



The Development of Green Science Board Game (Greecebome) Media on Environmental Pollution toward Student Interest in Learning

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Abstract

This study developed and analyzed Greecebome's feasibility as a learning media and to know also analyze the influence toward interest in learning of students. The type of this research is Sugiyono's research and development. The subject of this research is eleven students from junior high school. The data collection methods are observation and questionnaires. The results showed an average percentage of media feasibility by a media expert is 91%. A very decent category and average media feasibility percentage by a material expert is 88.75%, with very decent categories. Greecebome media is stated to be very well worth use in research after revisions according to the validator's suggestion. The interest in learning assessment from eleven students shows 94% with the category of interest in learning is very high. The assessment results from three science teachers show 96,88% with a very good category. From the assessment results, it can be concluded that Greecebome media is learning media that is very decent to support learning activities in class on environmental pollution material and encourage student interest in learning.

INTRODUCTION

Integrated learning combines various aspects of the subject until the students acquire complete knowledge and skills with meaningful learning activities (Firdaus, 2014). According to the Ministry of National Education (2006), Natural Science is a science to find out about nature by developing comprehension and application of concepts. Science is not only a collection of various concepts, facts, and principles but also discovering and developing also expected as a means for students to study the environment and develop the knowledge they have. In the implementation of natural science learning, the learning is applied oriented, develops thinking skills, develops student learning abilities, increases curiosity, and develops caring and responsible attitudes towards the society and the environment. This is in line with the purpose of Integrated Science learning, according to BSNP (2008), to improve conceptual understanding by developing discovery and processing skills.

Learning purposes can be achieved through learning activities that optimize student abilities, such as critical thinking skills, problem-solving skills, and quality learning activities using interactive, creative, fun, and motivating methods. According to Hasnunidah (2012), teachers should attempt to create the science learning process so that the learning atmosphere becomes more conducive and students will find it easier to understand the subject matter.

Learning media is very important to support learning activities in the classroom because learning media can support continuity in learning and involve students to actively participate in learning activities. This is in line with Fatimah's opinion (2014), which states that learning media has a role as information carrier technology that can be used for the learning process and the material will be delivered effectively.

Several things must be considered in choosing the right learning media. According to Suprihatiningrum (2013), there are several considerations in choosing the right learning media, such as paying attention to the learning objectives, the learning methods, the characteristics of the learning material, the use of learning media, the ability of teachers to use learning media, and the effectiveness of the learning media compared to the others.

Based on interviews with science teachers at Junior High School 3 Semarang located at Major General Street. DI Panjaitan No.58, Brumbungan, Central Semarang, Semarang City, Central Java 50135, learning activities in that schools are still teacher-centered, and learning activities tend to be monotonous so that learning motivation and student interest in learning activities are low. Besides, the teacher's low knowledge of learning media's importance in reaching the student learning process. The learning process received students' responses through interviews, where students expected to have fun learning activities and use creative learning media so they would be enthusiastic in participating the learning activities. This causes the students' motivation and interest in learning are low, low student activity in class, and low student learning outcomes. The low results can be seen in the Final Semester Assessment (PAS) results of science subject. Based on the things above, treatment is needed to increase student interest in learning so they become more active in learning activities by using Greecebome (Green Science Board Game) Media because it supported by Setyaningsih research (2015) with the board game media, it can increase learning outcomes and learning motivation of 8th grade's student.

Greecebome media is a board game based learning media that contains environmental pollution material and it designed by adjusting Basic Competencies in environmental pollution material. Greecebome media consists of one dice, companion card consisting of surprise cards, guess the picture cards, knowledge cards, pollution cards, today cards and reward cards, seven pawns for players, and a guidebook. The way to play this media is almost the same as for board game media in general, but the differences are that this media consists of 5 main areas equipped with a companion card. The companion cards that each player has are different from one another. When players are in these main areas, players are required to take their companion card that matches the area's name and answer the questions on the card on a piece of paper. The time to work on the questions ranges from 5-10 minutes. Playing this game needs 2-3 lesson hours and after the time is over, each group will be given a Student Worksheet (LKPD) to be discussed together.

METHOD

This research method is Research and Development (RnD) with the research subjects are eleven students from grades 8 and 9. Students carry out learning activities using Greecebome Media then discuss and work on LKPD, followed by filling out the student interest in learning questionnaire sheet on a google form.

The type of research used is research and development according to Sugiyono (2015) with the following steps: (1) Potentials and Problems, (2) Data Collection, (3) Product Design, (4) Design Validation, (5) Design Revision, (6) Product Trials, (7) Product Revisions.

The data collection methods in this study are: (1) The interview method used to determine the learning process in the classroom, (2) The questionnaire method to determine the media's feasibility, student interest questionnaires, and teacher assessment.

RESULT AND DISCUSSION

In this study, after the researcher completed the design of the board game media components, the media was validated by media experts and material experts with a total of ten experts. Furthermore, revisions are made based on criticism and suggestions from experts. Then, a small-scale product trial was conducted with eleven students from grade 8 and grade 9. Students carried out learning activities on environmental pollution material in the small-scale trial by using the Media Board Game, then continued for discussing and working on student's worksheets. After working on the student's worksheets, the researcher then explained the material and at the same time discussed the question card in the media. Then students are asked to fill out the interest in learning questionnaire sheet on Google Form to determine the effect of using the board game media on student interest in learning. In addition, the media is also assessed by science subject teachers to determine its effect on student interest in learning.

This research for developing Greecebome media on environmental pollution material on students interested in learning with the implementation of research carried out on 26th of

May 2020 and filling out online questionnaires with research subjects are eleven students from grade 8 and grade 9. The things that were studied included (1) Greecebome Media Feasibility (2) Small-scale Trial with 11 junior high school students and (3) The response of science subject teachers to Greecebome Media on environmental pollution material.

Before *Greecebome* Media was used in a small-scale study with 11 junior high school students as research subjects, the media was validated by an expert. The assessment of Greecebome Media's feasibility was carried out by five media experts and five material experts. Each expert will provide suggestions or input for media improvement. Validation aims to determine the validity of the media *Greecebome*. The validity assessment is carried out until the media suitable to use in small-scale research activities.

Media experts in the Greecebome Media validation were carried out by five experts consisting of lecturers and teachers, including 3 Lecturers from t Integrated Science Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang and two integrated science teachers. This research uses a theoretical basis from the National Education Standards Agency (BSNP). Indicators of media assessment for Media Experts consist of several assessment indicators, (1) Typography; (2) Display, which consists of colors, pictures or illustrations, and layout. The media assessment aspect is assessed by giving a score on each indicator.

Table 1. Results of Greecebome Media Validation by Media Experts

No.	Aspect	Percentage	Category
1.	Typography	87.5%	Very good
2.	Color	92.5%	Very good
3.	Picture	87.5%	Very good
4.	Layout	93.75%	Very good

The average percentage for Greecebome Media validation by media experts is 91% with a very decent category and match every criterion on the assessment indicators based on the BSNP. The typography indicator consists of 2 statement items, such as Typography on the Greecebome Media board and Typography on the Greecebome companion card. According to

Wahyuningsih and Setiadi (2019), board game media must pay attention to the appropriate letterforms because decorative letterforms with many variations tend to be difficult to read. Display indicators consisting of colors, images or illustrations, and layout. Color consisting of 2 statement items, such as the color on the Greecebome Media board and the color on the Greecebome companion card. Color plays an important role in board game media. The use of striking colors is good for focusing attention, but if it too much can interfere with vision (Wahyuningsih and Setiadi, 2019). Image or Illustration indicators consist of 2 statement items, such as pictures or illustrations on the Greecebome Media companion board and card. The board game media is closely related to the presentation of images because images are one of the information that can be presented in board game media. According to Maghfirothi (2013), illustration in the form of images attracts attention and interest in learning, clarifying ideas, or illustrating facts. The layout consists of 4 statement items, such as the title layout on the Greecebome board, the title layout on the Greecebome companion card, the right decoration layout and pictures/illustrations on the Greecebome board, and the right decoration layout and pictures/illustrations on the companion card Greecebome. Greecebome media is categorized as a very suitable media for learning activities. The assessment results from media experts were analyzed and considered to make revisions for Greecebome media, so the media developed by the researchers are better and feasible to be used for supporting learning activities.

Greecebome media has a very feasible category according to 5 media experts because the appearance of Greecebome Media is attractive and equipped with images adapted to environmental pollution materials. The pictures and illustrations can explain environmental pollution material, clear, and easy for students to understand. The print quality is good, so it's durable to use over and over again. According to Ariani (2015), good media has fulfilled quality aspects. One of them is the effectiveness aspect of the resilience of the learning media. In the companion card, in addition, to contain information, some exercises are packaged fun by paying attention to the objectives of learning achievement of environmental pollution

material in the form of competitive games to motivate students to learn. Therefore, Greecebome Media can be a learning media that is very suitable to support learning activities because it can reach a very suitable category as a learning media. Greecebome media is a learning media arranged as attractive media and junior high school students can use it in studying environmental pollution material.

According to Tobing, quoted by Setyanugrah (2017), board games can teach many things, such as training students' concentration and memory, training students to solve problems, think creatively, and critically. With the board game media, there are three aspects included in it, namely visual (image), audio (discussion, question and answer), and affective (attitude) aspects. In addition to improving students' skill when studying environmental pollution material, Greecebome Media is designed to be used in groups to discuss and easily convey their opinions related to environmental pollution material.

Greecebome media is categorized as a learning media that is very feasible because it can achieve the functions and benefits of learning media in general. Using Greecebome Media for learning activities can clarify environmental pollution material even the material presented in it and more in-depth than in the guidebook to improve students' process and learning outcomes. According to Triastusti's statement (2016), the use of board games can help the students to understand and remember the material that has been studied in a comfortable learning way to encourage student interest in learning. The shape and appearance are attractive to increase and direct students' attention when studying to generate enthusiasm and interest in students learning environmental pollution material. Interesting media and the application of colors and images according to student characteristics will increase student interest in learning (Andini, 2018). Use Greecebome Media as a learning media can provide interesting experiences for students, such as learning activities by using game media for learning material will make learning activities attract students' learning interest. Using the Greecebome Media as a learning media will make students more active in learning activities because students listen to the

explanations from the teacher and do other activities, like playing and discussing.

According to Sumberharjo's statement, quoted by Tafonao (2018: 108), the role of learning media can be used as the channel sender's message to the recipient and through learning media can also be used as the channel sender's message to the recipient help students to explain something that the teacher conveys. With the use of these tools teachers and students can communicate more confidently and lively. Also the interactions are multi-directional. Media contains messages as learning stimulants and can foster interest in learning so that students do not become bored in achieving learning goals.

Greecebome media is very feasible as a learning media according to the criteria for good learning media from Arsyad (2013): (1) Learning Media suitable with the objectives. Greecebome media is designed based on the achievement of Basic Competencies of environmental pollution material, KD 3.8 Analyzing environmental pollution and its impact on ecosystems and KD 4.8 Making writing about solving pollution problems in the environment based on observations (2) Practical, flexible, and enduring. Greecebome media has a durable base that can be used continuously, the product results have good quality (3) Able and Skilled in Using. Greecebome media has rules which are familiar to students and easy to use. Besides, this media is also equipped with a guidebook making it easier for students to use it.

Therefore, Greecebome Media can be used as learning media to support learning activities because it achieves a suitable category for learning media. Greecebome media is an educational learning media because it is a game-based media but requires students to understand environmental pollution. Greecebome media is a learning media attractively created and designed to be used by junior high school students when studying environmental pollution material and be interested in learning activities.

Greecebome media categorized as a learning media with very feasible to use because it is able to achieve the functions and benefits of learning media in general, by using Greecebome Media in learning activities it will be able to clarify environmental pollution material even the material presented in the media is more in-depth than what's in the guidebook students so that they are able to improve the process and learning

outcomes of students, with an attractive design and appearance it can increase and direct student's attention in the learning activities so it can generate enthusiasm and motivation for students to learn environmental pollution material, by using Greecebome Media as a learning media it is able to provide an interesting experience for students, using Greecebome Media which is an educational learning media will make learning activities more interesting for students and they don't get bored quickly, by using Greecebome Media as a learning media it will make students more active in learning activities because students not only listen the explanations from the teacher but students also do other activities such as playing and discussing. Greecebome media is easy to use and is equipped with a guidebook to make it easier for students.

Suggestion from the validator about *Greecebome Media* is the size of the letter on the companion card which needs to be enlarged or enlarged the size of the card, the background must be changed in another color to contrast with the letter, changing some errors in word, and re-examining the content contained on the companion cards.

Three lecturers carried out media validation by material experts from Department of Integrated Science and Biology and two subject science teachers.

Table 2. Results of Greecebome Media Validation by Material Experts

No.	Aspect	Percentage	Category
1.	Content Eligibility	90%	Very good
2.	Serving Feasibility	91.67%	Very good
3.	Language	83.33%	Very good

The average percentage for media validation by material experts is 83.33% with the very feasible category and meet the assessment criteria of BSNP. The Content Feasibility Aspect consists of 6 statement items. According to Sudjana, quoted by Rosita (2015), teaching, supporting the content of teaching materials, and material according to the level of student's thinking must be considered when choosing a learning media. In the Presentation Feasibility Aspect consists of 3 statement item. According to Saleh (2010), good

and interesting material will be able to attract student interest in learning. This is in line with Rosita's Statement (2015). The selection of appropriate material is expected to foster opportunities for exploration of knowledge, skills and attitudes that make it easier for students to learn. The Linguistic Aspect consists of 3 statement items. The language used is according with the level of student development and the vocabulary is easy to understand. Language plays an important role in learning media. According to Rosita (2015), The language used must be communicative so the students will easily understand and all of the students be active and productive.

Greecebome media is very feasible as a learning media because the companion cards contain materials and questions arranged to achieve the Basic Competency of environmental pollution material. Analyzing environmental pollution and its impact on the ecosystem and writing the idea for solving pollution problems in the environment based on observation results. In the companion cards, some questions require students to analyze, identify a problem, and solve the problem. Other than that, There are also simple questions to make sure students understand simple or basic environmental pollution material. On the companion card, there is also material that can increase students' knowledge about environmental pollution material sourced from student books or other relevant sources such as research journals. So it can be concluded that Greecebome Media is a learning media that can be used to support learning activities because it does not have an attractive appearance. Still, the content in this media is designed in such a way to be able to achieve Basic Competencies in environmental pollution material and be able to increase student understanding of in-depth material. Suggestions from the material validator about Greecebome Media are writing wrong words and re-examining the companion cards' content.

After validation by media and material experts, product revisions are carried out according to media experts and material experts' advice. The product revision aims to improve Greecebome Media according to the advice of media experts and material experts. After the revision was carried out, the product was used for small-scale trials with the research subjects

are 11 students from grades 8 and 9 to determine its effect on student interest in learning.

Student interest in learning has several indicators, such as interest feelings, attention, pleasant feelings, hope, and motivation. To measure students' interest in learning by using a questionnaire sheet. Data on the results of interest in learning were obtained after 11 students learned environmental pollution material by playing with Greecebome Media and ended with a discussion on Student Worksheets (LKPD) and filling out a questionnaire via google form by each student to find out their interest in learning. The assessment is carried out by choosing a score between 1-4, with the score one given if you do not agree with the statement in the questionnaire, score two is given if you agree, score three is given if you agree, and score four is given if you strongly agree. Also, on each item of the statement, students are also asked to provide reasons and at the end of filling out the questionnaire students are asked to provide suggestions to clarify the assessment and use it to improve Greecebome Media.

Table 3. Results of Student Interest in Learning

No.	Aspect	Percentage	Category
1.	Interest Feeling's Aspect	93%	Very good
2.	Attention's Aspect	93%	Very good
3.	Pleasure Aspect's	94%	Very good
4.	Hope Aspect	94%	Very good
5.	Motivation Aspect	96%	Very good

Eleven junior high school students carried out small-scale trials by conducting learning activities on environmental pollution material using Greecebome Media. After finishing playing and discussing working on Student Worksheets (LKPD), students assess the Greecebome Media related to their interest in learning when using this media. The assessment is carried out on the learning interest questionnaire sheet on the Google Form. After the Greecebome Media, environmental pollution material was declared very feasible and able to improve student interest in learning by media experts and material experts. A revision was made according to the advice of the experts. A

small-scale use test was carried out with 11 junior high school students to find out student interest in learning after using Greecebome Media when studying environmental pollution material. The indicators assessed on a small-scale trial are feelings of interest, attention, pleasure feelings, hope, and motivation.

The average percentage for learning activities using Greecebome Media to study environmental pollution material is very high with an average percentage of 94%. This shows that the use of Greecebome learning media can increase student interest in learning science on environmental pollution material. During using Greecebome Media students feel happy when studying environmental pollution material. This is according to Slameto's statement (2010), interest has a great influence on learning and learning materials that attract student interest will be easier to learn and remember.

The success of learning activities is marked by the acquisition of knowledge, skills, and positive attitudes from students by the expected goals. One of the factors that support the learning activity, such as the use of learning media as an intermediary, container, or connector for learning messages, and directs students to gain learning experiences. Learning experiences depend on student interactions with learning media. The right media and accordance with the learning objectives can improve the learning experience and student learning outcomes. Edgar Dale's opinion on the theory of "Cone Experience" as quoted by Huda (2016) is the basis for the use of media in learning. According to this theory, students must have concrete experiences so there are no wrong perceptions of the knowledge.

According to Jones, quoted by Slameto (2010) interest in learning consists of several aspects: feelings of interest, attention, feelings of pleasure, hope, and motivation. In the aspect of feeling attracted to the percentage of 93% with a very high category which indicates that learning environmental pollution material using Greecebome Media is considered attractive to students because the material is packaged in the form of a game the attractive appearance of the Greecebome Media. Greecebome media environmental pollution material is arranged so that students are interested in learning activities and solve problems and learn. Aspects of student interest when using Greecebome Media can be

seen when students ask about things that have not been understood in Greecebome Media. Students are also interested in finding answers to their questions by reading books and asking their playmates. This is according to Slameto (2010) opinion, which states that student interest in an object results in students being happy and interested in working on activities from that object.

The percentage of student attention's indicator is 93% with a very high category. There are four indicators in the modified aspect of attention from Ayu (2017), (1) listening to the teacher's explanation, (2) using the media as described by the teacher, (3) paying attention to the manual/guide, (4) paying attention when studying the material. Greecebome media, environmental pollution material can give more attention for learning activities. Indicators of student attention can be seen when listening to the teacher's explanation about the technical play, students playing according to the teacher's technical explanation, and according to the guidebook, students pay attention to the answers of their group friends when answering questions, and discussing each other. Greecebome media requires students to pay attention to the cards' questions and the knowledge they have at the time of discussion at the end of the game. It's according to Safari's opinion (2003), which states that students who have attention to the lesson will try hard to concentrate while learning and do the assignments given in order to get satisfactory results.

The percentage of student feeling of pleasure's indicator is 94% in the very high category. Media Greecebome on environmental pollution material is interesting and innovative media to support fun learning activities. The indicators of happy feelings can be seen when students seem enthusiastic to work on the questions that are not small in number, can communicate well, be active in groups, and look happy when using Greecebome Media. According to Slameto (2010), it states that when students have feelings of pleasure about learning something, there will be no sense of being forced to learn.

The percentage of student expectation indicator is 94% with a very high category. Using Greecebome Media in studying environmental pollution material, it's hoped that the media can

help students understand and remember their knowledge about environmental pollution material. This can be seen when students work on the questions on the cards. They try their best to answer questions by opening books and relevant sources to answer questions and understand environmental pollution material and get maximum grades. Supriyono (2014) states that if someone is interested in something, they will hope to get satisfying results.

The percentage of student motivation's indicator is 96% with a very high category. Greecebome media is designed with practice questions to test basic skills and ability to analyze and write down student's ideas through play and discussion activities. If the student becomes the winner, they will also get a reward besides getting the maximum score. So it motivates and encourages students to actively participate and complete their question cards through fun learning activities, by using Greecebome media. According to Sugihartono (2013), the existence of motivation in a person will encourage that person to do something to achieve a goal.

Students interest in learning when using Greecebome Media categorized is very high. Feelings of interest, attention, and pleasure when studying environmental pollution material using Greecebome Media have a positive impact on student interest in learning. The encouragement of student's interest, attention, pleasure, and activeness to learn by using Greecebome Media is able to encourage student interest in learning and it is hoped that students can understand and deepen their knowledge.

According to Ahmadi (2014), factors that can influence student interest in learning are encouragement from teachers, parents, friends, facilities and infrastructure to support learning activities. Teacher encouragement can lead to student interest in learning because of attractive learning strategies and methods also the use of learning media. The use of instructional media is very important for the learning and teaching process because learning media helps teachers provide maximum, effective, and efficient teaching. In the learning process, important components such as objectives, materials, media, and evaluation must be considered because each of these components are interrelated and inseparable. Teachers must be able to use the best media to facilitate learning and increase students' understanding of the subject matter.

It can be concluded that students interest in learning is very high when using Greecebome Media to study environmental pollution material. With the conclusion of the assessment are Greecebome Media as a learning media on environmental pollution material is considered very interesting and creative. The material in it is adjusted to the achievement of the Basic Competence of environmental pollution material and is even more complete than the material in student books and students are very interested when using Greecebome Media in learning activities because the material is packaged in the form of games. Hence, the learning activities become interesting and subject matter is easier to understand and able to encourage student interest in learning.

Besides conducting small-scale trials, the assessment for Media *Greecebome* was conducted by three science subject teachers by filling out the assessment on a google form. The teacher response questionnaire is used to get information and suggestions about Greecebome Media. In the teacher response questionnaire, there are eight statements.

Table 4. Results of the Response of Science Teachers

No.	Aspect	Percentage	Category
1.	Environmental Pollution material will attract interest in learning when using Greecebome Media.	100%	Very good
2.	Environmental pollution material contained in Greecebome Media is in accordance with the level of student knowledge	91.7%	Very good

3.	I am interested in teaching other integrated science material with the help of Greecebome Media	100%	Very good	7.	The instructions for using Greecebome Media are clear and easy to understand	91.7%	Very good
4.	I am more motivated to make learning media innovations such as Greecebome Media	91.7%	Very good	8.	Greecebome media is an interesting learning media to use so that it can attract student interest and motivation	100%	Very good
5.	The appearance of media forms and images from Greecebome Media attracts and clarifies the delivery of environmental pollution materials	100%	Very good				
6.	The presentation of environmental pollution material is structured logically and systematically on Greecebome Media	100%	Very good				

The average percentage from integrated science teachers when using Greecebome Media is 96,88% with a very decent category. With the conclusion of the three teachers' reasons, Greecebome Media is a creative and innovative learning media with its arrangement adjusted to the achievement of Basic Competencies in environmental pollution material and become an attractive learning media for students and able to increase student enthusiasm and interest in learning activities.

CONCLUSION

The Greecebome media on environmental pollution material for junior high school students has a very decent category by media experts and material experts with an average percentage are 91% from media experts and 88.75% from material experts. Greecebome media with environmental pollution material is declared very suitable for use as a learning media. Greecebome Media is a board game-based media that is educational and creative, able to increase students' enthusiasm and activeness in studying environmental pollution material and the design of the media based on the achievement of Basic Competencies in the environmental pollution material. The Greecebome media used in environmental pollution material was carried

out small-scale testing with the subject are 11 students in eighth and ninth grades. With an average percentage is 94%, Greecebome Media is very interesting to use during learning activities other than the shape looks creative. Students will find it easier to understand environmental pollution material and learning activities will be more meaningful for students to encourage student interest in learning because Greecebome media is game-based media. The responses of 3 subject science teachers with an average percentage is 96,88% with very suitable criteria. After all, Greecebome media is an attractive learning medium and can live up the learning activities and increase student enthusiasm and abilities. The media is designed to adjust the basic competence of environmental pollution material.

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