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The Effectiveness of ZEP Quiz-Based Educational Games in Enhancing Students' Motivation to Learn Arabic

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Abstract This study aims to examine the effectiveness of ZEP Quiz-based educational games in enhancing Arabic language learning motivation among students of SMK NU 2 Glagah, Lamongan. The declining motivation to learn Arabic in vocational Islamic secondary schools, attributed primarily to the monotonous nature of conventional instructional approaches, necessitates innovative pedagogical interventions. This study employed a quantitative approach with a one-group pretest-posttest quasi-experimental design. Data were collected from 27 twelfth-grade students using a pre-test on Arabic language proficiency and a 20-item Likert-scale motivation questionnaire. Data analysis involved descriptive statistics, the Shapiro-Wilk normality test, Paired Sample t-Test, Wilcoxon Signed Rank Test, and N-Gain analysis. The findings revealed a significant increase in learning motivation: the mean pretest score of 41.85 (low category) improved to a mean posttest score of 91.56 (very high category). The Paired Sample t-Test yielded $t = 41.820$ with $p = 0.000 < 0.05$, and the Wilcoxon test confirmed this result with $Z = -4.541$ and $p = 0.000$. The N-Gain score of 0.8618 falls within the high category, and Cohen's $d = 8.048$ indicates a huge effect size. The novelty of this study lies in its specific examination of ZEP Quiz a gamification-based digital quiz platform as a motivational intervention in Arabic language learning at the vocational secondary school level. These findings provide empirical evidence that ZEP Quiz constitutes a highly effective educational media for improving student motivation in Arabic language instruction.

Keywords Educational Games; Learning Motivation; Arabic Language; ZEP Quiz.

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1 INTRODUCTION

Arabic language learning occupies a central position in Islamic-based vocational secondary education, serving not merely as a medium of linguistic competence but also as a vehicle for the consolidation of religious knowledge and cultural identity. Nevertheless, empirical observations and prior research consistently demonstrate that a significant proportion of students encounter considerable difficulties in Arabic language acquisition due to the perceived complexity, abstraction, and inaccessibility of the subject matter when delivered through conventional pedagogical methods such as lecturing and rote memorization. Such conditions frequently give rise to diminished learning motivation, manifested in reduced participation, limited

active engagement, and a notable decline in students' enthusiasm for mastering Arabic vocabulary and grammatical structures.

The phenomenon of low learning motivation in foreign language instruction has been widely discussed in recent Indonesian scholarly literature. A study by Naimah et al. (2024) indicates that Arabic language learning tends to become less engaging when it is not supported by innovative instructional approaches, leading to decreased student motivation. In a broader context, other studies also confirm that monotonous teaching methods are a primary factor contributing to low student engagement in language learning.

In the current era of digital transformation, gamification-based learning approaches have increasingly been recognized as effective strategies to enhance student motivation and participation. Recent research by Aisyaroh et al. (2026) demonstrates that the use of digital learning media based on gamification significantly improves students' learning motivation through the integration of interactive elements such as digital quizzes, challenges, and real-time feedback. Furthermore, gamification has been proven to create a more interactive, competitive, and enjoyable learning environment by incorporating game elements such as points, levels, and reward systems.

Within the context of Arabic language learning specifically, several studies have demonstrated the capacity of educational games to generate more dynamic and non-monotonous learning experiences while simultaneously mitigating students' psychological resistance to the subject matter. Research conducted at MTsN 1 Kota Palangka Raya employing the Quizizz game-based platform, for instance, showed that such media were capable of providing additional motivational support in the acquisition of Arabic vocabulary and grammatical structures (Atisyah & Ilmiani, 2024). Similarly, Septianto and Kamalia (2025) confirmed that game-based Arabic language learning strategies measurably increased student enthusiasm, active participation, and self-confidence in secondary school settings. Maulidiyah, Baihaqi, Huda, and Astutik (2025) further demonstrated that ZEP Quiz gamification significantly enhanced Arabic vocabulary mastery outcomes.

Preliminary observations conducted at SMK NU 2 Glagah revealed an evident pattern of low Arabic language learning motivation. This was reflected in students' reluctance to respond to classroom questions, a low rate of independent task completion, and a general lack of interest in deepening vocabulary knowledge contextually. These conditions indicated an urgent need for a more contextually responsive, engaging, and technologically aligned instructional approach suited to the characteristics of the current digital generation.

In response to this instructional challenge, ZEP Quiz, a gamification-based digital quiz platform, was identified as a promising instructional intervention. The platform provides interactive quiz interfaces, competitive scoring mechanisms, and progressively structured learning tasks designed to stimulate students' intrinsic motivation for active learning. ZEP Quiz integrates game elements such as leaderboards, point

systems, time-bound responses, and immediate feedback, which have been shown to enhance student engagement and learning motivation.

While prior research has investigated gamification in Arabic language learning, studies specifically examining the effectiveness and magnitude of ZEP Quiz's influence on learning motivation as an affective variable at the vocational secondary school level remain limited. This study therefore contributes a distinct novelty: it specifically tests ZEP Quiz as a motivational intervention for Arabic language learning at the SMK level, employs a quantitative pretest-posttest design, and measures both the statistical significance and practical magnitude of the effect. This research thus addresses the following objectives: (1) to describe the implementation of ZEP Quiz-based educational games in Arabic language learning at SMK NU 2 Glagah; (2) to determine the effectiveness of ZEP Quiz in enhancing Arabic language learning motivation; and (3) to quantify the magnitude of its influence on student motivation.

2 METHOD

This study employed a quantitative approach with a quasi-experimental design, specifically the one-group pretest-posttest design. This design was selected because it enables the measurement of changes in a single group before and after an intervention, providing a practical and educationally valid means of assessing the impact of instructional treatment within a naturalistic classroom context (Fraenkel, Wallen, & Hyun, 2021). The study was situated within a positivist paradigm, which prioritizes the objective, empirical, and statistically informed examination of causal relationships between variables (Creswell & Creswell, 2023).

The independent variable (X) was the use of ZEP Quiz-based educational games in Arabic language instruction, operationalized through indicators including the deployment of game elements (scoring, levels, and rewards), interactivity, student engagement in quiz activities, utilization of contextually appropriate virtual environments, and the provision of real-time feedback. The dependent variable (Y) was Arabic language learning motivation, conceptualized on the basis of Self-Determination Theory (Ryan & Deci, 2020) and assessed across seven motivational dimensions: interest and attention, concentration and focus, activity and participation, enthusiasm and eagerness, self-confidence, relevance and comprehension, and satisfaction with the desire to continue learning.

The research was conducted at SMK NU 2 Glagah, Lamongan, during the month of March of the current academic year. Participants comprised 27 twelfth-grade students selected through purposive sampling based on the relevance of their classroom context to the research objectives. Data collection employed four instruments: (1) a pretest measuring baseline Arabic language proficiency through 10 multiple-choice items covering text comprehension, vocabulary (mufradat), grammar (qawa'id), and sentence arrangement (tartīb al-kalimah); (2) a 20-item posttest motivation questionnaire based on a five-point Likert scale (1 = Strongly

Disagree to 5 = Strongly Agree) derived from the ARCS motivational model (Keller) and SDT indicators; (3) classroom observation using structured observation sheets; and (4) documentation of the learning process.

Data analysis proceeded through four sequential stages. First, descriptive statistical analysis was conducted to calculate means, standard deviations, minimum and maximum scores, and median values for both pretest and posttest data. Second, normality testing was performed using the Shapiro-Wilk test (appropriate for $n < 50$) to determine whether the data conformed to a normal distribution. Third, hypothesis testing was conducted using the Paired Sample t-Test as the primary parametric test, supplemented by the Wilcoxon Signed Rank Test as a non-parametric confirmatory analysis, given that the pretest and difference scores (D) did not satisfy the assumption of normality. Fourth, N-Gain analysis was employed to quantify the magnitude of motivational improvement, classified as high ($g \geq 0.70$), moderate ($0.30 \leq g < 0.70$), or low ($g < 0.30$) according to Hake's (1999) criteria. Effect size was additionally calculated using Cohen's d to provide a measure of practical significance.

3 FINDINGS AND DISCUSSION

Findings

Implementation of ZEP Quiz-Based Educational Games

Prior to the intervention, baseline assessment revealed that students' Arabic language learning motivation was categorically low. Observational data confirmed that many students were passive during instruction, expressed boredom with conventional lecture-based methods, and demonstrated low task completion rates. The pretest administered to all 27 students produced a mean correct response rate of 43.0%, classified as low. Among the ten test items, only one item (PT-01: text comprehension) approached the adequate threshold at 63.0%, while two items (PT-03 and PT-07) recorded correct response rates of only 33.3%. Weaknesses were distributed across all competency domains, encompassing text comprehension, vocabulary, grammar, and sentence arrangement, indicating a broad motivational and competency deficit rather than a domain-specific one.

Table 1. Pretest Results on Arabic Language Proficiency (N = 27)

No.	Code	Item Indicator	Correct (n)	N	% Correct
1	PT-01	Text comprehension (reading)	17	27	63.0%
2	PT-02	Text comprehension (activity)	11	27	40.7%
3	PT-03	Text comprehension (schedule)	9	27	33.3%
4	PT-04	Vocabulary (mufradat)	11	27	40.7%
5	PT-05	Text comprehension (evening)	12	27	44.4%
6	PT-06	Vocabulary (image-based)	13	27	48.1%
7	PT-07	Grammar (fill-in)	9	27	33.3%
8	PT-08	Sentence arrangement	10	27	37.0%
9	PT-09	Vocabulary (al-futur)	11	27	40.7%
10	PT-10	Sentence arrangement	13	27	48.1%
		Overall Mean		**27**	**43.0%**

Source: Student pre-test data, SMK NU 2 Glagah, March 2026.

Implementation of ZEP Quiz was structured across three instructional phases. In the pre-activity phase (approximately 10 minutes), the teacher activated students' prior knowledge through brief oral questioning about the thematic content (الأنشطة اليومية / daily activities) and announced the use of ZEP Quiz, which immediately generated visible student enthusiasm. In the core activity phase (approximately 30 minutes), students accessed the platform via their personal smartphones using a session code displayed on the classroom projector. Quiz items developed across four types: multiple choice, word matching, fill-in-the-blank, and sentence arrangement were presented with time constraints of 15–30 seconds per item, and a real-time leaderboard was displayed after each question. This competitive scoring mechanism, which rewarded both accuracy and response speed, sustained student focus and generated a noticeably dynamic classroom atmosphere. In the closing reflection phase (approximately 15 minutes), the teacher revisited the most frequently missed items, facilitated structured discussion on correct responses, and informed students that ZEP Quiz would be employed in subsequent sessions, thereby cultivating anticipatory motivation.

Observational findings confirmed a dramatic behavioral shift: students who had previously exhibited passive tendencies demonstrated high levels of active engagement and concentration throughout the ZEP Quiz sessions. No student was observed to engage in off-task behavior during the quiz, a marked departure from pre-intervention classroom dynamics. This observation aligns with Csikszentmihalyi's flow theory, which posits that optimal engagement occurs when individuals are fully immersed in activities that are both challenging and intrinsically rewarding (Huang, Huang, & Tschopp, 2020).

Student Motivation Responses to ZEP Quiz Implementation

Following the intervention, students completed a 20-item motivation questionnaire. The overall mean motivation score was 4.60 on a five-point scale, classified as very high (threshold ≥ 4.20). Across seven motivational dimensions, all scores fell within the very high category, ranging from 4.55 (concentration and focus) to 4.74 (self-confidence). The absence of any negative responses (Strongly Disagree or Disagree) across all items and all respondents underscores the uniformly positive reception of ZEP Quiz as an instructional medium.

Five items received the highest mean score of 4.75: students felt challenged to obtain high scores (item 11), expressed increased confidence in answering questions (item 12), reported greater diligence in studying Arabic vocabulary (item 14), rated the game as making learning more engaging (item 18), and expressed a desire for its continued use (item 20). These findings suggest that ZEP Quiz produced not only immediate motivational gains but also behavioral changes of a more sustained nature, including self-directed study beyond the classroom context.

Table 2. Motivation Questionnaire Results by Dimension (n = 27)

No.	Motivational Dimension	Items	Mean	SS (%)	S (%)	Category
1	Interest & Attention	1, 2, 18	4.58	63%	33%	Very High
2	Concentration & Focus	5, 6, 8	4.55	59%	37%	Very High
3	Activity & Participation	3, 7, 10	4.59	61%	39%	Very High
4	Enthusiasm & Eagerness	4, 9	4.58	63%	33%	Very High
5	Self-Confidence	11, 12	4.74	70%	30%	Very High
6	Relevance & Comprehension	16, 17, 19	4.61	60%	40%	Very High
7	Satisfaction & Continued Learning	13, 14, 15, 20	4.60	62%	35%	Very High
	Overall Mean	**1-20**	**4.60**	**63%**	**35%**	**Very High**

Note: SS = Strongly Agree; S = Agree. Percentages calculated from 27 respondents. Very High category: mean ≥ 4.20.

Statistical Analysis: Effect of ZEP Quiz on Learning Motivation

Descriptive statistical analysis of the 27 students' pretest and posttest scores revealed a striking improvement. The mean pretest score of 41.85 (classified as low) rose to a mean posttest score of 91.56 (classified as very high), representing a mean difference of 49.70 points. The minimum score increased from 30 to 80, and the maximum from 60 to 100. All 27 students achieved posttest scores categorized as high or very high, compared to the pre-intervention condition in which all students were classified as low or very low.

The Shapiro-Wilk normality test indicated that the pretest data ($W = 0.8627$, $p = 0.0021$) and the difference scores D ($W = 0.9036$, $p = 0.0162$) did not conform to a normal distribution, while the posttest data satisfied the normality assumption ($W = 0.9557$, $p = 0.2929$). In response to this violation of normality, the Paired Sample t-Test was retained as the primary analysis given the robustness of the t-test to normality violations in adequately sized samples (n = 27) (Field, 2020; Pallant, 2020), and the Wilcoxon Signed Rank Test was employed as a non-parametric confirmatory analysis.

The Paired Sample t-Test yielded $t = 41.820$ ($df = 26$) with Sig. (2-tailed) = $0.000 < \alpha$ (0.05), far exceeding the critical t-value of 2.056. The null hypothesis (H_0) was thus rejected, confirming that a highly significant difference exists between pre- and post-intervention motivation scores. The Wilcoxon Signed Rank Test produced $Z = -4.541$ with Asymp. Sig. = $0.000 < 0.05$, consistently confirming the parametric result. The convergence of both parametric and non-parametric analyses strengthens the internal validity of the conclusion.

Table 3. Summary of Statistical Test Results

Data Pair	Mean Pre	Mean Post	Mean D	SD D	t / Z	Sig. (p)
Pretest – Posttest (t-Test)	41.85	91.56	49.70	6.18	41.820	0.000*
Posttest – Pretest (Wilcoxon)	—	—	—	—	−4.541	0.000*

*Note: * $p < 0.05$; $df = 26$ for t-Test; t-critical ($df=26$, $\alpha=0.05$, two-tailed) = 2.056.*

Magnitude of Effect: N-Gain and Cohen's d

N-Gain analysis demonstrated that all 27 students (100%) achieved N-Gain values within the high category ($g \geq 0.70$), with individual scores ranging from 0.7143 to 1.0000 and a class mean of 0.8618. This implies that, on average, students succeeded in closing approximately 86.2% of the remaining gap between their individual pretest scores and the ideal maximum of 100. Notably, even students with the lowest pretest scores (30) achieved N-Gain values exceeding 0.70, indicating that the motivational benefits of ZEP Quiz were equitably distributed across all levels of initial ability.

Compared to prior research on comparable gamification platforms including Kahoot!, Quizizz, and Wordwall, which typically yielded N-Gain values between 0.62 and 0.71 (Plass et al., 2020), the N-Gain obtained in the present study is substantially higher, suggesting a comparative advantage for ZEP Quiz attributable to its more comprehensive gamification integration: real-time leaderboards, diversified question formats, and immediate performance feedback.

The effect size calculation yielded Cohen's $d = 8.048$, classified as a huge effect ($d > 0.80$) (Kraft, 2020). This extraordinary effect size is not merely statistically significant but also practically meaningful, confirming that the ZEP Quiz intervention had a profound impact on student motivation at both the group and individual levels.

Discussion

The findings of this study provide strong empirical support for the effectiveness of gamification in enhancing learning motivation in foreign language instruction. The improvement in students' motivation after the implementation of ZEP Quiz can be explained through the framework of Self-Determination Theory, which emphasizes the fulfillment of three basic psychological needs: competence, autonomy, and relatedness (Ryan & Deci, 2020). ZEP Quiz facilitates competence through immediate feedback and progressive difficulty levels, autonomy through student-paced participation, and relatedness through competitive leaderboard interaction.

The implementation of ZEP Quiz also aligns with contemporary perspectives on scaffolded learning and constructivist pedagogy. Learning activities were designed progressively, allowing students to move from basic vocabulary recognition to more complex sentence construction tasks. This approach supports optimal learning conditions by ensuring that instructional challenges remain within students' developmental capacity. Recent studies in digital learning environments confirm that scaffolded, technology-supported instruction significantly enhances both engagement and learning outcomes (Sari, Anwar, & Wibowo, 2022; Hidayat, Kusumaningrum, & Prasetyo, 2023).

From the perspective of flow theory, the integration of time constraints, real-time feedback, and competitive features in ZEP Quiz created conditions that foster deep engagement. Students demonstrated sustained concentration and active involvement throughout the learning process, with no observed off-task behavior. This finding is consistent with recent research indicating that gamified digital environments can

maintain students' attention and reduce cognitive disengagement (Putra & Lestari, 2021; Rahmawati & Nurhayati, 2022).

The findings further highlight the significant role of self-efficacy in enhancing learning motivation. The highest score was found in the self-confidence dimension, indicating that students developed stronger beliefs in their ability to complete Arabic learning tasks. According to social cognitive theory, self-efficacy is strengthened through mastery experiences and positive feedback (Bandura, 2021). The repeated success experienced by students during ZEP Quiz activities functioned as a key driver of motivational improvement.

The high N-Gain score (0.8618) indicates a substantial improvement in learning motivation across all students. Importantly, this improvement was evenly distributed, including among students with low initial ability. This finding supports the principle of differentiated instruction, which emphasizes the importance of accommodating diverse learning needs. Recent studies also confirm that gamification-based learning can effectively support students with varying levels of ability (Utami & Kurniawan, 2023; Maulidiyah et al., 2025).

Despite its strong contributions, this study has several limitations. The use of a one-group pretest-posttest design limits the ability to establish causal relationships. The absence of a control group means that external factors cannot be fully controlled. In addition, differences in measurement instruments between pretest and posttest may affect the interpretation of effect size. Therefore, future research should employ experimental designs with control groups, larger sample sizes, and longitudinal approaches to strengthen the validity and generalizability of findings.

4. CONCLUSION

This study demonstrates that ZEP Quiz-based educational games constitute a highly effective instructional intervention for enhancing Arabic language learning motivation among students of SMK NU 2 Glagah. Three principal conclusions may be drawn from the findings. First, the systematic implementation of ZEP Quiz structured across opening, core activity, and reflective closing phases successfully transformed a passive classroom environment into an active, interactive, and motivationally engaged learning space. Second, the Paired Sample t-Test ($t = 41.820$, $p = 0.000$) and Wilcoxon Signed Rank Test ($Z = -4.541$, $p = 0.000$) confirmed a highly significant improvement in learning motivation following the intervention, with all seven motivational dimensions reaching the very high category and a mean questionnaire score of 4.60 (out of 5.00). Third, the magnitude of the effect, as quantified by N-Gain ($\dot{g} = 0.8618$, high category) and Cohen's d ($d = 8.048$, huge effect), establishes that ZEP Quiz not only significantly but substantively and practically enhances Arabic language learning motivation across all levels of initial student ability.

These findings carry implications for pedagogical practice, institutional policy, and future research. For practitioners, the systematic adoption of ZEP Quiz in Arabic language instruction at vocational secondary schools is strongly warranted, with attention to careful item design, progressive difficulty grading, and structured post-quiz reflection to consolidate learning gains. For school administrators, investment in digital

infrastructure and the normalization of gamification-based pedagogy within institutional learning strategies is recommended. For future researchers, the present study's limitations including the use of a single-group design, the absence of a parallel control group, and the cross-domain pretest-posttest measurement suggest that subsequent investigations employ true experimental designs (randomized control trials), extend the analysis to cognitive and linguistic skill outcomes, and explore the generalizability of findings across diverse educational levels and institutional contexts.

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