitudes, activity Levels, and knowledge concerning the environment The Journal of Environmental Education 31 12–19.
[6] Atrey K. 2007. Pesticide use knowledge and practices: a gender differences in Nepal Elsevier Inc doi:10.1016/j.envres.2007.01.001
[7] Spelke E. S. 2005. Sex differences in intrinsic aptitude for mathematics and science? a critical review American Psychological Association, 60 9 950–958.
[8] Ashari M 2012 Hubungan lama pendidikan, kemampuan kognitif biologi lingkungan, faktor budaya, dan tingkat kedisiplinan dengan sikap peduli lingkungan pada siswa di sekolah adiwiyata mandiri sman 1 geger madiun tahun pelajaran 2011-2012 (Tesis) Sekolah Pascasarjana, Universitas Negeri Malang, Malang. Unpublished.
[9] Pauw, J.B.D. and Petegem P.V. 2012. The effect of Flemish eco-schools on student environmental knowledge, attitudes, and affect https://hal.archives-ouvertes.fr/hal-00679170
[10] Duerden, M.D. and Witt, P.A. 2010. The impact of direct and indirect experiences on the development of environmental knowledge, attitudes, and behavior Journal of Environmental Psychology 30 379–392.
[11] Zsóka, Á, Szerényi, Z.M., Széchy, A., and Kocsis, T. 2013. Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students Journal of Cleaner Production 48 126 –138.
[12] Kean P E D 2005 The influence of parent education and family income on child achievement: the indirect role of parent expectations and the home environment. Journal Family Psychology 19 2 294–304.
[13] Yusup F. and Munandar A. 2015. Developing instrumental biology cognitive instrument for hih school students International Seminar On Mathematics, Science, and Computer Science, 594–597.
[14] Pambudiono A, Zubaidah S, and Mahanal S 2012 Perbedaan kemampuan berpikir dan hasil belajar biologi siswa kelas x sma negeri 7 malang berdasarkan jender dengan penerapan strategi jigsaw Jurnal UM.

[15] Eliot L. and Ibrahim R.A. 2015. Anak perempuan lebih pintar dari anak laki-laki? http://www.parenting.co.id/usia-sekolah/anak+perempuan+lebih+pintar+dari+anak+laki-laki%3F

[16] Santrock J.W. 2007 Remaja Jilid I (Jakarta: Erlangga)

[17] Dahar R.W. 1989 Teori-teori Belajar (Jakarta: Erlangga)

[18] Slameto 2003 Belajar dan Faktor-faktor yang Mempengaruhinya (Jakarta: Rineka Cipta)

[19] Ergen B. and Ergen Z. 2011. How does education affect environmental knowledge: a survey in urban and regional planning education US-China Education Review B 7 924-931.

[20] Legault L. and Pelletier L.U.C.G. 2000. Impact of an environmental education program on students and parent’s attitudes, motivation, and behaviours. Canadian J. Behav. Sci 32 243–250.