

# Improving Critical Thinking Skills OF High School Students THROUGH Gamification-Based Learning Media Development

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## ABSTRACT

This study aims to develop gamification-based learning media and test the effectiveness of the media on students' critical thinking skills. This study uses the Research and Development methodology, the ADDIE development model (Analysis, Design, Development, Implementation and Evaluation). The subjects of this research trial were class X geography students at the Pasanggaran High School in East Java, which consisted of an experimental class and a control class. Sampling using a purposive sampling technique. The type of data used is quantitative data. Collecting data using questionnaires and tests using descriptive analysis techniques. The respondent's due diligence resulted in 8326 and has been validated. The results showed that the use of gamification-based learning media had a positive effect on students' critical thinking skills using sig.  $0.000 < 0.05$ . Thus, gamification-based learning media is feasible to use and influences students' critical thinking skills.

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## 1. INTRODUCTION

The Indonesian Minister of Education, Culture, Research and Technology in overcoming problems in the field of education has established a new curriculum as a guiding provision in learning, namely the independent curriculum. The independent curriculum is an enhanced development of the emergency curriculum used during the pandemic. The independent curriculum is a teaching and learning program by freeing students to develop their natural talents and learn in a fun, relaxed, stress-free and calm way (S. Ahmed, S., 2022). In the independent curriculum, the education system hopes to achieve learners' critical thinking and problem solving, the development of ideas and the application of creative solutions, the ability to communicate and collaborate, as well as the ability to find, manage, and convey information, as well as the skills in using information and technology are needed (M. Alrabadi, IG, 2022). The problem that arises is that the level of critical thinking skills of students is relatively low. Critical thinking ability is a skill needed by humans to deal with various problems in their social and personal lives (A. Zayd, 2014; Masek, 2011; Krupat, E., 2011).

Students' critical thinking scores show a low critical thinking category (E. AL-Momani, M., 2022). Results from previous research show that students' critical thinking skills have not met the standards to provide support and reliable sources of information. McLean's research conclusion recommends that overall critical thinking skills need to be improved and applied. In order to improve learners' critical thinking and knowledge in geography lessons, the use of modern learning media needs to be updated with the help of digital technology. Learning during this time does not only depend on media and learning resources in the surrounding environment, but learners also need learning support from today's modern technology. One of the efforts to develop student's critical thinking skills is through the use of technology-based learning media. This technology media should be used in learning activities to improve student's critical thinking skills (Fajari, 2020; Nirbita., 2018; Ningsih., 2021).

In this case, learning innovations are needed such as media development including media or web-based learning applications. The results of the needs analysis show that the independent curriculum analysis shows that the education system equips students with critical thinking and problem-solving skills, the ability to find ideas and apply effective solutions, communication and cooperation, as well as the ability to see and convey problems from a local context and is expected to provide a correct solution to existing problems. Furthermore, the results of interviews with teachers and students showed that learning still uses the lecture method with the help of videos and some simple media. But the technology-based learning does not affect students' critical thinking skills because it does not invite direct contribution to the existing problems. There are 82.4% percent interested in visual learning media in the form of learning applications, where videos, learning materials, questions and images are combined into one unit in an attractive and accessible way. Most learners are also interested in learning apps with presentation materials and games to make learning more fun and help them better understand the material presented. In the material analysis conducted, 60% of learners find the material difficult to understand and less interesting.

The difficulties faced by these learners come from the lack of picture illustrations, relatively unattractive books, and incomplete presentation of learning materials. This means that learners need learning media that they can use in a fun way to help them understand the learning. In supporting the improvement of students' critical thinking skills, learning media is developed in this research in the form of gamification-based geography learning media. Game-based learning media is expected to help students improve critical thinking skills. Gamification is a learning concept by using game elements in a non-game context (E. Al-

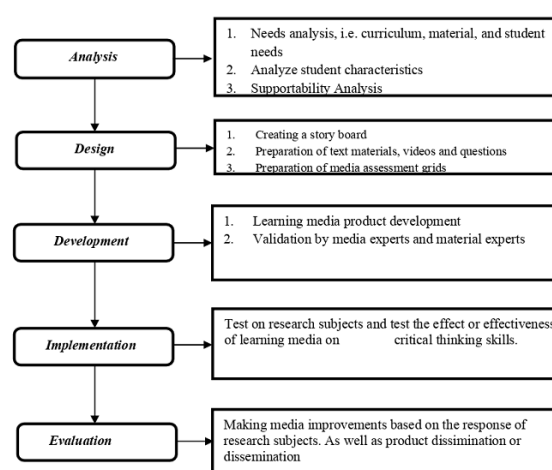
Momani, M., 2022). Gamification is a game-based learning concept (M. Rababa, EM, 2022). In this research, gamification-based learning media is a game-based learning concept in the form of applications. Learning media using game applications are designed to encourage learners to solve specific subject problems through exercises and simulations included in the application. Therefore, game-based learning media can increase students' knowledge and critical thinking about learning materials, especially atmospheric dynamics and their impact on life. In geography lessons, atmospheric material requires critical thinking skills (R. A. AL-Momani, M. O., 2022; Cicchino, 2015; Mao, 2022; Wardoyo, 2020; Chang, 2021).

Previous research shows that the use of gamification is successful in getting learners actively involved in the learning process (A. Sherif, 2014). Other research shows that gamification-based learning media can have a significant impact on the learning experience and even improve learners' performance on learning assessments (F. Mohammed, 2020). In the Journal of Modern Psychological Research at the University of Cumberland, Smyth said that a complex approach involving players in problem-solving, creativity and critical thinking can bring academic success (M. AL-Momani, 2022a). This recognizes the role of game-based learning media as an assessment tool that can use modern technology to stimulate the spirit of learning, increase critical thinking skills, and play a role in developing the character of students. So that the existence of game-based learning media that follows technological advances is expected to improve student's critical thinking skills (M. AL-Momani, 2022a).

The purpose of the research is to produce gamification-based learning media development and determine the feasibility and also the effect (effectiveness) of learning media on students' critical thinking skills in geography learning, in order to achieve students' awareness of global issues. The urgency of the research is to utilize education in developing knowledge, attitudes and skills of students' abilities in critical thinking so that students can synthesize their knowledge of current problems both in theory and practice. This research is thesis research in the form of developing gamification-based learning media based on novelty and in accordance with curriculum objectives, namely independent curriculum.

## 2. METHODS

The development research method applied is Research and Development (R&D) using the ADDIE development model (Analysis, Design, Development, Implementation and Evaluation) (M. . AL-Momani, 2022). The following is a flowchart of the ADDIE development procedure in the research (Figure 1).



**Figure 1.** Media Development Procedure Chart

The test subjects of this research were geography students of class X public senior high school Pasanggaran East Java consisting of experimental and control classes. The sampling method is a purposive sampling technique considering the average score of the two classes on the School Final Examination is almost the same. Consisting of 33 experimental class students and 32 control class students. Before the trial stage, media products were verified by media experts and material experts. The type of data used is quantitative data. Quantitative data is obtained from the percentage score of the media feasibility test results and the media effectiveness test on the critical thinking skills of students.

Research data was collected using test instruments and questionnaires. In this development research, the data collection instrument uses a combination of open and closed questionnaires. The combination of open and closed questionnaires will be distributed to students to determine the feasibility of the learning media products developed. The data analysis technique in the development of this learning media uses descriptive analysis. Data from product trials and students' critical thinking test results were analyzed by converting quantitative data into percentages. The percentage score data is then converted into descriptive text. The percentage value of feasibility and effectiveness can be classified based on the following assessment categories (Table 1).

**Table 1.** Classification of eligibility and effectiveness of media (E. AL-Momani, MO, 2022)

Range Value (%)	Qualification
81-100	Very Feasible or Very Effective
61-80	Eligible or Effective
41-60	Decent Enough or Enough Effective
21-40	Less Feasible or Less Effective
0-20	Inadequate or Ineffective _

The test instrument in this study consisted of 5 essay questions related to the indicators of critical thinking skills to measure the critical thinking skills of students after treatment. The test instrument developed by the researcher can be said to be good if it meets the criteria in accordance with the statistical tests of validity and reliability that have been carried out (M. AL-Momani, 2022b). The validity and reliability test of the instrument was conducted on 33 students in class X IPS 2 SMAN Pasanggaran. The class was not used as a research sample. Validity test with Pearson product-moment correlation using SPSS (Statistical Package for Social Sciences) version 23 for Windows. Reliability test results using Cronbach Alpha on the SPSS program in accordance with the r Product Moment table at a significance level of 5%. After the data is collected, hypothesis testing is carried out using the SPSS 23 for Windows application to determine the effect of gamification-based learning media on students' critical thinking. Before conducting hypothesis testing, a prerequisite test was carried out consisting of a normality test and a homogeneity test. The normality test in this study used the Kolmogorov-Smirnov test with SPSS at a 5% confidence level to test whether the research data was normally distributed. The homogeneity test was carried out using Levene's test of equal variances to test whether the data in each sample group had uniform population variants (homogeneous).

### 3. RESULTS AND DISCUSSION

#### 3.1. Gamification-Based Learning Media Development

Result of the development research is gamification-based learning media "who wants to be an astronaut". Gamification-based learning media "who wants to be an astronaut" is a learning media that combines web elements and applications into one. This gamification-based learning media can be used anytime and anywhere with all digital devices. Gamification-based learning media can be used in the form of a web or application without having to download and can be used offline. Gamification-based learning media contains atmospheric dynamics material and its impact on life accompanied by gamification elements with features such as a learning objectives menu, material, videos, games, quizzes, project assignments, individual assignments, glossaries, tests, and reflections. Learners can immediately complete challenges, do questions, and collect assignments using gamification-based learning media.

Before carrying out media trials and media effectiveness tests, the validation stage is carried out, namely by material expert validators and media expert validators. The following is a description of the results of material validation and media validation of the gamification learning media developed:

**Table 2.** Material Validation Results

No	Aspect	Amount question	Amount S cor A sticky	Amount S cor highest	Percentage Each Aspect	Qualification
1	Quality content and purpose	4	12	16	75 %	Worthy
2	quality instructional	5	18	20	90 %	Very decent
3	quality technical	5	17	20	85 %	Very Worth it
4	Question practice	6	19	24	79 %	I'm sifted
Amount		20	66	100	83 %	Very decent

**Table 3.** Media Validation Results

No	Aspect	Amount question	Amount S cor A sticky	Amount S cor highest	Percentage Each Aspect	Qualification
1	Software	10	39	40	98 %	Very decent
2	quality Visual	10	32	40	80 %	I'm sifted
Amount		20	71	80	89 %	Very worth it

Based on the results of validation by material expert validators presented in Table 2, the media product obtained a score of 83% with the qualification "Very feasible" to be used. Table 3 shows the results obtained from media validation conducted by media expert validators obtained a score of 89% with the qualification "Very feasible". Then the media product was revised according to the criticism and suggestions from the material expert validator and the

media expert. The revised gamification-based learning media was then carried out feasibility trials on students (Figure 1 to 5).



**Figure 2.** Appearance Early Media Gamification



**Figure 3.** Home Menu Display



**Figure 4.** Appearance Contents Menu

#### 4. CONCLUSION

Form family Al-Qaeda the basic in structure any Community, She is Enterprise Social, that believe several Careers Vitality, Of which job Childbearing and upbringing Social for individuals, and their acquisition their identities, to side Being no still brooder The economist for young people until age marriage.

I have I knew family several changes, whether in its shape synthetic, or in her relationships interior, or in Rate it Social. And fall This is amazing the changes in framework a movement the change cultural-social and his options multi that live in it in knowledgeable Millennium Third gesticulate His owner in the time Himself with prospects wider from risks Change, And move on to Community multiplied in it shapes relations, and interaction and engagements but rather I transgressed to nature expectations I have the people from their relationships by others on Limit to express "Giddens", and this is what witness it Communities the world since a period from time.



This is amazing the changes affected on practical Connection inside family, Considering that Connection that continue its importance Bezel life necessity to achieve Compatibility personal, And with that particular Emphasizes many from Researches on Existence crisis communicative inside family, where Prepare inability children on expression on their feeling most important Title she has.

The connection Begins from life embryonic And it evolves with development links Social, where Prepare family the environment The first to interact with individuals, and building a on him be life family pledged Naturally Connection existing In which Either coexistence Selma Or conflict And violence.

And I have shares number from variants in to set direction Connection inside family, from between This is amazing factors he Factor upbringing Social that received it parents And they try planted it in children, It is known on the society at in general that it Community at prevail Authority parental for a while from time With what Effect on practical Connection family from rebuke for children And sovereignty culture non-dialogue And non-Acceptance opinions little ones in times a lot, In addition to factors Economic that Led out woman for a scientist The job and neglect it to a side big from its responsibilities And do modes other with this responsibilities, to side means Connection and technologies modern that invaded families And worked on falsification warmth family, in which had become Child or Sons spend say ell Before devices Computer or the television compensate About dialogue and discuss Threads with their parents. For every This is amazing Circumstances And factors bear family And mother in a form private criticisms vitriol because of Loss Connection family.

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