

Implementation of Interactive Learning Media with Gamification Approach on Solar System Material

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Abstract:- This study aimed to analyze the implementation of interactive learning media with a gamification approach on the Solar System material for junior high school students. The research method used was descriptive quantitative. Data collection in this study used literature review, interviews, questionnaires and evaluation tests. Meanwhile, the data collection instrument used was a set of test questions for evaluating learning outcomes, teacher and student response sheets for interactive learning media with a gamification approach. The implementation phase included (1) preparation: before starting learning at the first meeting, students work on pre-test questions, (2) implementation of learning by implementing interactive learning media, (3) data collection by filling out response questionnaires, and (4) analysis data. The results of empirical trials to schools show the level of practicality with a very high category.

Keywords:- Gamification; Media Interactive Learning; Solar System.

I. INTRODUCTION

Education is the main key for the progress of a nation. The progress of a nation begins with improving the quality of human resources through improving the quality of education. This confirms that education will affect the life of the nation and state. The quality of education will be realized if learning can take place effectively, meaning that the learning process can run directed and in accordance with the learning objectives that have been set. The success of the learning process carried out at all levels of education cannot be separated from the methods and ways of teaching teachers in the classroom [1]. The application of learning methods in the learning process is carried out to achieve learning objectives to form student competencies. The teacher is the spearhead who plays an important role in the success of a student, because the teacher is the person who deals directly with students. There are several things that affect student success in terms of the teacher's role, namely the teacher's ability, teacher professional attitude, teacher educational background, and teaching experience [2]–[4].

The teacher's role can be supported by the application of technology as a learning medium to support student learning success. The COVID-19 pandemic has had an impact on the evolution of the application and development of increasingly sophisticated technology in learning. So, now the use of technology in supporting the learning process has become a close thing for teachers and students. Learning media in online learning is used as a tool to increase the efficiency and

effectiveness of learning. Learning media are used to achieve goals such as visually clarifying messages, supporting the five senses, overcoming the limitations of space and time, accelerating the learning and teaching process, and creating enthusiasm in learning [5]. New innovations are needed so that the learning process becomes fun and interesting so as to increase student learning motivation.

At the junior high school level there are subjects about the solar system. This solar system subject matter is an abstract subject because students cannot directly observe phenomena and celestial objects in the solar system [6]. Thus, learning the solar system needs to use learning media [7].

One of the important things in learning the solar system is paying attention to the use of learning media, so as to provide a fun and entertaining learning experience. This can be met with a combination of games in learning media. Educational games as learning media that are integrated with evaluation questions are expected to make learning more interesting, fun and active. This is in line with the positive impact of using games that are fun and entertaining and can provide practice to solve problems and sharpen logic so that they are accustomed to active thinking, learning, and practicing even though they are at home [8]. Interactive learning media with a gamification approach are interesting and suitable for this purpose.

The interactive learning media in question is useful for digitizing the teacher's role in the media. In this case, in delivering material, giving quizzes and evaluations, providing feedback on interactive activities carried out by users or students. Interactive learning media is able to present more realistic learning [9]. In addition, it also serves to improve understanding of concepts for users [10].

The gamification approach referred to in this interactive learning media is a learning approach that uses game elements that aim to motivate students and maximize feelings of happiness in the learning process. Learning media is called using gamification if it meets the elements of reward, point, mission, level, achievement, score, leaderboard, and also competition [11]. Gamification elements can be categorized as (1) self-elements that can motivate users to want to complete their work, focus on themselves, and individual achievements, (2) social elements act as incentives for users to try to get the best results, focusing on social aspects. , competition between users, even Cooperation [12]. Gamification presents perceived pleasure, enjoyment, involvement, motivation, value, participation in the system, speed of doing tasks [13]. Based on this explanation, this study aims to integrate the learning process by implementing interactive learning media with a

gamification approach on the Solar System material for junior high school students.

II. METODOLOGI

The research method used is descriptive quantitative. Data collection in this study used literature review, interviews, questionnaires and evaluation tests. Meanwhile, the data collection instrument used was a set of test questions for evaluating learning outcomes, teacher and student response sheets for interactive learning media with a gamification approach.

The implementation phase includes (1) preparation: before starting learning, a learning scenario is prepared to implement interactive learning media and at the first meeting, students work on pre-test questions, (2) implementation of learning by implementing interactive learning media, then given a post-test after studying all the material, (3) collecting data by filling out response questionnaires, and (4) data analysis. In the second stage, a learning outcome test was carried out which was used to measure student learning outcomes after the learning process using interactive learning media with a gamification approach on the material of the solar system. Student learning outcomes test in the form of 20 multiple choice questions that have been validated by material experts, with a very high level of validity.

After the students finished working on the evaluation questions, they were then given a student response sheet. It aims to determine student responses to interactive learning media. In addition to students, teachers are also given a response questionnaire sheet to determine the teacher's response to the implementation of learning media during teaching and learning activities. Student learning outcomes are used as a measure of the efficiency of learning media, while the results of student and teacher responses are used as a measure of the practicality of learning media. The subjects of this study consisted of 26 students of class VII G at SMP Negeri 23 Banjarmasin.

The practicality of the learning media is obtained through a questionnaire of teacher and student responses after implementing the learning media. The number of statements in the teacher and student questionnaires were 27 items and 20 items, respectively. The questionnaire uses a Likert scale. This questionnaire provides 4 alternative responses, namely: Strongly Agree with a score of 4, Agree with a score of 3, Disagree with a score of 2, Strongly Disagree with a score of 1. After the results obtained from the questionnaire Then the percentage of responses is calculated. The criteria for the percentage of practicality achievements can be seen in Table I below.

TABLE I. CRITERIA PERCENTAGE OF PRACTICAL ACHIEVEMENT

Intervals (in %)	Criteria
81 – 100	Very Practical
61 – 80	Practical
41 – 60	Practical Enough
21 – 40	Less Practical
0 – 20	Not Practical

If student surveys and instructor assessments show that interactive learning media are effective, then it can also be said to be practical [14]. If the assessment results in responses from teachers and students showing a minimum level of practicality of 70%, then the interactive learning media can meet the practical criteria [15].

III. RESULTS AND DISCUSSION

The material presented in this interactive learning media is the Solar System, Sun, Planets, and Meteoroids, Atheroids, and Comets. When using learning media, users will be directed to Material 1, namely the Solar System. Then the user has to do the quiz. If the participant manages to get a standard score, then the user can go to the next material. And so on until the material 4.



FIG. I. QUIZ 1 WITH PAC-MAN GAME

The implementation of the Gamification approach in this learning media application can be seen in the quizzes given at the end of each material. In Quiz 1, questions are presented in the form of a Pac-Man game as shown in Figure 1 above. After completing all the questions, the user will be directed to material 2 which is Sun.

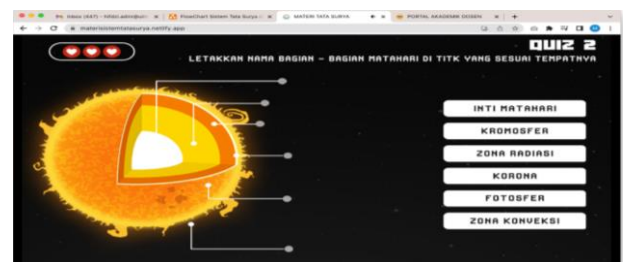


FIG. 2. QUIZ 2 WITH DRAG AND DROP GAME

Quiz on material 2: Matahari is presented in the form of a Drag and Drop game as shown in Figure 2 above. The next material is about Planets. In this material, the quiz is presented in the form of a Space Shooter game as shown in Figure 3 below.



FIG. 3. QUIZ 3 WITH SPACE SHOOTER GAME

Matter 4 is Meteoroids, Asteroids, and Comets. The quiz on this material is presented in the form of a crossword puzzle which can be seen in Figure 4.

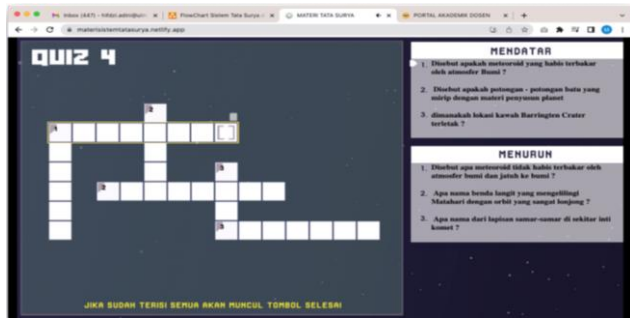


FIG. 4. QUIZ 3 WITH CROSSWORD PUZZLE GAME

Each quiz of the material is presented in the form of a game. Each game has Gamification elements including Challenges, Points, and Feedback. Challenges are challenges given to trigger or increase user motivation, Points are used as rewards after users complete challenges, and Feedback is used as a notification when users succeed or fail in providing an action [16]. This is in line with the statement that learning media is called using gamification if it meets the elements of reward, point, mission, level, achievement, score, leaderboard, and also competition [11].

The implementation phase includes (1) preparation, (2) implementation of learning with the implementation of interactive learning media, (3) data collection, and (4) data analysis. The following is a presentation of these stages.

1) Preparation

At this stage, the preparation of learning scenarios is carried out to implement interactive learning media. In addition, research instruments and assessment instruments have been prepared and validated by experts [17], [18].

2) Implementation of learning with the implementation of interactive learning media

The implementation of interactive learning media with a gamification approach on the Solar System material was carried out for 3 meetings. Learning activities are carried out face-to-face in the computer laboratory. The following is an overview of learning activities by implementing interactive learning media.

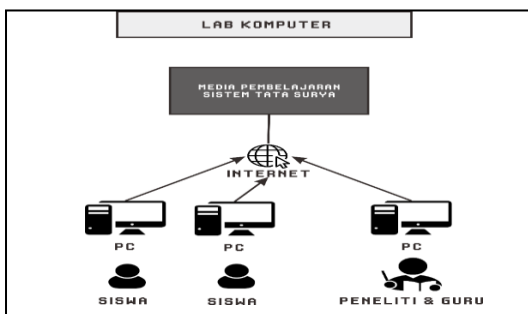


FIG. 5. LEARNING SCENARIO

Based on Figure 5, it is known that the teacher and students are in a computer laboratory and are connected in one internet network. This is to facilitate access to learning media

contained in cloud storage. Next, students study the material and are given evaluation questions about the Solar System.

3) Data Collection

After the last meeting, students were given evaluation questions to assess the understanding of the material that had been studied. Then students and teachers were given response questionnaires related to the implementation of interactive learning media used during the learning process. The results of the response questionnaire to interactive learning media are used to measure the practicality of learning media.

4) Data Analysis

The teacher response questionnaire was filled out by 1 teacher covering 6 aspects of the assessment. The following are the results of the responses from the teacher's questionnaire which are represented in the Table II.

TABLE II. RESULTS OF TEACHER RESPONSE QUESTIONS

Assessment Aspect	Percentage	Criteria
Ease of use and navigation	92%	Very Practical
Cognitive content	100%	Very Practical
Scope of knowledge and presentation of information	100%	Very Practical
Aesthetics	100%	Very Practical
Functionality	100%	Very Practical
Ease of teaching	100%	Very Practical
Average	98,15%	Very Practical

Based on Table II, the results of the teacher's response questionnaire to interactive learning media obtained a percentage of 98.15% from all aspects with very practical criteria. This means that the teacher gives a good response to interactive learning media with a gamification approach to the implemented Solar System material. It can be concluded that the learning media according to the teacher is said to be very practical. In addition to the teacher, students were given a questionnaire to find out their response while applying the interactive learning media. The results of the student response analysis can be observed in Table III below.

TABLE III. RESULTS OF STUDENTS RESPONSE QUESTIONS

Assessment Aspect	Percentage	Criteria
Ease of use and navigation	85.58%	Very Practical
Cognitive content	87.18%	Very Practical
Scope of knowledge and presentation of information	88.58%	Very Practical
Aesthetics	86.54%	Very Practical
Functionality	87.69%	Very Practical
Ease of teaching	93.27%	Very Practical
Average	87.87%	Very Practical

Based on Table III above, the results of the student response questionnaire to interactive learning media obtained a percentage of 87.87%. As seen in Table III, where the results

of the student response questionnaire were dominant, they chose Strongly Agree on the assessed aspect. So it can be concluded that the response to the implementation of interactive learning media is positive, so it can be concluded that the learning media is said to be very practical.

IV. CONCLUSION

Based on the exposure and results of data analysis above, the implementation of interactive learning media with a gamification approach on the Solar System material received positive responses from teachers and students. The results of empirical implementation in schools show the level of practicality of learning media with a very high category.

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