

DEVELOPMENT OF AN ENVIRONMENTAL CONSERVATION MODULE AS A TEACHING MATERIAL IN THE LEARNING PROCESS

Haris Munandar

Universitas Bina Bangsa Getsempena, Banda Aceh, Indonesia

**Corresponding author: haris@bbg.ac.id*

Article History:

Received: December 19, 2023

Revised: March 15, 2024

Accepted: April 16, 2024

Published: April 16, 2024

Abstract

Knowledge about environmental conservation is very important in shaping the character of students. The process of conveying information related to environmental conservation can be done through learning media, one of which is by using learning modules. The aim of this research is to develop modules related to environmental conservation. The number of samples involved in this research was 25 people. The method used in this research is quantitative descriptive. The type of research used is Research and Development (R&D) using the ADDIE design. Data collection techniques were carried out by validation, use of test questions and distribution of response questionnaires. Based on the validation results from material, language and media experts, a percentage of 90.83% was obtained with the criteria "very valid." The test results given to students after using this module showed that the average score was 72.35 with the conclusion that students' knowledge regarding environmental conservation became better after using the module developed. Meanwhile, the results of student responses regarding the environmental conservation module were 83.29% of students responding with the criteria of "strongly agree". Based on the results of this research, it can be concluded that media in the form of environmental conservation modules can be used as teaching materials or reading references to increase information related to environmental conservation and its relationship in the learning process.

Keywords: Module, environmental conservation, R&D

1 INTRODUCTION

The world is currently worried about the increasingly deteriorating quality of the environment caused by massive exploitation of nature, both sea, land and air. Today, the rapid growth of cities and the development of their industrial technologies have a negative impact on the environment as a result of the processes taking place in them, which occur in production. As a result of numerous emissions from production, a lot of pollutants enter the atmosphere, which affect the vital state of the natural environment of the city [1]. The large-scale excavation of various types of fossils for the benefit of human life is increasingly becoming increasingly inefficient and pursuing mere convenience, which has worsened the environment [2]. One of the individual learning media that is now increasingly being used is by using modules. Modules are printed teaching materials for learning on related topics, modules contain information needed by teachers and students to assess and achieve their abilities and knowledge. Modules are learning facilities or tools that cover various methods, materials and evaluations that are designed in a systematic and interesting way to achieve competency based on the level of complexity [3].

Based on the results of observations and initial interviews conducted on May 17 2022 with students from the Primary School Teacher Education Study Program at Bina Bangsa Getsempena University. The researcher obtained information that students did not know about environmental damage caused by humans and how to deal with the disasters they faced and as prospective teachers, learning about environmental damage or disasters that occurred could be related to students' experiences, for example

burning rubbish, vehicle fumes and fumes. factories that produce industrial exhaust gases. These results were obtained from interviews with several students, data showed that students only received information about environmental damage in basic elementary science concepts courses, so their knowledge regarding environmental conservation was still very minimal, so special reading material was needed for students to increase their insight. related to environmental conservation. The aim of this research is to develop modules related to environmental conservation.

Learning modules are teaching materials that are prepared systematically and interestingly which include material content, methods and evaluations that can be used independently to achieve the expected competencies. James D Russell explained that a module is a teaching and learning package relating to one unit of learning material. With the module, students can master the study material by studying individually. Students cannot proceed to the next study unit before they have mastered the unit being studied. Modules often use a variety of learning tools. Using modules, students can control their ability and intensity of study.

The environment is part of the integrity of human life, so it must be viewed as one component of the ecosystem which has value to be respected, appreciated and must not be harmed. This integrity also makes humans have the responsibility to behave well with the life around them. Environmental conservation is a process or method of protection from destruction and damage. The arrangement of natural resources that ensures sustainable use of their reserves, namely by continuing to improve the quality of their diversity value and maintaining them. Environmental conservation in question is policy action to address environmental preservation which greatly influences human life and welfare. The environment as one of God's creations should be preserved. Environmental sustainability is related to the welfare of a nation. Therefore, humans must protect and maintain the environment as well as possible. Efforts that must be taken to preserve the environment include, among others; caring for and protecting animals; planting trees and reforestation; revive dead land; make good use of air and water, and the most important thing is how to maintain the balance of nature and its habitat.

2 METHODOLOGY

The research method used in this research is descriptive quantitative with the type of research being research and development (R&D) using the ADDIE stages. In its implementation, the ADDIE model can be explained according to the following Figure 1.

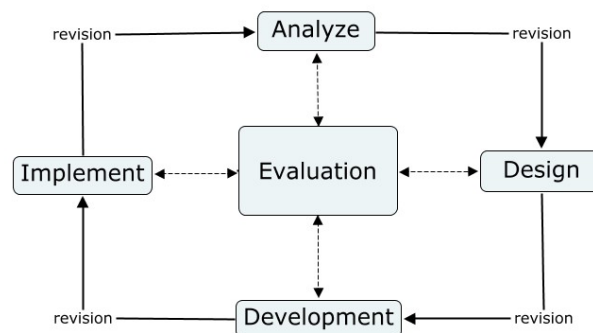


Figure 1. Stages of the ADDIE Model [4]

The samples taken in this research were 25 students from the class of 2019. The sampling was carried out using the Purposive Sampling technique. The instruments used in this research are validation sheets, user response questionnaire sheets and user knowledge test question sheets regarding the material in the environmental conservation module which is the product of this research.

2.1 Analysis

At this stage the researcher will identify problems and tasks that need to be completed during the learning process, the analysis step is carried out.

2.2 Design

At this stage the module to be developed begins to be designed, the module is in accordance with the analysis in the previous stage. In the first stage, the design determines the topics that will be discussed, for example, preparing a needs map and module framework and including material that must be in accordance with Graduate Learning Achievements (CPL), as well as material that is in accordance with Basic Competencies (KD), as well as linking the material to the problem of a polluted environment.

2.3 Development

At this stage action is taken to assess the product being developed. This development stage involves several stages, including expert evaluation [5] to ensure the suitability of the module being created, followed by revision of the final product after evaluation by a team of assessors or validators.

2.4 Implementation

This stage is the implementation of concrete steps to implement the environmental conservation module, at this stage everything that has been created or developed will be tested or used by students using the module and researchers are tasked with observing and giving direction regarding the material contained in it. module. After completing the process of distributing the modules to the target students, the researcher distributed questionnaires with the aim of obtaining response data on the use of the modules.

2.5 Evaluation

This stage is used to provide value to the learning program. The five steps of the ADDIE development system design paradigm were implemented during this evaluation. Formative and summative evaluations are two types of evaluation that can be carried out at the end of each discussion. The samples taken in this research were 25 students from the class of 2019. The sampling was carried out using the Purposive Sampling technique. The instruments used in this research are validation sheets, user response questionnaire sheets and user knowledge test question sheets regarding the material in the environmental conservation module which is the product of this research.

3 RESULTS

Development of an integrated environmental damage module for elemental chemistry using the ADDIE Model. The ADDIE model is a development model which consists of five stages which include analysis, design, development, implementation and evaluation. The stages of activities that have been carried out by researchers are: needs analysis, validation from the expert team as well as carrying out module revisions and field tests, namely distributing questionnaires to students. Furthermore, the development of the conservation module follows the stages of the ADDIE model in 5 activity stages.

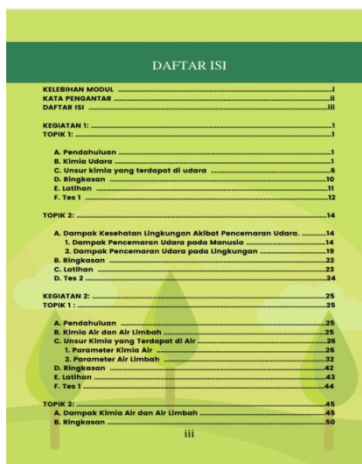
3.1 Analysis Stage

This stage corresponds to initial data collection stage that taken for information related to the problem to be researched [6]. The analysis stage in this research carried out data collection to find information about the module being developed, through needs analysis. Needs analysis was carried out by using a needs questionnaire for students. Questionnaires were given to 25 FTK students of the chemistry education study program. Based on data from the questionnaire results, the results show that students need development of an integrated environmental damage module in elemental chemistry. This can be seen and can be proven by the number of students who answered "yes" as many as 25 people and 24 people who answered yes if the module was developed.

3.2 Design Stage

The design steps carried out by the researcher are in several stages. The first stage is collecting source material or module references. This stage aims to collect literature sources that will be used later in

preparing the environmental damage module. This stage begins by looking for references related to environmental damage and discussing the health impacts caused by environmental pollution. The second stage is the media selection stage. The environmental conservation module developed was created using one of the online graphic design applications, namely the Canva application, which can be used to design various types of creative designs such as magazines, books, invitations, brochures and so on. Canva is used by researchers in developing environmental damage modules because it is based on the researchers' own abilities in designing the module, including practical laboratory-based work module for general chemistry for university students [7], and e-module for science practicum for teachers and high school students [8]. Canva is used by researchers in developing environmental damage modules because it is based on the researchers' own abilities in designing the module. The third stage is determining and selecting the format. This stage determines the size of the module that will be used and is done by looking at what students need. Therefore, it can make it easier for students to understand the contents of the module. In general, one of the displays in this environmental conservation module is as following Figure 2.



The image shows a table of contents for an environmental conservation module. The title 'DAFTAR ISI' is centered at the top. The table lists various sections and their corresponding page numbers. The sections include: KELEBIHAN MODUL (i), KATA PENGANTAR (ii), DAFTAR ISI (iii), KEGIATAN 1 (1), TOPIK 1 (1), A. Pendahuluan (1), B. Kimia Udara (1), C. Limas kimia yang terdapat di udara (8), D. Ringkasan (10), E. Latihan (11), F. Tes 1 (12), TOPIK 2 (14), A. Dampak Kesehatan Lingkungan Akibat Pencemaran Udara (14), 1. Dampak Pencemaran Udara pada Manusia (14), 2. Dampak Pencemaran Udara pada Lingkungan (19), B. Ringkasan (22), C. Latihan (23), D. Tes 2 (24), KEGIATAN 2 (25), TOPIK 1 (25), A. Pendahuluan (25), B. Kimia Air dan Air Limbah (25), C. Limas kimia yang terdapat di Air (26), 1. Parameter Kimia Air (25), 2. Parameter Air Limbah (32), D. Ringkasan (42), E. Latihan (43), F. Tes 1 (44), TOPIK 2 (45), A. Dampak Kimia Air dan Air Limbah (45), B. Ringkasan (50). The page number 'iii' is centered at the bottom of the table.

KELEBIHAN MODUL	i
KATA PENGANTAR	ii
DAFTAR ISI	iii
KEGIATAN 1	1
TOPIK 1	1
A. Pendahuluan	1
B. Kimia Udara	1
C. Limas kimia yang terdapat di udara	8
D. Ringkasan	10
E. Latihan	11
F. Tes 1	12
TOPIK 2	14
A. Dampak Kesehatan Lingkungan Akibat Pencemaran Udara	14
1. Dampak Pencemaran Udara pada Manusia	14
2. Dampak Pencemaran Udara pada Lingkungan	19
B. Ringkasan	22
C. Latihan	23
D. Tes 2	24
KEGIATAN 2	25
TOPIK 1	25
A. Pendahuluan	25
B. Kimia Air dan Air Limbah	25
C. Limas kimia yang terdapat di Air	26
1. Parameter Kimia Air	25
2. Parameter Air Limbah	32
D. Ringkasan	42
E. Latihan	43
F. Tes 1	44
TOPIK 2	45
A. Dampak Kimia Air dan Air Limbah	45
B. Ringkasan	50

Figure 2. Table of Contents Design

3.3 Development Stage

The first step in this stage is an expert or expert assessment of the module being developed. This development stage (Develop) is needed to develop a research that will be researched so as to produce a product needed in a research [4]. Based on the results of the expert assessment of the environmental conservation module, information was obtained that the percentage value of the three aspects consisting of material experts, language experts and media experts showed an overall average percentage of 90.83% with the validation criteria being "very valid". Thus, the development of an environmental conservation module is very valid for use by students. The objectives at this stage include creating a final development product, namely an environmental conservation module. At this stage there are several input suggestions from experts, so researchers must make revisions based on these input and suggestions

3.4 Implementation Stage

After the product is an environmental damage module, validation is carried out with the aim that the product is valid for use and approved for development of the environmental damage module and there is also input and suggestions from the expert team and respondents regarding the product being made. The next step is to apply the environmental conservation module to students to determine the completeness of students' understanding of the concept of environmental conservation. This step is carried out by being given test questions about the material contained in the module product that has been developed. The test is given to students after they have read the environmental conservation module thoroughly. The results of carrying

Munandar: Development of Environmental Conservation

out tests on students where the students were given modules to study for a week, then were given test questions, so that the test results obtained were 1,230 with an average score of 72.35. Therefore, it can be seen that students who use the environmental conservation module have better knowledge regarding environmental conservation after reading the module given to them.

The next step was to provide a user response questionnaire for environmental damage module products to 25 students. This stage aims to find out how students respond to the module that has been developed. Based on the results of the student response questionnaire, the score obtained was 1,062 with a percentage reaching 83.29%. with the criteria of strongly agree.

3.5 Evaluation Stage

The evaluation stage aims to review the quality of the environmental conservation module products being developed. The evaluation used in the ADDIE model is a formative evaluation where evaluation is carried out at each stage of research from analysis, design, development and implementation. Evaluation at the analysis stage is carried out by analyzing the needs obtained from the results of the distribution of the initial needs questionnaire, the results of the needs analysis. Next, the design stage is evaluated in the form of pre-validation by researchers. The evaluation development stages were carried out according to suggestions and comments from material, language and media expert validators. The implementation stage is carried out by conducting tests regarding environmental conservation material to see students' knowledge after being given the module and to see students' responses regarding the module being developed. This is in accordance with research conducted by [9] from the results of data obtained by 78.5% of students who chose to develop modules as teaching materials for the reason that they made it easier and helped students learn lecture material and saved time [10].

Students filled out the response questionnaire given by the researcher, the number of statements in the response questionnaire was 25 statements which received a low score. In statement number 23, there were 2 people who gave a score of 3, on the grounds that the material in the module was not yet completely up to date. Based on the results of data analysis, the overall percentage value was 83.29% with the criteria of strongly agreeing. it can be concluded that this environmental damage module can be used as an additional reference. This is in accordance with what previous research stated, the rating score of 81-100% [11] is included in the very practical criteria and can be applied without revision to be used in the learning process and make it of higher quality [12].

The test results of student answers were observed based on the scores obtained by students who used the module with a total of 25 students and obtained an average score of 72.35 so it can be concluded that students who used the module had better knowledge regarding environmental conservation. This is the same as research conducted by previous scholars showing that the use of modules can increase learning effectiveness [13] and students' understanding and the use of modules is more practical to use [14].

4 CONCLUSIONS

Based on the research that has been conducted, it can be concluded that the environmental conservation module can broaden students' insight regarding environmental conservation. The results of student responses showed that 83.29% of students responded strongly agreeing with the development of the environmental conservation module.

ACKNOWLEDGEMENTS

Authors may wish to thank those who have supported and special their help in this project research. Author also very much appreciation to their ideas in finishing this research about environmental conservation module.

REFERENCES

- [1] A. M. Popov, A. A. Popov, A. K. Ovsyankin, V. A. Schneider, and A. R. Evstratov, "Development of a module for environmental monitoring of the living condition of landscaping facilities using neural networks," in *Conference Series: Earth and Environmental Science*, IOP Publishing, 2022, p. 012145.
- [2] M. Abdurrahman, *Dinamika masyarakat Islam dalam wawasan fikih*. Bandung: PT. Remaja Rosdakarya, 2016.
- [3] R. T. Sari, S. Angreni, and R. A. Fortuna, "Pengembangan Modul Pembelajaran Ipa Berbasis Pendekatan Konstruktivisme Untuk Kelas V Sd," *Bio-Pedagogi: Jurnal Pembelajaran Biologi*, vol. 8, no. 2, pp. 89–93, 2019.
- [4] Y. H. Rayanto, *Penelitian Pengembangan Model Addie Dan R2d2: Teori & Praktek*. Pasuruan: Lembaga Academic & Research Institute., 2020.
- [5] A. Mujala, M. Reza, and K. Puspita, "Pengembangan Buku Pegangan Guru untuk Pembelajaran Kimia Terintegrasi Ayat-ayat Al-Qur'an," *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, vol. 10, no. 1, pp. 161–175, 2022.
- [6] B. A. Pribadi, *Desain dan pengembangan program pelatihan berbasis kompetensi implementasi model ADDIE*. Jakarta: Prenada Media Group, 2016.
- [7] K. Puspita, M. Nazar, L. Hanum, and M. Reza, "Pengembangan E-modul praktikum kimia dasar menggunakan aplikasi canva design," *JUPI (Jurnal IPA & Pembelajaran IPA)*, vol. 5, no. 2, pp. 151–161, 2021.
- [8] A. Mayasri, M. Reza, and M. Rafdi, "MEMBANGUN ERA BARU PEMBELAJARAN: PELATIHAN PEMBUATAN E-MODUL PRAKTIKUM IPA DENGAN CANVA DALAM KURIKULUM MERDEKA," *JMM (Jurnal Masyarakat Mandiri)*, vol. 8, no. 2, pp. 2069–2078, 2024.
- [9] D. Pratita, D. E. Amrina, and Y. Djahir, "Analisis Kebutuhan Mahasiswa Terhadap Bahan Ajar Sebagai Acuan Untuk Mengembangkan E-Modul Pembelajaran Digital," *Jurnal PROFIT Kajian Pendidikan Ekonomi Dan Ilmu Ekonomi*, vol. 8, no. 1, pp. 69–74, 2021.
- [10] G. P. Mahardhika, "Digital game based learning dengan model ADDIE untuk pembelajaran doa sehari-hari," *Teknoin*, vol. 21, no. 2, pp. 1–8, 2015.
- [11] H. W. Setiawan and R. S. Wiyardi, "Penggunaan app inventor dalam pembuatan game education berbasis android sebagai media pembelajaran yang mandiri dan interaktif untuk meningkatkan hasil belajar siswa TITL pada pembelajaran listrik dasar SMK Muhammadiyah Majenang," *Edu Elekrika Journal*, vol. 4, no. 1, pp. 24–30, 2014.
- [12] A. Prastowo, *Panduan kreatif membuat bahan ajar inovatif menciptakan metode pembelajaran yang menarik dan menyenangkan*. Yogyakarta: Diva Press, 2019.
- [13] S. C. Nurlatifah, S. R. N. Hodijah, and A. Nestiadi, "pengembangan modul berbasis multimedia dengan menggunakan Flip PDF Professional pada tema udara yang sehat," *PENDIPA Journal of Science Education*, vol. 6, no. 1, pp. 226–232, 2022.

Munandar: Development of Environmental Conservation

- [14] M. Irfan Arif and M. S. Mirza, "Effectiveness of an Intervention Program in Fostering Academic Resilience of Students at Risk of Failure at Secondary School Level," *Bulletin of Education and Research*, vol. 39, no. 1, pp. 251–264, 2017.