

PAPER • OPEN ACCESS

PBL Method under the environmental education in Indonesia analyzing the influence of PBL Method into the knowledge attitude and behavior aspects

To cite this article: I Rachman and T Matsumoto 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **245** 012025

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

PBL Method under the environmental education in Indonesia analyzing the influence of PBL Method into the knowledge attitude and behavior aspects

I Rachman¹ and T Matsumoto²

¹ Researcher, Graduate School of Environmental Eng., University of Kitakyushu

² Professor, Fac. of Environmental Eng., University of Kitakyushu

1-1, Hibikino, Wakamatsu-ku, Kitakyushu-shi 808-0135, Japan.

Email: destyn_liza@yahoo.com.sg

Abstract. The purpose of this research is to clarify the effectiveness of trial of environmental education program based on PBL to teachers and children of elementary schools in multiple cities in Indonesia and to compare before and after program implementation for a certain period of time. From the results of the questionnaire survey conducted for elementary school students, we analyze the relationships among the three items of environmental knowledge, consciousness, and behavior. The surveyed cities are three cities; Bandung, Malang and Batu. At the elementary schools in each city, we implemented the environmental education program prepared by us, in one semester (about 6 months), excluding day off, from November 2015 to June 2016. The effect was verified by conducting questionnaire survey before and after the trial. The questionnaire before the trial was done in October 2015, and the questionnaire after the enforcement was done in August 2016. Although WS being implemented for both the teacher and the students in group A, there was no notable significant difference in terms of awareness and behavior compared to group B and group C. In the item of awareness, Bandung City was significant difference in garbage related questions, and Malang City was significant difference in water related questions.

1. Introduction

One of the keys to success is by implementation of environmental education in all elementary schools in the city. In implementation of the environmental education, the Ministry of Education provides worksheet called “Midori no Noto”, which is distributed to students to be filled during their summer vacations. Accordingly, the next study applied Environmental Education Worksheet “Midori no Noto” used in Kitakyushu, with Problem-Based Learning (PBL) Method.

The success of Kitakyushu in educating the people through formal education becomes inspiration for educational environment in Indonesia and the method is then applied in Indonesia. In order to find out whether application of “Midori no Noto” worksheet with PBL method can improve students’ knowledge, awareness and behaviour in environment, a test was performed in 10 elementary schools in 3 big cities in Indonesia.



2. Research Methods

2.1. Procedure of PBL trial

In conducting actual classes, it is important to consider activities and flows in each process. The flow of PBL lessons is divided into 5 stages. The problem presentation in is cast to the whole class, but after that carried out by individuals and groups on a student basis. Therefore, the role of the teacher after teach each student and group as progressors so that these activities can be carried out smoothly. In the announcement and the review, management of the entire class will be conducted again. In this trial use "Catatan Lingkunganku" as worksheets and handbooks for teachers. This book adapts from the system "Midori no noto" in kitakyushu, but tailored with the conditions in Indonesia.

2.2. Trial and verification method of environmental education program

2.2.1. Survey Summary. The surveyed cities are three cities; Bandung, Malang and Batu. At the elementary schools in each city, we implemented the environmental education program prepared by us, in one semester (about 6 months), excluding day off, from November 2015 to June 2016. The effect was verified by conducting questionnaire survey before and after the trial. The questionnaire before the trial was done in October 2015, and the questionnaire after the enforcement was done in August 2016.

2.2.2. Classification method of comparison target group. Before implementing the environmental education program, WS (workshop) was held for teachers and children. We held WS of teaching method for teachers and WS of environmental education for elementary students in one day workshop in the 3 city. The city are Bandung City, Malang City and Batu City.

In order to clarify whether WS is effective for teachers and children, we implemented the environmental education program and categorized the schools of each city into three groups A, B and C. Next, the flow of the investigation method in A, B, C is shown in Fig. 1. A conducted WS for teaching methods targeting teachers and environmental education workshop for students, and then implemented a program for six months. B held only the workshop targeted to teachers and implemented the program for six months thereafter. C did not hold workshop for both the teachers and students, only the program was carried out.

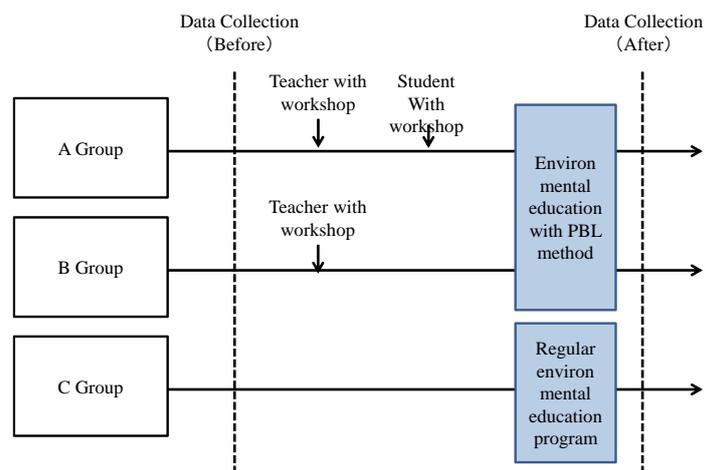


Figure 1. Flow of survey method in A, B, C



Figure 2. PBL Workshop Activity in Bandung city

2.2.3. *Question Summary.* Questionnaires were prepared with three items: environmental knowledge, consciousness, and behavior. The numbers of questionnaire are 25 questions, 17 questions, and 15 questions in knowledge, awareness, and behavior respectively. The contents of question in the item of knowledge are shown in Table 4. The choices are three stages: (1) correct, (2) wrong, and (3) do not know. Next, the contents of question in the item of awareness are shown in Table 5. The choices are 5 stages: (1) I think so, (2) I agree a little, (3) neither, (4) I do not think so, and (5) I do not think so at all. And next, the contents of question in the item of behavior/action are shown in Table 5.5. The choices are three stages: (1) Yes, (2) No, and (3) Sometimes.

3. Result and Discussion

This is thought that the memorized knowledge is more firmly established by utilizing auxiliary teaching materials in the environmental education program. In particular, significant differences are related in the question related to waste and drainage, and it seems that these questions are closely related to daily life supplementary teaching materials were effective. Consideration of comparison between groups room table 1 it can be seen that the significant difference between the A and B programs in the items of knowledge. Shown with the symbol of the star (*) ie if: Q1: 1.564E-10, Q2: 8.401E-06, Q3: 6.253E-05 # <* <Q1 <= ** <Q2 <= *** <Q3 <= ****. The symbol (****) indicates that there are have significant changes before and after using environmental education worksheet for one semester . This is thought that the memorized knowledge is more firmly established by utilizing auxiliary teaching materials in the environmental education program. In particular, significant differences were increased in the question related to waste and drainage, and it seems that these questions closely related to daily life among supplementary teaching materials were effective.

From table 1, it can be seen that in the items of awareness and behavior, there were not significant differences in all groups A, B and C. However, significant differences in awareness and behavior were relatively large, such as waste sorting method, water saving, learning method of drainage filtration, not draining into the house area. These are related in terms of knowledge, awareness, and behavior items. As same as knowledge items, these questions closely related to the items of awareness and behaviors are considered to be effective.

Table 1. Result of inter group comparison in the item of knowledge, awareness, behavior

No.	Group A	Group B	Group C
1	***	**	*
2	****	***	***
3	****	****	**
4	****	****	****
5	**	*	*
6	***	**	**
7	****	****	****
8	**	*	*
9	***	***	**
10	****	*	*
11	***	*	*
12	***	**	*
13	****	****	***
14	**	**	*
15	***	***	**
16	****	***	***
17	**	*	*
18	**	*	*
19	***	***	**
20	****	****	***
21	**	***	**
22	**	*	*
23	****	****	***
24	**	**	*
25	****	****	***

No.	Group A	Group B	Group C
1	***	***	***
2	*	*	*
3	**	**	*
4	*	*	*
5	***	**	**
6	*	*	*
7	***	**	*
8	**	*	*
9	*	*	*
10	*	*	*
11	***	***	**
12	*	*	*
13	***	**	**
14	*	*	*
15	***	**	*
16	***	**	**
17	*	*	*

No.	Group A	Group B	Group C
1	***	**	**
2	*	*	*
3	*	*	*
4	***	**	*
5	**	***	*
6	*	*	*
7	**	*	*
8	*	*	*
9	*	*	*
10	**	*	*
11	***	***	**
12	**	**	*
13	**	*	*
14	***	**	*
15	*	*	*

Q1: 1.564E-10, Q2: 8.401E-06, Q3: 6.253E-05
 #<* < Q1 <= ** < Q2 <= *** < Q3 <= ****

4. Conclusion

In order to make a comparison effect of before and after trial of the environmental education program, cross-tabulation was carried out by grouping A, B, C using the results of the questionnaire survey. Comparing before and after the program was implemented for both group A and B, the change could be seen more conspicuously, especially in A, positive answers increased. However, there was not much change before and after program implementation in group C. Group comparison between A, B and C was conducted using Wilcoxon's rank sum test. In the item of knowledge, there were significant differences in questions related to garbage reduction, drainage methods, and the nature of water. In the item of awareness, there were significant differences in questions such as separation of garbage, water saving, drainage methods. In the item of behavior, significant differences were found in questions such as garbage separation and drainage methods.

By summarizing the questions that showed significant differences, relevance was found in knowledge, awareness, and behavior on questioning about waste separation and reduction, pollution of waste water, and waste. Although WS being implemented for both the teacher and the students in group A, there was no notable significant difference in terms of awareness and behavior compared to group B and group C. In the field of garbage and water which was relatively focused in this PBL, not only knowledge but also the influence on awareness and behavior could be extracted. A side from the field of garbage and water, the items of knowledge were able to extract influence change, but influence on awareness and behavior could not be explicitly extracted. Therefore, it is necessary to improve on the program that induces children to think about themselves in the future.

References

[1] Indriyani Rachman, Toru Matsumoto, Yonik Meilawati Yustiani, Influence of Parents' Behavior to the Children Awareness on the Environmental Preservation, 1st International Conference Interdisciplinary Studies for Cultural, Heritage, ISCH2015, 2015.
 [2] Makoto Ichinpei, Hideaki Kobayashi, Junya Kobayashi, Kei Oshimori, Tetsuyuki Motoe: Upgrading the classroom Active / Learning, Opinion publication corporation, 2016.
 [3] Murat Genc, The project-based learning approach in environmental education. International Research in Geographical and Environmental Education, v.24, n.2, pp.105-117, 2015.
 [4] Jonathon Porritt MBE, Problem-Based Learning, A Case Study of Sustainability Education A

- Toolkit for University Educators, Teaching Environmental Education through PBL: Evaluation of a Teaching Intervention Program. *Research in Science Education*, April 2012, Volume 42, Issue 2, pp 219–232, 2012.
- [5] Clara Vasconcelos, Teaching Environmental Education through PBL, Evaluation of a Teaching Intervention Program, *Research in Science Education*, Volume 42, Issue 2, pp.219–232, 2012.
- [6] Cindy Febrianti, Understanding Growth and Development of Primary School Children. Sriwijaya University. *Journal of PGSD*, 2015 (in Indonesian).
- [7] portal.bandung.go.id, March 2017.
- [8] malangkota.go.id, March 2017
- [9] batukota.go.id, March 2017.