

Online Media Using Gamification Approach with IPAS Content for Grade III Elementary School Students

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ABSTRAK. Penelitian pengembangan ini dilakukan karena kurangnya penggunaan media pembelajaran yang inovatif, sehingga siswa kurang tertarik dan tidak aktif selama proses belajar mengajar yang menyebabkan hasil belajar siswa rendah. Tujuan penelitian ini adalah untuk menciptakan produk berupa media online gamifikasi pada materi "Ada Hewan Apa Saja di Sekitarmu" untuk kelas III SD. Jenis penelitian pengembangan yang digunakan adalah model ADDIE. Subjek penelitian ini terdiri dari 4 ahli, 25 siswa, dan 2 guru. Pengumpulan data dilakukan melalui metode tes, angket, wawancara, dan observasi. Data dianalisis menggunakan teknik analisis deskriptif kualitatif dan kuantitatif. Hasil penelitian ini menunjukkan bahwa kualifikasi Media Online Gamifikasi berdasarkan uji coba produk dinyatakan sangat baik, dengan hasil review oleh ahli materi pembelajaran sebesar 96%, respon siswa sebesar 97%, dan respon guru sebesar 99%. Hasil efektivitas penggunaan Media Online Gamifikasi pada topik "Ada Hewan Apa Saja di Sekitarmu" terbukti dapat meningkatkan hasil belajar siswa kelas III SD, dengan nilai uji-t sebesar 0,00 yang menunjukkan signifikansi lebih kecil dari 0,05 (taraf signifikansi 5%). Maka dapat disimpulkan bahwa media online menggunakan pendekatan gamifikasi efektif digunakan pada muatan IPAS kelas III SD. Dengan demikian, media online menggunakan pendekatan gamifikasi layak dan efektif untuk diterapkan dalam pembelajaran IPAS siswa kelas III SD.

ABSTRACT. This development research was carried out due to the lack of use of innovative learning media so students were less interested and inactive during the teaching and learning process. This research aims to create a product in the form of Online Gamification Media on the material "What Animals Are Around You" for class III elementary school. The type of development research used is the ADDIE model. The subjects of this research consisted of 4 experts, 25 students, and 2 teachers. Data collection was carried out through tests, questionnaires, interviews, and observation methods. Data were analyzed using qualitative and quantitative descriptive analysis techniques. The results of this research show that the qualifications for Gamification Online Media based on product trials are stated to be very good, with review results by learning material experts of 96%, reviews by learning media experts of 99%, student responses of 97%, and teacher responses of 99%. The results of the effectiveness of using Gamification Online Media on the topic "There Are Any Animals Around You" are proven to be able to improve the learning outcomes of third-grade elementary school students, with a t-test value of 0.00 which shows a significance of less than 0.05 (5% significance level). It can be concluded that online media using a gamification approach is effective in science content for class III elementary school. Thus, online media using a gamification approach is feasible and effective to be applied in science and science learning for third-grade elementary school students.

1. INTRODUCTION

Education is the main foundation that we can build for ourselves. Through education, we not only gain knowledge but also build character, develop abilities, and broaden perspectives. Education shapes people into better individuals through knowledge and character (Asbari, M., Novitasari, D., Silitonga, N., Sutardi, D., 2020) The role of education in schools is very important in shaping individuals into superior individuals, in accordance with the concept of the three centers of education proposed by Ki Hajar Dewantara. Schools are not only places to convey academic knowledge but also function as places to shape character and personality and improve morality in order to create quality individuals

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(Febriyanti, 2021). Education in schools should provide opportunities for each individual to develop spiritually, emotionally, and intellectually, as well as in knowledge and skills so that they can make a positive contribution to themselves and be able to face future challenges. Education in Indonesia has undergone eleven curriculum changes, starting from 1947 to the last in 2013. Changes and improvements to the curriculum continue to be made in line with technological developments. Without these changes, it is feared that the quality of education in Indonesia will decline. On December 10, 2019, Nadiem Makarim introduced and established the Merdeka Curriculum as an improvement of the 2013 Curriculum. The Merdeka Curriculum is designed with the principle of flexibility, allowing teachers to adapt learning according to student needs, as well as learning that favors students (Rahmadayanti, D. & Hartoyo, 2022). One of the impacts of implementing the Merdeka Curriculum in elementary schools is the merging of science and social studies subjects into one subject called Natural and Social Sciences (IPAS) (Dyaning Wijayanti Inggit, & Ekantini, 2023). This IPAS subject is a characteristic of the Merdeka Curriculum and serves as a core subject followed by students (Hasanah et al., 2023). IPAS broadly examines living things, inanimate objects in the universe, and human life as individuals and social beings who interact with their environment.

Based on the results of observations and interviews with third-grade teachers at SD Negeri 4 Temukus, there are learning problems in the classroom, especially in the learning subject of IPAS topic A. There are Any Animals Around You, namely: 1) Students have difficulty understanding material that is abstract if it is not presented without visual aids or interesting learning media, 2) Some students become passive because the teacher dominates learning activities, resulting in low student understanding of the subject matter, 3) Teachers still use conventional learning in the learning process. This has an impact on student learning outcomes being low. Based on interviews conducted at the target school, the results were obtained, namely, 1) Teachers in the learning process only rely on teacher books and student books as learning resources, 2) Teachers said that technological facilities such as Chromebooks are not used optimally because they have not been fully integrated into the learning process. Chromebook is an alternative digital device that can support learning activities (Qosim et al., 2023). The government, through the Ministry of Education and Culture Ristek, has provided assistance in the form of 284,000 Chromebook laptop units to schools throughout Indonesia. Chromebooks have various advantages, such as advanced features that make them easier for students to use (Kresnadi et al., 2023). Therefore, an effort is needed to solve the above problems, as for the solution offered is to use online media with a gamification approach so that students are involved in learning and motivated to learn.

Online media is a means of communication that utilizes internet devices as the main tool in delivering information. This media can be accessed through smartphones, laptops, computers, and Chromebooks as learning support tools that are directly connected to the internet (Nurma, 2021). Online media-based learning systems include various formats, such as websites, applications, videos, images, and texts, which are designed to help students understand abstract material to make it easier to understand. In line with the cone of learning experience theory proposed by Edgar Dale (1969), the more concrete the experience of students in learning a lesson, the better their understanding will be. Conversely, the more abstract the teaching material studied, the less learning experience students get. The application of the gamification approach through online media allows students to experience directly what they have learned. This makes the learning process more enjoyable and encourages students to actively participate in achieving learning objectives.

Online media with a gamification approach provides a special attraction for students because it integrates game elements into the learning process. The gamification approach is the application of fun game concepts into the real world of learning to create a more interesting learning experience through the integration of game elements (Suartama, 2023). Gamification is divided into two types, namely structural gamification and content gamification. In the material "Topic A. What Animals Are Around You," structural gamification will be applied, by integrating game elements, such as, 1) A level element, where players can level up after completing a certain number of challenges and accumulating enough points, 2) A point element, which is awarded when players answer questions, 3) Challenges, which are customized to the level, starting from easy to increasingly difficult, 4) Time pressure, which is used to increase tension and encourage players to complete challenges within a predetermined time. Lack of challenging activities can reduce students' enthusiasm for learning (Suartama et al., 2022). Therefore, providing learning experiences that involve exploration as well as opportunities for students to build knowledge independently through internet-based games facilitated by schools can be an effective solution.

Findings from previous studies show that gamification-based learning media has a positive impact on the learning process. Mobile-based gamification is able to increase interest in learning, hone numeracy skills, and motivate students, so it is feasible to use in learning activities (Umar, N., & Wiguna, 2020). The use of Minecraft-based gamification learning media is effective in improving student learning outcomes (Lavani et al., 2023). Overall, these studies show that gamification is effective in increasing students' interest and motivation to learn by utilizing elements such as points, levels, and challenges. The gamification approach makes learning more interesting, effective, and efficient, especially with the support of adequate school facilities so that digital learning can be optimally implemented.

This research creates an online learning media with a gamification approach that not only focuses on the game but also includes gamification elements such as challenges, levels, time pressure, and points. These elements are designed to train students' strategies, manage emotions, and encourage cooperation with friends in completing the level until the end without triggering negative emotions. This research aims to develop gamification-based online learning media on the topic of 'What Animals Are Around You' that is feasible and valid for use in learning in grade III. This learning media is

expected to be effectively applied in the learning process, creating an interactive digital-based learning environment and providing hands-on learning experiences that can increase students' interest in learning.

2. METHOD

This research is a Research And Development (R&D) development research, a research method used to produce certain products, and test the effectiveness of these products. In the development research carried out, namely using the ADDIE model which is used to develop learning media for the gamification approach. The ADDIE model (analyze, design, development, implementation, and evaluation). has several stages that match name, namely (1) analysis, needs analysis, curriculum analysis, and analysis of student characteristics. (2) Design, at the design stage begins with determining the gamification elements to be used, such as levels, points, challenges, and time pressure, then creating a storyboard (3). development, the development stage is the third stage, at this stage processing the storyboard that has been designed using visual design canva, after which it is imported into construct two for further development, gamification elements such as coin reward systems, time mechanisms, and increasing difficulty levels at each level are implemented. (4) Implementation, a field trial of the use of gamification online media in the learning process is carried out to determine the effectiveness of the media on IPAS content for third grade elementary school students. (5) Evaluation, at this stage processing the data that has been collected. The five stages of the development procedure can be seen in the following figure (Diah Masturah, E., Putu Putrini Mahadewi, L., & Hamonangan Simamora, 2018) . The ADDIE model is shown in Figure 1.

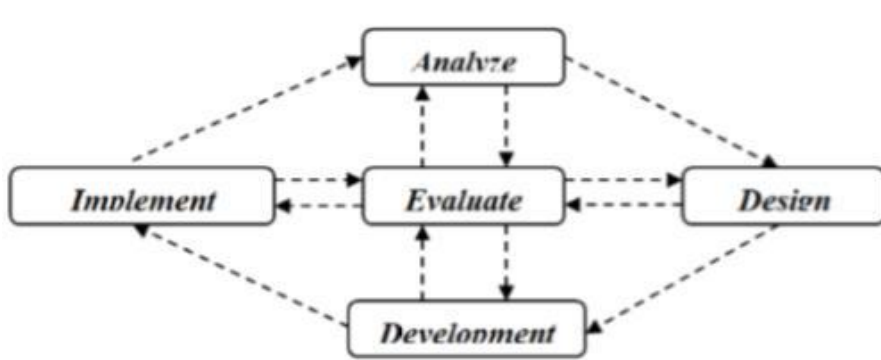


Figure 1. Stages of the ADDIE Model

Online media using a gamification approach must be tested for validity. The trial will be carried out in two stages. The first stage is validation or review from experts conducted by material experts and media experts. The second stage is a small group trial and teacher response (Novitasari Dewiana, 2020) . The instrument used is a questionnaire sheet to collect data from the review results of material experts and media experts, small group trials, and teacher responses. The test subjects were 2 material experts, 2 media experts, 9 students for small groups, and 2 teachers. The review grids of material experts, learning media experts, field trials, and teacher responses are described in Table 1, Table 2, Table 3, Table 4, and Table 5.

Table 1. Material Expert Instrument Lattice

Aspects	Indicator
Curriculum	1) Suitability of material with learning outcomes. 2) Suitability of material with learning objectives
Material	1) The sequence of materials in the learning media is explained appropriately. 2) Depth of material presented. 3) The suitability of the material with student characteristics. 4) The material can be easily understood 5) The concept of matter can be logicalized. 6) The accuracy of the material can support the use of media. 7) The materials show real-life situations.
Language	1) Language conformity with Indonesian language rules. 2) Sentences use standard language. 3) Language use is in accordance with student characteristics.
Evaluation	1) Suitability of questions with learning objectives. 2) Suitability of questions with learning outcomes.

Source: (Suartama, 2016) with modifications

Table 2. Media Expert Instrument Grid

Aspects	Indicator
View	<ol style="list-style-type: none"> 1. Attractiveness of the product display. 2. Appropriateness of design with student characteristics. 3. The accuracy of the images displayed with the material. 4. Fixed and harmonious color composition. Fixed and harmonious color composition. 5. Background suitability 6. Use of the right font and font size. 7. Clarity of sound when heard
Technical	<ol style="list-style-type: none"> 1. Ease of access to learning media. 2. Ease of navigation button function. 3. Clarity of instructions on learning media.

Source: (Suartama, 2016) with modifications

Table 3. Teacher Instrument Grid

Aspects	Indicator
Curriculum	<ol style="list-style-type: none"> 1. Suitability of material with learning outcomes. 2. Suitability of material with learning objectives.
Material	<ol style="list-style-type: none"> 1. The accuracy of the structure of the material presented. 2. Depth of material presented. 3. The attractiveness of the material presented. 4. Ease of student understanding of the material presented. 5. Appropriate use of media that supports the material. 6. The illustrations used in the media are able to clarify the material presented.
Language	<ol style="list-style-type: none"> 1. The accuracy of the use of grammar used in the presentation of the material. 2. Ease of student understanding of the language used in delivering the material.
View	<ol style="list-style-type: none"> 1. Attractiveness of the product display. 2. Use of images that are appropriate to the material. 3. Use of the right font and font size.
Technical	<ol style="list-style-type: none"> 1. Ease of access to learning media. 2. Ease of navigation button function. 3. Clarity of instructions on learning media.

Source: (Suartama, 2016) with modifications

Table 4. Student Instrument Grid

Aspects	Indicator
View	<ol style="list-style-type: none"> 1. Learning media is easily accessible. 2. The text can be read clearly. 3. Interesting picture. 4. The voice is clearly audible.
Expediency	<ol style="list-style-type: none"> 1. Learning Media makes students understand the concept of the material better. 2. Ease of obtaining information related to the material studied. 3. The simplicity of learning media provides enthusiasm/motivation for student learning.
Operation	<ol style="list-style-type: none"> 1. Ease of access to learning media. 2. Ease of navigation button function. 3. Clarity of instructions on learning media.

Source: (Suartama, 2016) with modifications

Table 5. Multiple Choice Test Item Grid

Learning Objectives	Indicator
Learners can analyze the characteristics of invertebrate and vertebrate animals	<ol style="list-style-type: none"> 1. name the types of vertebrate and invertebrate animals 2. analyze the characteristics of invertebrate and vertebrate animals by 3. students are able to analyze the characteristics of vertebrate animals
Learners can compare different types of animals around them.	<ol style="list-style-type: none"> 1. analyze invertebrate and vertebrate animal groups 2. compare invertebrate and vertebrate animals in daily life

In this development research, two data analysis techniques were used, namely quantitative descriptive analysis and qualitative descriptive analysis. The data analysis technique was carried out by grouping qualitative data which included the results of interviews, media feasibility assessments, comments, responses, criticisms, and suggestions for improvement. The results of this data analysis were then used to revise the developed product. Meanwhile, quantitative

descriptive analysis was used to process qualitative data collected through questionnaires in the form of scores. In addition, inferential statistical analysis was applied to evaluate the effectiveness of the product on student learning outcomes before and after using gamification online media. Data were obtained from the summative test scores of students in the target group. Furthermore, the summative test scores and post-test results were analyzed using paired sample t-test to determine the difference between the pre-test and post-test results. Before conducting hypothesis testing with a correlated t-test, a prerequisite test is required first, namely the normality test.

3. RESULT AND DISCUSSION

Result

This research was conducted in class III at SD Negeri 4 Temukus. Design on online media gamification of IPAS content on topik A. There are Any Animals Around You with the ADDIE development model. The stages of this ADDIE development model are analysis (analyze), design (design), development (development), implementation (implementation), and evaluation (evaluation). The first stage is analysis, at the analysis stage a needs analysis, curriculum analysis, and analysis of student characteristics are carried out. The second stage is design, at the design stage begins with determining the gamification elements to be used, such as levels, points, challenges, and time pressure. Each element has an important role. After the gamification elements are determined, the next step is to create a storyboard that serves to describe the flow and structure of the game in detail, starting from the appearance of the main menu, learning content, to gameplay at each level.

The third stage is development, the development stage is the third stage, at this stage the processing of storyboards that have been designed using visual design canva (Suartama,2023). In canva, elements such as layouts, icons, buttons, and backgrounds are designed with an attractive and easy-to-understand appearance. canva serves as a supporting tool to produce visually appealing and functional designs. The finished design is then imported into construct two for further development, gamification elements such as coin reward system, timing mechanism, and increasing difficulty level in each level are implemented. In the main menu of the game, players are presented with several options, namely the "Learn" menu to learn material about vertebrates and invertebrates interactively, the "Play" menu to start challenging gameplay. The developed gamification is presented in Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and Figure 7.



Figure 2. Main Menu



Figure 3. Learning Objectives



Figure 4. Learning Menu



Figure 5. Learning Materials



Figure 6. Play Menu



Figure 7. Play

After the online media with a gamification approach is completed, product assessment is carried out by experts in their respective fields using a questionnaire that has been prepared previously. The calculation results show that the validity of the material obtained a score of 96%, which means it has very high validity. Furthermore, the validity of the media obtained a score of 99%, so it was also declared to have very high validity. The next step is to make revisions according to the input and responses from the experts to improve the developed product. The summary results of the media validity analysis can be seen in Table 6.

Table 6. Validity Results of Gamification Online Media

Expert	Grain	Expert 1	Expert 2	S1	S2	Σs	V	Validity Qualification
Material	1-14	66	70	52	56	108	0.96	Very high
Media	1-10	50	49	40	39	79	0.99	Very high

After being declared valid, the gamification online media was then tested for practicality to teachers and students in the learning process. To find out the results of the practicality test through data analysis using percentages, in order to

know the level of achievement of teacher and teacher responses. The results of the teacher's response were 99% with very good qualifications and the student's response was 97% with very good qualifications.

In the fourth stage, namely implementation, a field trial of the use of gamification online media in the learning process was carried out to determine the effectiveness of the media on the content of IPAS for grade III elementary school students. The implementation stage begins with a pre-test to measure the learning outcomes of grade III students before using online gamification media. The pre-test was conducted using multiple choice questions. Furthermore, online gamification media was used in IPAS learning at SD Negeri 4 Temukus. The last step in the implementation stage is to carry out a post-test to measure changes in learning outcomes of grade III students after using online gamification media, using a learning outcome test in the form of multiple choice questions. Before hypothesis testing using correlated t-test analysis, normality and homogeneity tests were conducted first. The normality test was conducted using the Shapiro-Wilk formula, which resulted in a pre-test value of 0.302 and post-test data of 0.07, which means the test is normally distributed. Furthermore, the variance homogeneity test was carried out using One-Way ANOVA, with the provision that if the Sig value > 0.05 then the data distribution is homogeneous. The homogeneity test results show a value of 0.166 > 0.05, which means the data is homogeneous at a significant level of 5%.

After the test was declared normal and homogeneous, the effectiveness test of gamification online media development was carried out. The subjects of this effectiveness test were 25 third grade students. The effectiveness test was conducted to measure the IPAS knowledge competency of students in grade III which was carried out twice. The results showed that the pre-test scores were moderate, while the post-test results were very high. Based on the t-test table, the significance value (2-tailed) is 0.000, which indicates that the significance value is smaller than 0.05 (5% significance level). This means that H_0 is rejected and H_1 is accepted. The fifth stage is evaluation. At this stage, an evaluation is carried out by processing the data that has been collected. The evaluation carried out in this study includes formative evaluation, namely product assessment from expert assessments and student trials, as well as summative evaluation, which is carried out through giving pre-test and post-test to determine the effectiveness of the products developed.

Discussion

Based on the research results, gamification online media has gone through various stages of development, validated by experts, measured its practicality, and tested its effectiveness (Mei & Surat, 2021). Gamification online media integrates technology in the learning process by providing opportunities to explore, while being directly involved in the learning process. Gamification has great potential in enhancing students' learning experience. Gamification can increase motivation, participation, and social influence among students. This gamification online media is designed with two main menus, namely "Learn" and "Play." The "Learn" menu allows students to understand the concept of vertebrate and invertebrate material through interactive explanations and attractive visuals. After that, the "Play" menu presents gradual challenges, such as problems and obstacles based on the concepts learned, to test and deepen students' understanding. Gamification elements such as points, levels, challenges, and time pressure aim to increase motivation, engagement, and participation in a fun way (Junghye Fran Choi & Kim., 2019). Learning environments can become more engaging and interactive when technology is optimally utilized to support learning activities. This makes students more active in learning and learning outcomes significantly improved.

Based on the results of media experts and material experts, gamification online media is considered very good from various aspects that have been evaluated. In addition to meeting learning needs, gamification online media can encourage students to be more active and interactive with a learning process that is packed with elements of reciprocity. Images and animations can convey a complex concept, attract attention, and can be used to present messages better than other media (Siddiq, Y. I. et al., 2020). Based on the results of user responses, gamification online media is considered practical based on the percentage score and aspects that have been evaluated. This gamification online media is considered easy to use and according to user needs. Gamification online media can make students feel entertained. This is in line with the results of previous research which states that, games are basically entertaining and fun games (Mardhotillah, H. & Rakimahwati, 2021).

Some previous research results show that gamification online media is proven to be able to significantly improve student learning outcomes, so that it can be declared effective in producing student abilities (Laili et al., 2019). This is in line with research which states that the use of gamification online media can increase enthusiasm (Windawati, R. & Koeswanti, 2021). Other researchers state that, gamification online media is one of the factors in influencing student interest and motivation in learning, so that students do not quickly feel bored and bored during learning (Rohmawati, 2019). This development research has an impact on researchers in creating creative and innovative learning media in assisting the learning process. The innovation of gamification online media in the material There Are Any Animals Around You has implications in increasing students' interest and interest in the learning process to make it easier to understand teaching material, learning becomes more fun, effective, and efficient. Gamification online media can increase student involvement to be much higher than conventional learning methods, because students not only listen to the material, but are also actively involved in working on problems, completing obstacles and learning becomes more *fun* or "*fun*", because gamification changes the learning process which is often monotonous to be more interactive and fun, which makes students enjoy every stage more and not feel burdened

4. CONCLUSION

Based on the results and discussion presented, it can be concluded that gamification online media on the topic of Any Animal Around You IPAS is feasible to use in helping students during the learning process. After going through product trials, students become interested in learning and easily remember the learning because this Gamification Online Media integrates gamification elements such as points, levels, challenges, and time pressure to create an interesting and motivating learning experience. The content of this media includes two main menus: "Learn" and "Play." The "Learn" menu helps students understand the concept of vertebrate and invertebrate material through interactive explanations equipped with interesting visuals. Meanwhile, the "Play" menu presents gradual challenges in the form of interactive questions and concept-based obstacles, to test and deepen students' understanding of the material that has been learned. Thus, learning becomes more effective and efficient.

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