

Development Of Infographic Poster Media In Biodiversity Learning To Improve Critical Thinking Skills Of High School Students

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Abstract

This research aims to develop learning media in the form of interactive infographic posters on Biodiversity materials to improve the critical thinking skills of high school students. The method used is Research and Development (R&D) with the ADDIE development model which includes the stages of analysis, design, development, implementation, and evaluation. The subject of the study was a student of class XI Social Studies at SMA Negeri 1 Kotabunan. The validation results showed that the media included in the category was very valid with an average score above 90%. The results of the effectiveness test using N-Gain showed an increase of 0.72 (high category), while the Paired Sample t-test produced a p-value of $0.000 < 0.05$ which indicates a significant increase in students' critical thinking skills after using media. Observation of student activities also showed excellent response with an average score of 3.7 (92.5%). Thus, the interactive infographic poster is declared valid, practical, and effective and feasible to be used as an alternative innovative learning media to support Geography learning and strengthen critical thinking skills according to the demands of the Independent Curriculu..

Keywords: Interactive Infographic Poster, Critical Thinking, Geography Learning, ADDIE.

INTRODUCTION

Education is a fundamental aspect in nation building, especially in an effort to realize the ideals of a Golden Indonesia as mandated in Law Number 14 of 2023 concerning the National Education System. The government seeks to form a generation that is intelligent, independent, and has the ability to think critically as the main capital in facing the challenges of the 21st century. Critical thinking skills are not only needed to achieve academic achievements, but also

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IJETER, Volume 03 Issue 04, 2025



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become an important foundation in solving real problems in daily life and in dealing with scientific and technological advances in the modern era (Kardin Sitohang, 2022). Geography learning, especially in biodiversity materials at the high school level, has an important role in developing students' critical thinking skills. This material requires a deep understanding of the diversity of living things and the interactions between organisms in ecosystems. However, in practice, many students have difficulty understanding abstract concepts such as cause-and-effect relationships in ecosystems, species classification, and the impact of human activities on biodiversity (Husamah, 2021). These difficulties have an impact on students' low analytical and evaluation skills in understanding ecological relationships (Amalia et al., 2023).

One of the causes of students' low critical thinking skills lies in the use of learning media that is still conventional. The dominant textbooks and lecture methods in the classroom tend to be text-oriented and memorized, so they are less able to stimulate higher-level thinking skills (Kurniawati, 2022). Conventional media such as charts or static images are also often not accompanied by *guiding questions* that can encourage students to think critically and reflectively about the material being studied. As a result, students tend to think of biodiversity learning as a memorization activity, rather than a contextual conceptual analysis process.

In this context, the use of interactive visual media is one of the potential solutions to overcome learning gaps. Research shows that visual media such as infographics can improve conceptual understanding and student involvement in the learning process (Puspitasari, 2023). Infographic posters, which combine visual elements, short text, and systematic information structures, are able to simplify complex concepts while fostering data analysis and interpretation skills (Saputri & Suryanti, 2021). Thus, this media has the potential to increase the effectiveness of geography learning through the presentation of interesting, relevant, and easy-to-understand information.

In addition to supporting the improvement of concept understanding, learning media also plays a role in fostering students' motivation to learn. According to Yulianti & Nugroho (2020), well-designed learning media can help teachers convey information in an interesting way, facilitate understanding of data, and increase students' enthusiasm in participating in learning. In line with that, Pratiwi & Sari (2021) emphasized that the use of innovative media in geography learning is able to significantly improve the quality of learning and student learning outcomes.

The development of effective learning media must begin with a needs analysis, including the suitability between the material taught, the characteristics of students, and learning objectives (Lestari, 2021). Media that is tailored to the characteristics of students will make the learning process more efficient and meaningful. In this context, infographic posters function not

only as a visual aid, but also as a means of strengthening critical thinking skills by presenting information in a structured manner and facilitating the analysis process.

Based on these problems, this research was conducted to develop infographic-based learning media on biodiversity materials with the aim of improving the critical thinking skills of high school students. Through the development of this media, it is hoped that students will be more motivated and actively involved in the learning process, as well as teachers will obtain innovative media alternatives that are in accordance with the demands of the Independent Curriculum. Thus, the results of this research are expected to contribute to improving the quality of geography learning in high school, especially in an effort to foster critical thinking skills in the 21st century.

METHOD

This research uses the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model. This model was chosen because it has systematic stages to produce valid, practical, and effective learning products. The research was conducted at SMA Negeri 1 Kotabunan, East Bolaang Mongondow Regency, North Sulawesi Province, with the research subject of grade XI students of Geography subject.

This research is carried out through several stages in accordance with the ADDIE development model, namely analysis, design, development, implementation, and evaluation. The stages are explained as follows.

1. Analysis Stage

The analysis stage is carried out to identify needs and problems in the geography learning process. Based on the results of observations and interviews with teachers and students, it was found that students still had difficulty in understanding abstract and contextual concepts in biodiversity materials. In addition, the learning media used by teachers is still limited to textbooks and conventional presentations, so students' interest in learning is relatively low. Based on these findings, the researcher developed infographic poster learning media as an interesting and interactive visual tool to foster interest in learning and hone students' critical thinking skills.

2. Design & Development Stage

This stage includes designing and creating *interactive infographic poster media* according to the results of needs analysis. The design was prepared with attention to readability, visual clarity, and conformity with the Basic Competencies of Geography. The resulting product is



then validated by material experts and media experts, and is declared valid and very practical with minor revisions.

3. Implementation & Evaluation Stage

The implementation stage is carried out in class X Geography by involving teachers and students. In this stage, students use infographic poster media during learning activities. Observations were carried out to assess student activities and involvement, while interviews were conducted to find out teachers' responses to the effectiveness of the media. The evaluation was carried out using the Miles and Huberman interactive data analysis model, which includes the process of data reduction, data presentation, and conclusion drawing (Figure 3). To ensure the validity of the data, triangulation techniques were carried out by comparing the results of observations, interviews, and documentation.

RESULTS AND DISCUSSION

Research Results

This research was carried out at SMA Negeri 1 Kotabunan, East Bolaang Mongondow Regency, North Sulawesi Province. The purpose of the research is to develop learning media in the form of *interactive infographic posters* on Biodiversity materials to improve the critical thinking skills of grade XI Geography students. The development model used is ADDIE, which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation.

1. Analysis Stage

Based on the results of interviews and observations, it is known that students still have difficulty understanding the concept of biodiversity and its relationship with environmental conservation. The learning media used by teachers is still conventional and less attractive to students. In addition, students show a high interest in visual and interactive media. Therefore, learning media was developed in the form of *interactive infographic posters* that can present material visually, attractively, and easily understand.

2. Design & Development Stage

The design stage is carried out by adjusting the media content to the Basic Competencies of Geography class XI, namely identifying Indonesia's biodiversity and its preservation efforts. The poster was designed using Canva and CorelDraw tools, paying attention to color elements, readability, and integration of *Higher Order Thinking Skills* (HOTS) elements through analytical and reflective questions.



Validation is carried out by three experts (material, media, and language). The validation results show that the media is included in the category of being very valid.

Table 1. Expert Validation Results

Validation Type	Average Score	Category
Material Expert	3.7 (93%)	Highly Valid
Media Member	3.74 (93.5%)	Highly Valid
Linguist	3.76 (94%)	Highly Valid

3. Implementation and Evaluation Stage

The implementation stage was carried out to 30 students in grade XI social studies. The evaluation was carried out to assess the effectiveness of the media in improving students' critical thinking skills. Testing is carried out through pretest and posttest as well as observation of student activities during the learning process.

Table 2. Results of N-Gain Calculation of Critical Thinking Ability

Statistics	Pre-test	Posttest	N-Gain	Category
Average Score	62.4	86.8	0.72	High
Maximum Score	80	100		
Score Minimum	45	70		

Based on the calculation results, an N-Gain value of 0.72 was obtained which is included in the high category, indicating that learning media is effective in improving students' critical thinking skills.

To ensure that the increase in learning outcomes is statistically significant, the Paired Sample t-test is carried out.

Table 3. Paired Sample t-test results

Statistics	Value	Information
t-count	8.93	
p-value (Sig. 2-tailed)	0.000	< 0.05 (Significant)

The test results showed a p-value < 0.05, which means that there was a significant improvement in student learning outcomes after using interactive infographic poster media.

In addition to improving learning outcomes, observations of student activities during learning also showed a positive response.

Table 4. Results of Student Activity Observation

Observed Aspects	Average Score	Category
Ability to analyze information	3.7	Excellent
Problem-solving skills	3.5	Good
Learning independence	3.8	Excellent
Cooperation in groups	3.6	Good
Enthusiasm for the media	3.9	Excellent
Average: 3.7 (92.5%)		

Thus, the learning media developed is declared valid, practical, and effective to be used in Geography learning to improve students' critical thinking skills.

DISCUSSION

The results of the study show that the development of *interactive infographic poster* media with the ADDIE model produces a valid and effective product in supporting Geography learning. Expert validation shows an average score above 90%, indicating that the media has met the feasibility in terms of content, display, and language. These results are in line with Andi Ibrahim & Asrul Haq Alang (2020) who stated that systematically designed visual media is able to improve students' conceptual understanding and facilitate visual learning styles.

The effectiveness of the media was also proven through a significant increase in learning outcomes with an N-Gain value of 0.72 (high category) and the results of the Paired Sample t-test which showed a *p-value* of < 0.05 . This indicates that the use of interactive infographic poster media significantly improves students' critical thinking skills. These findings are consistent with research by Amrina et al. (2022) which shows that interactive visual learning media can improve higher order thinking skills.

In addition, the results of observation of student activities show that the category is very good, which means that this media is able to increase participation and motivation to learn. Infographic posters provide students with the opportunity to think analytically and understand the relationships between concepts through engaging visualization. This is in accordance with

the opinion of Taufik (2021) that the use of innovative media in Geography learning is able to create an active, collaborative, and meaningful learning atmosphere.

CONCLUSION

Based on the results of the research and discussion, several conclusions were obtained as follows:

1. The learning media developed was declared valid, with the validation results of experts in the respective material, media, and language categories being in the very *valid* category (above 90%). This shows that *interactive infographic posters* are worth using in terms of content, appearance, and language.
2. The media developed is practical, because it is easy for teachers to use and attractive to students. The results of the observation showed excellent student response to the display and content of the media, with an average score of 3.7 (92.5%), reflecting increased enthusiasm, learning independence, and the ability to cooperate in learning.
3. Learning media is effective in improving students' critical thinking skills. The *results of the N-Gain* test showed an increase of 0.72 (high category), and the *Paired Sample t-test* resulted in a *p-value* of $0.000 < 0.05$ indicating a significant increase between the pretest and posttest values after the use of the media.
4. Overall, the development of *interactive infographic poster* media with the ADDIE model resulted in a valid, practical, and effective product in supporting Geography learning. This media not only helps students understand the concept of biodiversity more deeply, but also fosters critical thinking skills that are relevant to the demands of the *Independent Curriculum* and the challenges of 21st century learning.

Thus, *interactive infographic posters* are suitable for use as an alternative alternative learning media in improving the quality of the teaching and learning process in schools, especially in Biodiversity materials.

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