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Game-Based Interactive Media Innovation in Arabic Language Learning: The Effectiveness of STAD-Based Digital Escape Rooms on Students' Learning Interests

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Abstract

This study aimed to examine the effectiveness of integrating a Digital Escape Room with the Student Teams Achievement Division (STAD) cooperative learning model in improving students' interest in learning Arabic at MTs Ma'arif Sukorejo. The study employed a quasi-experimental design using a pretest–posttest control group design, involving 58 eighth-grade students divided equally into an experimental group ($n = 29$) and a control group ($n = 29$). In the experimental class, students learned Arabic through collaborative STAD activities integrated with Digital Escape Room challenges developed using the Genially platform, whereas the control class received conventional instruction. Data were collected using a learning-interest questionnaire covering students' enjoyment, interest, attention, and active participation, supported by observation, interviews, and documentation. The questionnaire demonstrated high reliability with a Cronbach's Alpha coefficient of 0.884. Data were analyzed using prerequisite tests, an Independent Samples t -test, and the Normalized Gain (N-Gain) test through IBM SPSS Statistics 27. The Independent Samples t -test, conducted on the posttest scores, revealed a significant difference between the experimental and control groups ($p < 0.001$). Furthermore, the experimental group achieved an average N-Gain score of 40.42% (moderate category), whereas the control group obtained –12.30%, indicating no meaningful improvement. These findings demonstrate that integrating the STAD cooperative learning model with Digital Escape Room media provides a more effective learning experience for enhancing students' interest in learning Arabic than conventional instruction.

Keywords: Digital Escape Room, STAD, learning interest, Arabic language learning, game-based learning.

Introduction

Learning Arabic in formal education requires instructional approaches that foster students' linguistic competence as well as their communicative skills (Syafei, Ardiansyah, and Nugraha 2025). In line with the implementation of the Independent Curriculum, learning is expected to adopt a student-centered approach that promotes active

participation, character development, and the mastery of twenty-first century competencies, including critical thinking, collaboration, and creativity (Andelia and Indriani 2026). Despite these expectations, Arabic is still frequently perceived by students as a challenging subject, resulting in low learning interest. Learning interest is reflected in students' attention, enthusiasm, and active engagement throughout the learning process, including their interactions with learning materials, teachers, and peers (Budiasningrum, Setiawan, and Efendi 2025). Students with high learning interest tend to participate more actively in classroom discussions, demonstrate greater curiosity, and engage more consistently in learning activities, whereas those with low learning interest generally exhibit limited attention and passive participation during instruction (Iliza and Hanif 2025).

The continued reliance on conventional instructional media, such as whiteboards and printed textbooks, provides limited opportunities for interactive learning and is not fully aligned with the demands of twenty-first century education, which emphasizes innovation, interactivity, and the integration of digital technology (Impron et al. 2025). Initial interviews with Arabic language teachers at MTs Ma'arif Sukorejo revealed that many students were reluctant to express their ideas, participated minimally in classroom discussions, and quickly lost interest during learning activities. These findings were consistent with classroom observations, which showed that learning remained predominantly teacher-centered and provided limited opportunities for students to participate actively and collaborate with their peers. Such conditions indicate a gap between the student-centered principles promoted by the Independent Curriculum and the instructional practices currently implemented in the classroom, highlighting the need for more engaging and interactive learning approaches.

In modern educational settings, learning media play a fundamental role in enhancing the quality and effectiveness of the learning process. According to Schram, learning media function as technological tools that facilitate the delivery of instructional messages between educators and learners (Riyana 2012). Beyond serving as communication channels, learning media also support educators in presenting instructional content more effectively and efficiently, thereby fostering meaningful learning experiences. Contemporary educational research further emphasizes that well-designed learning media can improve students' cognitive engagement by integrating

verbal and visual information in ways that facilitate knowledge construction and retention (Mayer 2021). As an integral component of learning resources, learning media comprise both software, which contains instructional content, and hardware, which enables the delivery of that content during the learning process (Adawiyah and Syarifuddin 2023). Therefore, the effectiveness of learning media depends not only on technological features but also on how they are pedagogically designed to support meaningful learning.

Along with the development of technology, digital and multimedia learning media are opportunities as well as challenges in education. This technology allows the use of video, animation, and simulation so that students not only read or listen to the material, but can also see and experience learning in person (Resti et al. 2024). This makes the learning process more interesting and able to increase students' motivation and understanding. However, there are still obstacles such as limited access to technology and the internet in some areas. In addition, the inappropriate or excessive use of digital media can also interfere with focus and reduce learning effectiveness. The implementation of relevant media has been proven to be able to stimulate students' attention, present a multisensory learning experience, and facilitate the internalization of material in a more concrete and meaningful way (Syafei 2025). On this basis, the urgency of learning media innovation is very crucial to escalate the active involvement and learning interest of students, especially in the context of Arabic language teaching. In addition, the integration of digital media opens up space for students to carry out self-regulated learning as well as collaborative, which in pairs not only escalates cognitive capacity, but also stimulates the development of their affective and social dimensions. Therefore, the reconstruction of digital learning media that is systematically designed and adaptive to the characteristics of students is present as an effective alternative solution in optimizing Arabic language learning (Dahlan, Sulthan, and Faridah 2025).

Currently, the fastest growing learning media is interactive media. One of the applications of technology in interactive learning media is game-based learning. This approach is a game designed to stimulate thinking skills, while also increasing interest in learning and problem-solving skills (Sabilla, Sakir, and Firdaus 2025). Game-based digital media in Arabic learning has been identified as being able to help students overcome the saturation and learning anxiety that often arise due to the characteristics of the material that are considered difficult (Safitri et al. 2025). The existence of elements

of challenge, problem-solving, and direct feedback in digital learning media can increase students' curiosity and interest in learning materials. The use of media in the learning process can also help students build a positive attitude towards learning activities (Firdausiyah, Syarifuddin, and Rizal 2025). In addition, this research is also based on the game-based learning theory put forward by James Paul Gee and Sebastian Deterding, who explain that the implementation of game-based learning is able to transform the process into an immersive, competitive, and substantial process. This stimulation significantly contributes to an increase in intrinsic motivation as well as the recurrence of students' academic interests (Agustin, Rahman, and Gustiana 2025).

The Digital Escape Room represents an innovative gamification-based learning medium. This approach requires students to solve various challenges gradually in order to achieve learning objectives (Aulina, Istanti, and Haryadi 2026). The digital escape room media in this study was developed using the Genially application as a game-based interactive learning facility. The use of the application allows the presentation of Arabic materials in the form of educational games that are interesting and challenging so that it can significantly trigger students' interactive participation in the classroom. Through the interactive features available, students are directed to gradually complete various challenges, puzzles, and learning problems to move on to the next stage of the game. In addition, the attractive visual display and the integration of audio, image, and animation elements in the digital escape room are able to construct a more dynamic learning atmosphere while reducing students' academic saturation. Thus, the use of the Genially application in the development of digital escape room media is expected to be able to escalate students' interest in learning Arabic through the stimulation of a more active, collaborative, and innovative instructional experience. This media encourages critical thinking, problem-solving, and active participation of students in learning. To make its use more optimal, this media can be combined with a STAD-type cooperative approach to escalate social interaction and students' collective responsibility in work groups, individual responsibilities, and interactions between students. The STAD-type cooperative approach, conceptualized by Robert E. Slavin, essentially emphasizes the synergy and collective responsibility of students in heterogeneous small-group structures (Mubadillah and Sa'adah 2025). A number of important benefits of implementing STAD include the optimization of student involvement in the classroom and the stimulation of

interpersonal skills. In addition, this model contributes positively to internalizing the values of teamwork and academic responsibility independently (Natasya Nurul Lathifa et al. 2024).

A number of previous studies confirm that the implementation of Escape Room media is significantly able to escalate students' intrinsic motivation and active engagement, as well as stimulate critical thinking, communication, collaboration, and creativity competencies (4C skills) (Aulina, Istanti, and Haryadi 2026). This argument is strengthened by Aprilia and Inganah's research which confirms the effectiveness of Digital Escape Room in stimulating students' affective aspects, in the form of increasing instructional motivation and internalizing cultural awareness (Aprilia and Inganah 2025). Empirical findings from Roheti et al. It was shown on the effectiveness of escape room media in stimulating the affective dimension and active participation of students. The characteristics of this interactive and creative media have proven to be reliable in triggering teamwork throughout the instructional process (Roheti et al. 2025). Research by Rosiana et al. Emphasizing that the Student Teams Achievement Division (STAD) type cooperative learning integration model assisted by the Wordwall platform has proven to be effective in escalating students' learning outcomes, interests, and active participation during the instructional process (Nina Rosiana et al. 2025). These findings are in line with the cooperative learning theory developed by Slavin, which asserts that the Student Teams Achievement Division (STAD) model is effective in escalating student engagement and learning motivation. The improvement is stimulated through synergistic integration of working groups, accountability of individual responsibilities, and a system of rewards given to groups (Nurfadilah, Tanjung, and Prehartanti 2025). Although this study shares relevance with previous studies in terms of the use of escape room media, the main differentiation of this study lies in the integration of the media with the Student Teams Achievement Division (STAD) type cooperative learning model. Through this convergence approach, the focus of teaching not only includes the exploitation of digital interactive media, but also focuses on strengthening aspects of collaboration, synergy, and social interaction between participants in the education of group structures. The integration of Digital Escape Room media with the STAD-type cooperative model is projected to be able to construct a more dynamic learning atmosphere and optimize the active participation of students. Through this synergy, students are not only involved in

the cognitive dimension, but also socially transform throughout the instructional process. This holistic involvement in its existence is expected to escalate the retention of students' interest in learning Arabic.

Based on this rationale, this study aims to examine the effectiveness of integrating Digital Escape Room media with the STAD cooperative learning model in enhancing the Arabic learning interest of eighth-grade students at MTs Ma'arif Sukorejo. By providing empirical evidence on this instructional approach, the study contributes to the growing body of research on game-based learning in Arabic language education and offers practical guidance for educators seeking to promote students' learning interest through interactive and collaborative learning environments.

Method

This research applies a quantitative method through a quasi-experiment design with a pretest–posttest control group design model, this step is used to test the effectiveness of the use of game-based interactive media in the form of STAD-based digital escape rooms on students' interest in learning Arabic. Sugiyono (2010) explained that quantitative research is a scientific approach that is carried out systematically to analyze the components in a phenomenon and the relationships between its variables. Based on this understanding, the quantitative approach is oriented to formulate and apply mathematical models, theoretical frameworks, and hypotheses to test and explain the relevance of a natural phenomenon (Wahyudi 2019).

The study involved 58 eighth-grade students from MTs Ma'arif Sukorejo, Pasuruan, consisting of 29 students in the experimental group (Class VIII A) and 29 students in the control group (Class VIII B). A purposive sampling technique was employed because the selected classes possessed comparable academic and instructional characteristics relevant to the research objectives. The selection of both classes was conducted in consultation with the Arabic language teacher, who confirmed that they were comparable in terms of grade level, curriculum, prior Arabic learning experiences, and overall learning abilities before the intervention. These criteria were used to establish baseline equivalence between the experimental and control groups, thereby minimizing potential pre-existing differences that could influence the research findings. The experimental group received instruction using the STAD-based Digital Escape Room

media, whereas the control group was taught through conventional instructional methods without the digital intervention.

Before the intervention, preliminary data were collected through classroom observations and semi-structured interviews with the Arabic language teacher to identify students' learning conditions, learning interest, and instructional practices. The study was conducted over four research meetings. The first meeting was devoted to classroom observations and interviews with the Arabic language teacher. During the second meeting, both groups received an introductory lesson on the Arabic topic of sports (*al-riyāḍah*) to ensure that students had comparable prior knowledge. In the subsequent instructional sessions, students in the control group completed the learning interest questionnaire as a pretest, received instruction through conventional teacher-centered learning, and completed the posttest at the end of the lesson. Meanwhile, students in the experimental group completed the same pretest before participating in STAD-based cooperative learning activities. They worked collaboratively in heterogeneous groups to discuss the learning materials and complete group tasks, followed by an individual Digital Escape Room activity using their own mobile devices. After completing the learning activities, the students completed the posttest questionnaire to measure changes in their learning interest. All research instruments were designed in a linear manner with the purpose of the study, which is to measure the effectiveness of the combination of media and models on students' interest in learning Arabic at MTs Ma'arif Sukorejo. This comparative data collection combines four main techniques, namely questionnaires, interviews, observations, and documentation.

The learning interest questionnaire is used as the main instrument to measure the level of students' enthusiasm for learning, both in the experimental group and in the control group, through the pretest and posttest stages. This instrument is designed to ignite the dynamics of learning motivation before and after the intervention is given. The construction of this questionnaire refers to several indicators of learning interest, which include aspects of feeling happy, interest in the material, attention during the instructional process, and active involvement of learners. The measurement of this instrument uses a four-point Likert scale, which consists of Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS) options. As a support for the data, semi-structured interviews were conducted with Arabic teachers to explore qualitative data on the learning

portrait, the level of student interest, the variety of media and methods that exist, and the obstacles faced in the field. Observations were carried out on a non-participant basis to observe the learning process in the classroom, especially student activities, group work, student attention, and responses to the use of STAD-based Digital Escape Room media. In addition, documentation is used to complete research data, such as student list data, learning schedules, photos of activities, and pretest and posttest questionnaire results.

Research data sourced from learning interest questionnaires at the pretest and posttest stages were analyzed using two statistical stages. First, a prerequisite test that includes a test of normality and homogeneity of data. Second, hypothesis testing was conducted using an Independent Samples *t*-test to compare the posttest scores of the experimental and control groups after the intervention. Finally, the efficacy and effectiveness level of the use of *STAD*-type cooperative learning-based Digital Escape Room in boosting students' interest in Arabic were evaluated through the N-Gain test formula. The resulting N-Gain scores were expressed as percentages and interpreted based on the N-Gain interpretation criteria adopted in this study to determine the level of improvement in students' learning interest after the intervention.

Result and Discussion

This study was conducted at the junior secondary education level involving 58 eighth-grade students of MTs Ma'arif Sukorejo, who were assigned to an experimental group and a control group. The experimental group received instruction using a STAD-based Digital Escape Room, whereas the control group was taught through conventional instructional methods. The intervention was designed to empirically examine the effectiveness of integrating the Digital Escape Room with the STAD cooperative learning model in enhancing students' interest in learning Arabic.

Students' learning interest was measured using a 20-item questionnaire developed based on four indicators proposed by Slameto, namely feelings of enjoyment, interest, attention, and active participation. The questionnaire employed a four-point Likert scale with both positive and negative statements to obtain a comprehensive measure of students' learning interest before and after the intervention.

The questionnaire was administered during the pretest and posttest stages to identify changes in students' learning interest before and after the instructional intervention. The collected data were subsequently analyzed to compare the learning

interest of students in the experimental and control groups following the implementation of the STAD-based Digital Escape Room.

The collected data were analyzed using IBM SPSS Statistics. Instrument validity was established through expert judgment, followed by a reliability test to ensure the internal consistency of the questionnaire. Normality and homogeneity tests were subsequently performed as prerequisite analyses before hypothesis testing. An Independent Samples *t*-test was conducted using the posttest scores to determine whether there were significant differences in students' learning interest between the experimental and control groups after the intervention. Furthermore, the effectiveness of the STAD-based Digital Escape Room was evaluated using the Normalized Gain (N-Gain) score, which measures the relative improvement in students' learning interest from the pretest to the posttest.

Validity Test

Validity test is defined as a scientific evaluation procedure that serves to test the level of precision, validity, and accuracy of research instruments in collecting empirical data. The effectiveness of an instrument is shown by its ability to precisely operationalize and measure latent variables to be observed, in line with the established theoretical constructs (Zayrin et al. 2025). In this context, the validity test serves to ensure that each question item or statement has a linear relevance to the indicators and dimensions of the research variable.

The validation of the instruments in this study applies a qualitative-normative approach through an expert review conducted by the supervisor. This strategic step is taken to ensure that each question item not only has textual performance validity, but also has strong contextual relevance to the phenomenon being studied, so that it can be scientifically accounted for.

Reliability Test

The reliability test was applied to increase the level of consistency of research instruments in collecting data. An instrument is broken down reliably if it is able to produce consistent and reliable data on each repeated measurement (Darma 2021). In this study, reliability estimates were calculated using the Cronbach's Alpha coefficient assisted by IBM SPSS Statistics software, with a thin criterion if the Cronbach's Alpha value obtained exceeded the threshold of 0.70.

Table 1. Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.884	20

Based on the results of quantitative analysis carried out on 20 research instruments, a Cronbach's Alpha coefficient of 0.884 was obtained. Referring to the reliability test criteria, an instrument is declared reliable and has strong internal consistency if the resulting Cronbach's Alpha value exceeds the threshold of 0.70. Thus, the value of 0.884 obtained in this test indicates that the instrument used has a very high level of reliability. This confirms that all question items in this transport are *ajek*, stable, and trustworthy as an accurate data collection tool in research.

Normality Test

The normality test was applied to determine whether the distribution of student learning interest data, both in the experimental group and the control group, met the normal distribution requirements. The data distribution test in this study was analyzed using the Kolmogorov-Smirnov One-Sample test as a prerequisite for statistical analysis.

Table 2. Normality Test

		Tests of Normality					
		Kolmogorov-Smirnova			Shapiro-Wilk		
Classes		Statistic	df	Sig.	Statistic	df	Sig.
Student Learning Interest Results	Pre-Test Experiment (Escape Room with STAD)	.142	29	.142	.928	29	.049
	Post-Test Experiment (Escape Room with STAD)	.137	29	.171	.897	29	.008
	Pre-Test Control (Conventional)	.107	29	.200*	.975	29	.712
	Post-Test Control (Conventional)	.136	29	.179	.901	29	.011

The results of the normality analysis showed homogeneous data under distribution conditions. The experimental class produced a significance value of 0.142 at the pretest

stage and increased to 0.171 at the posttest stage. On the other hand, the control class recorded a significance value of 0.200 in the pretest and 0.179 in the posttest. Given the possibility that the overall data is above the minimum standard of 0.05, the zero hypothesis is accepted which means that all variances of the research data are distributed normally.

Homogeneity Test

The homogeneity test is a statistical analysis to bring out the similarities of variants from several populations or data groups (Muliana et al. 2025). This test aims to prove that the variation in scores in the groups compared is equivalent, so that the generalization of the results of the parametric analysis used can be considered valid and free from the bias of differences in the distribution of data.

Table 3. Homogeneity Test

Test of Homogeneity of Variance

		Living Statistic	df1	df2	Sig.
Student Learning Interest Results	Based on Mean	.015	1	56	.902
	Based on Median	.013	1	56	.910
	Based on Median and with adjusted df	.013	1	52.590	.910
	Based on trimmed mean	.028	1	56	.869

The variance homogeneity test through Levene's Test showed a significance figure of 0.902. This index confirms that the distribution of data has a homogeneous variance, given that the resulting probability value is above the alpha standard threshold ($0.902 > 0.05$) in both the experimental and control classes. The implications of these findings suggest that both observation groups have baseline equivalence (equivalent characteristics) and meet the formal requirements for further analysis using independent sample t-assays. The validity of this homogeneity also provides methodological guarantee that the score fluctuations that occurred at the end of the study were purely triggered by STAD-based digital escape room media interventions, not due to the disparity bias of the initial variance between groups.

Uji Independent Sample T-Test

Independent Samples t-Test is defined as a comparative parameter test to propagate the mean difference between two independent populations or data groups. This test was applied to prove a comparative hypothesis, where the variability of data between groups was analyzed to ensure that the differences in results found were representations of the effects of independent variables, not just statistical coincidence.

Table 4. Uji Independent Sample T-Test

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Student Learning Interest Results	Equal variances assumed	0.015	0.902	5.572	56	0.000	10.276	1.844	6.582	13.970
	Equal variances not assumed			5.572	55.187	0.000	10.276	1.844	6.581	13.971

The Independent Samples t-test conducted on the posttest scores revealed a significance value (Sig. 2-tailed) of 0.000, which was lower than the significance level of 0.05 ($0.000 < 0.05$). Therefore, the null hypothesis (H_0) was rejected, and the alternative hypothesis (H_a) was accepted. The analysis yielded a t-value of 5.572 with a mean difference of 10.275 between the experimental and control groups, indicating a statistically significant difference in students' learning interest after the intervention. These findings demonstrate that the implementation of the STAD-based Digital Escape Room significantly improved the learning interest of eighth-grade students in Arabic compared with conventional instruction. While the Independent Samples t-test confirmed a statistically significant difference in students' learning interest between the experimental and control groups based on the posttest scores, the effectiveness of the intervention was further evaluated using the Normalized Gain (N-Gain) analysis to determine the magnitude of improvement in students' learning interest from pretest to posttest.

N-Gain Test

To further evaluate the effectiveness of the intervention, the Normalized Gain (N-Gain) analysis was conducted to measure the magnitude of improvement in students' learning interest from the pretest to the posttest in both the experimental and control

groups. The N-Gain values were calculated using IBM SPSS Statistics by comparing students' pretest and posttest scores and were expressed as percentages. The resulting N-Gain percentages were interpreted according to the N-Gain interpretation criteria adopted in this study to determine the level of improvement achieved by each group. This analysis complemented the Independent Samples *t*-test by providing additional information on the effectiveness of the STAD-based Digital Escape Room intervention relative to conventional instruction.

Table 5. N-Gain Test

No	Experimental Class	Control Class
	N-Gain Score (%)	N-Gain Score (%)
1.	42,11	11,76
2.	45,00	-10,00
3.	17,31	3,23
4.	57,14	-10,00
5.	28,00	9,09
6.	33,33	30,00
7.	38,10	-56,00
8.	46,15	13,04
9.	4,17	-16,00
10.	52,38	-4,76
11.	39,29	-164,71
12.	68,29	13,79
13.	31,03	,00
14.	77,78	-38,10
15.	43,33	47,37
16.	25,00	20,69
17.	69,70	22,50
18.	47,06	25,00
19.	50,00	6,45
20.	12,50	,00
21.	16,67	6,67
22.	11,54	-29,17
23.	43,24	-4,76
24.	26,09	-16,00
25.	68,42	6,25
26.	47,37	-46,43
27.	40,00	23,33
28.	35,14	20,00
29.	56,00	-220,00
Average	40,4181	-12,3015
Minimal	4,17	-220,00
Maximum	77,78	47,37

Based on the N-Gain analysis, the experimental group that received the STAD-based Digital Escape Room intervention obtained an average N-Gain score of 40.42%, indicating a moderate level of improvement according to the N-Gain interpretation criteria adopted in this study. The N-Gain scores ranged from 4.17% to 77.78%, with a standard deviation of 18.45, suggesting a consistent improvement in students' learning interest following the intervention. In contrast, the control group, which received conventional instruction, recorded an average N-Gain score of -12.30%, indicating a decline in learning interest, with scores ranging from -220.00% to 47.37% and a standard deviation of 55.37. These findings indicate that the STAD-based Digital Escape Room intervention was more effective than conventional instruction in improving students' interest in learning Arabic.

The findings of this study demonstrate that integrating the Digital Escape Room with the STAD cooperative learning model significantly enhances students' interest in learning Arabic. This conclusion is supported by the Independent Samples *t*-test, which revealed a statistically significant difference between the experimental and control groups ($p = 0.000$), as well as by the N-Gain analysis, in which the experimental group achieved an average N-Gain score of 40.42%, indicating a moderate level of improvement according to the N-Gain interpretation criteria adopted in this study, substantially higher than that of the control group. These findings indicate that combining game-based digital media with cooperative learning strategies provides a more effective learning experience than conventional instruction in fostering students' interest in Arabic language learning.

The present findings are consistent with those reported by Halizah et al. (2025), who found that the implementation of a Genially-based Digital Escape Room improved elementary students' reading interest and learning achievement (Halizah, P.K. Sari, and Salsabiila 2025). However, the present study also reveals several important differences. While Halizah et al. focused on improving reading literacy among elementary school students through the use of Digital Escape Room media, this study investigated students' interest in learning Arabic at the junior secondary level by integrating the Digital Escape Room with the STAD cooperative learning model. Therefore, the contribution of the present study lies not only in confirming the effectiveness of Digital Escape Room as an instructional medium but also in demonstrating that its integration with a structured

cooperative learning strategy can further strengthen students' engagement and learning interest in Arabic language education.

These findings can be interpreted through the perspective of recent Game-Based Learning research, which suggests that digital game-based environments increase students' motivation, engagement, and active participation by providing meaningful challenges, immediate feedback, and interactive learning experiences (Buchner, Rüter, and Kerres 2022). In the present study, the Digital Escape Room encouraged students to solve instructional challenges actively rather than passively receiving information, thereby creating an immersive learning environment that enhanced students' attention, curiosity, and enthusiasm throughout the learning process.

Furthermore, the results support recent perspectives on cooperative learning, which emphasize that collaborative interaction and shared problem-solving promote deeper engagement and more meaningful learning experiences when integrated with game-based instructional approaches (Fonseca et al. 2023). During the implementation of the STAD model, students worked collaboratively in heterogeneous groups to discuss Arabic learning materials before completing the Digital Escape Room individually using their own mobile devices. This combination of collaborative learning and individual accountability enabled students to construct knowledge collectively while maintaining personal responsibility for task completion. Consequently, the integration of the STAD model with the Digital Escape Room not only enhanced students' interest in learning Arabic but also strengthened collaboration, communication, and active participation during classroom instruction.

Overall, this study extends previous research by providing empirical evidence that integrating Digital Escape Room media with the STAD cooperative learning model represents an effective instructional innovation for Arabic language learning in madrasah contexts. Unlike previous studies that primarily examined the independent effects of Digital Escape Room media, the present study demonstrates that combining game-based learning with cooperative learning strategies produces a more comprehensive learning experience capable of improving students' affective engagement and interest in learning Arabic. These findings also provide practical implications for Arabic language teachers by demonstrating that the integration of digital game-based media with cooperative

learning strategies can be adopted as an effective instructional approach to foster students' learning interest in madrasah classrooms.

Conclusion

This study aimed to examine the effectiveness of integrating the Digital Escape Room with the STAD cooperative learning model in improving Grade VIII students' interest in learning Arabic at MTs Ma'arif Sukorejo. The findings demonstrate that this objective was successfully achieved. The Independent Samples *t*-test yielded a significance value of 0.000 ($p < 0.05$), indicating a statistically significant difference between the experimental and control groups after the intervention. This finding was further supported by the Normalized Gain (N-Gain) analysis, in which the experimental group achieved an average N-Gain score of 40.42%, indicating a moderate level of improvement according to the N-Gain interpretation criteria adopted in this study, whereas the control group showed substantially lower improvement.

The findings confirm that integrating the Digital Escape Room with the STAD cooperative learning model creates a more active, interactive, collaborative, and engaging learning environment that effectively enhances students' interest in learning Arabic. Therefore, this study contributes to Arabic language education by providing empirical evidence that combining game-based digital media with a structured cooperative learning strategy offers a more effective instructional approach than conventional teaching for fostering students' learning interest in madrasah classrooms.

Despite these contributions, this study has several limitations. First, the participants were drawn from only one madrasah, which may limit the generalizability of the findings. Second, the study focused only on students' learning interest and did not examine other important learning outcomes, such as academic achievement, learning motivation, higher-order thinking skills (HOTS), or collaborative competencies. In addition, the implementation of the STAD-based Digital Escape Room depends on the availability of adequate digital infrastructure and stable internet connectivity, which may affect its applicability in different educational settings. Therefore, future studies are recommended to involve larger and more diverse samples and to investigate the effectiveness of this instructional approach across broader cognitive, affective, and collaborative learning outcomes.

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