

The Effect of Twister Game-Based Learning Media on Students' Learning Outcomes in the Reproductive System Topic

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ABSTRACT

This study examined the effect of Twister game-based learning media on students' learning outcomes in the reproductive system topic among eleventh-grade students at MA DDI Galla Raya, Pangkep Regency. It also compared the learning outcomes of students who used the media with those who received instruction without it. The study employed a quasi-experimental method with a non-equivalent control group design. The population consisted of 70 eleventh-grade students, from which two classes were selected through purposive sampling. Class XI MIA 1 was assigned as the experimental group, while Class XI MIA 2 served as the control group, with each group consisting of 35 students. Data were collected through pretests and posttests and analyzed using descriptive and inferential statistics to examine improvements in learning outcomes and determine whether a significant difference existed between the two groups. The findings showed that the experimental group's mean score increased from 47.57 on the pretest to 76.14 on the posttest. In comparison, the control group's mean score increased from 44.71 to 67.57. Hypothesis testing at a significance level of 0.05 revealed that the p-value was lower than α ($0.000 < 0.05$). Therefore, the use of Twister game-based learning media had a significant effect on improving students' learning outcomes.

ABSTRAK: Penelitian ini dilaksanakan untuk mengetahui sejauh mana penggunaan media pembelajaran Game Twister memengaruhi hasil belajar peserta didik pada materi Sistem Reproduksi di kelas XI MA DDI Galla Raya Kabupaten Pangkep, serta membandingkannya dengan hasil belajar peserta didik yang tidak menggunakan media tersebut. Penelitian menerapkan metode eksperimen semu (Quasi Experimental Research) dengan desain Non-Equivalent Control Group. Populasi penelitian berjumlah 70 peserta didik kelas XI, dan melalui teknik Purposive Sampling dipilih dua kelas sebagai sampel penelitian. Kelas XI 1 MIA ditetapkan sebagai kelompok eksperimen dan XI MIA 2 sebagai kelompok kontrol, masing-masing terdiri dari 35 siswa. Pengumpulan data dilakukan melalui tes pretest dan posttest, kemudian dianalisis menggunakan statistik deskriptif dan inferensial untuk melihat peningkatan hasil belajar dan menguji perbedaan signifikan antar kelompok. Hasil penelitian memperlihatkan bahwa kelompok eksperimen memperoleh rata-rata nilai pretest 47,57 dan meningkat menjadi 76,14 pada posttest. Sementara itu, kelas kontrol hanya mengalami peningkatan dari 44,71 menjadi 67,57. Uji hipotesis pada taraf signifikansi 0,05 menunjukkan bahwa nilai p lebih kecil dari α ($0,000 < 0,05$). Dengan demikian, dapat disimpulkan bahwa penggunaan media Game Twister berdampak signifikan terhadap peningkatan hasil belajar peserta didik.

Keywords: Game Twister learning media, learning outcomes

INTRODUCTION

Education plays a crucial role in developing students' abilities and potential so that they can grow into individuals who have faith in and devotion to God Almighty. Through high-quality education, students are guided not only to acquire knowledge but also to develop their personality, broaden their perspectives, and enhance their overall quality. Therefore,

education constitutes an essential means of optimizing the development of human resources (Indriana, 2011).

Education can also be understood as a learning process through which individuals acquire new knowledge and experiences. This process contributes to personal maturation by developing the ways individuals think, behave, and understand life. Education not only broadens knowledge but also shapes individual character, enabling people to perceive their surroundings and the wider world from a broader perspective through learning experiences, including those derived from simple aspects of everyday life (Raharjo, 2010).

The success of the learning process is determined not only by the roles of educators and the curriculum but also by various factors originating from students themselves and their surrounding environment. These factors can be broadly classified into internal and external factors, both of which influence the course and outcomes of learning. External factors include influences from the family, school environment, surrounding community, and peer relationships. Internal factors originate within the students themselves and include physical health, learning readiness, aptitude, interest, and attention during the learning process (Slameto, 2015).

In implementing the curriculum, educators play an essential role in directing the learning process toward the intended objectives. Their responsibilities extend beyond delivering instructional content to designing and determining the learning components required by students. Therefore, educators need to be capable of organizing instructional materials and selecting learning resources that align with students' learning needs. They are also expected to develop teaching materials that make learning activities more engaging, varied, and less monotonous (Willis, 2013).

The learning process represents the practical implementation of the curriculum within educational institutions. Through this process, educators guide students in developing their abilities, understanding the subject matter, and achieving the established educational objectives. Therefore, successful learning is closely associated with the appropriate implementation of the curriculum in teaching and learning activities (Sudjana, 2018).

Schools also serve as institutional settings in which educators contribute to developing high-quality future generations. Individual quality is reflected in a person's ability to adapt, harmonize, and balance spiritual, moral, social, and intellectual dimensions. Accordingly, the knowledge acquired at school can be meaningfully applied in community life (Tohirin, 2015).

Interaction between teachers and students during the learning process plays an important role in achieving learning objectives. Through effective interaction, students can understand the subject matter more easily and participate more actively in learning activities. The success of instruction can be evaluated through students' learning outcomes, which commonly vary from high to low levels of achievement. These differences are influenced by changes in students' knowledge, attitudes, and behavior throughout the learning process. In addition, low learning motivation and interest, inappropriate instructional methods, and insufficient teaching skills may adversely affect students' learning outcomes (Salehuddin & Yasin, 2010).

One strategy for supporting the success of the learning process is the appropriate use of instructional media. Instructional media serve as supporting tools that assist educators in effectively delivering learning materials to students (Adam & Syastra, 2015).

The development of instructional media aims to provide students with additional learning resources while supporting their understanding and mastery of the subject matter. Such media can be designed to address students' learning needs while remaining engaging and motivating throughout the learning process (Nurrita, 2018).

Various types of instructional media may be used in learning activities according to the nature of the subject matter and students' characteristics. One type is graphic media, which includes visual materials such as posters, charts, comics, pictures, and two-dimensional illustrations that can help students understand the material more easily. Three-dimensional media, including models or replicas that can be directly observed, may also be used, along with projection media such as slides that support a more engaging presentation of instructional content. In addition, the surrounding environment can serve as a learning medium because it is closely connected to students' experiences and everyday lives (Karo-Karo & Rohani, 2018).

Presenting instructional content through learning media can facilitate students' active engagement throughout the learning process, provide meaningful challenges, and stimulate their inspiration and motivation to be creative and interact with their peers (Shafira et al., 2018).

An observation conducted by the researchers on February 12, 2020, at MA DDI Galla Raya revealed that biology instruction, particularly on the reproductive system topic, continued to face several challenges. These difficulties were largely attributed to the teacher's predominant reliance on the lecture method as the primary instructional strategy. Based on information obtained through an interview with Mr. Agung, S.Pd., the school had

provided facilities such as an LCD projector and Microsoft PowerPoint-based instructional materials. Nevertheless, biology instruction at MA DDI Galla Raya still required more engaging learning media to motivate students to participate actively and thereby improve their learning outcomes. The limited visual variation in the PowerPoint presentations made it difficult for students to maintain their attention on the material being delivered. As a result, students tended to remain passive and merely observe the content displayed through the LCD projector (Agung, 2020).

As an effort to address these challenges, the use of the Twister Game as an instructional medium offers an effective approach to improving students' learning outcomes. The Twister Game consists of a rotating game wheel divided into several sections containing images related to the reproductive system topic, accompanied by question cards (Buchori & Setyawati, 2015).

The Twister Game learning medium was designed with an engaging visual appearance through the use of varied colors and illustrations relevant to the reproductive system topic. It was also produced from durable, water-resistant paper, making it more practical for use during classroom activities. In addition, the language used in the game was kept simple and communicative to facilitate students' understanding of the material. The use of the Twister Game in reproductive system instruction can promote greater student participation because it integrates game elements with enjoyable and productive learning activities (Jannah & Wiyatmo, 2018).

The implementation of the Twister Game begins by inviting one student representative to come to the front of the classroom and present the results of the group discussion using the game as an instructional medium. Once the pointer stops on a particular image, the student selects a question card corresponding to that image. The student then responds to the question presented on the card (Wulandari, 2019).

RESEARCH METHOD

This study employed a quantitative approach, emphasizing the processing of numerical data through statistical analysis. Research data were collected using pretests and posttests comprising questions related to the human reproductive system (Sugiyono, 2013). A quasi-experimental design was adopted to approximate the conditions of a true experiment, although it did not fully control the internal and external factors that could influence the research outcomes (Arikunto, 2010). The study was conducted at MA DDI Galla Raya, Pangkep Regency, South Sulawesi, during the second semester of the

2020/2021 academic year. A non-equivalent control group design was used, involving two classes selected as the research sample: one experimental group and one control group. The experimental group received instruction using the Twister Game learning medium, whereas the control group was taught through conventional lectures and question-and-answer activities without additional instructional media. Before the intervention, both groups completed a pretest to assess their initial abilities. Following the intervention, a posttest was administered to evaluate differences in learning outcomes between the two groups (Sugiyono, 2010).

Table 1. Research Design

Group	<i>Pretest</i>	<i>Treatment</i>	<i>Posttest</i>
Experimental Group	O ₁	X	O ₂
Control Group	O ₃	-	O ₄

Notes:

X = Treatment using the Twister Game learning medium

- = Instruction without the Twister Game learning medium

O₁ = Pretest administered to the experimental group

O₂ = Posttest administered to the experimental group

O₃ = Pretest administered to the control group

O₄ = Posttest administered to the control group

The population of this study comprised all 70 eleventh-grade students at MA DDI Galla Raya, Pangkep Regency, who were distributed across two classes. The experimental group consisted of 35 students from Class XI MIA 1, while the control group comprised 35 students from Class XI MIA 2. The research instrument was a multiple-choice test consisting of 25 items. The data were analyzed using descriptive and inferential statistics, including tests of normality, homogeneity, and hypothesis testing. These analyses were conducted to determine the extent to which the use of the Twister Game learning medium affected students' learning outcomes in the reproductive system topic.

RESULTS AND DISCUSSION

The descriptive analysis revealed clear differences in learning outcomes between the experimental and control groups. In the experimental group, pretest scores ranged from 30 to 65, with a mean of 47.57 and a standard deviation of 10.804. After instruction using the Twister Game learning medium, posttest scores increased, ranging from 55 to 90, with a mean of 76.14 and a standard deviation of 8.496. In the control group, pretest scores also

ranged from 30 to 65, with a mean of 44.71 and a standard deviation of 10.498. Following conventional instruction, posttest scores increased to a range of 50–85, with a mean of 67.57 and a standard deviation of 8.942. These findings indicate that the experimental group achieved a greater increase in mean learning outcomes, suggesting that the use of the Twister Game was effective in improving students' learning outcomes.

The analysis indicated an improvement in the learning outcomes of students in Class XI MIA 1 following the implementation of the Twister Game learning medium. Before the intervention, 7 students (20%) were classified in the very low category, while the remaining 28 students (80%) were in the low category. After the intervention, the distribution of posttest scores changed considerably: 5 students (14.28%) remained in the low category, 12 students (34.28%) moved to the moderate category, 14 students (40%) achieved the high category, and 4 students (11.42%) reached the very high category.

In contrast, Class XI MIA 2, which served as the control group and did not receive instruction using the Twister Game, showed a different pattern. On the pretest, 11 students (31.43%) were classified in the very low category, while 24 students (68.57%) were in the low category. After conventional instruction, 17 students (48.57%) remained in the low category, 14 students (40%) improved to the moderate category, and 4 students (11.42%) reached the high category.

Table 2. Descriptive Statistics of Learning Outcomes

Statistic	Experimental Group		Control Group	
	<i>Pretest Score</i>	<i>Posstest Score</i>	<i>Pretest Score</i>	<i>Posttest Score</i>
Maximum Score	65	90	65	85
Minimum Score	30	55	30	50
Mean	47,57	76, 14	44.71	67,57
Standard Deviation	10, 804	8.496	10.498	8.942
Variance	65	90	65	85

Before conducting the independent-samples *t*-test to compare the two groups, prerequisite tests consisting of normality and homogeneity tests were performed. The normality test was used to determine whether the pretest and posttest score data were normally distributed. The results of these tests are presented in the following table.

Table 3. Normality Test Results for the Experimental and Control Groups

Students' Learning Outcomes	Kolmogorov-Smirnov		
	Statistic	df	Sig
<i>Experimental Group Pretest</i>	.104	35	.200
<i>Experimental Group Posttest</i>	.132	35	.127
<i>Control Group Pretest</i>	.137	35	.095
<i>Control Group Posttest</i>	.136	35	.101

The normality test conducted at a significance level of 0.05 indicated that the pretest and posttest data from both the experimental and control groups were normally distributed.

Table 4. Homogeneity Test Results

Students' Learning Outcomes	Statistic	df 1	df 2	Sig
Based on Mean	.102	1	68	.750
Based on Median	.099	1	68	.753
Based on Median and Adjusted df	.099	1	67,317	.754
Based on Trimmed Mean	.090	1	68	.765

Based on the results of the analysis, the homogeneity test conducted on Classes XI MIA 1 and XI MIA 2 yielded a significance value of 0.750. Because this value exceeded $\alpha = 0.05$, the variances of the two groups were not significantly different. Therefore, the data were considered homogeneous.

Table 5. Hypothesis Test Results

Students' Learning Outcomes	t-test				
	F	Sig	t	df	Sig (2-tailed)
Equal Variances Assumed	.102	.750	4.111	68	<.000
Equal Variances Not Assumed	-	-	4.111	67.823	<.000

The independent-samples *t*-test yielded a significance value of 0.000 ($p < 0.001$), which was lower than the predetermined significance level of $\alpha = 0.05$. Therefore, the null hypothesis (H_0) was rejected and the alternative hypothesis (H_1) was accepted. This finding indicates that the use of the Twister Game learning medium had a statistically significant effect on students' learning outcomes.

The descriptive analysis further demonstrated that the implementation of the Twister Game positively influenced the biology learning outcomes of eleventh-grade students at MA DDI Galla Raya, Pangkep Regency, particularly in the reproductive system topic. The students' mean score increased from 47.57 before the intervention, which was classified as low, to 76.14 after the intervention, which was classified as high. These findings confirm that the Twister Game learning medium was effective in improving students' learning achievement.

The Twister Game learning medium was designed with an engaging visual appearance that incorporated a combination of bright colors and illustrations relevant to the reproductive system topic. It was constructed using thick, durable, and water-resistant paper and featured simple, communicative text developed according to the format established in previous research (Buchori & Setyawati, 2015).

The visually engaging design of the Twister Game attracted students' interest and increased their motivation to participate in learning through educational game activities. Throughout the learning process, students demonstrated high levels of participation and enthusiasm because the activities were conducted in an interactive, enjoyable, and game-based environment. This finding is consistent with the study by Jannah and Wiyatmo (2018), which reported that the implementation of game-based learning media positively influenced students' learning interest and outcomes. These improvements were reflected in several dimensions, including enjoyment, attention, curiosity, and learning effort. The mean score for enjoyment increased from 2.51 to 3.27, attention from 2.74 to 3.17, curiosity from 2.48 to 3.15, and learning effort from 2.65 to 3.05. Therefore, the use of interactive learning media can enhance students' motivation and interest in learning, thereby facilitating a deeper understanding of the subject matter.

Similar findings were reported by Hutama (2017), whose study demonstrated that a modified Twister game contributed to improving the learning achievement of students with autism in the topic of geometric shapes. The substantial increase in the mean score, from 29.17 before the intervention to 89.58 after the intervention, confirms that game-based instructional approaches can significantly support students' conceptual understanding.

In addition, Sari and Reza (2016) concluded that game-based learning media made a meaningful contribution to improving children's English vocabulary. Their statistical analysis yielded a calculated t value of 57.75, which was lower than the critical t value of 75; consequently, H_0 was accepted, although the authors interpreted the treatment as having an effect. These findings indicate that the Twister Game has considerable potential as an instructional medium and may contribute significantly to improving students' learning outcomes across different subject areas.

In the control group, the data analysis showed that the students' mean score increased from 44.71 on the pretest to 67.57 after they received conventional instruction. Although an improvement was observed, the resulting score remained lower than that of the experimental group. This finding indicates that instruction without the Twister Game learning medium did not produce optimal improvement in students' conceptual understanding.

This phenomenon may be explained by the limitations of conventional instruction, which continues to emphasize the delivery of content through lectures. This approach positions the teacher as the primary source of information, while students merely receive explanations with limited opportunities for interaction. Low levels of participation may restrict the development of students' creativity and critical thinking skills. As explained by Isjoni (2009), conventional teaching practices generally place the teacher at the center of the learning process, thereby limiting students' active involvement.

Hairy et al. (2018) similarly reported that teachers rarely used audiovisual media, such as images or animated videos, when teaching the human reproductive system. Consequently, students could only visualize the mechanisms of the reproductive system based on the static images presented, which could potentially lead to misconceptions. Differences in students' imaginative abilities when engaging with abstract concepts may therefore result in varying levels of understanding of the learning material.

In the context of this study, the use of the Twister Game in the experimental group elicited a variety of student responses. Students were first introduced to the procedures for using the medium and were subsequently engaged directly in activities such as spinning the wheel, selecting question cards, and providing answers based on questions related to the displayed images. These activities fostered enthusiasm, strengthened collaboration among students, and created a more meaningful learning experience. Consistent with Wulandari (2019), game-based learning activities can enhance students' emotional and cognitive engagement, ultimately contributing positively to their learning outcomes.

A comparison of the pretest and posttest scores showed that the control group's mean score increased from 44.71 to 67.57, whereas the experimental group demonstrated a greater improvement, rising from 47.57 to 76.14. These findings indicate that the Twister Game learning medium was effective in improving students' learning outcomes, as their achievement increased from the low to the high category. This result supports the view of Djamarah and Zain (2006), who emphasized that the use of instructional media is a crucial factor in improving the effectiveness and efficiency of the learning process. Instructional media can direct students' attention toward the learning material, enabling them to concentrate more effectively, understand the content more readily, and develop greater motivation to learn.

The findings demonstrated that the implementation of the Twister Game had a clear positive effect on improving students' biology learning outcomes. This medium created a more interactive and enjoyable learning environment while facilitating students' understanding of abstract concepts through a more systematic and comprehensible presentation of the material. Nevertheless, its implementation encountered several challenges, including the additional time required to explain the rules of the game and allow students to adapt to the unfamiliar medium. Despite these limitations, with appropriate planning and adequate instructional support, the Twister Game has the potential to serve as an innovative learning medium that can significantly enhance students' academic achievement.

CONCLUSION

Based on the findings concerning the reproductive system topic among eleventh-grade students at MA DDI Galla Raya, Pangkep Regency, the use of the Twister Game learning medium had a positive effect on students' learning outcomes. This was demonstrated by the experimental group's mean posttest score of 76.14, compared with 67.57 in the control group, which received conventional instruction without the Twister Game. This difference indicates that the Twister Game was more effective in improving students' biology learning outcomes, particularly in the reproductive system topic.

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