

ADIWIYATA EDUCATIVE GAME TOOL AS A SUPPORTING MEDIUM OF CHILDREN'S RIGHTS IN ENVIRONMENTAL EDUCATION FOR ELEMENTARY SCHOOL STUDENTS IN BEGINNING CLASS

¹Novi Trilisiana, ²Henny Riska Pratiwi

^{1,2}*Universitas Negeri Yogyakarta*
trilisiana@gmail.com, hennyriskal991@gmail.com

Abstract

Students in beginning class of elementary school are children who are 7-10 years old. They have rights to acquire education, access information, and express themselves through playing. They also have rights for good and healthy environment. Those rights could be manifested into Environmental Education which is friendly and safe for them. One of the media that supports those rights in Environmental Education could be an Educative Game Tool, namely Adiwiyata Educative Game Tool. There are two aims of this study: to produce the design and shape of Adiwiyata Educative Game Tool as a supporting medium of children's rights for Environmental Education and to understand the effectiveness and implementation of Adiwiyata Educative Game Tool as a supporting medium of children's rights for Environmental Education. This study was conducted through Research & Development Method. Qualitative data analysis is conducted through descriptive analysis that explains facts with supporting theories. Furthermore, quantitative data analysis is conducted descriptive statistics. The design and shape of Adiwiyata Educative Game Tool which support children's rights for Environmental Education consist of product package, handbook, playing board, Adiwiyata cards, advise book, dice, glass, pawns, green points, red points, and medal. Adiwiyata Educative Game Tool could be implemented in incidental program of Environmental Education that could be adapted to school policy. Furthermore, Adiwiyata Educative Game Tool could be used outside the school with a distinctive cultural approach of children.

Keywords: Children's Rights, Environmental Education, Adiwiyata Educative Game Tool

INTRODUCTION

Children have the rights which is protected by law. In Indonesia, children's rights are stipulated in the 1945 Constitution, Law, and Decree of the President. Some of the children's rights regulated in the law of Indonesia are acquiring education, accessing information and expressing themselves through playing. Children also have rights for good and healthy environment. The children's rights could be striven until it is fulfilled passably. Children's rights need to be fulfilled through friendly and safe learning design for children.

Children's rights about learning safely can be incorporated into the Environmental Education that packed through games. Not only learning about the environment, but also children can play with peers and adults.

Children are entitled to be positioned as a subject capable of learning and care for the environment according to their stage of development.

Environmental education is a learning process that aims to shape the behavior, values and customs to respect the environment (Wahyu S, 2010). If it is associated with Verse 32 of 2009 on the Protection and Management of the Environment (*PPLH*) in Article 65 chapter (2) which states that " everyone is entitled to environmental education, access to information, access to participation and access to justice in meeting environmental rights good and healthy " then environmental education is one of the facilities in order to meet the civil rights, no exception the children's rights. Environmental education is the process of recognizing values and clarifying concept in order to develop skills and attitudes necessary to understand and

appreciate the interrelatedness among man, his culture and his biophysical surrounding (IUCN, 1999).

The importance of Environmental Education for children is children care about the cleanliness and health of the environment around them. Children can recognize the home environment, school environment, and society. The three of those environments are the environments in which there are living beings such as humans, animals and plants that live in harmony so that the children be cared ecosystem living things. Therefore, the Indonesian government provides Environmental Education facilities to children.

Indonesia through cooperation between the Ministry of National Education and the Ministry of Environment has socialized Environmental Education (EE) for students from elementary to senior high school. One of the government's program featured are School that has insight of Adiwiyata. Government seriously instilled the value of environmental conservation to community of elementary schools. It can be seen through the fact that, in 2011 the number of elementary schools that have been insightful Adiwiyata getting in 95 schools of 178.435 schools in Indonesia (KNLH, 2011:iii). Environmental Education for the children supported government is the children's rights to learn.

Environmental education (EE) has the objectives. Yusuf Hilmi A. & Oom Romlah (2010) in their paper, there are 6 levels of EE purposes, namely, awareness, knowledge, attitudes, skills, participation and evaluation. Based on Content Outlines Environmental Education Materials developed by Tim PLH (2006), in principle, the purposes of environmental education include in several domains of learning in the form of knowledge, awareness, attitudes, skills and actions.

Environmental education for elementary school students, especially the beginning class, should be packed in accordance with the level of social-emotional development of children who ranged in age from 7 to 10 years old. On that age, children

like the play activities that involve their peers. Children still need the guidance of adults in the form of an example of the behavior of teachers as the role models. Therefore, it is appropriate if the messages of life and the essence of environmental education delivered to children through play and role models from adults.

The fact that there are need for children to learn and to play on Environmental Education, this study created a form of learning medium innovation namely, Educative Game Tool. Educative Game Tool (EGT) in this study was named as the Adiwiyata Educative Game Tool inspired from government programs that the School Insightful Adiwiyata. Adiwiyata Educative Game Tool has been developed and has been tested its feasibility by researchers at the one of the Elementary School insightful Adiwiyata.

There are two aims of this study: to produce the design and shape of Adiwiyata Educative Game Tool as a supporting medium of children's rights for Environmental Education and to understand the effectiveness and implementation of Adiwiyata Educative Game Tool as a supporting medium of children's rights for Environmental Education.

RESEARCH METHOD

The method used in this research is research and development. This method aims to research and develop products. The steps of method consist of 10 steps: (1) preliminary study and information collection; (2) development planning; (3) design development; (4) design validation; (5) design revision (6) product trials; (7) product revision; (8) operational trials; (9) final product revision; (10) dissemination and implementation.

The step of preliminary study includes interviewing with EE coordinators and teachers, studying EE materials, and observing place of study. The step of planning includes learning analysis that sets

the material, goals, learning indicators and evaluation. The step of design development is making prototype. The steps of design validation include validation from subject expert and media expert. Both subject expert and media expert give suggestions for the revision of design to be ready for trials. Product trials include limited field trial and wider field trial. After conducted product trials, researchers revised the product based on feedback from end users. After revision, the next step is a operation trial. Products that have been made operational trials has revised to produce the final products. The final products are distributed in the research place and published in reports and research articles.

The subjects of trials consist of six students in limited field trial, 12 students in a wider field trial, and 24 students in operational trial. This study has instruments such as assessment sheets by experts, assessment sheets by students, assessment sheets by teacher, observation sheets, and guidelines for the interview. Assess the effectiveness between Adiwiyata EGT and learning objectives is done with pre-test and post test (Sugiyono, 2011: 73), as described as follows:

One Group Pretest-Posttest Design

Group	Pretest	Treatment	Posttest
A	O1	X	O2

Data analysis included quantitative and qualitative data in accordance with the data collection instruments. Quantitative data is data 5 scale (Likert). Quantitative data is converted by category qualitative assessment, which is very good, good, enough, less, and very less. The following table data conversion:

Tabel 1. The Guidance of Assesment Category

Score	Range Average Rating (X)	Category
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5	X > 4,08	Very Good
4	3,36 < X 4,08	Good
3	2,64 < X 3,36	Enough
2	1,92 < X 2,64	Less
1	X 1,92	Very Less

RESULT AND DISCUSSION

Children’s Rights in Environmental Education

The children’s rights are a part of human rights which must be guaranteed, protected and fulfilled by parents, families, communities, governments and countries. Some of the children’s rights are (1) The right to education and teaching in order to develop personality and talent; and (2) The children's right in playing and relaxing. Those rights can be met by providing proper education and providing the opportunity of playing for children.

The laws in Indonesia, which guarantee the right of children to education and teaching, are a) UU No. 39 in 1999 contain "Every child has the rights to education and teaching in the context of personal development in accordance with their interests, talents and level of intelligence"; b) UUD 1945 Verse 31 Chapter 1 and 2 contain "Every citizen is entitled to education. Every citizen has the right to follow basic education and the government must finance it."

The children’s rights could be striven until it is fulfilled passably. Children’s rights need to be fulfilled through friendly and safe learning design for children. Children’s rights about learning safely can be incorporated into the Environmental Education that packed through games. Not only learning about the environment, but also children can play with peers and adults. Children are entitled to be positioned as a subject capable of learning and care for the environment according to their stage of development.

Environmental education has a learning process that is based on the Guidelines of Contents Environmental Education Materials developed by the government (Tim PLH, 2006). The learning process can be broken down as follows:

- a. An outline of the environmental education curriculum should be emphasized the facts that occurred in the current environment, what causes it and how to overcome.
- b. The development of environmental education practices should be adapted to the environmental conditions present and likely future development.
- c. It is important to the students if there is the opportunity to learn outside the classroom or field studies.
- d. Classroom activities are adapted to the environmental principles of a general nature and the problems of local situations requiring unique knowledge for the specific area.
- e. Another important thing, the process of environmental education should be integrated into other areas of study such as science, social studies, religion, language and so forth.

In accordance with the nature of environmental education which is multidisciplinary, it is very appropriate that the learning process using the learning approach 'thematic', especially for classes I, II and III of Elementary School as contained in the curriculum for elementary school (*SD*) and Islamic Elementary School (*MI*) in 2006. In the higher classes, it is not using thematic learning approach but remain to be integrated (interdisciplinary). Learning is incorporated into one of the disciplines.

Various learning methods could be used in environmental education, learning both in the classroom and outside the classroom. Those methods include: discussion, discovery methods, problem-solving methods, evaluation methods, field practice and so on. In the introduction to the environment, teachers should use learning methods in outside the classroom (outdoor learning).

In addition to teaching methods, teachers need instructional media to facilitate the achievement of learning objectives on Environmental Education. Those media include: plants, cleaning tools, farming tools, books and computers. Learning media could be used on activities like learning by playing.

One of the instructional media that can be termed as Educative Game Tool (EGT) was charged for Environmental Education.

EGT reviewed from the concept of the game based on the opinion of Campbell (2006) is a board game like Monopoly game that is designed to have the nature of learning and the need to think logically. EGT could support the children's rights to learn and to play. Media facilitating children to play or do a fun game, will improve the child's brain cell activity (Anggani Sudono, 2000:8). EGT has the following advantages (Munadi, 2008: 165):

- a. Students can gain knowledge of the concept include the rules of reason (principle), basic elements, process, outcomes and impacts in a fun way.
- b. Provide opportunities for students to think, to imagine, to show new ideas and provide an opportunity to be capable in motor skills.
- c. Students can learn to be responsible, tolerant, independent, and respect.
- d. Students can participate actively and be able to recognize themselves as individuals and as a group member.
- e. Fun atmosphere in playing not only accepts students from many backgrounds but also provides interest for actual achievement and creative.

Based on these advantages, educative game tool can be a medium supporting children's rights in Environmental Education. The subject matter as well as the values of Environmental Education can be delivered culturally to the children so that the content and the value of eco-friendly appeal to children. Moreover, through the game, the learning atmosphere relaxed and the game will keep the interest of students in performing tasks or repetitive as the game will make up the monotony becomes an enjoyable (Heinich, 1996: 327).

Heinich also highlights the weakness of the competition in the game that will have a negative impact for students who are less skilled in competing or students who are weak in terms of ability and skills; and a game without good management and coordination will take effect no achievement

of learning goals. Moreover children become engrossed in play, they waste the time and forget to do other activities. Therefore, the educative game tool in environmental education still needs the teacher's role as a companion.

The roles of the companion are to straighten out the answers or actions of a child is wrong and explain the ideal concepts. Companion should not be a teacher. Parents, brothers, sisters or other adults could be the companion. The important role of the companion is to avoid mistakes in the child's understanding of the concept.

Educative Game Tool (EGT) Containing Environmental Education

Educative Game Tool (EGT) is a game tool which is intentionally designed specifically for educational purposes (Mayke Sugianto, 2005). That EGT is designed specifically to support the goals of education, the development and utilization of EGT must consider the characteristics and aspects of child development. EGT is a means to stimulate children in learning by playing, both use modern technology and traditional (Dadan, 2012: 22).

Name Adiwiyata juxtaposed in Educative Game Tool derives from the name of the government program, the School of Adiwiyata. Adiwiyata word comes from two Sanskrit words 'Adi' and 'Wiyata'. Adi has a meaning: the great, super, ideal or perfect. Wiyata has a meaning: the place where a person gets knowledge, norms and ethics in social life. When the two words are combined, the overall Adiwiyata has meaning or definition: "an ideal place obtaining all the science, norms and ethics that can be the basis of human beings towards the creation of the welfare of our lives and leads to development ideals that sustainable" (KLH, 2011).

Adiwiyata Educative Game Tool was developed based on following components,

- a. Development objectives are based on the learning objectives of Environmental Education for elementary school students in beginning class.

- b. Internalize Program of Adiwiyata as the philosophy of Educative Game Tool.
- c. Activities playing by learning are packaged according to the principles and processes of Environmental Education which has been listed in the government general guidelines.
- d. Materials and tools used are adjusted to the needs of the field based on the characteristics of students, rules of the games and EE itself.
- e. There are a system of evaluation of this development.

The designs and shapes of Adiwiyata EGT that support the Children's rights in EE consist of packaging products, handbook, board games, Adiwiyata cards, rubric suggestions book, dice and shaker cup, pawns, green and red points, and Adiwiyata medal. The physical forms of the product in the form of a set of tools that are printed game mostly use paper materials of various types. Materials and forms in the manufacture of products are selected with adequate safety standards for children.

The products have a packaging shaped half-hexagonal geometry. Form of the game board is a hexagonal flat wake. The shape of Adiwiyata cards is a rectangle with a size 7 x 10 cm. The form of Rubric Suggestions Book is like a pocket book. Dice form is a cube with ribs 1.5 cm and a shaker cup shape is adapted to the size of the dice. The form of pawns is formed a slab of thick cardboard with a size of 2.5 x 3 x 0.5 cm. The form of green and red points is a slab of 4 cm diameter circle. Adiwiyata Medal is a slab of 7 cm diameter circle and has a strap as a necklace. Game board is hexagonal shape which has six sides for a hexagonal shape in accordance with the distribution of six EE materials which has been managed by the researcher. So, each side that illustrates the kind of materials is different.

The subject matter contained in the EGT of Adiwiyata contains the cognitive aspects of the effort to realize the behavior of care for the environment. The materials are used as 6 -fire ways to protect the earth at the same 6 -fire ways toward Adiwiyata (the

good and ideal place accepting science). The materials to be integrated into each of the components Adiwiyata EGT. Those materials consist of,

- a. Maintenance of cleanliness and health of myself.
- b. Reducing and reusing rubbish.
- c. Supporting the recycling.
- d. Planting for plants and caring for animals.
- e. Energy savings.
- f. Invite friends and family to care for the environment.

1) Board of Game

Board of game has plots that consists of 24 image plots and 6 Adiwiyata plots. Image plots are divided into four images on each side of the hexagonal game board. Image plots contain images representing visual messages from six materials of Adiwiyata while Adiwiyata plots signify players to answer the questions on the Adiwiyata cards.

Table 2. Materials of Adiwiyata in Visual Messages

Subject Matter	Visual Messages (Pictures)
Maintenance of cleanliness and health of myself	<ul style="list-style-type: none"> a. Child is brushing teeth; b. Child is eating foodstuffs in the country; c. Child eat in moderation and do not throw it away; d. Child is washing hands; e. Child is cutting the nails
Reducing and reusing rubbish	<ul style="list-style-type: none"> a. Child is throwing garbage according to types of trash; b. Child is using eco-bags when shopping; c. Children donate second-hand thing to charities; d. Children are writing on both sides of paper.
Supporting the recycling	<ul style="list-style-type: none"> a. The work of the former straw; b. Activities make compost; c. Do not throw garbage anywhere you feel like it. d. The work of ice cream sticks.
Planting for plants and caring for animals	<ul style="list-style-type: none"> a. Child is planting tree seedlings; b. Child is watering plants; c. Child is caring for animals; d. Errors of children torturing animals (learning from mistakes)
Energy savings	<ul style="list-style-type: none"> a. Benefit of sun is drying clothes; b. Kids turn off the tap water

- c. Kids turn off the lights;
 - d. Kids turn off the electronic device;
 - e. Kids riding bicycle.
- Invite friends and family to care for the environment
- a. Some of children do cleaning service projects;
 - b. Kids remind friends well who littering;
 - c. Kids invite parents to care for the environment;
 - d. Kids make environmental poster.

2) Handbook

Handbook is a book that explains the games background games, game tools, player criteria, companion criteria, how to play, and tips to win the Adiwiyata Educative Game Tool.



Figure 1. Board of Game and Handbook

3) Adiwiyata Cards

Adiwiyata cards can be termed as a major component in Adiwiyata Educative Game Tool for content cards containing questions and statements about the concept of Environmental Education which includes aspects of knowledge, awareness, attitudes, and values. Kids can learn the concept of the ideal in environmentally friendly behave in a way to distinguish right and wrong, the reality–the ideal connect and understand the causal relationship slowly. Each question requires an answer which will provide feedback to the child in the form of points of green or red points. Every Question needs answers that are environmentally responsible green will earn points, which means having a value (+1). The answer otherwise the child will get the red points, which means having a value (-1).

Table 3. Question Samples of Adiwiyata Cards

No	Questions
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- I. Maintenance of cleanliness and health of myself**
- 1 In order for your body healthy and fresh, how many times you take a bath every day?
 - 2 In order for your teeth clean and healthy, when you brush your teeth?
- II. Reducing and reusing rubbish**
- 3 Suppose you spend a carton of milk in the morning today. What would you do on a used box of milk?
 - a. Put it into a paper recycling
 - b. Turning it into a bird feeder or other creative objects
 - c. Directly put into a box of waste
 - 4 Teacher of art lesson has excess paint so that he doesn't know what to do with the paint. What would you suggest to the teacher?
- III. Supporting the Recycling**
- 5 Are you using both sides of paper to write on?
 - 6 Do you know whether your family members collect cans or bottles to be sold to dustmen?



Figure 3. Green and Red Points and Adiwiyata Medal

Feasibility Assessments of Adiwiyata Educative Game Tool (EGT)

Feasibility assessments of Adiwiyata EGT can be judged from subject expert, media expert, teacher and students. Each assessments has aspects adapted to each expertise of assessors. Assessments have done repeatedly to get the validation of feasibility for Adiwiyata EGT. During the assessments, researchers conducted a revision of the product based on the advice of experts and users. Each subject expert, media expert and teacher number in 1 while students number in 24 people. Here are the final results validate the feasibility.

4) Rubric Suggestions Book

Rubric Suggestions Book has a function as an answer key to companion assessing the child's responses, according to the dynamic conditions.



Figure 2. Adiwiyata Cards and Rubric Suggestions Book

5) Green and Red Points

Green Point is the symbol awards to players while Red Point is a symbol of penalty to the player. The concept of reward and punishment is packed into the collection points. A green point is worth +1 while a red point is worth -1.

6) Adiwiyata Medal

Adiwiyata medal is a symbol of the final award to a player who has the highest points among the other players.

Table 4. Validation Results of Subject Expert

Aspects	The mean Score (1-5)	Category
Correctness of the materials	4.50	Very Good
Clarity of materials	4.30	Very Good
Sufficiency of materials	4.50	Very Good
Functionality of materials	4.30	Very Good
Total	4.40	Very Good

Table 5. Validation Results of Media Expert

Aspects	The Mean Score (1-5)	Category
Handbook	3.70	Good
Board of game	3.75	Good
Adiwiyata Cards	3.70	Good
Dice	4.00	Good
Green and red points	4.00	Good
Pawns	3.78	Good
Adiwiyata Medal	4.00	Good
Product Package	4.00	Good
Usability of Product	3.25	Enough
Total	3.78	Good

Table 6. Assessment by Students

Aspects	The Mean Score (1-5)	Category
Ease to understand	4.60	Very Good

Environmental Education		
The ease and convenience of using Adiwiyata Educative Game Tool	4.60	Very Good
Total	4.60	Very Good

Table 7. Assessment by Teacher

Aspects	The Mean Scores (1-5)	Category
Learning	4.50	Very Good
Materials of EE	5.00	Very Good
Media of EGT	5.00	Very Good
Total	4.83	Very Good

Based on the results of expert validation of materials and media experts, EGT products tested operationally feasible to students as users. The results of student assessment in operational test and teacher assessment are very feasible and decent. So, product of Adiwiyata EGT is suitable for use in environmental education for students in beginning class.

Effectiveness of Adiwiyata EGT

EGT effectiveness assessment has conducted for 24 students based on the assessment of students understanding neither beginning nor end related Environmental Education. Assessing the effectiveness EGT developed researcher can be measured from the following three indicators:

- a. Assessment of students understanding about the environment.
- b. Assessment of behavior knowledge about how to preserve the environment and nature.
- c. Assessment of students understanding about the behavior of environment ideal.

All three indicators obtained from sheets of student understanding, observation companion and interviews of students who have been assessed in Likert scale.

Table 8. Understanding Student Assessment

Indicator	Mean Value	
	Pre-test	Post-test
Assessment of students understanding about the environment	69	93
Assessment of behavior	60	84

knowledge about how to preserve the environment and nature		
Assessment of students understanding about the behavior of environment ideal	94	111
Score Ratings	223	288
Mean Value	3.09	4.00
Category	Enough	Good

The table above shows that there is an increase in scores between the understanding of the beginning and end of each indicators. These increases indicate there are changes in the effectiveness of the EGT.

Implementation of Adiwiyata Educative Game Tool

Ideally, the maximum players are 6 children that adapted to the side of game board. So, each players sit in front of each sides. This is to anticipate the players not jostle when playing. The minimum players are 2 children.

Lesson plan developed is learning that is integrated into the product of Adiwiyata EGT. The researchers developed lesson plan that can be broken down as follows:

- a. Assign subject matter

Chosen subject matter not separated from the Handbook for Content Outlines Environmental Education Materials which was published by the Ministry of Environment in 2012. The subject matters were taken as the matter of class II-IV in elementary school. Not all of the subject matter in the guidelines integrated into the Adiwiyata EGT as adapted to the needs of the field and the ability of researchers.

In general, integrated subject matter include (1) the human and the environment, (2) maintain the cleanliness and health of the environment, (3) water, (4) soil and land, (5) energy and (6) forest. Then, the subject matters are processed and integrated into the board game, handbook games, questions and statements in Adiwiyata cards and

play activities and learning (rules of the game).

- b. Write objectives and standards of competence

Objectives of Environmental Education as well as aspects of the competency of children to be achieved in this game include:

1) **Knowledge and awareness:**

Children gain knowledge and facts about ecological systems in order to achieve awareness of the respect and appreciation of the importance of the environment for human beings and caring for the environment play a role.

- 2) **Attitudes and values:** Children are aware their attitudes, desires and needs about respect to the natural environment.

- c. Formulate indicators of achievement

Indicators of achievement in learning activities and play with Adiwiyata Educative Game Tool, among others:

- 1) Answer the questions in Adiwiyata cards appropriately, spontaneous and fast;
- 2) Ask an interesting new things to be known;
- 3) Follow the rules and instructions for the game;
- 4) Tell and explain the daily activities related to environmentally conscious behavior;
- 5) Ask for or respond to everyday activities conducted himself and the other players ;
- 6) Link the concept of reward and punishment with the behavior of environmentally friendly and does not.

- d. Do evaluation

Evaluation is used to determine the level of knowledge and awareness and the attitudes and values of Environmental Education to children. Evaluation of the Adiwiyata Educative Game Tool can be defined as the activity to assess the achievement of

the objectives and competencies from Adiwiyata Educative Game Tool.

Evaluation form in this game include evaluation of the results of the end of the game. Evaluation results from the sum of green points (reward) which is worth +1 and reduction of red points (punishment) which is worth -1. Children who get the highest scores on the accumulation of points collected is the winner as well as children who have reached the basic competencies. Evaluation process was conducted during the game.

As suggested by the subject expert that companions and teachers need to understand what factors cause child to be a winner. The reverse also applies. Possible factors such as luck or chance the child lying becomes the factors that must be observed and addressed wisely. That is, not all children who become winner are really most concerned about the environment. The companion must be fair in giving understanding among children who are the winner and not with using the language of encouraging each children (encouragement).

CONCLUSION AND SUGGESTION

Adiwiyata EGT designs and shapes that support the rights of children in EE consist of packaging products, handbook, board games, Adiwiyata cards, rubric suggestions book, dice and shaker cups, pawns, green and red points, and Adiwiyata Medal. Adiwiyata EGT product are suitably used in environmental education for children in beginning class because it had validated from subject expert, media expert, teacher and students. There was an increase scores between the beginning and end student understanding of indicators Environmental Education from pre-test and post-test activities. Adiwiyata Educative Game Tool could be used outside the school with a distinctive cultural approach of children.

Suggestions from this study is the product of Adiwiyata EGT can be supported by the Ministry of Environment and institutions concerned with children education so that the product can be mass produced. Research and development of

instructional media that support the rights of children in environmental education should continue to be developed.

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