Developing Learning Media for the Snakes and Ladders Game Newton's Law with the QuizWhizzer Application to Support Student Learning Motivation

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Abstract: One important factor that can influence students' learning success is their learning motivation. This research aims to develop the Snakes and Ladders QuizWhizzer Game learning and test the feasibility and influence of using this media on students' learning motivation in the classroom. This research was carried out at Madrasah Tsanawiyah Sleman in November 2023. The method used was research and development (R&D) with the Four D (4D) development model taken from four development stages, namely Define, Design, Develop and Disseminate. The research sample was class VIII students, totaling 5 students. The results of the feasibility test by experts show that the media is suitable for use as a support for learning in the classroom because it can increase students' learning motivation as indicated by the results of the snakes and ladders game and direct interviews.

Keywords: Newton's Law, QuizWhizzer, Motivation

Introduction

In this era of rapid technological development, significant changes have occurred in life, especially in the field of education. The integration of technology in learning has led to changes in both the delivery and experience of education by teachers and students. One aspect of this transformation is the digitalization of learning organizations, which involves the integration of digital technology into various aspects of educational institutions. So in learning, teachers must carry out reforms by developing appropriate learning media. The teacher's role is expected to create effective learning that can encourage students to be more enthusiastic in receiving learning material. One thing that teachers can do is to use learning media. In learning activities, teachers must have tips or art for combining forms of learning and the media used so as to create a harmonious learning process (Wena, 2009, p.10).

The choice of learning media greatly influences student motivation and learning outcomes (Dewi, et al., 2015). Media is something that transmits messages and can stimulate students' thoughts, feelings, and desires so that they can encourage their learning process. Media can be in the form of props and facilities. The use of media in the learning process is not intended to replace the teacher's way of teaching, but rather to complement and assist teachers in conveying material or information. By using media, it is hoped that there will be interaction between students and between students and teachers. Apart from that, the existence of learning media makes students more enthusiastic and motivated in their learning process. Learning motivation can be classified into two, namely intrinsic motivation (circumstances that originate from within the student himself which can encourage him to carry out learning actions) and extrinsic motivation (circumstances that come from outside the individual student which encourage him to carry out learning activities). The presence or absence of learning motivation greatly influences student learning success. Learning success will be achieved if you have the will and encouragement to learn.

One educational game that can be implemented as a learning medium is QuizWhizzer. This media is interesting, and interactive, prioritizes cooperation and communication, and can create positive interactions between students through games in the learning process (Susanto & Ismaya,

2022). QuizWhizzer is suitable for use in learning because it makes learning not boring and there are lots of games. There are many features provided by this to create questions packaged into a game. Apart from that, QuizWhizzer can be played on a cellphone or laptop. QuizWhizzer can also be played during Distance Learning (PJJ) or directly in the classroom. Quiz Whizzer is also an interactive learning media to help teachers present lessons more interesting and not boring. Apart from that, this game can also provide motivation and enthusiasm for students to answer questions given by the teacher (Meileni et al., 2021). In QuizWhizzer, users can ask questions to students in the form of a competition by following a certain path that has been prepared, resembling a snakes and ladders game system and the author also includes a link to the Canva module and Newton's law material which students can access easily. With this, we as writers can collaborate on two learning media, namely Canva and QuizWhizzer, where the collaboration between these two media is very suitable to be combined. The use of educational game media assisted by Canva and QuizWhizzer is very suitable for use as learning media. This is supported by several previous studies such as the development of Canva-based media which has been carried out by (Rohma & Sholihah, 2021).

Based on this description, it is necessary to develop a learning media in the form of an animated game of snakes and ladders that makes the learning process easier with the concept of playing while learning Newton's law material. The aim of this research is specifically to determine the feasibility and characteristics of the Snakes and ladders game created using the QuizWhizzer application and to find out how the use of this media influences students' learning motivation in the classroom.

Methode

The subjects of this research were 5 class VIII students at Madrasah Tsanawiyah Sleman on Newton's Law material. This type of research is research and development (R&D) which was developed by Borg and Gall (1989). The Four D (4D) development model is taken from four development stages, namely Define, Design, Develop, and Disseminate.

The define stage includes literature study activities, which are carried out by examining concepts or theories related to the learning tools that will be developed and physics learning strategies in SMP/MTs, especially on Newton's law material. The design stage includes initial product design activities

in the form of compiling and creating material in the Canva application as well as a guide to using QuizWhizzer. The develop stage includes activities carried out including instrument preparation and development of the QuizWhizzer application, expert validation, evaluation and revision. To be more detailed, this stage begins with preparing an initial draft of the learning tool from the needs analysis in the field study before development.

In the feasibility test, the material and media will be validated by one of the Physics Education Study Program lecturers at Yogyakarta State University. Then evaluate the material validation test regarding the content and suitability of Newton's law material. Validation test for the suitability of media experts regarding media engineering and visual communication. Based on the evaluation results, there are suggestions and input from lecturers, the next step is to revise the tools and instruments before they are tested in real classes. Finally, in the disseminate stage, the learning application that has been created is tested through the application of QuizWhizzer media in online classes (limited or small group trials) obtained in the form of empirical results by students through the scores obtained.

Media feasibility tests are carried out by experts using questionnaires. The scoring system uses a modified Linkert scale with 5 answer choices, namely: (5) strongly agree; (4) agree; (3) sufficient; (2) disagree; and (1) strongly agree. Next, the level of suitability of the material is calculated by finding a percentage, to obtain a value, it is calculated using the equation

$$N = \frac{S}{P} \times 100\%$$

Information:
N = percentage of assessment
S = score obtained
P = overall score

Criteria for the quality of learning media can be seen in Table 1.

Table 1. Percentage of Qualitative Criteria for Material in Learning Media

Value	Eligibility Category
81% - 100%	Very Good
61% - 80%	Good
41% - 60%	Enough
21% - 40%	Not Enough
0% - 20%	Not Good

Learning outcomes are values that will be calculated to meet the criteria for student learning motivation by taking tests directly by students.

Learning outcome scores can be calculated using the total number of students' scores after working on the snakes and ladders game.

Result and Discussion

The results of research into the development of the QuizWhizzer media which was carried out at Madrasah Tsanawiyah Sleman class VIII is a snakes and ladders educational game with Newton's laws as material. This media is in the form of a quiz that includes modules and interactive material created using Canva. QuizWhizzer snakes and ladders game can be shared with students using a link, where students can work through the link with their friends. Media QuizWhizzer, the Snakes and ladders game can only be played by small groups of 20 students. The following is the development of the QuizWhizzer learning media for the Snakes and ladders game.

Figure 1. Initial Display of The Quizwhizzer Guide Page

Students are expected to be able to understand the module before working on the QuizWhizzer game snakes and ladders. This module contains a guide to playing the snakes and ladders game according to the steps that have been determined. The aim is so that students are not confused and can understand the features of the snakes and ladders game. The module was created using Canva with attractive animations, so students can quickly understand the contents of the module.

Figure 2. Material display

The material page contains an outline of Newton's laws. Each sub-material menu contains material on forces, types of forces, types of Newton's laws and examples.

Figure 3. Initial View of The Snakes and Ladders Game Page

Before taking the quiz, students must write their names, so that the teacher can assess the results of the students' work. Students cannot log in to take the quiz before writing their name.
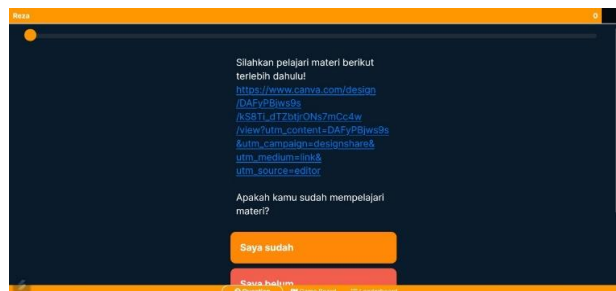

Figure 4. Initial View of Newton's Law Material

On the front page of the quiz, there is a link to the interactive material for the Snakes and Ladders game which was designed using Canva. Before taking the quiz there will be a link with 3 choices, have read, haven't read, and skip, where students can choose from the three, if the student chooses they have read it means the student has read the interactive material on Newton's laws in the link and will get points, if students choose not to read it and skip it then the students will skip reading the interactive material on Newton's laws and will not get points. So, with points, it is hoped that students can use the opportunity to first study the interactive material on Newton's laws and increase students' literacy skills.

The question icon is a quiz display, the map icon is a snakes and ladders game display to see where students have reached what number, and the three-dotted line icon is ranking among students who have finished taking the quiz.
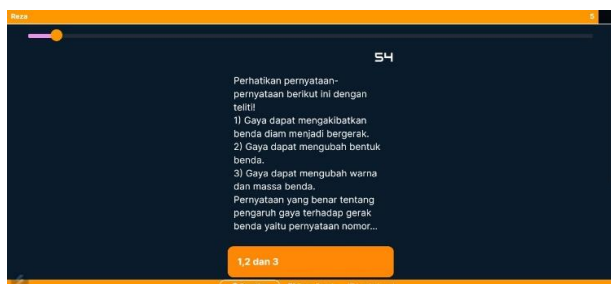
Figure 5. Display of the first question

This game has 20 steps and for each step there is a quiz that must be completed so that students can reach the finish line. If the answer is correct then the student will go one step further and get 10 points, but if the answer is wrong then the student will stay in place and get 0 points, the more wrong answers the longer it will take the student to reach the finish line. The winner of this game is the student who gets the most points with the fastest time at the end of the game.
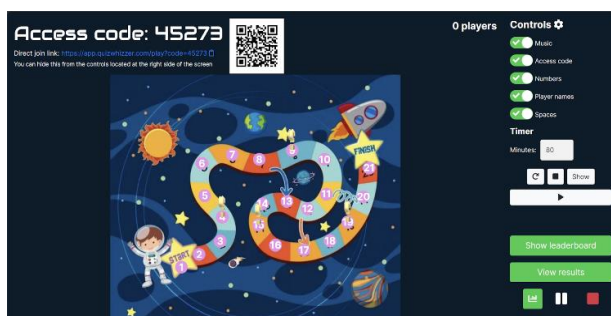

Figure 6. Display for monitoring students playing QuizWhizzer

In this display the teacher can monitor the QuizWhizzer snakes and ladders game being played by students, the teacher can set playing time, delete unwanted players, display the winner, and see live scores in Spreadsheet form for the game as well as analysis of the results of the QuizWhizzer game. To test the feasibility of the QuizWhizzer media for the snakes and ladders game, validation was carried out by experts, namely material experts and media experts.

Table 2. Validation Test Results by Material and Media Experts

Material Feasibility Test	Score
Contents of the material	52
Material suitability	40
Media Expert Eligibility Test	
Media engineering	25
Visual communication	63
Total	**180**
Percentage	**92,3 %**
Eligibility Category	**Very Good**

Table 3. Empirical Test Results by Students

Rated aspect	Score
The final score for the student game is 1 - 5	365
Average	73
Eligibility Category	**Good**

The Quizwhizzer-based snakes and ladders game developed has passed the validation and empirical testing stages to be considered feasible and implemented in learning. This media can be used as an alternative by teachers when students don't like science lessons and seem boring, this media can also be accessed independently by students (student-centered learning). From the validation test results, a value of 92.3% was obtained, overall it can be interpreted in the very feasible category. The validation test results are confirmed by the results of empirical tests carried out by class VIII students with a score of 73 with an interpretation that is suitable for use.

This QuizWhizzer-based snakes and ladders learning media were created using an application that is easy to use and utilizes the concept of playing while learning. QuizWhizzer was chosen to develop this media because the media is quite interactive, so it can make learning not boring and there are lots of games. QuizWhizzer can be played by students using all types of devices such as smartphones, laptops, tablets, and computers. Apart from that, there are many features provided to create questions that are packaged into a game, such as the QuizWhizzer editor, which makes it easy for users to upload images, sounds, links, and even YouTube links to the questions they create, and are automatically saved. Then another feature is an analysis of quiz results in terms of scores, questions, time, and accuracy. By using features, especially various animations, students can focus more when learning and of course, also be more motivated. The author linked the Canva display and it is very attractive when combined. The display that is different from other research lies in the display link, in the form of a slide show when opened, and provides an interesting interactive innovation for this learning media.

Assessment of student eligibility is obtained from empirical test results. Indirectly, the more students' scores, the better and more feasible this snakes and ladders game is. The existence of strong learning motivation makes students study diligently which ultimately manifests in student learning outcomes. For this reason, learning motivation should be applied to students so that students will happily follow the subject matter taught by teachers

at school. So, to measure students' learning motivation, the data we need is the final score from completing the Snakes and ladders game quiz. From the data that has been obtained, the average student score is 73 so the snakes and ladders game in terms of feasibility assessment by students is said to be feasible.

This shows that the use of 4D models assisted by the Quizwhizzer application has succeeded in increasing students' learning motivation on Newton's law material. Increasing motivation to learn Newton's laws is possible because students gain the concept of Newton's laws through real problems that exist around them. Apart from that, in the learning process, students are motivated to learn because of the quizzes when learning using the Quizwhizzer application. Students compete to answer quizzes according to their abilities and try as hard as possible to answer correctly. This is in line with research conducted (Fajjah, 2022) showing that the Quizwhizzer application can improve students' understanding of learning concepts. By increasing students' understanding, their learning outcomes also increase, with increasing student learning outcomes, students' learning motivation also increases. In other research, it was also stated that using the QuizWhizzer application makes students active so that learning is not boring (Sumandya & Saraswandewi, 2023).

Before empirically testing the snakes and ladders game on students as respondents, the snakes and ladders game was tested for feasaibility validation by material experts and media experts, where the aspects assessed from the suitability of the material were the content and accuracy of the material which included contextuality, ease of application of the material into learning media. , the completeness of the material in the learning media, and the ease with which the material can be understood. Meanwhile, the aspects that are assessed in terms of media suitability are media engineering which includes media that is easy to use, accuracy in choosing tools for development, clarity of instructions for using the media, media packaging, and the level of durability of the media as well as visual communication which includes communicative (language that is easy to understand, good, correct and effective).), simplicity of the game display, selection of the type and size of letters used, spacing (letters, lines, characters), readability of the text, appearance of the images presented, balance of image proportions, suitability of images that support the material, layout settings, color composition, harmony of selection color, neatness of design,

attractiveness of design, and learning media as a whole can motivate students in learning. Based on the results of material and media feasibility tests by material and media experts, Yogyakarta State University Physics Education Lecturers, a percentage of 92.3% was obtained, which is included in the very feasible criteria.

However, there are several drawbacks to the QuizWhizzer-based snakes and ladders game, where students who answer five times in a row correctly will get a streak, so they will advance 2 steps, where it can be concluded that the student did not answer 2 questions so the final score cannot be 100 but has reached the line finish because to achieve a score of 100 you have to answer the quiz from start to finish correctly. So here it is possible for students who answer one or two times to have a higher score because they did not get a streak. Therefore, student scores cannot solely be used as a benchmark for determining student learning motivation. Here the author not only pays attention to the final score but the student's ability to answer questions as well as the author's interview with the student after working on the Snakes and Ladders game.

Then the weakness of QuizWhizzer is that when you edit questions or unwanted features you can only edit them once a day, so you can't edit them several times in one day. Furthermore, when this game is run, it would be better to be guided by the teacher in class, because with existing modules or guides, teachers still need assistance and it is more effective and efficient when done together in class, which allows for other factors, for example, when done at home students do not have quotas or difficult signals. It's not that it can't be run remotely, but we should also look at the conditions of the students to see whether it is possible for the students or not.

The research results show that students are very enthusiastic about the QuizWhizzer-based Snakes and ladders game, even though they don't like physics subjects, the QuizWhizzer-based Snakes and ladders game can help them learn physics, especially Newton's laws. Students are much more enthusiastic in carrying out learning activities when using the QuizWhizzer-based snakes and ladders game compared to taking written tests or conventional methods. From the results of research that has been carried out, media based on the Snakes and ladders game can be used as an alternative for teachers to increase student enthusiasm in an interesting and fun way and increase student motivation in learning.

Conclusion

Based on the results of the research that has been carried out, it can be concluded that the QuizWhizzer-based learning media for Newton's Law Snakes and Ladders game is suitable for use as learning media for SMP/MTs, especially class VIII for science material. Validation of the suitability scores of the material and media by experts shows that the criteria are very feasible using empirical tests of class VIII students at Madrasah Tsanawiyah in Sleman with good scores. Teachers can use the QuizWhizzer-based snakes and ladders game learning media as a support for classroom learning because it can increase students' learning motivation.

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