The ability of superior student in fraction materials based on ecopreneurship

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Abstract. One of the innovations in mathematics learning is the implementation of ecopreneurship principle as a representation of social science approaches in developing fractional problems at the inclusive of primary school aimed at superior students. So this study aims to provide an overview of superior students understanding skills in fractional materials through the development of questions based ecopreneurship that are expected to improve superior students cognitive ability and be able to interpret questions that implicitly imply the principle of ecopreneurship. This Action Research conducted on 3 superior students in the inclusive of primary school proves that there is an enhancement in students understanding in fractional material in cycle II by 45% when it compared with cycles I. the indicators is that students are able to apply the concepts and answer the questions precisely in addition to implicitly they are able to understand the content of questions related to the principle of ecopreneurship. The results are expected to become the reference for the teachers in developing more innovative mathematics lessons. This concept is expected to be a new finding that is useful in improving superior students understanding in answering mathematical fractions and is expected to be able to train their social skills.

1. Introduction
One of the materials that are quite difficult to understand by the students in the mathematics subjects is fractions. Fractions are part of a whole number, which can be written with the symbol \( \frac{a}{b} \), where \( b \neq 0 \) and \( a \) and \( b \) are counts, \( a \) is called numerator and \( b \) is called denominator [1]. Fraction knowledge is essential both in everyday life as well as for learning more advanced mathematics and science. Fractional material is quite difficult, As similarly found in the Hadi’s research that in studying the concept of fractions it is possible to misconception students. there are some obstacles to students in fractional materials such as: have no understanding the concept, use the wrong process, carelessly in understand the meaning of the problem, less understanding of the prerequisite concept, wrong in computation or calculation [2]. The development of the students understanding to the meaning of fractions in the teaching-learning process was a complex process because the concept of fraction had a number of interpretations, namely (1) fraction as a part of the whole, (2) fraction as the result of a measurement, (3) fraction as an operator, (4) fraction as a quotient, and (5) fraction as a ratio. The teaching - learning process about fractions, teachers often emphasized on how to do the operation procedure than on the meaning of operation. It is stated that one of the reasons why the mathematical
idea of fractions was systematically misinterpreted by students was an inconsistency with the principles of arithmetic used in operations involving natural numbers [3]. Many researchers studied the students’ errors related to fractions. The investigation of errors of students when they did the addition of fractions. The reasons for these errors were a weak understanding of the fraction concept, a very common limiting construction arising from learners’ experience with whole numbers and the set algorithms which are taught for whole number arithmetic [4]. The quality of learning fractions conceptually is likely to improve when students are exposed to a concept represented through different embodiments and in a variety of different situations. If children encounter and work with the same conceptual structure presented in different forms, they can be helped to “gather the mathematical essence of an abstraction” [5].

This study discusses the ability of superior students to understand fractions. The superior students are individuals with high or superior intellectual ability in the academic field, with the result of standard intelligence tests achieving an IQ score of 120-129, and the tests performed by qualified persons. The use of IQ as the separation criterion between a superior and a capable person has the advantage of being more objective and can be done from the beginning of one's life [6]. With a high IQ capability, researchers want to know the description of their abilities with different situations of teaching in fractional materials. One of the different situation is integrate the values of ecopreneurship in the development of the fractional materials. Hopefully the superior students can understand the concept of fractions and implicitly train their social skills. Ecopreneurship comes from two keywords, including ecoliteracy and entrepreneur ship character So that ecopreneurship is expected to make learners who have creativity, innovation and unyielding spirit but balanced with ecological behavior, so as to safeguard, utilize, and manage the natural environment wisely [7]. An ecopreneur must be able to reduce or minimize the negative impact of what he does on environmental sustainability including anticipating current environmental problems [8]. These values that need to be nurtured and instilled in children early on in order to anticipate some of the current environmental problems include: climate change and global warming; extreme weather events, drought and deserts; food availability and distribution; pollution, as a consequence, the cultivation of ecopreneurship values must be able to make provision for them in conducting critical analysis of environmental problems occurring in the present and future [9]. Ecopreneurship can be described as an innovative, personality-based value creation through innovation and wise use of the environment [10], so that Ecopreneurship is expected to be an alternative in developing environmentally sound creativity [11]. Educational researchs about ecopreneurship in learning are very little, let alone in the field of mathematics. However, this research is relevant to previous research entitled "Development of Ecopreneurship in Primary Education" states that almost every elementary school has implicitly applied ecopreneurship learning through the internalization of ecopreneurship values in formal and informal curriculum that have implications for learning intrakurikuler, kokurikuler, and extrakurikuler [2]. In addition, there are no specific studies that examine ecopreneurship in fractional material, but relevant research on fractional topic in an effort to improve students' understanding is sufficient, one of which is research conducted by Pohan under the title "Improving Student Understanding On The Sum of Decimal Fractions Using Cooperative Learning "which states that there is a significant increase in the students' understanding of the two cycles that have been done, that is 50% for the first cycle and 87.5% for the second cycle is marked by the increasing ability of students in answering the problem of numbers with right number operations [12]. The research focuses on developing ecopreneurship-based story stories in an effort to improve students' understanding in fractional materials.

This study proves that mathematics learning is not identical with numbers and is not limited to cognitive ability, although explicitly the measurements are still related to numbers, but implicitly this study aims to train children's social skills in instilling ecopreneurship values early on. This research uses Action Research Classroom (ARC) conducted on 3 superior students in the inclusive of primary school proves that there is an enhancement in students understanding in fractional material in cycle II by 45% when it compared with cycles I. In addition, students are indirectly able to associate their understanding with integrated ecopreneurial values in the matter, so that students are able to benefit indirectly in the story of their story, mainly related to the value of creativity, productivity, cooperation, independent and love the environment. The results of this study is expected to be a teacher solution in developing mathematics learning that is not only oriented to cognitive abilities alone but able to develop social skills in students from an early age.
2. Experimental Method

Action research method is the most appropriate method to know the level of students understanding in fractional materials through the development of ecopreneurship based math problems. This classroom action research is expected to provide an overview of the superior students ability both quantitatively and qualitatively. Action research is used by educational practitioners to improve their practices [13]. Here, Figure 1 shows The stages of action research

![Image of action research stages](image.png)

Figure 1. The stages of action research

Basen on Figure 1 action research used are planning (planning), implementation (acting), observation (observing) and reflective (reflecting), with the implementation phase and observations made in the time period simultaneously. Subjects in this study were 3 superior students in the inclusive of primary school with two cycles and two different treatments. Data to be collected in this research are qualitative data and quantitative data.

3. Result and Discussion

Ecopreneurship becomes the right base in creating innovative and different mathematics learning with mathematics learning in general because it uses social science perspective. Ecopreneurship comes from two words namely ecoliteracy and entrepreneurship, so this concept will not be separated from the principles of ecoliteracy and the values of entrepreneurship. According to Capra formulates the following ecological principles: (1) Interdependence. This principle asserts that all ecological commodities including living things are mutually evolving and linked to one another in a unified linkage called the network of life and possessing a wide and complex relationship; (2) Recycling (ie, the residual output of waste utilization is reused as a source of energy and food for life processes in the life chains of living and non-linear cycles; (3) partnership (Partnership). Partnership is cooperation between ecological communities especially living creatures. Living things work together because they are interconnected, mutually supportive, mutually supportive to living and living with one another; (4) flexibility. This principle is concerned with nature that allows nature to adapt to the various changes and conditions that arise in the process of natural development itself; (5) diversity. This principle deals with the nature and life of living things as they should be. This is done by opening up for interdependence and flexibility by accepting and absorbing influences from outside but simultaneously can bring influence to the development of life [14]. These five principles have an important role to be taught to the younger generation, especially from childhood, so that they will understand more about the urgency of maintaining environmental balance in order to support sustainable living. These five principles of ecoliteracy are also the basis for determining the development of fractional problems based on ecopreneurship.

The development of these ecopreneurship questions should also be based on the values of entrepreneurship as part of the ecopreneurship conceptual. There are 17 values of entrepreneurship are: independent, creative, risk-taking, action oriented, leadership, hard work, honest, discipline, innovative, responsibility, cooperation, abstinence, commitment, realistic, curiosity, communicative, and strong motivation for success [15]. These values form the basis of ecopreneurship development
that is interpreted in the form of fractional questions in the form of a description through the comprehension of the students in two cycles with different treatment.

In each cycle, researcher and partner teachers conduct intensive cooperation to seek the creation of learning that can improve the understanding of superior students ability in fractional materials and the application of ecopreneurship values in each question. The apparent treatment differences of both cycles are seen in the students' comprehension test. Here are some examples of student comprehension tests in cycles I and II can be seen through Figure 2.

1. The school was holding an exhibition of second-hand goods, one of the items sold was made by Ari. Ari makes a bag from old newspapers, then he sells for Rp. 80,000 to Mr. Yanto, vivi gave 20% discount for the bag that he should sell, what price must be paid Pak Yanto to buy the bag?

2. Every morning students at SD Laboratorium Percontohan UPI Tasikmalaya conduct hunting activities of garbage to be collected, grouped and sold through waste bank activities. First class gets $1\frac{1}{2}$ kg worth of waste, Second class gets $16\frac{3}{4}$ kg, and Fourth grade $20\frac{1}{4}$ kg. How much waste is being sold from grades 1-3?

3. SD Laboratorium Percontohan UPI Tasikmalaya has Hydroponics program, planted plants are kale vegetable. Yields in January reached 100 bunchs, each harvest is always sold to the market with the price of 1 bunch of vegetable kangkung is Rp.5000 / bunch. In the vegetable market kale is resold at a price of Rp. 6000 / bunch. What percentage of the seller's profits in the market if the kale he owns are sold out?

Explicitly, the story is no different from the math problem in general, but implicitly many keywords in each question represent the principles and values of ecopreneurship that are useful to students, such as the use of the word "make" in the first question that describes the value of productivity and creativity, besides the value of creativity can be seen from the used goods that became the main ingredient in making his work. In second question, "hunting activities of garbage" also describes the principle of ecopreneurship, where students are reminded to always keep their surroundings through waste utilization activities for sale. In third question, hydroponics is the main characteristic of describing eco-recreational activities. In the third question, it is asserted that the harvests in the hydroponics activities are traded that describe the principles of ecopreneurship. This simple way will become a habit that allows each student to associate their thoughts to have the character of ecopreneurship. So students are not only adept at answering fractions but are trained to have useful social skills for their lives in the present and the future.

Based on the results of the test in the first cycle only 55% percent of the superior students can apply concept or formula appropriately but answer wrongly. Characteristics of students in working on this fractional question is very varied. The results in the first cycle are quite disappointing, and this is due to the level of difficult questions that tend to be difficult even if the given problem has different weights, ranging from easy, medium, and difficult. The question of cycle II is made based on the evaluation in the first cycle. The characteristics of the problem are not much different from cycle I. The principle of ecopreneurship becomes the basis in making the question of cycle II, but the difference is the difficulty level which tends to be easier when compared to cycle I and proven the students' work output increased from the previous cycle as much as 100%.

Table 1 shows the results of the data in the level of descriptors 2 and 3 for each indicator. In Cycle I, two of the superior student can apply concept or formula appropriately but answer wrongly, but in cycle II three of the superior student can apply the concept or formula and respond appropriately.
Table 3. Comparison of level of understanding cycle I and cycle II

<table>
<thead>
<tr>
<th>Student</th>
<th>Number of Indicators Each Problem Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cycle I</td>
</tr>
<tr>
<td>Student 1</td>
<td>1</td>
</tr>
<tr>
<td>Student 2</td>
<td>2</td>
</tr>
<tr>
<td>Student 3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
</tr>
<tr>
<td>Percentage</td>
<td>55%</td>
</tr>
</tbody>
</table>

Table 1 provides an overview of students understanding of fractional mathematics work with indicators "students can apply formulas / concepts in simple cases / in similar cases’ assessment 0-3. Student got score 0 if No answer matter, student got score (1) if student can answer but not apply concept or formula appropriately, student got score (2) if student can apply concept or formula appropriately but answer wrongly student got score (3) if the student can apply the concept or formula and respond appropriately. When viewed from the cognitive abilities seen of the superior students understanding ability increases from cycle I to cycle II. In addition, affectively students begin to know and implement ecopreneurship in everyday activities, one of indicator is the suitability of the results of student and teacher answers during the interview process.

4. Conclusion
Ecopreneurship as a representation of the integrated social science in mathematics learning proves that social science is proven to combine with mathematics learning in fractional material, the indicator is the understanding of superior students in fractional material increased by 45% in cycle II. The ability of superior students in understanding the problem can be seen from the application of the concept and the right formula. In addition, students are implicitly trained to have social skills, especially those related to principles and values of ecopreneurship. It proves that fractional learning based on ecopreneurship is very suitable applied in learning mathematics about fractions in Elementary School.

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6. References