WEB OF SEMANTIC Universial Journal on Innovative Education

Volume 2 Issue 6, Year 2023
ISSN: 2835-3048
https://univerpubl.com/index.php/semantic

Development of Animaker-Based Science Learning Multimedia on Global Warming Materials at SMP Brother Don Bosco Tomohon

Made G.I. Pertiwi
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado
madegitaip@gmail.com

Anatje Lihiang
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado

Meike Paat
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado

Article Information

Received: Apr 20, 2023
Accepted: May 15, 2023
Published: Jun 13, 2023

Keywords: *Multimedia, Science Learning, Animaker, Global Warming*

ABSTRACT

This study aims to produce and determine the feasibility and effectiveness of animaker-based science learning multimedia on global warming material at Junior High School Brother Don Bosco Tomohon. The subjects of this study were students of class VII SMP Brother Don Bosco Tomohon, 3 experts consisting of 2 science lecturers at Manado State University, 1 science teacher at SMP Brother Don Bosco Tomohon. This type of research and development refers to the development model of Borg and Gall. Data collection was carried out by observation, interviews, questionnaires, and tests (pretest-posttest). The data generated are: (1) produce animaker-based science learning multimedia product on global warming material for class VII SMP Brother Don Bosco Tomohon. (2) multimedia was declared fit for use with an average score of all aspects by media experts of 90.47%; material expert I 90% and material expert II 91.42%; by the response of students as users of 91.22%% so that the feasibility of the developed multimedia is included in the "Very Good" category and (3) multimedia is stated to be effectively used by obtaining an average student learning outcome of 80% in the high/very effective criteria category.

INTRODUCTION

Innovations in the world of education continue to be made to adapt to the rapid developments of the times. The rapid development of science and technology makes students much more interested in using interesting learning media. Almost everything that educators do nowadays utilizes technology, so that the teacher's sensitivity and ability in the field of technology is one of the main factors for the success of the learning being carried out. In line with that, education as an agent of change should not be nervous about technology (Sari, et al., 2022: 1-2).

The development of information technology has brought major changes to the advancement of the world of education. Along with developments, learning methods have also progressed a lot, both personal learning methods and media in the learning process. The form of information technology development applied in education is internet-based learning. After the development of the internet, the sources of information obtained can be more diverse, distance and time are no longer an obstacle for not knowing any information. So this internet-based learning media needs to be developed so that using this media can attract students' interest so that it can improve student learning outcomes (Sari & Setiawan, 2018: 101).

Learning media that can be used is very necessary to support teacher tasks in order to motivate and improve student learning understanding. One of the media that can be used is the development of learning videos. Learning media that is good and student-oriented can improve the quality of the learning process (Mutia, et al., 2017: 108). Teachers are required to understand how to implement existing technology and information so that learning objectives can be achieved. So that a teacher is able to develop aspects that exist during the teaching and learning process to be more effective to be carried out inside and outside of learning.

Learning science in junior high school itself is less attractive to students because students tend to memorize and remember a material concept only to get a satisfactory grade. Each student has different constraints and difficulties when studying science material. The science learning process should not only memorize material or formulas, but it is more important for students to understand the importance of science concepts in everyday life. The use of science learning media in the form of videos is expected to help students understand a concept in learning.

Based on the preliminary findings of researchers and interviews with science teachers at the Brother Don Bosco Tomohon Middle School, learning at the school has carried out face-to-face learning (offline) but with due observance of health protocols. The learning process still uses the 2013 curriculum, using the discovery learning model. In learning activities the teacher uses more of the latest revised 2013 curriculum science printed books, the use of learning media used is also adjusted to the needs of the ongoing material. The use of learning media in the form of learning videos is still not used in the teaching and learning process. Several learning media used in learning such as pictures or videos are accessed via the internet by science subject teachers. Based on the findings from interviews with several Grade VII students at the Brother Don Bosco Junior High School, the learning process was carried out after recess which made students sometimes feel tired and lack enthusiasm in the learning process. Students also explained that the media that is often used besides books also uses PPT related to the material.

The effects of global warming are increasing day by day, we cannot allow the earth's temperature to get warmer. Knowledge of how the dangers, effects, and prevention are important and a demand for humans. The impact has been predictable on agriculture, wildlife, human health, social

and political. Knowledge about global warming has not become a concern of the government because there are still many people who do not know and do not care about and weak law enforcement regarding environmental preservation (Rosidin and Suyatna, 2017: 779).

Global warming is forcing us to rethink our way of life, working with policy makers, scientists, architects, urban planners, to strengthen our capacity to adapt to a rapidly changing world. Climate change has increased global inequality and there is an urgent need to create healthy environments that are accessible to all and reduce social disparities in the distribution of green and blue spaces in cities (Ghainder, et al., 2020:201).

Submission of global warming material certainly requires a medium that is able to integrate global warming concepts appropriately, so that it is expected to equip students to think in an integrated and creative manner. Selection of the appropriate media is also a consideration that should not be ignored. Learning media is not only integrated, but also able to arouse students' interest in learning more about the topics discussed in the media (Asfuriyah and Nuswowati, 2015: 740).

*animakers*is one of the innovations that can be used as an alternative to learning media, the application is easier to make and apply by educators, which are easily available on internet pages. Animaker is an application that can create complete movements with sounds and transitions so that it gives the impression of learning material that is more interesting (Munawar, et al., 2020: 312).

The objectives in this study areto develop appropriate and effective Animaker-based science learning multimedia for students to use.

METHOD

This study uses research and development methods (Research and Development). This study refers to the Borg and Gall model in Palilingan (2014), this model includes: (a) Exploratory Studies, (b) Planning, (c) Development of Initial Forms, (d) Data Collection and Analysis Instruments, (e) Validation (Expert Validation and Field Testing, (f) Revision Based on Validation Results, (g) Product Dissemination.

Figure 1. R&D Research Stage

The data collection instrument in this study was using questionnaires and learning achievement tests. The questionnaire consists of a media expert validation questionnaire, a material expert

validation questionnaire, and a student response questionnaire. Meanwhile, the learning outcomes test consists of pretest-posttest questions.

The assessment questionnaire is used to measure the feasibility of the learning multimedia that is made. After receiving an assessment by the validator, then the values obtained are analyzed. Tabulation of data by the validator obtained from 2 material expert lecturers and 1 media expert lecturer. Data tabulation is done by giving an assessment of these aspects by giving a score of 4,3,2, and 1. According to Arikunto (2006) the formula used to calculate the percentage of each subject can be written as follows:

$$Presentase = \frac{Jumlah\ skor\ yang\ di\ capai}{Jumlah\ skor\ maksimum} x\ 100\%$$

The average score obtained is then converted into a qualitative value according to the assessment of the validation level criteria and product development revisions which can be seen in the following table:

Table 1. Development Product Validity Criteria

No	Percentage (%)	Validation Criteria
1	76-100	Valid (No need to revise)
2	56-75	Valid enough (No need for revision)
3	40-55	Less valid (Revised)
4	0-39	Invalid (Revised)

The effectiveness of learning is measured from the learning outcomes test using the pretest and posttest, to find out the increase in students' cognitive learning outcomes, it is done using the following equation:

$$N = \frac{w}{n} x\ 100\%$$

Calculating the average grade and the percentage (%) of the average grade using Ms. Excel by categorizing student abilities, based on standard categorization techniques set by the Ministry of Education and Culture. The effectiveness category uses the following learning outcomes assessment criteria:

Table 2. Categories of learning outcomes

No	Mastery Level	Validation Criteria
1.	85-100	Very high
2.	65-84	Tall
3.	55-64	Currently
4.	35-54	Low
5.	0-34	Very low

RESULTS AND DISCUSSION

Exploration Studies

Preliminary research or initial observation is carried out at the school where the research will be carried out. At this stage, a survey was carried out in schools by interviewing subject teachers in schools related to the learning carried out and the media used to support the teaching and learning

process. Researchers also conducted interviews and observations of several students regarding the learning process they felt and the difficulties they faced in learning, especially for science material itself.

The facilities at Brother Don Bosco Tomohon Middle School itself are very adequate, such as LCD, computers, speakers, Science Lab, and still use the 2013 curriculum with syllabus and lesson plans. Learning media is also used in science learning, it's just that some of the media used are taken via the internet. Teachers do not innovate learning media by developing the learning media themselves with the help of various online and offline applications that are already available.

Science learning which is carried out after recess makes students find it difficult to follow the learning process carried out by the teacher. In this case the researcher is trying to develop an animaker-based learning multimedia to support the science learning process in schools. Animaker is suitable for use in global warming material because this application can create learning multimedia by combining images, video, sound, writing and animation.

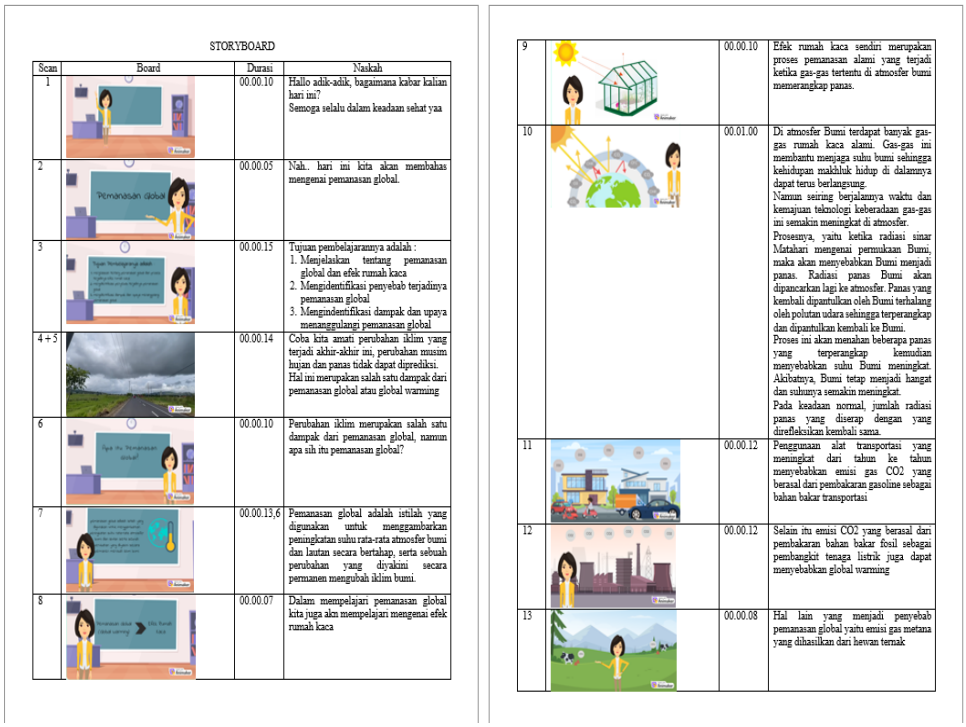
Planning

At this stage, planning is carried out to identify the learning objectives to be achieved through the development of an Animaker-based science learning multimedia on global warming material.

Early Form Development

This stage begins with designing the material that will be used in the learning media that will be made. The order of presentation of the material is: (1) Learning objectives, (2) Definition of global warming and the greenhouse effect, (3) Causes of global warming, (4) Impact of global warming, (5) Efforts to tackle global warming.

After the design of the material, it is continued with making storyboards and making learning media.



STORYBOARD

Scan	Board	Durasi	Naskah
1		00.00.10	Hallo adik-adik, bagaimana kabar kalian hari ini? Semoga selalu dalam keadaan sehat yaa
2		00.00.05	Nah.. hari ini kita akan membahas mengenai pemanasan global.
3		00.00.15	Tujuan pembelajarannya adalah : 1. Menjelaskan tentang pemanasan global dan efek rumah kaca 2. Mengidentifikasi penyebab terjadinya pemanasan global 3. Mengindentifikasi dampak dan upaya menanggulangi pemanasan global
4 + 5		00.00.14	Coba kita amati perubahan iklim yang terjadi akhir-akhir ini, perubahan musim hujan dan panas tidak dapat diprediksi. Hal ini merupakan salah satu dampak dari pemanasan global atau global warming
6		00.00.10	Perubahan iklim merupakan salah satu dampak dari pemanasan global, namun apa sih itu pemanasan global?
7		00.00.13,6	Pemanasan global adalah istilah yang digunakan untuk menggambarkan peningkatan suhu rata-rata atmosfer bumi dan lautan secara berlahap, serta sebuah perubahan yang diyakini secara permanen mengubah iklim bumi.
8		00.00.07	Dalam mempelajari pemanasan global kita juga akn mempelajari mengenai efek rumah kaca
9		00.00.10	Efek rumah kaca sendiri merupakan proses pemanasan alami yang terjadi ketika gas-gas tertentu di atmosfer bumi memerangkap panas.
10		00.01.00	Di atmosfer Bumi terdapat banyak gas-gas rumah kaca alami. Gas-gas ini membantu menjaga suhu bumi sehingga kehidupan makhluk hidup di dalamnya dapat terus berlangsung. Namun seiring berjalannya waktu dan kemajuan teknologi keberadaan gas-gas ini semakin meningkat di atmosfer. Prosesnya, yaitu ketika radiasi sinar Matahari mengenai permukaan Bumi, maka akan menyebabkan Bumi menjadi panas. Radiasi panas Bumi akan dipancarkan lagi ke atmosfer. Panas yang kembali dipantulkan oleh Bumi terhalang oleh polutan udara sehingga terperangkap dan dipantulkan kembali ke Bumi. Proses ini akan menahan beberapa panas yang terperangkap kemudian menyebabkan suhu Bumi meningkat. Akibatnya, Bumi tetap menjadi hangat dan suhunya semakin meningkat. Pada keadaan normal, jumlah radiasi panas yang diserap dengan yang direfleksikan kembali sama.
11		00.00.12	Penggunaan alat transportasi yang meningkat dari tahun ke tahun menyebabkan emisi gas CO2 yang berasal dari pembakaran gasoline sebagai bahan bakar transportasi
12		00.00.12	Selain itu emisi CO2 yang berasal dari pembakaran bahan bakar fosil sebagai pembangkit tenaga listrik juga dapat menyebabkan global warming
13		00.00.08	Hal lain yang menjadi penyebab pemanasan global yaitu emisi gas metana yang dihasilkan dari hewan ternak

Figure 2. Learning Media Storyboard

Data Collection and Analysis Instruments

Data collection was carried out by filling out a questionnaire by 1 media expert and 2 material experts to test the feasibility of the learning multimedia that was made. Apart from that, to find out effectiveness, a learning result test (pretest-posttest) will be filled out by students at SMP Brother Don Bosco Tomohon. Data analysis was used by Ms. Excel to analyze the average and percentage of student learning outcomes.

Validation

Learning Media Expert Validation

Based on the data obtained, the total number of very good categories (SB) was 13, good categories (B) 8, poor categories (K) and very poor categories (SK) did not exist. The percentage of data is obtained by comparing the total value achieved with the maximum value then multiplied by 100% according to (Arikunto, 2006) as follows:

$$\frac{jumlah\ skor\ yang\ dicapai}{jumlah\ skor\ maksimum} x\ 100\% = \frac{76}{84} x\ 100\% = 90{,}47\%$$

From the calculation above, the percentage obtained is 90.47%. This percentage is included in the valid category (no need to be revised).

Learning Material Expert Validation

Based on the data obtained, the total number of categories in subject matter expert 1 is very good (SB) 21, good categories (B) 14, less categories (K) and very poor categories (SK) do not exist. For material experts 2, very good category (SB) 23, good category (B) 12, poor category (K) and very poor category (SK) do not exist. The percentage of data is obtained by comparing the total value achieved with the maximum value then multiplied by 100% according to (Arikunto, 2006) as follows:

Material Expert 1 :

$$\frac{jumlah\ skor\ yang\ dicapai}{jumlah\ skor\ maksimum} x\ 100\% = \frac{126}{140} x\ 100\% = 90\%$$

Material Expert 2 :

$$\frac{jumlah\ skor\ yang\ dicapai}{jumlah\ skor\ maksimum} x\ 100\% = \frac{128}{140} x\ 100\% = 91{,}42\%$$

From the results of the calculation above, the percentage of material expert test 1 is 90% and material expert 2 is 91.42%. This percentage is included in the valid category (no need to be revised).

Small Group Test

Small group tests were carried out directly at schools by displaying an Animaker-based science learning multimedia for viewing and then giving a questionnaire to fill out. The subjects for this small group trial were 10 students of class VII SMP Brother Don Bosco Tomohon.

Based on data obtained from all 10 respondents, giving varied responses to 15 indicators with very good category (SB) 114, good category (B) 30, poor category (K) 6 and very poor category (SK) none .The percentage of data is obtained by comparing the total value achieved with the maximum value then multiplied by 100% according to (Arikunto, 2006) as follows:

$$\frac{jumlah\ skor\ yang\ dicapai}{jumlah\ skor\ maksimum} x\ 100\% = \frac{552}{600} x\ 100\% = 92\%$$

From these calculations, the percentages included in the valid/valid category do not need to be

revised.

Large Group Test

In the large group field test conducted on 30 students in class VII-B SMP Brother Don Bosco Tomohon. This field trial was carried out through two stages, namely the initial stage (pretest) and the final stage (posttest). The purpose of holding this learning outcomes test is to determine the effectiveness of the global warming material being tested. This learning outcomes test consists of 20 objective questions with material related to global warming.

Table 3. Summary of Data on Pretest and Posttest Results

No.	Statistics	Statistical Value	
		Pretest	*Posttest*
1	Minimum Score	20	50
2	Maximum Score	80	95
3	Sum(∑)	1315	2270
4	Average	43,83	75,66
5	Completeness Presentation	20%	80%

The results of the learning outcomes test were carried out on 30 students with the KKM determined by the school being 65. Based on the table it can be seen that the average pretest test result is 43.83 with a completeness percentage of 20%. Meanwhile, the average posttest test result was 75.66 with a completeness percentage of 80%. This means that the learning media meets the effective qualifications because of the high/effective criteria.

The distribution of questionnaires was also carried out in large group tests as a support in the development of learning multimedia, by providing student response questionnaires to be filled out by 30 students at school. From the distribution of the questionnaire, data were obtained from each indicator, namely very good (SB) 320, good category (B) 111, poor category (K) 13 and very poor category (SK) 6.

$$\frac{jumlah\ skor\ yang\ dicapai}{jumlah\ skor\ maksimum} x\ 100\% = \frac{1642}{1800} x\ 100\% = 91{,}22\%$$

Revision Based on Validation Results

After going through the stages of product trial development to students. This learning multimedia product has undergone revision or improvement. The results of the development of "animaker-based science learning multimedia on global warming material".

Figure 3.Multimedia Home Screen

Figure 4. Display of Learning Objectives

Figure 5. Display of Learning Materials

Conclusion

Based on the results of research and discussion regarding the development of animaker-based science learning multimedia on global warming material, it can be concluded as follows:

1. This development research resulted in a science learning media product in the form of an Animaker-based Science Learning Multimedia on Global Warming Material for class VII SMP Brother Don Bosco Tomohon.
2. Science Learning Multimedia based on Animaker Global Warming Material for class VII, after being validated by media experts and material experts with a valid validation level or very feasible to use.
3. The effectiveness of learning outcomes for students at SMP Brother Don Bosco Tomohon obtained high/effective criteria.

BIBLIOGRAPHY

4. Asfuriyah, S. and Nuswowati, M. 2015. Development of a Science Magazine Based on Contextual Learning on the Theme of Global Warming to Increase Student Interest in Learning. Unnes Science Education Journal. Vol. 4(1) p. 739-746
5. Ghainder, K., et al. 2022. Global Warming is a Mental Health Issue : An Editorial. International Journal of Mental Health, Vol. 51(3) pp. 200-202
6. Munawar, B., Hasyim, AF, and Ma'arif, M.2020. Design for the Development of Digital Teaching Materials Assisted by Animaker Applications in PAUD in Pandeglang Regency. Journal of Golden Age.Vol. 4(2) pp. 310-321

7. Mutia, R., Adlim, and Halim, A. 2017. Development of Science Learning Videos on Pollution and Environmental Damage Materials. Journal of Indonesian Science Education. Vol. 5(2) pp. 108-114
8. Palilingan, RN 2014. Step-by-step Form of the R&D Method. Manado: Manado State University
9. Rosidin, U., and Suyatna, A. 2017. Teachers and Students Knowledge About Global Warming: a Study in Smoke Disaster Area of Indonesia. International Journal Of Environmental & Science Education. Vol. 12(4) pp. 777-785
10. Sari, AP, and Setiawan, A. 2018. The Development of Internet-Based Economic Learning Media using the Moodle Approach. IJAL : International Journal Of Active Learning. Vol. 3(2) pp. 100-109
11. Sari, VP, Munaris, and Prasetya, RA 2022. Development of Animaker-Based Learning Media in Online Learning as a Learning Resource for Advertising Texts, Slogans, or Posters for Grade VII Middle School Students. Journal of Words (Language, Literature, and Learning). Vol.1(1) pp. 1-9