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 Powtoon-Based Learning Media On Class VII Environmental Pollution Materialat Junior High School Brother Don Bosco Tomohon

Agnes I.C Ogi
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado
agnesicogi@gmail.com

Emma Pongoh
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado

Ferny Tumbel
Pendidikan IPA, Pascasarjana, Universitas Negeri Manado

Article Information

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

Keywords: *Media Development, Powtoon, Environmental Pollution*

ABSTRACT

Learning activities are influenced by factors that include subject matter, media, supporting facilities, teachers and the surrounding environment. Media as a component in learning activities has a function as a means of communication, meaning that media absolutely must exist or must be utilized in learning activities. One of the media that can support the learning process is Powtoon. Powtoon is an IT-based web application that can be used as a learning medium in which there are interesting features such as features for making presentations or animated videos that can be used easily and attractively, thus Powtoon can be utilized in the development of learning media .This study aims to (1) produce Powtoon-based learning media on environmental pollution material, (2) determine the feasibility of Powtoon-based learning media on environmental pollution material, (3) determine the effectiveness of Powtoon-based learning media on environmental pollution material. The research methodology used refers to the Borg and Gall model (Palilingan, 2014). The subjects in this study were students of class VII SMP Brother Don Bosco Tomohon. The results of development research show that (1) Powtoon-based

learning media on environmental pollution material is suitable for use with the acquisition of material expert percentage I of 88.57%, material expert II of 90% and media expert percentage of 90.47%. (2) The effectiveness of Powtoon-based learning media on environmental pollution material obtained a percentage of 77.41% with the criteria high/very effective.

INTRODUCTION

Every Indonesian citizen is obliged to get proper education. Through education, humans carry out learning activities, namely gaining knowledge and experience obtained during the learning process. The learning process must be carried out properly so that it can help students absorb learning material (Masturah, 2018).

Learning activities are the process of students achieving change, learning is influenced by factors which include educators, students, subject matter, media, supporting facilities, and the surrounding environment. Teachers are expected to be able to choose the learning method used and choose the right learning media so that learning is more effective. Teachers not only need to prepare material, but teachers are also expected to be creative both in choosing the right learning model and media to use in learning activities.

Media as a component in learning activities has a function as a means of communication. As one of the components in learning activities, it means that media absolutely must exist or must be utilized in learning activities. Because in learning activities if one of the components is not there it will have an impact on the results to be obtained, where the results obtained will not be optimal(Magdalena, 2021).Therefore it is highly hoped that there will be innovations in learning technology that are more effective and passed on to teachers so that the quality is better which has an impact on improving the quality and competitiveness of students, so there must be development of products or media that can be used in learning (Sulangi, 2022).

The word media comes from Latin and is the plural form of the word medium which literally means intermediary or introduction. Learning media is everything related to software and hardware that can be used to convey material content from learning resources to students that can stimulate students' thoughts, feelings, attention and interests so that the learning process becomes more effective, for example using sound recordings, videos, animations three dimensions, mockups, as well as various types of software that are familiar to the world of education in this case the learning process (Priyanto, 2022). The benefits of learning media are being able to clarify messages so they are not too verbal, overcome the limitations of space, time, energy and sensory power,

Graham (in Sidqi, 2021) explains that one of the media that can support the learning process is Powtoon. Powtoon is an IT-based web application that can be used as a learning medium in which there are interesting features such as features for making presentations or animated videos that can be used easily and attractively (Ernalida in Primary, 2022). Powtoon has been equipped with various animated character selection features, which are very interesting, including handwriting animation, cartoon animation, and livelier transition effects as well as very easy timeline settings, has objects, backgrounds, and music, so that users can create video by using the features that are already available, besides that users can also import images or audio.

Learning media has not been said to be good if through its use it cannot provide benefits to

learning outcomes. To find out, an analysis of the feasibility and effectiveness of learning activities is carried out. According to Maesyarah (2018) in his research, he concluded that learning media that had been developed and assessed by a team of experts were deemed feasible and attractive for use as learning media. As is the case with (Wulandari, 2020) in his research explaining that the Powtoon-based learning video media based on the results of expert validity is declared feasible and based on trials, the media meets the criteria to be used as a science learning medium.

Based on the results of observations and interviews on August 10, 2022 which the researchers conducted with a science teacher at the Frater Don Bosco Tomohon Middle School, information was obtained that in the learning process teachers rarely use instructional media. The teaching materials used are in the form of textbooks, LKPD and PPT (if any). In most teacher learning activities

using textbooks from schools as teaching materials, continuous use of textbooks as teaching materials in learning activities makes students feel bored, less interested in learning so that it has an impact on students' difficulties in understanding the material being studied. In addition, the school has available technological media in the form of LCD projectors but cannot be utilized optimally as learning media.

In presenting a learning material, teachers are expected to be able to understand material that is related to everyday life, in the form of the application of material in the field of technology and the impact on the surrounding environment. One of the science materials that is closely related to everyday life and the surrounding environment, namely environmental pollution material, in which students must know what pollution is, what types of pollution, influencing factors, impacts that occur due to pollution and countermeasures.

The purpose of this study is to produce Powtoon-based learning media on environmental pollution material that is appropriate and effective for use in learning activities.

RESEARCH METHODS

This research uses the research and development (R&D) method which refers to the Borg and Gall model (Palilingan, 2014), this model includes the following stages:

a. Exploratory Studies
b. Doing Planning
c. Develop Initial Products
d. Data Collection and Analysis Instruments
e. Validation (Product Validation and Product Revision)
f. Product Trials (Small Group Trials, Revisions, Large Group Trials, and Revisions)
g. Final Product Manufacturing
h. Product Dissemination

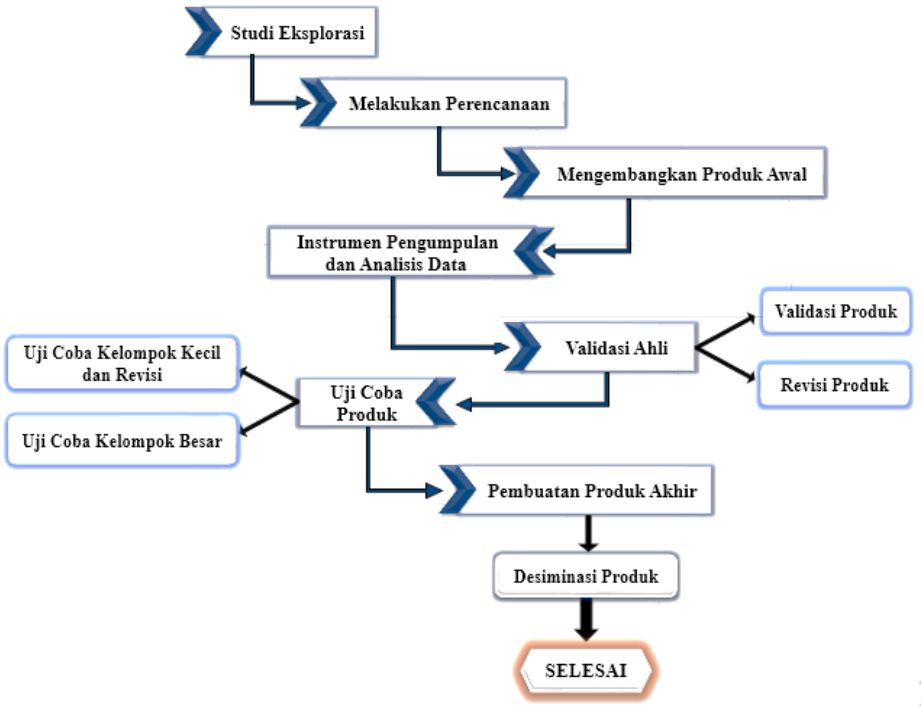

Figure 1. Stages of the R&D Method

The data collection instruments used in this study were: a questionnaire (questionnaire of material experts, media experts, student responses) and learning outcomes tests (pre-test and post-test). Data analysis in this study used Ms. Excel, the following formula is used to analyze whether the product being developed is valid or not:

$$P = \frac{\sum x}{\sum x_i} \text{x} 100\%$$

Information : P = Percentage sought

$\sum x$= Total value of respondents' answers

$\sum x_i$= Total ideal value

100 = Fixed number

With the following test criteria:

Table 1. Product Validity Criteria

No.	Presentation (%)	Validity Criteria
1.	76 – 100	Valid (No Revision Required)
2.	56–75	Valid enough (No Revision Required
3.	40 55	Less valid (Revised)
4.	0-39	Invalid (Revised)

(Arikunto, 2006)

Furthermore, to analyze the effectiveness of the product developed using the following formula:

$$P = \frac{\sum x}{\sum x_t} \text{x} 100\%$$

Information : P= The percentage you are looking for
$\sum x$= Total score achieved
$\sum x_t$= Sum of total scores
100= Fixed number

With the following test categories:
Table 2. Categories of Learning Outcomes

No.	Assignment 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

(Arikunto, 2006)

The initial product that was developed was validated first by material and media experts, based on the results of the validation, a revision was made to the initial product that was developed, after being revised it was then validated again and if it was declared valid/feasible then it would proceed to the product trial stage, namely small group trials . In small group trials, the developed product is tested on several students to find out about the quality of the product being developed, if deficiencies are found in the product, it is revised again and validated again and if it is valid then the product is ready to be tested on large groups. In this large group test it will be seen whether the product developed is effective in improving student learning outcomes or not. To find out whether it is effective or not, before and after the product is shown, students are given a test and to find out whether there are still deficiencies in the product being developed, at the end of the trial the large group is distributed a questionnaire whose results are used as a support in the development of the product being made. After that proceed to the stage of making the final product, where at this stage the final product will be perfected before it is produced. After making the final product, the product is ready to be produced and disseminated or what is known as the dissemination stage. After that proceed to the stage of making the final product, where at this stage the final product will be perfected before it is produced. After making the final product, the product is ready to be produced and disseminated or what is known as the dissemination stage. After that proceed to the stage of making the final product, where at this stage the final product will be perfected before it is produced. After making the final product, the product is ready to be produced and disseminated or what is known as the dissemination stage.

RESULTS AND DISCUSSION

1. Exploratory Studies

An exploratory study was conducted at the Brother Don Bosco Tomohon Middle School on August 10, 2022 with the aim of knowing and identifying various things in this regard related to learning activities and supporting teaching materials used at the school, especially in Natural Sciences (IPA) subjects.

2. Doing Planning

At this stage the media and learning activities are created and designed according to the results of preliminary research or exploratory studies.

Here are the steps:

a. Formulation of research and development objectives to be achieved

b. Establish success criteria for the product being developed, to find out if the product meets eligibility standards based on validation results.

c. Determine the instrument used to test the feasibility of the product being developed in the form of a validation questionnaire for material experts and media experts, while to determine the effectiveness of the resultslearn to use written tests.

d. Design initial product development activities and field tests which include:

1) Have discussions with supervisors

2) Determining the research subjects (the research subjects were students of class VII A SMP Brother Don Bosco Tomohon).

3) Create material designs, storyboards and media.

4) Prepare evaluation instruments for use in the product evaluation stage before and after field trials are carried out, namely questionnaire instruments and learning achievement tests.

5) Develop initial product

6) Perform initial product validation and revision

7) Conduct field trials (small group trials) and revisions (if necessary)

8) Conduct large group trials

3. Develop Initial Products

At this stage the researcher makes a learning media product design to produce the initial product as desired. The stages of Powtoon-based learning media design on environmental pollution material include:

a. Material Design

The material designed is even semester class VII science material about environmental pollution. This material is designed according to Core Competencies and Basic Competencies. One of the sources for this designed material comes from the author's own thesis research in 2020/2021 concerning the Application of STAD and GI Learning Models to Learning Outcomes in Environmental Pollution Materials at SMPN 9 Dumoga. Apart from that, there are also other sources, namely the Ministry of Education and Culture K13 Revision 2018 Science print book, the internet, and other sources.

b. Storyboard Design

This storyboard is designed as an illustration of the visual design of learning media which is arranged sequentially from start to finish, which includes: visuals/images, duration, narration and music used.

c. Media Design

This media design is a stage of transforming material design and storyboard design into a learning media product. The program used in implementing the design that has been made is by using the Powtoon website which consists of various features such as images, animations, characters/roles, video, audio, text, and many other features that can help us in making a learning media to be very interesting.

The following are the results of product development/preliminary form:

Figure 2. Opener

Figure 3. Environmental Pollution

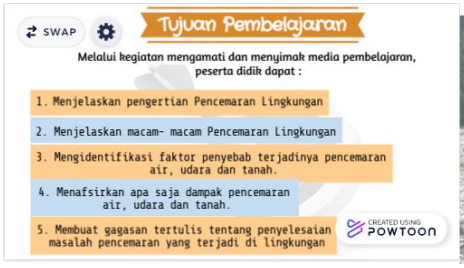

Figure 4. Learning Objectives

Figure 5. Definition Environmental pollution

Figure 6. Various Kinds

Figure 7. Water Pollution Environmental Pollution

Figure 8. Air Pollution

Figure 9. Soil Pollution

Figure 10. Feedback Questions

Figure 11. Closing

4. Data Collection and Data Analysis Instruments

a. Data Collection Instruments

1) The material expert validation questionnaire instrument on learning media is used to determine the feasibility of the media that has been developed

2) The media expert validation questionnaire instrument on learning media is used to determine the feasibility of the media that has been developed

3) The student response questionnaire instrument on learning media is used as one of the supporting instruments in developing learning media

4) The learning achievement test instrument (THB) is used to determine student learning outcomes before and after using learning media. This instrument is also used to measure/find out the effectiveness of the developed learning media

b. Data analysis

The data in this study were analyzed using MS. Excel to calculate the data from the instrument obtained.

5. Expert Validation

At this stage product validation is carried out by two experts, namely material experts and media experts, as follows:

a. Product validation

1) Material Expert Validator

This validation was carried out by two validators namely Dr. Ferny Tumbel, MS (Biology Lecturer at Manado State University) as validator I and Ms. Patricia Seaban, S.Pd (Class VII Science Teacher at SMP Brother Don Bosco Tomohon) as validator II. The following is a summary of the assessment results from material experts:

Table 3. Summary of Material Expert Assessment Results

Validators	**I**	**II**
Total Score Achieved	**124**	**126**
Maximum Total Score	**140**	
Minimum Total Score	**35**	
Average	**3.54**	**3,6**
Percentage	**88.57**	**90**

The results of calculations from material experts I obtained were 88.57% and material experts II were 90%, these percentages reached the valid category (no need to be revised), then Powtoon-based learning media was declared valid/feasible to use.

2) Media Expert Validator

This validation was carried out by the validator Dr. Meike Paat, M.Pd (Lecturer in Biology, Manado State University), the following is a summary of the assessment results from media experts (Appendix 8)

Table 4. Summary of Media Expert Assessment Results

Total Score Achieved	**76**
Maximum Total Score	**84**
Minimum Total Score	**10**
Average	**3.61**
Percentage	**90.47%**

The results of calculations from media experts were 90.47%, this percentage reached the valid category (no need to be revised), then the Powtoon-based learning media was declared valid/feasible to use.

b. Product revision

Product revisions were carried out in accordance with criticism and suggestions from experts (material experts and media experts).

6. Trials

a. Small-scale trials and revisions

Small-scale trials or small group trials are carried out to find out what are the weaknesses, deficiencies and errors contained in the learning media products being tested. The results of this product trial will be used as input to revise the product before being tested on a large scale.

In the following data from small-scale trials, the total score achieved for the very good category (SB) is 102, the good category (B) is 23, the poor category (K) is 5 and the very poor category (SK) does not exist. From the total score achieved, a total score of 130 (102 + 23 + 5) is obtained and the percentage of small group trial results is obtained using the following calculation:

SB category as many as 102: $\frac{Jumlah\ skor\ yang\ dicapai}{Jumlah\ skor\ total}$ x100%

$=\frac{102}{130}$ x 100% = 78.46%

Category B as many as 23: $\frac{Jumlah\ skor\ yang\ dicapai}{Jumlah\ skor\ total}$ x100%

$=\frac{23}{130}$ x 100% = 17.69%

Category K as many as 5: $\frac{Jumlah\ skor\ yang\ dicapai}{Jumlah\ skor\ total}$ x100%

$=\frac{5}{130}$ x 100% = 3.84%

The percentage calculation obtained is included in the valid category (no need to be revised), but in order to meet the needs of students and for the progress of the product being developed, the researcher revised it.

Based on the results of small-scale trials, researchers revised the products that had been tested.

b. Large-scale trials and revisions

The results of the development of Powtoon-based learning media on environmental pollution material were tested in large group trials. This trial was carried out using a written test that was applied at the beginning of the learning activity (pre-test) and at the end of the learning activity (post-test). The learning result test (THB) is conducted to determine the effectiveness of learning media. The following results were obtained from large-scale trials:

Table 5. Large Scale Trial Results Data

	Pre-test	***Post-test***
Min Value	**20**	**50**
Maximum Value	**75**	**95**
Total Value (N)	**1585**	**2255**
Average	**51,12**	**72,74**
Completeness Presentation	**32,25**	**77,41**

Based on data from large-scale trial results, an average pre-test score of 51.12 was obtained with a complete percentage of learning outcomes reaching 32.25% and an average post-test score of 72.74 with a complete percentage of learning outcomes reaching 77.41%. . This means that the learning media meets the effective qualifications with high/very effective criteria.

7. Final Product Manufacturing

At this stage, final improvements are made to the product being developed and a valid/decent and effective Powtoon-based learning media will be obtained for use in science learning activities,

especially on environmental pollution material.

8. Product Dissemination

After going through various stages (product creation, testing, product revision and refinement), the developed product is ready for production and distribution.

CONCLUSION

Based on the results of development research, it can be concluded that:

1. The resulting product is a Powtoon-based learning media on environmental pollution material.

2. Powtoon-based learning media on environmental pollution material, through validation from experts it was stated that the learning media developed was valid and feasible to use.

3. The learning media developed have met the criteria for effectiveness, through the use of these media learning outcomes in science, especially in environmental pollution material, can be increased.

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