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Arabic Orthography: Development of Kahoot and Gamification Website-Based Writing Materials to Improve Understanding of Writing Rules

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Abstract

This study aims to design and develop Arabic orthography instructional materials using the Kahoot platform integrated with gamification to enhance students' understanding of Arabic writing rules. The research employed a Research and Development (R&D) approach using the ADDIE model, involving 60 students from MAN 1 Boalemo. The development process included needs analysis, content design, material digitization, validation, implementation, and evaluation. Expert validation confirmed high feasibility with ratings of 88% (media expert), 83% (content expert), and 92% (language expert). Trial implementation showed strong acceptance from both teachers (89%) and students (80%). Learning effectiveness was measured through pretest and posttest, with mean scores improving from 58.85 to 84.20. Paired sample t-tests indicated statistically significant improvement ($p < 0.05$), while normality tests confirmed data distribution was normal. The results suggest that gamified instructional design using Kahoot effectively boosts student motivation, engagement, and mastery of Arabic orthography. This work contributes to the field by offering an engaging, scalable, and pedagogically sound solution for Arabic language learning in digital environments.

Keywords: *Arabic orthography, gamification, Kahoot*

Introduction

Arabic orthography is a fundamental aspect of Arabic language learning, closely related to the ability to read and write correctly according to established rules (Borham, Ramli, & Ghani, 2022). Mastery of orthography includes understanding letter shapes, their positions within words, and writing conventions such as the use of *hamzah*, connecting letters, and dot placement (Hula, Helingo, Jassin, & Sarif, 2022). In Indonesia's learning context, many students face challenges in mastering these rules due to the lack of interactive and contextual learning media.

Traditional teaching methods, such as lectures and written exercises, still dominate the teaching of Arabic orthography (Ismail, Mohamed, Abdul Razak, Hj Ibrahim, & Isa, 2021). These approaches are often perceived as monotonous and less effective in motivating students to grasp technical and detailed material like writing rules. As a result, many students struggle to write Arabic letters accurately, even after participating in formal learning processes (H. Khotimah, Arifin, & Rahmawati, 2023).

Previous studies have attempted to address this issue by introducing visual media and interactive technology-based exercises (Manoppo & Abdullah, 2024). For example, Arabic letter recognition software, digital writing apps, or computer-based worksheets have been developed (Syahrial Labaso, Ratna Hestiana, Rinaldy, & Adtman A. Hasan, 2024). However, many of these methods remain one-directional, less responsive, and fail to fully engage students in an active and enjoyable learning process (Syagif, 2022).

Research has shown that the application of gamification in the learning process can significantly increase student motivation and engagement (Haoming & Wei, 2024). Gamification is an approach that incorporates game elements such as points, challenges, and rewards into non-game activities, in this case, education (Hula, Mariana, 2024). In language learning, gamification has proven to enhance memory retention and student participation, particularly in understanding complex or traditionally perceived as boring material.

One platform that supports the gamification approach is Kahoot (Karmila Sari & Siti Nurani, 2021). Kahoot is a web-based application that allows teachers to create real-time interactive quizzes (Abdillah, Kuncoro, Erlangga, & Ramdhan, 2022). With its appealing design, point system, and student competition features, Kahoot provides a fun and challenging learning experience (Tyaningsih, Hayati, Sarjana, Sridana, & Prayitno, 2022). However, the use of Kahoot in Arabic language teaching, especially in the context of orthography, has not been widely explored (Astawan, & Gading, 2022).

Previous research using Kahoot has mainly focused on vocabulary (mufradat) and grammar (*qawâ'id*) learning, while the development of orthography materials based on this platform remains limited. This gap presents an opportunity for innovative instructional design that is more contextual and tailored to student needs, particularly in improving their understanding of Arabic writing rules (Srimulyani, 2023).

Another limitation of previous studies lies in the lack of integration between content and technology-based pedagogical approaches. (Aulia & Anggraeni, 2021). Many learning media focus solely on attractive visuals without considering the systematic delivery of content. (Asmarani, Sarinem & Raflesia, 2024). In fact, orthography requires a logical presentation sequence, varied exercises, and direct feedback to reinforce understanding (Fonna, Elisyah, Ali, & Armita, 2024).

To address these issues, this research aims to design and develop Arabic orthography teaching materials that integrate learning content with a gamification approach using the Kahoot platform (Nurhikmah;, Aswan, Asrul Bena, & Malik Ramli, 2023). The developed materials will cover basic to advanced writing rules, including varied exercises and writing simulations adapted to different student proficiency levels

(Aini, Lutfiani, & Zahran, 2021). This design is expected to provide a solution to the shortage of interactive and enjoyable orthography learning media (Hidayat, Supriani, Setiawan, & Lubis, 2023).

Through this learning design, students will gain theoretical understanding of Arabic orthography and apply writing rules directly through competitive quizzes and exercises (Kedah, 2023). This approach fosters active learning that engages students' cognitive and affective aspects, creating a more inclusive and participatory learning environment (Sri Legowo, 2022).

Several studies have explored Arabic orthography from diverse perspectives, providing a foundation for this research. For instance, Abdul Mutalib (2023) examined the orthographic and morphological adaptation of Arabic loanwords in Malay legal texts, focusing on lexical changes, while Shaiful Baharum et al. (2022) analyzed orthographic errors among non-native Arabic learners, emphasizing pedagogical interventions. In contrast, this study shifts the focus to instructional design by developing gamified Kahoot-based materials to enhance Arabic writing rule comprehension. The effectiveness of gamification in education is supported by Nurjannah et al. (2021), who demonstrated its positive impact on mathematics learning, and Hendriyati Haryani et al. (2023), who highlighted its broader potential in modernizing pedagogy. Further, Chandra and Yuhelman (2023) reinforced Kahoot's role in boosting engagement through structured instructional models, aligning with this study's approach of integrating Kahoot into a website for targeted Arabic orthography instruction. Together, these works underscore the gap in applying gamification specifically to Arabic writing rule acquisition, which this research aims to address.

This study aims to design and develop Arabic orthography teaching materials based on the Kahoot website using a gamification approach to improve students' understanding of Arabic writing rules. It is hoped that this innovation will make a significant contribution to the development of more effective, interactive, and adaptive Arabic language learning media that meets the demands of the modern era.

Method

Research Design

This study employs a Research and Development (R&D) design with the ADDIE approach (Analysis, Design, Development, Implementation, Evaluation) (Ruhansih, 2017). This model was chosen as it is well-suited for designing and developing technology-based learning materials. In this context, the research focuses on the development of Arabic orthography writing materials using the Kahoot-based website, incorporating gamification principles, and evaluating its feasibility and effectiveness in improving students' understanding of Arabic writing rules.

Participants

The participants in this study are students from MAN 1 Kab. Baolemo who are enrolled in Arabic language programs. A total of 60 students were selected randomly from three different classes. The selection criteria included basic Arabic language

proficiency, willingness to participate in technology-based learning, and access to digital devices for online learning.

Material Development

The learning materials were developed based on a needs analysis conducted through surveys and interviews with Arabic language teachers and students. The material development process involved several stages:

Needs Analysis

The initial stage involved analyzing the challenges faced by students in writing Arabic orthography. Through observations, it was found that students often struggle to understand the rules of Arabic letter writing, particularly in the aspects of letter shapes, connections, and letter positioning within words. Additionally, orthography instruction had not yet utilized interactive and engaging media.

Content Design

Based on the needs analysis, the researchers designed Arabic orthography materials that included themes such as the shapes of Hijaiyah letters, letter positioning within words, *hamzah*, and letter connection rules. These materials were developed into interactive quizzes on the Kahoot platform, integrating gamification elements like scores, leaderboards, and time limits.

Digital Material Development

In this stage, the content was digitized using Kahoot. Each unit consisted of brief instructional materials (via PDF or slides) and quizzes containing 10 multiple-choice questions and five short answer questions. Experts, including Arabic language specialists, educational media experts, and content experts, validated the product. The validation results indicated that the teaching materials were appropriate for use, with minor revisions needed for question structure.

Implementation

The materials were implemented on the Kahoot platform with integrated gamification principles to boost student motivation.

Evaluation

Evaluation was conducted through pretests and posttests to measure the improvement in understanding of Arabic orthography. The evaluation instrument was a written test with a reliability coefficient of 0.82 (Cronbach's Alpha). Data analysis was performed using t-tests in Excel to assess learning outcomes.

Research Procedure

The research procedure included several steps. (Dalimunthe, Affandi, & Suryanto, 2021):

1. Preparing instruments, including needs analysis questionnaires and material evaluation formats.
2. Developing and conducting initial testing of Arabic orthography materials on the Kahoot platform.
3. Implementing the materials to the selected participants.
4. Collecting data through observations, questionnaires, and interviews.
5. Analyzing the data to assess the effectiveness of the materials in improving understanding of writing rules.

Data Collection Instruments

The instruments used in this study included questionnaires, pretests, and posttests. The questionnaires were used to gather student perceptions of the learning materials, while the pretests and posttests measured the improvement in understanding of writing rules before and after using Kahoot-based materials. (Dewi, Asril, & Wirabrata, 2021).

Data Analysis

The data collected in this study were analyzed quantitatively. Descriptive statistics were used to examine changes in average pretest and posttest scores.

With this approach, the research aims to produce learning materials that are visually appealing and interactive and effective in enhancing students' understanding of Arabic orthography. (K. Khotimah & Aini, 2022).

Result and Discussion

This study focuses on developing web-based e-learning media utilizing Kahoot and gamification to improve MA (*Madrasah Aliyah*) students' understanding of Arabic orthography. The approach used is Research and Development (R&D) with the ADDIE development model, which consists of five main stages: analysis, design, development, implementation, and evaluation. This media is designed to make Arabic orthography learning more interactive and engaging for students.

Analysis Stage

To assess the needs, the researchers distributed questionnaires to MA students to identify the challenges in learning Arabic that would form the foundation for product development. The following findings were obtained based on the questionnaire results.

Table 1. Student Needs Analysis

No	Criteria	"Yes" Responses	"No" Responses	Percentage (P)
1	Do you find it challenging to read Arabic letters without diacritics?	55	5	92%
2	Do you often get confused distinguishing similar-looking Arabic letters?	48	12	80%
3	Do you find it challenging to write Arabic letters correctly?	50	10	83%
4	Do you find Arabic lessons in class uninteresting?	56	4	93%
5	Do you feel bored when learning Arabic through conventional methods?	58	2	97%
6	Have you ever used digital media or games to learn Arabic?	40	20	67%
7	Are you more motivated to learn using interactive quizzes like Kahoot?	60	0	100%

8	Would you like to learn Arabic in a more enjoyable, game-like way?	60	0	100%
9	Would you like a learning medium that helps you understand Arabic letters' shapes and sounds more easily?	60	0	100%
10	Would you like to try learning Arabic language media based on websites and games?	60	0	100%

Table 2. Student Needs Analysis Results

Respondents	Total Score (f)	Maximum Score (N)	Percentage (P)	Category
60 Students	91	100	91%	Needed

Based on the survey results from 60 students, it was found that most students face challenges in learning Arabic, particularly in reading Arabic letters without diacritics (92%) and distinguishing similar-looking letters (80%). Half of the respondents (83%) reported difficulty correctly writing Arabic letters. Furthermore, most students stated that Arabic lessons in class feel uninteresting (93%) and often make them bored (97%).

Despite this, 67% of students have already been exposed to digital media or games to support their learning. The survey results also show that all students (100%) feel more enthusiastic when learning through interactive quizzes like Kahoot and more enjoyable game-like methods. This is further supported by the fact that all students (100%) expressed a desire for learning media that helps them understand the shapes and sounds of Arabic letters more easily.

All respondents (100%) were also willing to try web-based and game-based learning media as an alternative to improve their understanding of Arabic. These findings indicate a strong need for interactive learning media, like Kahoot, to enhance student engagement and knowledge in Arabic lessons.

Table 3. Teacher Needs Analysis

No	Criteria	Response	Percentage (P)
1	Do you think the Arabic teaching process is running well?	No	0%
2	Do students respond positively to Arabic lessons?	No	0%
3	Do you use textbooks as a learning source for explanations?	Yes	100%
4	Do you use technology as a learning medium during lessons?	Yes	100%
5	Are the technological facilities at your school supportive of Arabic lessons (e.g., animation videos, PowerPoints)?	Yes	100%
6	Are the learning media well-received by students?	Yes	100%
7	Do you think the current learning media effectively support your Arabic teaching?	No	0%
8	Do you use language that is easy to understand?	Yes	100%
9	Do you avoid using language that can cause ambiguity?	Yes	100%

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10	Do you agree that interactive multimedia-based Android learning should be developed and used in Arabic lessons?	Yes	100%

Table 4. Teacher Needs Analysis Results

Respondent	Total Score (f)	Maximum Score (N)	Percentage (P)	Category
Edwin Husain	70	100	70%	Needed

Survey results show that the majority (70%) believe the current learning media are not sufficiently effective, indicating a strong need for new learning media, particularly interactive technology-based tools, like Android-based multimedia. This highlights the importance of developing more varied and engaging learning media to improve students' understanding and enthusiasm for Arabic learning.

Design Stage

Next, the researcher proceeded to the design phase, which includes:

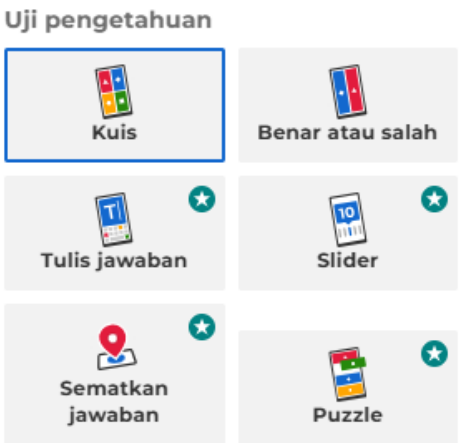
a) Designing the Content or Material

The selected material will be linked to the Kahoot website. The researcher began developing summaries, images, and appropriate videos for the Arabic orthography subject.

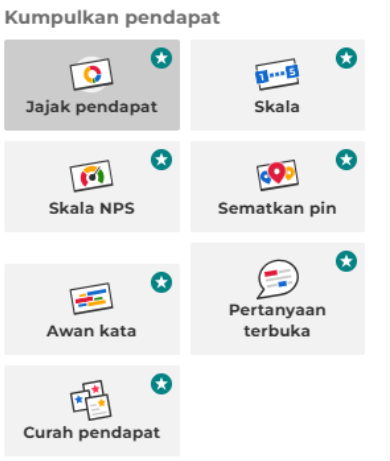
b) Designing the Learning Media.

The media comprises a website developed using Kahoot, featuring engaging examples and interactive elements. The researcher utilized a color scheme that aligns with the content of the material. Additionally, necessary images were designed using Canva. Notes:

- The researcher used quizzes and true/false question formats to create Arabic orthography exercises.

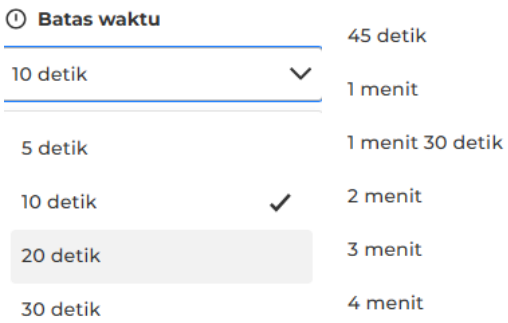


- In this menu, quiz creators can gather opinions in various ways.

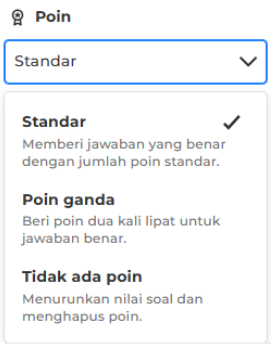


- In this menu, quiz creators can also use slides to present information.

- In this menu, quiz creators can set the time limit for answering questions. Here, the researcher put the time to 10 seconds.



- In this menu, quiz creators can set the number of points that students will earn. Here, the researcher used the standard point setting.



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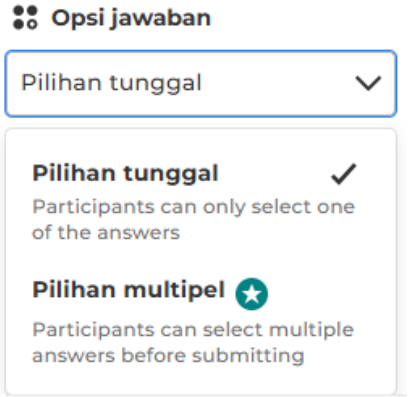
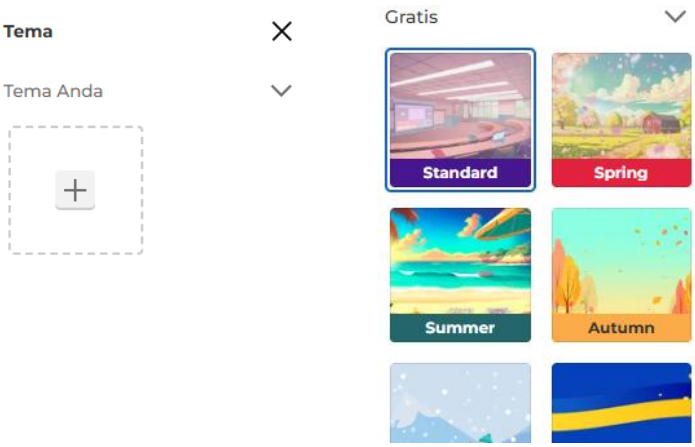
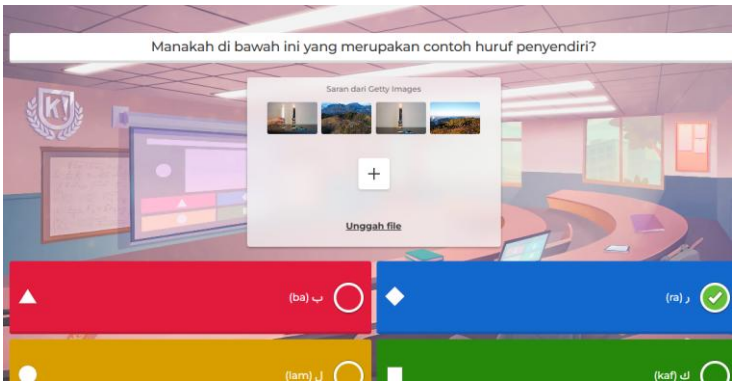
- In this menu, quiz creators can set the answer options. Here, the researcher used single-choice options.



- In this menu, quiz creators can choose the background theme. Here, the researcher used the standard theme.



- This is the question display and its answer choices.



Development Stage

This stage involves the process of developing the product. In addition to creating learning media through Kahoot, it also includes creating assessment instruments. Expert lecturers then review the developed media and instruments. After the validation process, necessary revisions are made before the press is implemented for students. The details of the development stage are as follows:

Product Feasibility Validation Results:

Media Expert Validation

Media expert validation is essential to ensure that the learning media developed by the researcher meets quality standards based on the input, criticism, and suggestions from media experts. In this study, the media validator is JRH, a lecturer in English Language Education (Tadris Bahasa Inggris, TBI) at the State Institute of Islamic Studies (IAIN) Sultan Amai Gorontalo. The results of the media expert validation are as follows:

Table 5: Results of Media Expert Validation Analysis

Media Validator	Score Obtained (f)	Maximum Score (N)	Percentage (P)	Category
JRH	88	100	88%	Highly Suitable

From the table above, it can be concluded that the language aspect of the interactive learning media developed by the researcher received a score of 88%. This percentage falls within the 80% to 100% range, indicating that the interactive learning media based on Kahoot is highly suitable for use.

b. Material Expert Validation

RBB, a lecturer in Arabic Language Education at IAIN Sultan Amai Gorontalo, is the material expert for this interactive learning media validation. This validation focuses on the feasibility of content, presentation, and language. The results of the material expert validation are as follows:

Table 6: Results of Material Expert Validation Analysis

Material Validator	Score Obtained (f)	Maximum Score (N)	Percentage (P)	Category
RBB	83	100	83%	Highly Suitable

Based on the table above, it can be concluded that the content aspect of the interactive learning media received a highly suitable rating from the material expert. The average percentage score obtained is 83%, which falls within the 80% to 100% range, indicating that the developed learning media is highly suitable for use.

Language Expert Validation

Table 7: Results of Linguist Validation Analysis

Language Validator	Score Obtained (f)	Maximum Score (N)	Percentage (P)	Category
MIM	92	100	92%	Highly Suitable

Based on the table above, it can be concluded that the language aspect of the Kahoot-based learning media received a highly suitable rating from the language expert. The average percentage score obtained is 92%, which falls within the 80% to 100% range, indicating that the learning media developed is highly suitable for language quality.

Implementation Stage

After the product is validated, the next step is the implementation stage, which aims to apply the developed learning media. The researcher involves the Arabic language teacher and 10 students in this stage. This implementation aims to gather teacher and student feedback regarding the developed learning media. The results of the feedback from both the teacher and students are as follows:

Teacher's Feedback

The teacher's feedback on the interactive learning media can be obtained through a teacher response questionnaire containing 15 statements. The results of the teacher's feedback can be seen in the table below:

Table 8: Teacher's feedback

No	Criteria	Percentage (P)
1	Relevance of the quiz to the learning material	80%
2	Relevance of the quiz to the explanation of the learning material	100%
3	Relevance of the images to the quiz	100%
4	The media can be used by both teachers and students	100%
5	Clarity of the quiz content	100%
6	Relevance of the quiz to the material	80%
7	Completeness of the material in the quiz	80%
8	The quiz is easy to understand	100%
9	The media can be used by both teachers and students	100%
10	Relevance of the quiz to the learning objectives	80%
11	The media and the quiz are interrelated	80%
12	Sentence length suitable for the students' comprehension level	80%
13	Sentence structure appropriate for the students' comprehension level	100%
14	Paragraph construction appropriate for the students' comprehension level	80%
15	The language used is semi-formal (everyday classroom language)	100%
16	Consistency in the use of symbols, icons, and navigation	80%
17	Relevance to the intellectual development of grade X students	80%
	Total	89%

Table 9: Teacher Feedback Questionnaire Analysis Results

Respondent	Score Obtained (f)	Maximum Score (N)	Percentage (P)	Category
EH	89	100	89%	Highly Suitable

Based on the table above, it can be concluded that learning media development using Kahoot has received a highly suitable rating. The average percentage obtained from the teacher response questionnaire is 89%, which falls within the 80% to 100% range, indicating that this learning medium is highly suitable for teaching Arabic orthography.

Student's Feedback

The students' feedback on the learning media developed by the researcher can be obtained through a student response questionnaire containing 14 statements. The results of the student feedback analysis are shown in the table below:

Table 10: Student's feedback

Respondent	Score Obtained (f)	Maximum Score (N)	Percentage (P)	Category
60 Students	2496	3000	80%	Highly Suitable

Based on the data from the student response questionnaire, it can be concluded that the learning media developed by the researcher received a highly suitable rating. The average percentage obtained from the student response questionnaire is 80%, which falls within the 80% to 100% range, indicating that this interactive learning media is highly suitable for teaching Arabic orthography.

Evaluation Stage

This stage is carried out to determine whether the development of media has led to increased student performance. All grade 10 students are assessed through a practical test, with assessment indicators matching those used in the initial ability questionnaire they have previously filled out. The evaluation questionnaire consisted of 10 statements with 10 Arabic orthographic indicators, including the recognition of letter shapes in various positions (initial, medial, final, and isolated), the use of diacritics to aid in pronunciation, as well as the understanding of certain writing rules such as *alif washl* and *alif qatha'*. In addition, the Arabic orthographic system includes the use of shadda (consonant multiplication), breadfruit (vowel signs), and tanwin (double suffixes), which affect the structure and meaning of words in Arabic. Data from the initial ability questionnaire and practical test assessment were then processed and analyzed using SPSS version 27, as follows:

Test of Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRETEST	.088	60	.200*	.983	60	.560
POSTTEST	.117	60	.039	.973	60	.215

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive statistical results show a significant improvement between PreTest and PostTest. The average score of the PreTest is 58.85, with a 95% confidence interval ranging from 55.41 to 62.29, while the average score of the PostTest increases to 84.20, with the confidence interval from 80.69 to 87.71. The median also showed an increase from 58.50 in the PreTest to 84.50 in the PostTest. The distribution of data is indicated by a similar standard deviation, 7,350 in the PreTest and 7,509 in the PostTest, although the variance in the PostTest (56,379) is slightly greater than in the PreTest (54,029). The range of scores for PreTest is 28, with a minimum of 47 and a maximum of 75, while PostTest has a smaller range of 26, with a minimum of 71 and a maximum of 97. The PreTest distribution is slightly tilted to the right (slope 0.460), while the PostTest distribution is almost symmetrical (slope -0.077), with both showing flat kurtosis, -0.199 and -0.837, respectively. Overall, the data showed a significant improvement in performance from PreTest to PostTest.

Paired Sample Test

Paired Sample Test

Test Value = 70

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
PRETEST	-14.227	59	.000	-8.133	-9.28	-6.99
POSTTEST	22.292	59	.000	15.433	14.05	16.82

Table 11 PreTest and PostTest Scores Table

No	Student Name	PreT	PostT	(%)	Y/N	No	Student Name	PreT	PostT	(%)	Y/N
1	AM	64	89	39.06	Yes	31	NS	67	92	37,31	Yes
2	APA	59	84	42.37	Yes	32	NU	70	93	32,86	Yes
3	AD	53	92	73.58	Yes	33	NAD	58	81	39,66	Yes
4	BP	70	71	1.43	Yes	34	NFH	59	84	42,37	Yes
5	BS	60	80	33.33	Yes	35	NZA	60	89	48,33	Yes
6	CAP	75	95	26.67	Yes	36	OW	62	88	41,94	Yes
7	CF	64	74	15.63	Yes	37	PP	66	91	37,88	Yes
8	DM	64	73	14.06	Yes	38	PW	65	89	36,92	Yes
9	DA	55	97	76.36	Yes	39	PRS	57	83	45,61	Yes
10	EA	54	76	40.74	Yes	40	QP	59	85	44,07	Yes
11	EP	61	83	36,07	Yes	41	QS	63	90	42,86	Yes
12	FK	58	79	36,21	Yes	42	QS	60	88	46,67	Yes
13	FG	62	87	40,32	Yes	43	RF	61	86	40,98	Yes
14	GA	65	86	32,31	Yes	44	RP	66	92	39,39	Yes
15	GP	59	80	35,59	Yes	45	RS	62	89	43,55	Yes
16	HA	62	88	41,94	Yes	46	RS	64	88	37,5	Yes
17	HP	57	82	43,86	Yes	47	SA	59	84	42,37	Yes
18	HS	63	79	25,4	Yes	48	SA	56	80	42,86	Yes

19	IU	67	90	34,33	Yes	49	SF	57	82	43,86	Yes
20	ID	70	89	27,14	Yes	50	TS	68	90	32,35	Yes
21	IH	56	77	37,5	Yes	51	TS	66	89	34,85	Yes
22	JA	61	85	39,34	Yes	52	US	61	86	40,98	Yes
23	JA	66	88	33,33	Yes	53	UW	62	88	41,94	Yes
24	KT	63	83	31,75	Yes	54	VP	65	92	41,54	Yes
25	LW	68	87	27,94	Yes	55	VP	64	89	39,06	Yes
26	MP	55	79	43,64	Yes	56	WS	57	83	45,61	Yes
27	MIH	66	90	36,36	Yes	57	WPB	60	85	41,67	Yes
28	MW	58	80	37,93	Yes	58	YA	62	88	41,94	Yes
29	MAI	60	82	36,67	Yes	59	YS	59	84	42,37	Yes
30	MY	62	87	40,32	Yes	60	YS	60	86	43,33	Yes

Based on the Paired Sample T-test analysis results, it is known that the average pretest score of participants of 61.87 is significantly lower than the test score set at 70. This is shown by the value of $t(59) = -14.227$ with a significance level of $p = 0.000$ ($p < 0.05$), and an average difference of -8.133. The 95% confidence interval range for this difference is between -9.28 to -6.99, which is entirely below zero, suggesting that the difference is statistically significant and consistently lower than the reference value. On the other hand, the average posttest score of 85.43 showed a significant improvement compared to the same test score, with test results showing $t(59) = 22,292$, $p = 0.000$ ($p < 0.05$), and a mean difference of 15,433. The 95% confidence interval ranges from 14.05 to 16.82, all of which are above zero, confirming that the post-credits score is significantly higher than the reference value. Thus, the results show an increase in participants' scores from pretest to posttest, both of which differ significantly from the test scores that have been set.

Conclusion

This study successfully achieved its objective of designing and developing Arabic orthography instructional materials integrated with gamification via the Kahoot platform. The five stages of the ADDIE model—analysis, design, development, implementation, and evaluation—were systematically applied to ensure the instructional materials were aligned with learners' needs and pedagogical goals. The needs analysis indicated that 92% of students struggled with reading unvowelized Arabic texts, 83% had difficulty writing accurately, and 97% found traditional methods monotonous. Teachers also confirmed a 70% need for more interactive and technologically integrated media.

In the design stage, the materials were structured to include orthographic rules, writing conventions, and *hamzah* usage, all delivered through Kahoot's gamified environment. The development phase produced validated learning content rated as "highly suitable" by media (88%), material (83%), and language experts (92%). This affirmed the feasibility of the content both in terms of pedagogy and technical execution. During implementation, 60 students and 1 Arabic teacher used the media. Positive feedback was recorded: teacher response reached 89% and student acceptance 80%, suggesting high engagement and usability. Finally, the evaluation phase using pretest and posttest scores showed statistically significant improvement. Average scores

increased from 58.85 (pretest) to 84.20 (posttest). Paired-sample t-test confirmed this improvement with $t(59) = -14.227$, $p < 0.001$ for pretest and $t(59) = 22.292$, $p < 0.001$ for posttest, with normality confirmed by the Shapiro-Wilk test ($p > 0.05$).

These findings validate that Kahoot-based gamified instruction significantly enhances students' motivation, participation, and understanding of Arabic orthographic rules. This study advances the current state of Arabic language pedagogy by offering an interactive, data-driven, and student-centered alternative to conventional instruction. Future research should extend this gamification approach to other language skills (e.g., listening, speaking, grammar), incorporate adaptive learning algorithms, and conduct longitudinal studies to evaluate long-term retention and transferability of skills.

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