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The effect of teams games tournament assisted by Quizizz paper mode on motivation and biology learning outcomes

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Abstract

Motivation as a critical factor in supporting academic achievement is well-established. However, efforts to enhance student motivation and improve learning outcomes remain a significant challenge. This research aims to analyze the effect of using the Teams Games Tournament (TGT) learning model assisted by Quizizz Paper Mode (Q-Cards) on motivation and cognitive learning outcomes of class XI students at SMA IT Ihsanul Fikri Mungkid on the immune system material. The research design was quantitative quasi-experimental with a non-equivalent control group pretest-posttest design. The research results showed a significant influence of the Teams Games Tournament (TGT) learning model assisted by Quizizz Paper Mode (Q-Cards) on learning motivation with a significance value of 0.000 and student learning outcomes with a significance value of 0.000. The results of this research can be used as input for teachers and prospective teachers in considering the appropriate models and media to increase student motivation and learning outcomes to improve the quality of education and as a reference base for further research related to student motivation and cognitive learning outcomes.

Abstrak. *Peran motivasi sebagai faktor penting dalam mendukung prestasi akademik sudah diketahui dengan baik. Namun, upaya untuk meningkatkan motivasi siswa dan meningkatkan hasil belajar masih menjadi tantangan yang signifikan. Tujuan penelitian ini adalah untuk menganalisis pengaruh penggunaan model pembelajaran Teams Games Tournament (TGT) berbantuan Quizizz Paper Mode (Q-Cards) terhadap motivasi dan hasil belajar kognitif siswa kelas XI SMA IT Ihsanul Fikri Mungkid pada materi sistem imunitas. Desain penelitian yang digunakan adalah quasi eksperimen kuantitatif dengan non-equivalent control group pretest-posttest design. Hasil penelitian menunjukkan bahwa terdapat pengaruh yang signifikan model pembelajaran Teams Games Tournament (TGT) berbantuan Quizizz Paper Mode (Q-Cards) terhadap motivasi belajar dengan nilai signifikansi 0,000 dan hasil belajar siswa dengan nilai signifikansi 0,000. Hasil penelitian ini dapat dijadikan masukan bagi guru dan calon guru dalam mempertimbangkan model dan media yang tepat untuk meningkatkan motivasi dan hasil belajar siswa guna meningkatkan mutu pendidikan dan sebagai bahan acuan untuk penelitian selanjutnya terkait motivasi dan hasil belajar kognitif siswa.*

A. Introduction

Learning motivation is a conscious effort made by students to engage in learning activities and direct these activities toward achieving specific goals (Miftahussaadah & Subiyantoro, 2021). Students with high learning motivation strongly desire to succeed, exhibit enthusiasm for learning, and possess a drive and need to learn (Febriani, 2017). Learning motivation makes students tenacious, diligent, and persistent in the learning process (Amini & Daulay, 2022). Therefore, learning motivation is an important factor influencing student outcomes and performance (Feng et al., 2013; Lin & Chen, 2017).

Fostering student learning motivation takes work. One significant challenge is parents' and teachers' low level of concern (Prayitno, 2014). This is supported by class observations at SMA IT Ihsanul Fikri Mungkid on November 6, 2023, which showed that students often engage in non-learning activities such as chatting, daydreaming, and not paying attention to the teacher. These behaviors indicate a lack of optimal attention to learning. Furthermore, students showed little enthusiasm for asking or answering questions, tending to remain silent during lessons. They also struggled to understand the material, as evidenced by their difficulty answering questions about recently explained content. These observations suggest that students' learning motivation is still less than optimal.

Student motivation to learn will help achieve educational goals and must be addressed appropriately. Santoso (2016) supports this, stating that extrinsic factors are the primary reason behind low student motivation due to limited diversity in teaching approaches and the teacher's monotonous and unpleasant methods. This is evidenced by the fact that extrinsic factors account for 51.88% of the reasons for low motivation, compared to 48.12% for intrinsic factors related to student situations, abilities, and goals. Motivated students tend to devote all their abilities to achieving optimal learning results. The higher the level of student motivation, the greater their desire to study actively and seriously to achieve maximum learning outcomes (Indayati, 2014).

Learning outcomes play an important role in the educational process, causing positive changes in student behavior and gradually changing students' cognitive, affective, and psychomotor abilities (Rahmat, 2014). Cognitive learning outcomes refer to achieving educational goals related to knowledge, including understanding, knowing, memorizing, interpreting, translating, differentiating, organizing, and giving assessments. Cognitive learning outcomes measure success in the learning process, derived from evaluation results during or after learning activities (Febriani, 2017). According to Bloom, revised by Anderson and Krathwohl (2010), cognitive learning outcomes consist of six aspects: recalling, understand, application, analysis, evaluation, and synthesis.

Based on observations, students' cognitive learning outcomes are relatively low. This is evident from the results of the Joint Daily Assessment (PHB) for the odd semester in the class, with scores ranging from 56 to 84. Additionally, 50% of the students (18) met the criteria for of learning objectives achievement, while the remaining 50% (18) did not.

Low learning outcomes are also related to the characteristics of the material students' study (Mulyani et al., 2020). The immune system topic is the second most challenging subject (Raida, 2018). Another study by Pribadi et al. (2018) found that primary misconceptions are related to the components and functions of the immune system. This is evident from the students' mean daily test scores for the immune system subject, which averaged 54.5, failing to meet the criteria for achievement of learning objectives. Students also struggle to differentiate clearly between the long-term working mechanisms of the human body's innate and acquired immune systems. Additionally, teachers face challenges in developing effective instructional methods due to the limited time allotted for teaching immune system content.

Teachers have an important role in designing learning by implementing learning models that are varied, conducive, and interactive to increase learning motivation and student learning outcomes. High motivation and learning outcomes cannot be separated from the support of educators in creating a comfortable learning atmosphere for students (Erina & Kuswanto, 2015). The TGT learning model offers several advantages, including fostering an active teaching and learning process and prioritizing accepting student differences. Additionally, it enables students to master the material relatively quickly, encourages socialization among students, enhances learning motivation and outcomes, and promotes healthy competitive cooperation (Nugroho, 2015). However, to achieve maximum learning outcomes, the TGT learning model should be implemented using learning media (Arsyad, 2015). This is because the TGT learning model involves tournament play, which can be filled with interesting academic competition activities and uses a quiz scoring system

Previous research has shown that applying the TGT learning model assisted by Question Card media positively influences science learning outcomes. This is evidenced by the significant differences in science learning outcomes between the experimental class using this media and the control class using the conventional learning model (Gunarta, 2018). Besides, some empirical studies examined the effect of the TGT learning model assisted by Quiz media on student learning outcomes in Biology learning (Arizka & Khairuna, 2022; Adhawiyah, 2023). Using learning media makes the learning process more interesting and enjoyable, helping students more easily

understand the material being taught, thus optimizing students' cognitive learning outcomes.

Based on previous research, a study that simultaneously examines the potential of the TGT learning model based on Quizizz Paper Mode (Q-Cards) for developing motivation and learning outcomes has yet to be conducted. Q-Cards is an alternative technology-based interactive quiz media that uses sheets of paper that are given a QR Code, known as Q-Cards, which have many advantages, including having a time limit when taking quizzes so that students learn to think quickly in completing quizzes and not need a smartphone. These supports using Q-Cards as a learning tool because, according to school regulations, students are prohibited from bringing smartphones. In addition, Q-Cards sheets can be used many times with varying quiz content, so teachers do not need to print new Q-Cards sheets.

Based on these problems, this study aims to examine the effect of Teams Games Tournament (TGT) assisted by Quizizz Paper Mode (Q-Cards) on the motivation and cognitive learning outcomes of 11th-grade biology students on the immune system material. Thus, this research will significantly advance educational practices and student outcomes.

B. Material and method

This study employs a quantitative methodology using a quasi-experimental design with a pretest-posttest control group. The study population included all male students in grade 11 of SMA IT Ihsanul Fikri Mungkid. The sampling used in this study was cluster random sampling. Cluster random sampling is used to determine samples with broad objects to be studied or data sources (Sugiyono, 2019). The sampling technique using cluster random sampling can be done if the population does not consist of individuals but consists of groups of individuals or clusters, provided that the members come from groups that have the same or homogeneous characteristics. The sampling technique was the lottery method with steps:

1) A one-way ANOVA test was carried out, with a significance result of more than 0.005, which means there was no difference in students' cognitive learning outcomes.
2) A lottery was carried out with cards, the first draw for the experimental class and the second for the control class.
3) Two cards were drawn randomly by the researcher using a lottery pattern; it is known that the first lottery card taken for the experimental class is XI-5, and the second lottery card for the control class is taken as class XI-1.

The instrument used on the learning motivation scale is the Attention, Relevance, Confidence, and Satisfaction (ARCS) learning motivation scale developed by John Keller (2008). In the research of John Keller (2008), validity and reliability tests were conducted on the ARCS learning motivation instrument. The validity test results showed that the Attention indicator obtained a calculated r of 0.19, Relevance of 0.43, Confidence of 0.51, and Satisfaction of 0.49. The r table value is at a significance level of 5%, and n corresponds to the number of respondents, namely 90, so the r table value is 0.1726, meaning that the ARCS learning motivation instrument is declared valid. The reliability test results also showed that Cronbach's Alpha value was greater than the r table, namely 0.96 > 0.1726. Thus, the ARCS learning motivation instrument is reliable.

The cognitive learning outcomes test instrument used is the Pretest Post-test questions. The pretest was used to measure the initial abilities of students in both the control and experimental groups before being given treatment. The post-test was given after the learning was completed. The validity test results on the pretest post-test question instrument obtained 30 questions out of 50 questions included in the valid category with an r table value of 0.361 and n corresponding to the number of respondents, namely 36. In addition, the reliability test results showed that Cronbach's Alpha value was greater than the r table, which is 0.724 > 0.361, so it can be concluded that the pretest post-test question instrument is reliable.

Inferential analysis examines the hypothesis concerning learning motivation and cognitive learning outcomes. Before conducting an independent sample t-test, preliminary tests are performed for normality and homogeneity. The results of the overall normality test indicate a p-value range of 0.102 to 0.203, suggesting that all data are normally distributed (see Table 1 for details). Meanwhile, the overall data homogeneity test yields p-values ranging from 0.222 to 0.594, indicating homogeneous data across all groups (refer to Table 2 for specific results).

Table 1 Normality test of motivation and student cognitive learning outcomes

Data	Test of Normality Kolmogorov-Smirnov			Information
	Statistic	Df	Sig	
Initial motivation in experiment class	.168	36	.102	Normal
Final motivation in experiment class	.176	36	.060	Normal
Initial motivation in control class	.090	36	.200	Normal
Final motivation in control class	.119	36	.200	Normal
Pretest in experiment class	.173	36	.080	Normal
Post-test in experiment class	.120	36	.200	Normal
Pretest in control class	.232	36	.201	Normal
Post-test in control class	.158	36	.203	Normal

Table 2 Homogeneity test of motivation and students' cognitive learning outcomes

Data	Levene Statistic	Df1	Df2	Sig (based on mean)	Information
Initial learning motivation	0,959	1	70	0,331	Homogeneous
Final learning motivation	0,287	1	70	0,594	Homogeneous
Pretest cognitive learning result	0,463	1	70	0,498	Homogeneous
Post-test cognitive learning result	1,518	1	70	0,222	Homogeneous

C. Results and discussion

Implementation of TGT assisted by Q-Cards

Data on implementing the TGT teaching approach using Quizizz as a tool were collected through observation forms completed by a peer researcher. Observers filled out observation sheets based on the learning process across three sessions. Each observation sheet consisted of 11 statements, with response options "Implemented" and "Not Implemented" for each statement. These statements in the questionnaire pertain to applying the TGT instructional approach alongside Q-Cards media. The results detailing the implementation of the TGT instructional model supported by Q-Cards media are presented in Table 3.

Table 3 Percentage of implementation of TGT assisted by Q-Cards

Meeting	Percentage of Learning Implementation	Category
1	100%	Very Good
2	100 %	Very Good
3	100%	Very Good
Average	**100%**	**Very Good**

Researchers used the TGT learning model Assisted by Q-Cards media for the experimental class and conventional learning using the lecture method for the control class. The syntax of the TGT learning model includes (1) presentation of material, (2) group formation, (3) games tournament, and (4) group awards (Sutirman, 2013). However, at the first and second meetings at the group award stage, the teacher only accumulated the group scores and then congratulated the winning group without giving a reward. So, the teacher only rewarded the group at the third meeting by looking at the highest accumulated score and the fastest group.

The research consisted of three sessions in alignment with the prepared teaching module. Analysis of the implementation of the TGT instructional model in Table 3 reveals a mean implementation rate of 100% when using Quizizz Paper Mode media, demonstrating excellent adherence during the learning sessions. Effective implementation of the learning process according to plan is expected to positively benefit students in terms of motivation and cognitive learning outcomes (Mirawati, 2023).

The effect of TGT assisted by Q-Cards on students' motivation

Student learning motivation data was acquired by distributing a questionnaire to each student. The questionnaire contained 15 positive statement items. Data on initial learning motivation results were obtained from students before receiving treatment, and data on final learning motivation results were obtained after students received treatment. Student learning motivation data can be seen in Table 4.

Table 4 displays that the initial learning motivation score for the control class was 35.69 in the low category, while the final score averaged 46.67 in the medium category. The average initial score for the experimental class was 34.22 in the low category, and the final average learning motivation score was 63.91 in the very high category.

Based on the results of the prerequisite tests, the research data exhibits both normal distribution and homogeneity. Consequently, hypothesis testing of the research data proceeded with parametric statistical analysis, specifically using an independent sample t-test conducted using SPSS version 22. A critical test criterion is applied in analyzing the independent sample t-test data: Ho is rejected if the significance level (2-tailed) is <0.05. The results of the independent sample t-test are presented in Table 5.

Table 4 Results of student learning motivation

	Initial Motivation		Final Motivation	
	Control	**Experiment**	**Control**	**Experiment**
Highest score	48	40	60	74
Lowest score	28	28	37	52
Average	35,69	34,22	46,67	63,91
Median	35	33,5	45,5	62
Mode	35	32	45	68
Standard deviation	4,74	3,75	5,67	5,79
Score Category	**Low**	**Low**	**Medium**	**Very high**

Score Category: 64-75 = Very High, 52-63 = High, 40-51 = Medium, 28-39 = Low, and 15-27 = Very Low

Table 5 Independent sample t-test results

	F	Sig	T	Df	Sig (2-tailed)
Initial learning motivation	0,959	0,331	1,460	70	0,149
Final learning motivation	0,287	0,594	-12.760	70	0,000

Table 5 indicate that initial learning motivation data supported the acceptance of the null hypothesis, suggesting no significant difference in baseline competencies between the control and experimental groups. In contrast, the final learning motivation data did not support the null hypothesis in favor of the alternative hypothesis, indicating that the application of the Teams Games Tournament (TGT) learning model with Quizizz Paper Mode (Q-Cards) media positively influenced the learning motivation of class XI SMA IT Ihsanul Fikri students.

The findings of this study suggest that utilizing the TGT learning model along with Q-Cards impacts students' learning motivation. The results of this research are relevant to the opinion of Nurhayati et al. (2018), who stated that applying the TGT type cooperative learning influences increasing student learning motivation. Other research by Octariani and Panjaitan (2020) shows that TGT learning positively influences students' motivation and enthusiasm for learning. This is similar to the opinion of Yuliawati (2021), who states that implementing the TGT learning model can increase students' learning motivation.

The TGT learning approach comprises four phases: delivering material, forming groups, games tournaments using Q-Cards media, and group awards (Sutirman, 2013). Implementing the TGT learning model with Q-Cards media impacts student motivation for learning from the ARCS learning motivation indicators, namely attention, relevance, confidence, and satisfaction (Keller, 2008).

The first stage is delivering the material, which is carried out by presenting the material directly to the teacher. The teacher's presentation aims to explain to students the stages of implementing TGT and explain the material so that students can understand and answer game questions, become winners, and receive awards (Utami, 2018). Students will understand the importance of paying complete attention to the material discussed (Slavin, 2020). Tournaments can attract students' attention to be serious about learning (Sari et al., 2018). When delivering the material delivered by the teacher will help students work better to get scores and become the best group when taking part in games tournaments (Rosnah, 2015).

When delivering the material, the teacher explains it using examples and relates it to students' daily lives. Students may be observed paying attention to the teacher when delivering the material throughout the learning process. Students' attention in learning will be stimulated if a teacher provides examples or cases related to students' experiences because not all students have high imaginations (Febrianti, 2019). Students' attention will arise because of curiosity (Sari et al., 2018). Attention or student attention is one of the important points in maintaining student learning motivation for successful learning (Keller, 2008). Students' attention is a primary aspect of the learning process, and it is key to simplifying comprehension of the content and improving their achievements (Winaryati & Hidayat, 2020). Apart from that, in delivering, the instructor also posed questions to students about the material related to the immune system material. Also, as supported by Alfiyana et al. (2018), if students are faced with cognitive conflicts and are asked to find answers to questions, they can focus on the material being discussed.

Supported by Nasrah et al. (2017), the learning environment and relevance of material to students' daily lives are crucial in fostering students' understanding of the material's significance in their lives. According to Andani and Lusiana (2015), students are more motivated to learn when they perceive the material as applicable to their daily lives. Sanjaya (2014) suggests that students' interest increases when they perceive the material as valuable and useful. This perspective is supported by Rozi et al. (2021), who emphasize the importance of employing effective teaching techniques to stimulate students' interest in learning and exploring teacher content.

During the second stage, students are grouped randomly into six groups, as described. This stage allows students to review and prepare for the tournament games, fostering collaboration among group members to understand and support each other in mastering the material. As Leonard (2013) noted, collaboration in learning enhances understanding and builds students' confidence in achieving collective success. Novtiar and Aripin (2017) suggest that understanding the material boosts students' self-assurance, aligning with Sari et al. (2018), who propose that overcoming challenges and positive experiences can further enhance students' self-esteem.

The third stage is the game tournament, where the teacher provides academic games using Q-Cards, which contain questions regarding the content covered. Game tournaments in the TGT model can add fun, excitement, and a competitive spirit between groups (Utami, 2018). Academic games during the learning process may stimulate students' attention and motivation to participate (Koriaty & Agustani, 2016). Uliyah and Isnawati (2019) reported that academic games enhance enthusiasm and active involvement in the learning process.

The tournament games stage uses the help of Q-Cards media. Q-Cards media is supported by an attractive, colorful display and music that adds to the competitive atmosphere (Faijah et al., 2022). Using interesting, fun, and new media can attract students' attention so that students have an interest and develop an interest in learning (Utami et al., 2020). When teachers use media that attracts attention, students will be interested in participating in learning well (Fajeriadi et al., 2024). In line with Salsabila et al. (2020) opinion, interactive quiz media can direct students' attention, thereby creating learning motivation, which impacts increasing learning outcomes.

The questions presented on the Q-Cards media correspond to learning indicators. Questions in Q-Cards media are multiple-choice questions true-false. Several questions in the Q-Cards media relate to everyday life. Students will be more motivated if the questions are connected to something in their lives (Irwandi & Fajeriadi, 2019). Students can think about a problem presented in the question if it is connected (relevant) to everyday life so that students find it easier to pay attention to things related to solving the problem (Pratiwi et al., 2018).

Students complete Q-Cards questions by discussing them with their group members. The discussion method can increase students' self-confidence to achieve their goals (Sari et al., 2018). Students and their groups exchange opinions when answering the teacher's questions, creating confidence in answering the questions correctly (Putri, 2019). When students correctly answer the Q-Cards questions, they will get a score and move up one level in the Quizizz ranking system. Self-confidence will increase when students succeed in answering questions correctly and gain satisfaction when they get the highest score or grade (Astuti et al., 2017).

The fourth stage is group awards, where the teacher presents rewards to the winning group based on the fastest and top performer by announcing the game in front of the class and displaying the game's final results on the projector screen. Giving rewards as prizes will increase student satisfaction with the achievement results achieved (Zamzami, 2018). With rewards, satisfaction will occur, and when students feel happy and satisfied, they will maintain and repeat behavior that gives rise to satisfaction from the efforts made (Zamzami, 2018). Giving prizes will encourage students to study harder, and students who are not yet active will be motivated to catch up (Suharni & Purwanti, 2018). Satisfaction is one of the keys to motivation that encourages students to develop their abilities and skills further to improve their learning achievements (Sari et al., 2018).

The effect of TGT assisted by Q-Cards on students cognitive learning outcomes

The cognitive learning outcomes data for both the control group and experimental class students are presented in Table 6.

Table 6 Students cognitive learning result

	Pretest		Post-test	
	Control	**Experiment**	**Control**	**Experiment**
High score	73	63	83	96
Lowest score	26	30	60	70
Average	45	43,94	69,86	83,33
Median	44,5	43	70	83
Mode	46	40	63	80
Standart Deviation	9,63	7,75	6,87	7,46
Score Category	**Low**	**Low**	**Medium**	**High**

Based on Table 6, the control class has an average pretest score of 45 in the low category, and the average post-test score is 69.86 in the medium category. The pretest average is 43.94 in the low category, and the average post-test score the test result was 83.33 in the high range. For the experimental class, the average pretest score was 43.94, categorized as low, and an average post-test score of 83.33, categorized as high.

Based on the results of the prerequisite tests, which confirmed the normal distribution and homogeneity of the research data, hypothesis testing proceeded using parametric statistical methods, specifically the independent sample t-test. In the analysis of the independent sample t-test data, the critical test criterion was applied: Ho was rejected if the significance (2-tailed) was <0.05. The independent sample t-test are presented in Table 7.

In Table 7 of the independent sample t-test results, the pretest data exhibited a significance value of 0.633 > 0.05, leading to Ho's acceptance, indicating no difference in students' initial abilities between the control and experimental classes. Contrastingly, the post-test data had a significance value of 0.000, rejecting Ho and supporting H1, indicating that the Teams Games Tournament (TGT) learning model assisted by Quizizz Paper Mode (Q-Cards) had an impact on the cognitive learning outcomes of class XI SMA IT Ihsanul students regarding the immune system topic.

Table 7 Independent sample t-test result

	F	Sig	T	Df	Sig (2-tailed)
Pretest Cognitive Learning Result	0,463	0,498	0,479	70	0,633
Post-test Cognitive Learning Result	1,518	0,222	5,962	70	0,000

The findings of this study indicate that implementing the TGT learning model with Q-Cards influences students' cognitive learning outcomes. These results are consistent with Anggraeni (2018), which suggests that using the TGT learning model with Quizizz media positively affects student motivation and academic performance. Similarly, Pello (2018) successfully enhanced student learning achievements by implementing the TGT learning model with Kahoot media. This finding is echoed by Roykhan et al. (2022), who observed significant impacts on students' cognitive learning outcomes when using the TGT model supported by Wordsquare media.

The impact of integrating the TGT learning model with Q-Cards media on students' cognitive learning outcomes is closely tied to the TGT's sequential stages, which encompass material delivery, group formation, game tournaments, and group rewards. During the initial stage, teachers deliver material focusing on cognitive domain indicators such as remembering (C1) and understanding (C2) (Izzudin et al., 2022). Effective delivery enhances students' ability in C1 by ensuring they acquire comprehensive information during learning activities (Busyairi & Sinaga, 2015). Clarity in information delivery aids in students' ability to remember (C1) and understand (C2) the material (Dakhi, 2020). Additionally, relating content to real-life examples during delivery facilitates students' understanding (C2) of the material (Juwantara, 2019).

Throughout this phase, interspersing the delivery with questions related to the immune system stimulates active thinking and learning among students, thereby improving their understanding abilities (C2) (Utami et al., 2020).

The second stage is group formation. During this phase, students are formed into six groups consisting of six members, each chosen randomly. At this stage, students and their groups can explore the material and ensure that all group members understand it. This stage involves students as peer tutors (Septiyan, 2017). Students with low abilities will put more effort into learning, and students with high abilities are obliged to help team members who do not understand the subject matter (Utami, 2018). The peer tutoring method plays a role in helping train cognitive abilities in the realm of understanding (C2) in learning material (Rosanti, 2018). The peer tutoring method can improve student learning outcomes for their friends without any embarrassment or awkwardness (Nabila et al., 2021).

The third stage is the game's tournament. The teacher provides academic games using Q-Cards, which contain inquiries regarding the content that has been examined. The games tournament stage is related to the cognitive domains of recall (C1), comprehension (C2), application (C3), and analysis (C4) (Izzudin et al., 2022). Students and group members discuss answering the questions available on the Q-Cards media. Group discussion activities in solving questions can provide an understanding and allow the exchange of information with friends to strengthen understanding of the material (Wijayanti, 2016). Students and their groups will use all their knowledge to win the game (Rudolphi-Solero et al., 2021). Students try to remember the material, but if there is material, they forget to answer questions (Anggriyani & Hrp, 2021). Academic games given to students function to strengthen students' understanding (C2) of previously studied material (Rosnah, 2015).

Games can be used as an intermediary for learning and positively influence student learning outcomes (Budiariawan, 2019). Apart from that, Safniyeti et al. (2017) also believe that by implementing the TGT learning model, students feel that learning is not boring because the assessment format in learning takes the shape of academic games, which are quite fun so by employing the TGT learning model, students can improve their capacity for remembering (C1) and understanding (C2) the material they have learned. This model facilitates quick comprehension of the content through interactive learning, leading to improved retention of the lesson material (Mirawati, 2023).

Students who understand the learning material will apply their knowledge with game-based questions (Izzudin et al., 2022). Students will apply their knowledge when playing games (Sugiata, 2019). This aligns with Rahayu's (2017) opinion that students feel calm when working on game-based questions. Students who are given an example and practice questions will involve the cognitive domain ability to apply (C3) the material concepts obtained in solving them (Busyairi & Sinaga, 2015). Students can use games that contain questions to apply their knowledge (Izzudin et al., 2022). Group discussions in solving problems help enhance student academic performance because students and groups exchange opinions in solving problems given by the teacher, which can train students' analytical skills (Putriyanti & Fensi, 2017). Providing practice questions can train students' cognitive analyzing (C4) abilities (Busyairi & Sinaga, 2015).

The tournament games stage uses the help of Q-Cards media. Q-Cards is an interactive quiz used as a formative evaluation containing questions about the

material. If students answer the question incorrectly, then the correct answer will appear, which is then discussed with the teacher and students and can be used as student evaluation material so that it can improve results. Students' cognitive learning (Suryadi & Muladi, 2021). Interactive questions are useful for students to improve their understanding of the material that has been presented (Centauri, 2019). The questions presented in Q-Cards are interactive, significantly stimulating students to comprehend the learning material being carried out (Kurniawan & Huda, 2020).

Their colorful visual appearance and music support Q-Cards, which can add to the competitive atmosphere (Faijah et al., 2022). Interesting media utilization makes students more enthusiastic, boosts student engagement, and improves learning outcomes (Isnaeni & Hildayah, 2020). Interactive quiz games are designed to boost learning outcomes by providing practice questions in a gaming format, including rules that enrich the learning process, encouraging student engagement and ultimately enhancing learning results. (Adiwisastra, 2015). With interactive quizzes using Q-Cards, students see the questions as text, can observe the shapes and colors, and enjoy the sound of music accompanying the practice questions presented (Faijah et al., 2022). The variety of displays presented plays a role in building memory in students' minds. The variety of displays stimulates the right brain to process information to impact student academic performance positively (Kurniawan & Huda, 2020).

The final stage, namely group awards, is related to indicators of cognitive skills in remembering (C1), understanding (C2), applying (C3), and analyzing (Izzudin et al., 2022). Students who successfully win the game's tournament can be said to have mastered the material from remembering to analyzing (Lestari et al., 2018). Meanwhile, the group that does not win will try to understand better the material for the next tournament (Syahfitri et al., 2018). Rewarding the winning team can increase learning motivation, collect the highest score points, and achieve maximum results (Gunarta, 2018). Rewards play a role in shaping student academic performance (Utomo, 2015).

The award received by the best group will be a source of pride for students and group members because, with hard work, the learning team can become the best (Sarah et al., 2022). Having group awards makes students want to continuously be the best (Hero & Nalu, 2022). Giving awards encourages the enthusiasm of each group in the learning team to try their best to complete the task and become the best group (Aryani, 2018). Agree with Saputra et al. (2021) that giving rewards can increase enthusiasm for the ongoing learning process, thus leading to enhanced student learning achievement.

D. Conclusion

The TGT learning model, when integrated with Quizizz Paper Mode media, significantly influences the motivation and cognitive learning outcomes of 11th-grade students at SMA IT Ihsanul Fikri Mungkid, particularly in understanding immune system material. The experimental class demonstrated a notably higher overall motivation score of 63.91 (very high category) than the control class, with a final average learning motivation score of 46.67 (medium category). The statistical significance of the final learning motivation score (Sig 2-tailed = 0.000) supports these findings, indicating a significant difference below 0.05. Similarly, the cognitive learning outcomes were positively impacted by the TGT learning model with Quizizz Paper Mode media. The experimental class achieved a higher post-test score average of 83.33 (high category) compared to the control group's average of 69.86 (medium category). The statistical significance of the post-test scores (Sig 2-tailed = 0.000) also indicates a significant difference below 0.05. These research findings provide valuable insights for educators and prospective teachers in selecting appropriate instructional models and media to enhance student motivation and improve learning outcomes. They also serve as a foundational reference for further research into student motivation and cognitive learning outcomes in educational settings.

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