

# The Use of Quizizz Application to Improve Motivation and Learning Outcomes in Science Subjects of 6th-Grade Students

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## ABSTRACT

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The motivation and learning outcomes in science education among sixth-grade students remain suboptimal, primarily due to a lack of interactive learning media integration and adaptation to the evolving educational landscape. Consequently, classroom engagement has waned, leading to student disinterest and disengagement during learning activities. To address this, employing the Quizizz learning media has emerged as a potential solution to bolster student motivation and enhance learning outcomes. This quantitative study sought to 1) assess the impact of Quizizz learning media on student learning motivation in science education and 2) determine its influence on student learning outcomes. Employing an experimental research model, data collection entailed questionnaires for gauging learning motivation and pretest/posttest evaluations for learning outcomes. The sample population encompassed 62 6th-grade students from groups A and C. Data analysis was conducted using SPSS 26 for Windows, employing the t-test (Independent Sample T-test) methodology. Findings revealed: 1) a demonstrable influence of Quizizz learning media on enhancing student learning motivation, as evidenced by a notable increase in average motivation scores from 72.66 to 78.53 within the experimental group, surpassing the control group results, and 2) a significant impact on student learning outcomes (posttest), with the experimental group displaying an increase from an average pretest score of 68.6 to 74.7 in the posttest evaluation.

## **Keywords**

Learning Media  
Motivation  
Outcomes  
Quizizz  
Science Learning

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## **Introduction**

The progress of the Industrial Revolution 4.0 has become a new challenge for all fields of science including the field of education. Education itself plays an important role for a nation, because education is a conscious effort to develop the potential of human resources through teaching [1]. The rapid development of science and technology is also felt at this time and affects human life. In the world of education, technology has a very positive impact on learning. Students can access more and faster information from various sources. In addition, many applications are available for teachers, like PowerPoint, YouTube, or e-learning-based systems as learning media. Technology makes teaching and learning more fun and innovative [2]-[4].

Quality learning can be created by the presence of two essential or critical elements of the success of such learning such as students' willingness to learn and their educators' creativity. Learning with high motivation, which the creativity possessed by the teacher supports, can encourage student learning motivation and lead to successful learning objectives [5]-[7]. With this learning motivation, it is felt that it will produce good student learning outcomes. This statement can be measured in many ways, including changes in behavior and students' ability to understand the material presented during the learning process.

Motivation consists of two kinds, namely, intrinsic motivation and extrinsic motivation. Motivation is a whole of the driving force within each student, which gives rise to a learning activity that guarantees the continuity of learning activities and provides direction so that the desired goals can be achieved or appropriately realized [7]. The indicators of learning motivation are there is desire and desire to succeed, there is a drive and need for learning, there are hopes and aspirations for the future, there is an appreciation for learning, there are exciting activities in learning, and there is a conducive learning environment [8].

Using exciting and appropriate learning media can be one way for teachers to foster learning motivation in students. Learning media is anything that is used for attention and learning abilities so that it can encourage the learning process [9]. Several facts in the field show that the teacher is not optimal in creating a fun learning atmosphere and using the right media makes students seem bored [10].

So it can be said that learning media is a place to be able to convey or channel messages from educators to students in the learning process. With the right learning media, of course, it

will provide many benefits, especially in increasing learning motivation, where with this media it will provide learning variations, provide core information and points systematically so that it can facilitate the learning process, and can help stimulate students to be able to think and analyze, as well as creating learning conditions and situations without a sense of pressure so that students can understand the learning material provided by the teacher, and the motivation and learning outcomes also increase.

With the use of Quizizz media, it is hoped that educators can create fun learning and provide a different atmosphere than usual so that students can feel working on practice questions in a more fun and different way [11]-[13]. During quizzes, students answer questions. Their ranking will be displayed in front of the room and on their device to motivate students to answer correctly and get the highest score [12].

Based on the results of observations and interviews conducted at a particular private elementary school in Yogyakarta, Indonesia, it was found that several problems needed to be resolved, including the low motivation and student learning outcomes in learning activities, one of which was in science subjects, especially 6th-grade. One of the student motivations that need to be improved is the ability of students to work on practice questions on time given by the teacher when in class is still not optimal, the awareness of students to be able to listen and observe properly the teacher when explaining material or lessons in class is still not optimal and it seems that there is still a need for further improvement.

The method used by the teacher is still not optimal and provides more attractiveness for students when learning activities take place. The teacher here still uses a teaching method that focuses on books, lecture and question and answer methods, so that the questions are given in written form and then students will work in notebooks or student worksheets prepared by the teacher.

To help students achieve learning outcomes or grades that are under expectations, students need to study with exciting and fun media so that students can absorb and understand subject matter faster and better. The influence of use of appropriate or engaging learning media, one of which is Quizizz learning media can help increase the learning motivation of students or students so that it is expected to be able to provide suitable learning outcomes and in line with expectations. There are several advantages of the Quizizz application [14]-[16] including the following: easy to use, can make questions in various forms of questions, practice questions and quizzes that have been made can be distributed to students by providing question codes or question links, the results of the work can be downloaded directly in excel form, and it doesn't seem boring because it is equipped with pictures, colors, animations, and also sound.

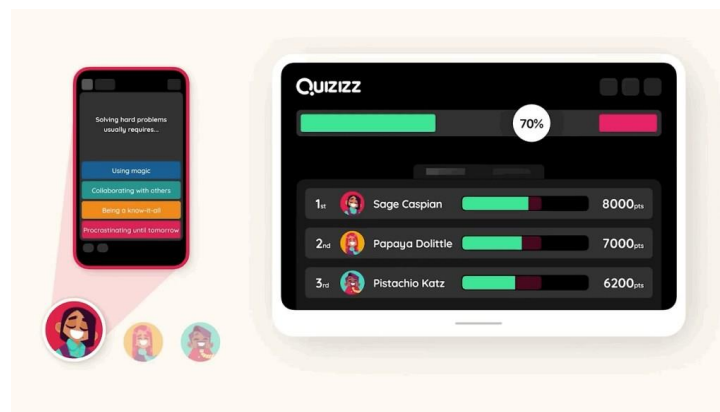
## **Methods**

### **A. Research Design**

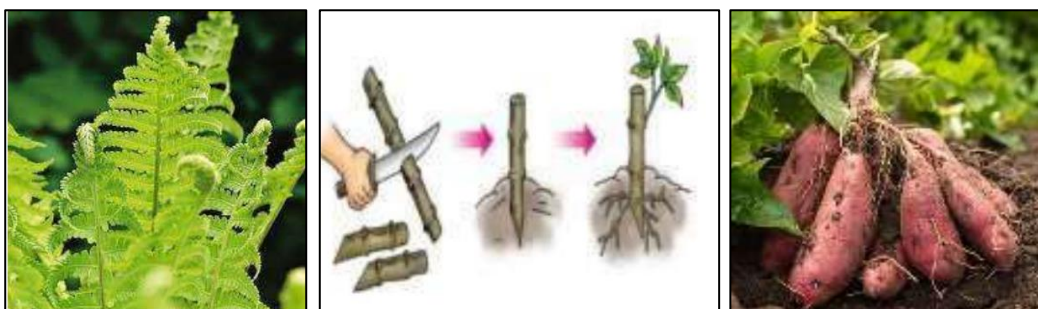
This research uses quantitative research, the research design used in this study is quasi-research by applying the pretest-posttest control group design. There is one group that is given a pretest ( $O_1$ ) and then given a treatment ( $X$ ) and then the posttest ( $O_2$ ). This research was conducted at a private elementary school with a population of 62 sixth-grade students in 6th-grade A, B, and C. Students have to do as many as 20 questions. Furthermore, the quantitative data obtained will be analyzed using the prerequisite and hypothesis tests.

### **B. Learning Activities**

Learning in the experimental group was conducted utilizing Quizziz (refer to Fig. 1). The taught material was related to plants and their reproduction (refer to Fig. 2). During the learning process, students were engaged with games associated with the subject matter, incorporating several relevant activities (refer to Fig. 3). The stages of the learning process are illustrated in Table 1.



**Fig. 1.** The learning outcome result of the pre-test and post-test



**Fig. 2.** Example of learning materials (plant and reproduction)

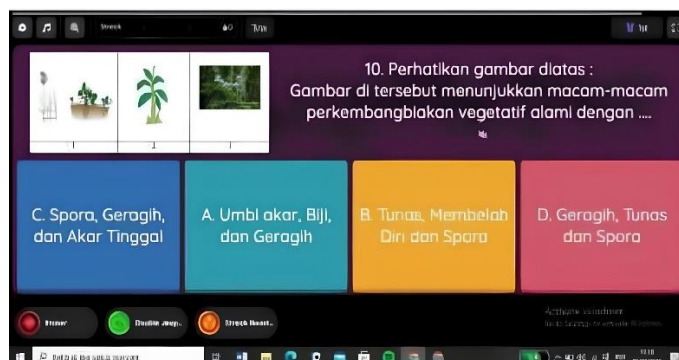


Fig. 3. Example of learning materials (plant and reproduction)

Table 1. Activity Description

Introduction
1. Commence class with a greeting and attendance check by the teacher, emphasizing the importance of discipline in achieving goals. 10 minutes
2. Encourage students to prioritize discipline and its benefits in daily life.
3. Initiate a student-led prayer session, acknowledging the early arrival of a student as an act of appreciation and integrity.
4. Recapitulate the previous lesson as a form of prelude to the current topic.
5. Introduce Theme 1 Subtheme 1, "Save Living Beings," elucidating the objectives and benefits of the upcoming lesson.
Main Session - Day 1
1. Display various fruits or vegetables, stimulating student interest in the topic of plant reproduction.
2. Instruct students to access the Quizizz learning space created by the teacher to begin the interactive learning process. 35 minutes
3. Provide guidance on accessing the Quizizz platform.
4. Engage students in the Quizizz learning game.
5. Instruct students on vegetative propagation in plants, focusing on natural methods.
6. Introduce and discuss the concept of natural vegetative reproduction in plants.
7. Present a Quizizz slide show with interactive content and quizzes on natural vegetative propagation.
8. Elaborate on various methods of natural vegetative reproduction in plants, using visual aids and examples.
9. Facilitate student interaction with the content, encouraging participation in the Quizizz quiz.
10. Conclude the session with a quiz, assessing student comprehension of the topic.
Main Session - Day 2
1. Guide students back to the Quizizz learning platform.
2. Provide an overview of the day's lesson on artificial vegetative reproduction in plants.
3. Present a slide show on Quizizz, introducing the concept and types of artificial vegetative reproduction.
4. Clarify the methods involved in artificial vegetative reproduction, including grafting, cutting, and layering.
5. Discuss the comparison of different methods of artificial vegetative reproduction, showcasing plant examples.
6. Encourage active participation through Quizizz quizzes and interactive tasks.
7. Assign a practical task for students to apply one of the discussed methods to a plant at home, requesting photo documentation within the stipulated timeframe.
8. Conduct an evaluation to measure student understanding, administering a pretest using a student worksheet (LKS) and a posttest using the Quizizz platform on a later date.

### C. Data Collection and Analysis

The research methodology employed in this study included the use of questionnaires before and after implementing Quizizz learning media, comprising 20 statement items, along with pretest and posttest assessments featuring Cronbach's Alpha values exceeding 0.600, affirming the reliability of the 17-item pretest and 16-item posttest questionnaires in the context of science subjects. To ascertain the validity of the measurement instrument, each item was correlated with the total score using the Product Moment formula. Subsequently, the validity of 17 out of 20 statement items and 16 out of 20 pretest and posttest items was

confirmed, while 3 statement items and 4 test items were deemed invalid, based on the analysis conducted via SPSS.

In addition to the validity analysis, the reliability test was conducted on the instrument, yielding an Alpha reliability value of 0.849 for the questionnaire on student learning motivation and 0.706 for the questionnaire on student learning outcomes in science subjects. Given that the Cronbach's Alpha coefficient value surpassed 0.600, it can be concluded that the items in the questionnaire, comprising 17 items for the science pretest and 16 items for the posttest, were deemed reliable. The formulated hypotheses concerning student learning motivation and learning outcomes were tested using SPSS 26 for Windows, employing the t-test (Independent Sample t-test) for analysis.

## **Results**

### **A. Student's learning motivation**

The initial motivation questionnaire results were derived from a pre-distributed survey among students before implementing the Quizizz learning media intervention. A comparison of the overall scores from the pre-and post-learning questionnaires highlighted variations in student learning motivation within the experimental and control groups. Six key indicators were considered in assessing the impact of the intervention on student motivation, encompassing elements such as the desire for academic success, encouragement and learning needs, future aspirations, learning appreciation, interest in the subject matter, and the influence of the learning environment.

**Table 2.** Motivation Score Summary

	<b>Control</b>		<b>Experiments</b>	
	Before (Pre)	After (Post)	Before (Pre)	After (Post)
Number of Students	30		32	
Max. Score	83	85	80	83
Min. Score	67	70	53	48
Mean	72.66	78.53	67.23	68.8

### **B. Student learning outcomes**

This section details the research data derived from two distinct groups in the study. The experimental group comprised 30 students, while the control group was composed of a total of 32 students. In the experimental group, the students were exposed to a treatment involving using the game-based learning platform Quizizz, while the control group relied on traditional worksheet-based learning materials.

The data retrieval process involved administering pretests and posttests, each consisting of 15 multiple-choice items aligned with the specific learning indicators on the science curriculum for sixth-grade students. These indicators encompassed the following concepts:

- Identification of natural vegetative propagation in plants
- Classification of various types of natural vegetative propagation in plants
- Determination of suitable plant types for natural vegetative propagation
- Classification of different types of artificial vegetative propagation in plants, accompanied by examples of relevant plant species.

**Table 3.** Learning Outcome Score Summary

	Control		Experiments	
	Before (Pre)	After (Post)	Before (Pre)	After (Post)
Number of Students	30		32	
Max. Score	84	85	75	77
Min. Score	55	60	45	57
Mean	68.6	74.7	60.9	67.3

### C. Hypothesis testing

Hypothesis testing was employed to assess formulated hypotheses pertaining to student learning motivation and learning outcomes when utilizing the game-based learning platform Quizizz. This statistical examination was conducted through SPSS 26 for Windows, employing the working hypothesis t-test (Independent Sample t-test) outlined as follows:

H01: There is no significant positive impact of implementing Quizizz learning media on science learning motivation.

H02: There is no significant positive influence of using Quizizz learning media on science learning outcomes.

Ha1: There is a substantial positive impact arising from using Quizizz learning media on science learning motivation.

Ha2: There is a significant influence resulting from using Quizizz learning media on science learning outcomes.

The t-test results indicate a significant effect, given the significance level being less than 0.05. Notably, the average scores for learning motivation and learning outcomes in the experimental group were higher than in the control group. Specifically, the average score for learning motivation in the experimental group was 78.53, as opposed to 68.78 in the control group. Similarly, the average score for learning outcomes in the experimental group was 74.7, compared to 67.3 in the control group. These findings align with the hypothesis test table, revealing a Sig value (2-tailed) of less than 0.005, thus supporting the acceptance of the alternative hypothesis (Ha).

Consequently, it can be concluded that the null hypothesis (H0) is rejected, affirming that:



- The implementation of Quizizz learning media effectively enhances student learning motivation in science subjects.
- The integration of Quizizz learning media contributes to improved student learning outcomes in science subjects.

## **Discussion**

### **A. The Effect of Using Quizizz Learning Media on Student Learning Motivation**

According to the research findings, it is evident that the incorporation of Quizizz game-based learning media has a positive impact on the motivation of sixth-grade elementary school students in learning science, surpassing the conventional worksheet-based learning approach. Quizizz is an engaging tool for educators to present learning materials and practice questions in a captivating format, fostering student participation and motivation. Interacting directly with Quizizz makes students more engaged and focused, leading to an enjoyable and stimulating learning experience.

Utilizing Quizizz introduces a dynamic shift from traditional learning methods, creating an interactive environment where students participate, compete, and engage with course content. Integrating multimedia elements such as audio, music, visual aids, and interactive features within Quizizz cultivates a lively atmosphere, enhancing student interest and motivation. Furthermore, gamification elements, such as real-time feedback, rewards, and a competitive ranking system, encourage students to excel and actively participate in learning.

The data analysis illustrates the significant influence of Quizizz on student motivation and learning outcomes, demonstrating that this game-based learning tool is more effective than conventional worksheet-based methods. The research aligns with previous studies by Ref. [11], which affirm the positive impact of Quizizz on enhancing student motivation and active participation in learning activities. It is evident that the strategic utilization of Quizizz facilitates an interactive and enjoyable learning environment and plays a pivotal role in fostering increased student engagement and motivation, ultimately contributing to the achievement of learning objectives [13].

### **B. The Effect of Using Quizizz Learning Media on Student Learning Outcomes**

The research findings indicate a significant enhancement in the science learning outcomes among sixth-grade students who engage with Quizizz learning media compared to those following conventional worksheet-based learning approaches. Learning outcomes, denoting students' proficiency levels in comprehending specific subject matter, represent the culmination of various factors that affect the learning process. Ref. [17] highlights that using appropriate learning media significantly contributes to improved student responses and heightened learning achievements.



Moreover, a multitude of factors influence student learning outcomes, including internal and external determinants [18]. Incorporating dynamic, creative, and innovative learning media tailored to students' needs fosters an engaging and lively learning environment, consequently elevating student motivation and learning outcomes. The gamified features of Quizizz, with its interactive elements, sound effects, visual cues, and competitive components, stimulate active student participation, fueling their enthusiasm and dedication toward the learning process [14].

It is evident from the research that the use of Quizizz learning media significantly contributes to students' enhanced learning outcomes. The engagement with Quizizz fosters an atmosphere conducive to active participation, where students are prompted to focus, apply critical thinking, and compete with their peers to excel in the interactive learning environment. Notably, the gamification features embedded within Quizizz, including ranking displays, instant feedback, and entertaining character memes, further augment the students' drive to excel and succeed in their learning endeavors.

Drawing from the extensive data analysis, it is apparent that integrating Quizizz within sixth-grade science curriculum significantly amplifies student learning outcomes. The experimental group, utilizing Quizizz, exhibited markedly higher posttest scores compared to the control group, indicating the effectiveness of Quizizz in fostering improved learning outcomes. The findings underscore the importance of employing engaging and interactive learning tools like Quizizz to invigorate student participation and elevate academic achievements in science education.

This research aligns with the recent findings of Ref. [17], which emphasize the beneficial impact of Quizizz-based applications on student engagement and comprehension, leading to enhanced learning outcomes. The fun and interactive learning activities facilitated by the Quizizz application motivate students, enabling them to grasp complex concepts more effectively and enhancing their overall understanding. These insights affirm the instrumental role played by Quizizz in fostering a dynamic and enriching learning environment, ultimately contributing to improved student learning outcomes.

## **Conclusion**

Based on the comprehensive examination of the research findings and the problem's initial formulation, it is evident that integrating Quizizz game-based learning media into science instruction for sixth-grade students in elementary school yields significant impacts. The results of the research have indicated the following key points:

1. Implementation of Quizizz game-based learning media positively influences student learning motivation, as indicated by rejecting the null hypothesis (H<sub>0</sub>) and accepting

the alternative hypothesis (Ha) with a substantial confidence level of 48.0%. This underscores the potential of interactive learning tools, such as Quizizz, to effectively stimulate and sustain student engagement and motivation in the learning process.

2. Incorporating Quizizz game-based learning media in the context of science education for sixth-grade students has a discernible effect on learning outcomes. The rejection of the null hypothesis (H0) and the acceptance of the alternative hypothesis (Ha) at a confidence level of 85.3% signifies that Quizizz contributes significantly to enhancing students' academic performance and comprehension in science. This underscores the efficacy of interactive and technology-based approaches in fostering improved learning outcomes.

These findings collectively underscore the promising role of interactive game-based learning platforms, such as Quizizz, in enhancing student motivation and academic achievements within elementary school science education. As educators and policymakers seek to optimize learning experiences, these results provide valuable insights into the potential of integrating technology-driven pedagogical tools to foster a more engaging and effective learning environment for young learners.

### Conflict of Interest

The authors declare that there is no conflict of interest.

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