

Implementation of Environmental Education Based Local Potential to Increase Environmental Knowledge Student

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Abstract. The challenge of complexity environmental problems requires intensive efforts by environmental education. However, students' environmental knowledge about of the surrounding local potential is low. It is necessary to integrated implementation of environmental education based local potentials to enhance students' environmental knowledge. This research was conducted on students at Teaching and Education Faculty, Universitas Riau in August-December 2018. Implementation of environmental education based local potentials was carried out in learning with integrating contents of environmental education curriculum is the concept of ecosystems, environmental problems and environmental management based local wisdom, with data and field facts owned by Riau Province. Implementation is carried out in control and experimental classes, selected based on the homogeneity and normality values of the students' environmental knowledge. Parameters analyzed were the learning feasibility value by observer and student's environmental knowledge. Results showed that implementation of environmental education based local potential was very good (0.96-1.00). Implementation learning can increased students' environmental knowledge by 0.60 (moderate), better than control class by 0.21 (low). So that implmentation of environmental education based local potential can be used as an alternative effort to improve students' environmental knowledge.

1. Introduction

Environmental education is an efforts needed to support sustainable environmental management. A good implementation of environmental education is expected to be a controlling factor in preventing environmental damage. Environmental education literacy is consistently needed in the context of long-term efforts to prevent environmental damage [1]. An effort to achieve the sustainable development goals can be done by optimizing the application of environmental education [2, 3]. The role of environmental education is to increase knowledge and insight about richness and importance of the environment for life, which in turn triggers intrinsic motivation of students' commitment to participate in protecting environment.

Implementation of environmental education has been widely implemented in universities both monolithic and integrated. However, several research findings found that students' knowledge about environmental problems occurring around them is still relatively low, including: (1) only 50% -58% of students in Jakarta City have good environmental knowledge [4]; (2) teacher candidates (students) in Turkey do not fully understand the ecological and environmental concepts in answering various problems in their environment. In addition, there are some environmental problems that are unknown to students, but have become an important issue in their area [5].



Universitas Riau as a collage in Riau Province that applies environmental education. This policies is implemented in the Teaching and Education Faculty (FKIP). Results of the evaluation application environmental education in FKIP Universitas Riau, although most students (81.50%) already have a good value of environmental education, but environmental knowledge of surrounding local potential is still relatively low with an average value by only 58.01. This is due to the limitations of learning resources that are accurate and relevant to conditions the surrounding environment (21.9%) [6].

Riau Province as a provinces in Indonesia which has a rich diversity of unique natural resource potentials, including: peat swamp forest ecosystems, tropical rain forest ecosystems, peat swamp lake ecosystems and various biodiversity endemic flora and fauna. In addition, Riau Province also has a high complexity environmental problems, including forest and land fires that occur every year since 1998-2019 [7], abrasion of coastal areas reaches 59.02 ha/year [8], pollution of heavily polluted rivers [9], and the increased intensity of flood inundation in urban areas.

The diversity of local potential should be able to be used as a source of learning environmental education. Learning by using data around problems can increase long-term knowledge retention and application of knowledge significantly [10]. Learning of environmental education based on local potential allows students to study ecological and biological disciplines more effectively and deeply [11]. Nevertheless the application of environmental education that has been implemented so far has not yet optimally integrated the local potential in the environment that is attractively packaged. Therefore it is necessary to integrate the application of environmental education based on local potentials that can significantly enhance students' environmental knowledge.

2. Methodology

This research is an experimental research conducted on students of the Teaching and Education Faculty (FKIP) Universitas Riau who are taking environmental education courses in August-December 2018. The application of environmental education based on local potential is carried out in learning by integrating the content of environmental education curriculum in the form of ecosystem concepts, problems environment and environmental management based on local wisdom, with various data and field facts owned by Riau Province. The trial was conducted involving 2 classes namely, control and experimental classes. The determination of the control class and experiment is carried out by considering the level of homogeneity and normality of the value of students' environmental knowledge. The experiment class was program study of elementary school teacher education, and the control class was program study of Japanese language and literature education.

The experimental design used was a pretest-posttest control group design, which is a research design that contained pretest and posttest to measure the effectiveness of learning in 2 groups of subjects, one was treated (experimental group) and the other without treatment (control group) [12]. The parameters measured and analyzed in this study were (1) the learning feasibility value by observer; and (2) the value of students' environmental knowledge.

RESEARCH DESIGN (Pretest-Posttest Control Group Design)			
Class	Pretest	Treatment	Posttest
Experiment	T1	Implementation Environmental Education Based Local Potential	T2
Control	T1	-	T2

Figure 1. Research design

Evaluation of the feasibility of learning is done by involving 3 observers with observation sheet instruments during the experiment. While the assessment of environmental knowledge is carried out with a cognitive test instrument (learning outcomes) given to students to get the expected answers in writing both before and after the experiment. The instrument used to measure students' environmental

knowledge is a cognitive test sheet in the form of multiple choice questions that have been analyzed item items consisting of tests of validity, reliability, distinguishing features and level of difficulty of the questions.

Analysis of research data was done descriptively. Analysis of the implementation of the implementation of environmental education based on local potential is done by measuring the percentage of the feasibility of learning with the following formula:

$$P (\%) = \frac{Q}{R} \times 100\%$$

Remark :

P = Percentage (%) of learning accomplishment

Q = Total score of observations all learning activities

R = Maximum score for each aspect of the question

Data analysis of environmental knowledge is done by measuring the test results before (pretest) and after (posttest) implementation. Data analysis of the level of improvement of environmental knowledge was calculated by the N-Gain formula.

$$Ngain = \frac{\text{Posttest value} - \text{Pretest value}}{\text{Maksimum value} - \text{Pretest value}}$$

Interpretation of implementation criteria and students' environmental knowledge criteria are presented in Table 1.

Table 1. Learning implementation category [13]

No.	Value	Criteria
A Criteria of learning feasibility value		
1	$81\% \leq skor \leq 100\%$	Very good
2	$61\% \leq skor < 81\%$	Good
3	$41\% \leq skor < 61\%$	Enough good
4	$21\% \leq skor < 41\%$	Less good
5	$skor < 20\%$	Not good
B Criteria of Increased environmental knowledge		
1	N-Gain > 0.7	High
2	$0.3 \leq \text{N-Gain} \leq 0.7$	Moderate
3	N-Gain < 0.3	Low

3. Results and Discussion

3.1. Integration of Environmental Education Based Local Potential

Implementation of environmental education based local potential is done through integration results of environmental education curriculum and local potential content. The contents of environmental education curriculum Universitas Riau consist of 5 sub subject learning achievements, namely: (1) basic concepts and applications of environmental science; (2) basic concepts and characteristics of various ecosystem typologies; (3) environmental problems at the local and global level, and their impact on humans and environment; (4) sustainable environmental management efforts; and (5) Observing, analyzing and finding solutions to various environmental problems around. The local potential contents are data and facts local potential in the environmental sector in Riau Province, including: (1) various types of unique ecosystems; (2) latest environmental issues; and (3) local wisdom in environmental management in Riau Province.

The contents curriculum are integrated with data and facts about the potential of the local environment in Riau Province as a source of learning in the form of teaching materials in the form of academic modules (Figure 2). Academic modules are used in learning environmental education as a source of data and information, learning tasks and guiding the whole learning process both for lecturers and students. This local education module based on local potential that was developed has been carried out a validation test in previous research, involving (1) environmental experts to assess the appropriateness of the display, presentation and graphic aspects; (2) environmental experts to assess the feasibility of the contents of the module contents. Validation results show that the module developed is very valid with an overall average value of 4.56.

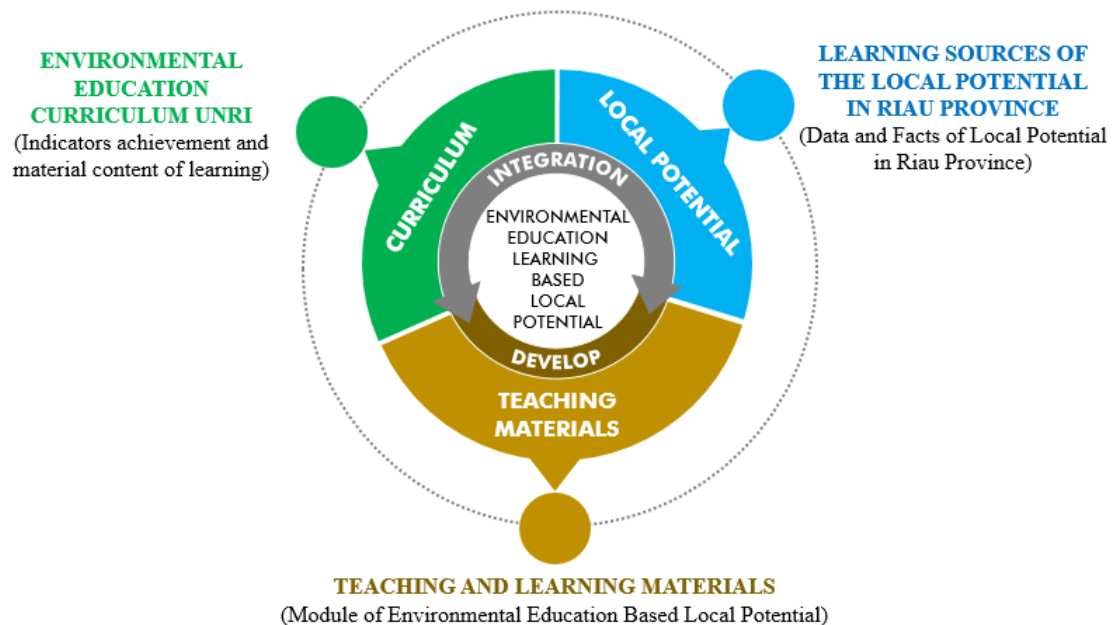


Figure 2. The model integrating of implemented environmental education based local potential

This integration needs to be done in order to explore the potential of the surrounding environment as a real source of learning. Development of learning material needs to pay attention to the characteristics of the area in the education unit [14]. The activity of developing learning material content must be adjusted to the development of students' knowledge and characteristics as well as taking into account the local potential in the region [15].

3.2. The implementation Feasibility of Environmental Education Based on Local Potential

The assessment results show that the implementation of learning using modules is classified as very good. From various assessments at each stage of learning starting from apperception, delivery of competencies and activity plans, application of learning, and utilization of local potential-based modules in learning are also classified as very good with values ranging from 0.96-1.00. Modules can be used very well if the value of implementation in the application of learning is at a value > 0.81. Values under 0.81 need to be reviewed and improved so that the development module can be implemented in class [13]. The results of evaluating the implementation of environmental education based on local potential are presented in Table 2.

Table 2. The learning feasibility of environmental education based on local potential observer

No	Observed aspects	Implementation					
		1	2	3	4	5	6
A	Apperception	1.00	1.00	1.00	1.00	1.00	1,00
B	Submission of Competencies and Activity Plans	1.00	1.00	1.00	1.00	1.00	1,00
C	Application of Learning	1.00	1.00	1.00	1.00	1.00	1,00
D	Utilization of Modules in Learning	0.92	1.00	1.00	1.00	1.00	1,00
Average		0,96	1.00	1.00	1.00	1.00	1.00
Criteria		Very Good	Very Good	Very Good	Very Good	Very Good	Very Good

According to observers the application of environmental education based local potential is in accordance with the learning objectives to be achieved by students, so they are interested in exploring information and pouring it into learning. The learning process makes it easy for students because it raises a variety of issues that are around especially Riau area. This can be seen from students and their groups being able to identify and analyze the causes of various environmental problems. So that from the learning process was born an applicative solution to help overcome the factors causing environmental problems.

3.3. Improvement of Students' Environmental Knowledge Value

The assessment of the value of students' environmental knowledge was measured based on the results of the analysis of the value of knowledge before and after the trial was conducted in 2 classes representing the control class and the experimental class. The experiment class was program study of elementary school teacher education, and the control class was program study of Japanese language and literature education. The results are presented in Table 3

Table 3. Student's environmental knowledge based on pretest and posttest value in the control and experiment class

No	Class	Pre-Test		Post-Test	
		Value	Criteria	Value	Criteria
1	Control	52.32	Less (D)	62.17	Enough (C+)
2	Experiment	58.11	Enough (C)	83.42	Very good (A-)

The experimental results show that an increase in the pretest and posttest scores both in the experimental class and the control class. The mean value of pretest and posttest in the experimental class is greater than the control class. In the experimental class the value of knowledge increased from 58.11 with sufficient criteria to 83.42 with very good criteria. The mean value in the control class increased from 52.32 with less criteria to 62.17 with sufficient criteria. The increase in the value of knowledge is caused by a good understanding of students about the learning material.

Based on the data increase in the post-test scores in the control class and subsequent experiments performed an analysis of the value of N-Gain. The analysis shows that the increase in the value of knowledge in the experimental class is greater than the control class. The increase in environmental knowledge in the experimental class is moderate with an N-gain value of 0.60, whereas in the control class it is classified as low with an N-gain value of 0.21 (Figure 3).

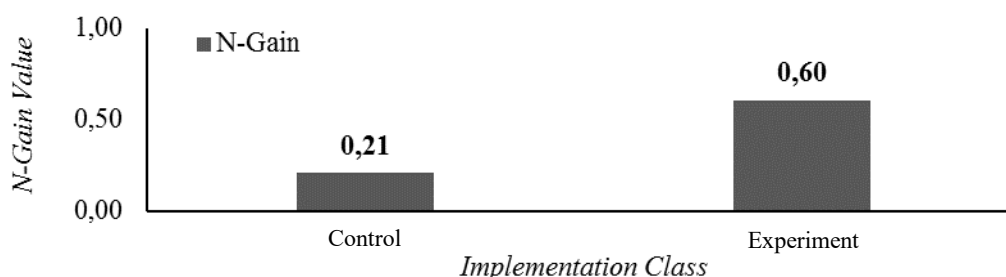


Figure 3. N-Gain analysis results improvement of student environmental knowledge in the control and experiment classes

The difference in the value of improvement in the control class and experiment shows that the application of environmental education based on local potential is better than without using modules. [16] Utilization of learning based on local potential can bridge, even integrate students' experience and knowledge to master learning material in depth. This is because teaching materials such as modules can simply make it easier for students to obtain a number of information, knowledge, experience, and skills in learning. [17; 18] In addition, learning to use surrounding problems can increase students' understanding in more depth.

4. Conclusion

The application of environmental education based on local potentials is carried out in learning by integrating the content of curriculum on environmental education material in the form of ecosystem concepts, environmental problems and environmental management based on local wisdom, with various data and facts on the field of the environment in Riau Province. Data and local potential facts are used as learning resources in the form of examples of field cases and packaged in the form of academic learning modules. The implementation of environmental education based on local potential is classified as very good (0.99). The application of environmental education based on local potential can increase students' environmental knowledge by 0.60 (moderate) compared to the control class by 0.21 (low). So that the application of environmental education based on local potential can be used as an alternative effort to improve environmental knowledge of students.

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