



The Influence of a “Natural Exploration” Approach in Developing Environmental Attitudes and Understanding of 3R Principles for Primary School Students

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ABSTRACT

This paper describes the impact of a natural exploration approach in thematic learning to develop environmental attitudes and deeper understanding of the 3R principles (Reduce/Reuse/Recycle) in elementary school students. This research involved a single group (pretest-posttest) of fourth grade students from a public elementary school in Indonesia during the year 2014/2015. Participants were recruited randomly in a class that numbered 36 students. The pedagogical approach used to implement thematic learning with a natural exploration approach were: (1) exploration activities, involving exploration and observation in the local school environment; (2) elaboration activities, where students worked in groups to make predictions about the rubbish problem in their school environment and to propose alternative solutions; (3) confirmation activities, where students in groups communicated their group’s results in a collage exhibition; and (4) assessment activities, using performance capabilities and measuring the students’ environmental attitudes and their understanding of the 3R principles. The research instruments used were: (1) an observation sheet; (2) interviews; and (3) a questionnaire. Data analysis was performed using a dependent t-test. The research demonstrates that a “natural exploration” thematic learning approach can be very effective in improving the environmental attitudes and understandings of 3R principles in fourth grade primary school students.



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INTRODUCTION

Education can develop student potency in the physical, intellectual, emotional, social, and spiritual aspects of environmental learning. In accordance with children's developmental stage and other characteristics of their physical and sociocultural environments, elementary school subjects can touch on environmental issues through the Natural Sciences, Indonesian language (Bahasa) and Art, Culture, and Crafts. In Indonesia, natural science instruction essentially includes four components, those of scientific attitude, scientific process, scientific products, and applications. (Bahasa) Indonesian in elementary school has the main function to make learning more contextual and meaningful. While art, culture, and craft functions as realization for process and product in competency, attitude, knowledge, and skills as artistic creativity is developed. According to Winarni (2012a, p4): *the basic learning process is investigation and discovery through environment exploration or natural exploration.*

The "natural exploration" technique is a learning approach that engages the learning objective through observation, discussion, and result reporting. Learning that emphasizes natural environment utilization as an object and a phenomenon is studied through scientific work called *JAS* (Marianti and Kartijono, 2005). Therefore, this approach can be used as an alternative to develop the environment attitudes and understandings of the Reduce, Reuse, and Recycle (3R) principles that can be integrated into school subjects. The 3R principles are expected to introduce children to environmental problems in a local context. In accordance with Indonesian State Law No.23 (1997) environment management is an integrated effort to preserve environmental functioning including environmental planning, utilization, development, maintenance, restoration, monitoring, and regulatory policy.

However, the situation in Indonesia is that good environmental management is not always applied in educational contexts. For example, students are often not comfortable with the idea of garbage. Students are not accustomed to disposing of garbage in the rubbish bin according to good practice. Therefore, it is necessary for environmental management activities including environmental regulation, selection, recovery, control, development, and conservation aspects to become part of the school curriculum.

According to the WHO cited in Muyani (2014: p5) "*garbage is something that not used anymore, dislike or something discarded that derived from human activities.*" We recognise human behaviour is a major source of environmental degradation. There are many ways that we can preserve the environment, eg. disposing of garbage in place, or sorting garbage into organic and inorganic waste. Further, organic waste can be used again (eg.as a fertilizer source and inorganic garbage can often be recycled into other goods beneficial to human life (Andru, 2012). According to Andru (2014, p26) this garbage reduction, includes: (1) restriction on garbage hoarding, (2) garbage recycling, and (3) garbage utilization.

The "natural exploration" approach emphasizes learning activities that are associated with the natural environment around the students, so that they have diverse insights, learn about various concepts, and link the problems with real life issues. Based on this, resultant learning can be more meaningful, ethical, and integral to everyday life. The purpose of this study was therefore to determine the effect of a natural exploration approach in thematic learning to positively influence environmental attitudes and understandings of 3R principles for students.

METHOD

The research type was a single group pretest-posttest (Winarni, 2011, p51). The study population was composed of fourth grade students from a public elementary school in Bengkulu, Indonesia during the year 2014/2015. The sample size totalled 109 from three different classes. Study samples were drawn randomly by a draw (Winarni, 2011, p102-103). The selected comparison sample was the *IVB* class numbering 36 students. The study's associated learning implementation was based on a curricular theme "The Beauty of My Country" and the sub-theme "Natural Beauty of My Country." Learning outcomes were linked to students integration of science, Indonesian, and art.

An independent variable the "natural exploration approach" in thematic learning was selected. Possible dependent variables were students environmental attitudes and understandings of the 3R principles. The steps used to implement thematic learning with a natural exploration approach were:

- a) Exploration activities, involving exploration and observation of garbage and various operational plants within the school environment.
- b) Elaboration activities, where students returned to the classroom and worked in groups to make predictions about the garbage problem in the school and to propose alternative solutions. For this activity, students were facilitated to create artwork utilizing garbage found in the local environment.
- c) Confirmation activities, where students in groups communicated their results in a collage exhibition. At the time of the exhibition, each workgroup was asked to explain the image purpose and the materials used in the manufacture of their artwork.
- d) Assessment activities, using performance capabilities with performance assessment. Written assessment was conducted to measure students' environmental attitudes and their understanding of the 3R principles.

Dependent variables were environmental awareness and the understanding of 3R principles. Environmental awareness included: (1) need to preserve the environment, (2) dispose of garbage in place, (3) sorting of organic and inorganic waste, (4) the wearing and enjoyment of recyclables as artwork, (5) the need for environmental hygiene. Meanwhile, 3R principles included: (1) the need to reduce the volume of garbage, (2) the reuse of objects that could still be used, (3) creative reuse and enjoyment of recyclable materials, and (4) concern for the school environment. The research instruments used were: (1) an observation sheet; (2) interviews; and (3) a questionnaire. Data were analysed using dependent t-test and normality with Shapiro Wilks test (Winarni, 2011, p102-103).

RESULTS AND DISCUSSION

Before the test of hypothesis 1, the research data was tested for its normality. Results from pretest and posttest in the environment care attitude are presented in Table 3.1.

Table 3.1 Pretest and posttest results for environmental care attitude

Results	Pretest	Posttest
Averages	52.3	88.5
Standard Error	0.243	0.138
Median	63	78
Standard Deviation	15.8	9.4
Highest Score	80	90
Lowest Score	30	60

Table 3.1 shows that the average score on environmental attitudes for the pretest was 52.3 and for the posttest was 88.5 or an increase of 36.2. Data for the pretest and posttest was analysed for normality using Shapiro Wilks test with significance results obtained on the pretest of 0.53 ($p > 0.05$) and for the posttest of 0.72 ($p > 0.05$). Since the environment attitude data was distributed normally then analysis continued with a dependent t test. Dependent t test results obtained a value t (7.98) $> t$ in table (2.03), therefore a null hypothesis was rejected and H1 accepted, meaning that the use of a “natural exploration approach” in thematic learning had a noticeable effect improving the environment attitudes of fourth grade elementary school students in the treatment group.

These study's findings are consistent with Hamzah's statement (2013, p35): *that environmental education not only provides knowledge about the environment but also increases environmental awareness and environmental attitudes*. It can be said that caring behavior and environment friendliness requires knowledge, development, and maintenance through education.

The “natural exploration approach” improves environmental attitudes due to three main characteristics, namely: (1) it is associated with the surrounding environment directly, (2) it uses observation and exploration activities, and (3) new knowledge is communicated either orally, or in writing, or by using drawings, photo, or other audiovisuals (Marianti, 2006).

Environmental attitudes in this study were developed in line with other understandings of the 3Rs (reduce, reuse, recycle) principles as the growing efforts to habituate student behaviours to recover or reclaim organic and inorganic garbage as media for their artwork. Pretest and posttest data related to student understandings of 3Rs principles are presented in Table 3.2.

Table 3.2 Pretest and posttest results for the understanding of 3R principles

Results	Pretest	Posttest
Averages	46.2	76.68
Standard Error	2.583	1.313
Median	62	76
Standard Deviation	17.48	11.26
Highest Score	72	86
Lowest Score	22	54

Table 3.2 shows that the average score for understanding of 3R principles on the pretest was 46.2 and for the posttest was 76.68 or an increase of 30.48. Normality tests using the Shapiro Wilks test, obtained significance scores for the pretest of

0.198 ($p > 0.05$) and post-test of near 0.00 ($p < 0.05$), meaning that the understanding 3R principles data were not normally distributed. On this finding, analysis continued with a Wilcoxon rank test result of 0.000 < 0.005 hence the null hypothesis was rejected and H1 accepted, meaning that “the natural exploration” in thematic learning had a noticeable effect in enhancing students' understandings of the 3R principles.

3R principles are a garbage management program that consists of three elements, namely: reduce, reuse and recycle. Utilization of used goods is the process of turning a discarded material into new materials that more useful (Hanif, 2013). Garbage processing is done by reducing garbage production and excessive consumption patterns. Reducing garbage production needs to be taught to children as early as possible so that children can reduce the accumulation of garbage around them. One example would be to encourage children not to buy food at the school canteen that uses excessive plastic packaging.

Reuse is the principle where students utilize again the objects that can still be deemed useful. Further, Mulyani (2014) states that the reuse principle is intended to avoid the use of goods that are disposable and to teach children to not discard items that are still usable. There are many ways to reuse items that we have. For example, when buying a product, choose one that has a reusable packaging such as glass bottles. For students, the objects that we use in everyday life, are often discarded immediately. These objects can be reused for various purposes, for example: writing on both sides of the paper, using refillable bottles, reusing tin cans as a toy or to contain kitchen spices, the reuse of plastic bags, or the use of a broken bucket as a planter, or re-using glass bottles as a water bottle.

Recycling is an activity that utilizes waste by changing the shape and nature of garbage into valuable new products. Wastes that can easily be recycled are comprised of a glass, cans, plastic, and paper.. Recycling performs a transition function and changes the form of the material, for example processing paper or wrap into new packaging for valuable goods (Alamendah, 2010).

The 3R principles developed in this study were consistent with the objectives of the 3R principles including: (1) reducing garbage and waste generated by reducing consumption, (2) reducing garbage accumulation, (3) improving waste management by promoting reduce, reuse, recycle (3R) principles, (4) improving the general quality of environmental hygiene, and (5) increasing the value of recycled waste products into other items of value (Alamendah, 2010) .With the application of the 3R principles it is expected that waste can be reduced, and that creativity can be fostered in processing waste into useful objects.

The “natural exploration approach” first described by Piaget and Vygotsky emphasizes constructivism, as well as cognitive and social development. Some students will be more effective in the learning process if they actively undergo cognitive reconstruction, both while interacting with natural phenomena and in the social conditions in the classroom. As an implication, teachers should pay close attention to the development of conceptual learning and student understanding (Winarni, 2013, p15).

A natural exploration approach encourages students to recognize the object, and the symptoms of the problem, while examining the local context for the learning (Ridlo, 2005). Students understanding is not obtained directly from the teacher, but through scientific activities, such as observing, comparing, predicting, making hypotheses, and formulating conclusions based on data. In this study, students also

created written reports and artistic collage work. Students explored directly natural phenomena occurring around their school. Phenomena can be found in the local environment around the students and this helps students to observe and at the same time understand the symptoms or concepts that occur.

“Natural exploration” learning has several functions including: (1) a psychological function, where the stimulus comes from the environment and is a stimulus to the individual resulting in a response (or behaviour), (2) a pedagogical function, with an environmental impact didactic, and (3) an instructional function, where the learning program is an environment that is specifically designed to develop the learners behaviours. A natural exploration learning approach is realized through three basic efforts (i.e. coaching, learning, and training).

CONCLUSIONS AND RECOMMENDATIONS

In this study, students were trained to make observations through the exploration of their natural surroundings and to fine-tune these skills using all the senses to obtain information or data concerning objects or events occurring in their local environment. Students more easily understand complicated and abstract concepts if these are accompanied by concrete example (appropriate to the circumstances at hand) with efforts to practice the invention of a new concept through both physical and mental activities. The most advanced stage of observation is classification, where a process is used to determine the class of objects or activities or divide the set of objects, events or information about the objects into classes according to a method or system (Winarni, 2012b, p16).

Based on the study results, it can be concluded that the use of a natural exploration approach in thematic learning can be very effective in improving the environmental attitudes and the understanding of 3R principles in fourth grade primary school students.

Advice stemming from these research data are: (1) that the natural exploration approach can be recommended for use by elementary teachers because it can serve as a psychological, pedagogical, and instructional tool realized through the instructional processes of coaching, learning, and training, and (2) for teachers of other grade levels or contexts, further research is recommended to explore further ideas which relate pedagogy to environmental attitudes and students developing knowledge of 3R principles. This is important for elementary schools both for Indonesia and elsewhere in the world.

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