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Development of Arabic Vocabulary Gamification Model Using The Fuzzy Delphi Method

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Abstract
This study aims to obtain the consensus of experts on the needs of the main element and sequence position (ranking) priority for each item in the design development of the model gamification vocabulary in Arabic. This study employed the fuzzy Delphi approach using a seven-point Likert scale. This work aimed to create a model gamification vocabulary for Arabic based on expert consensus. Consequently, the researchers gathered the opinions of nine experts from various sectors, particularly Arabic language, technology education, and Arabic language industry participants. This 21-item survey questionnaire has three primary components: (i) informational elements, (ii) interface elements, and (iii) the element of interactivity. Triangular fuzzy numbering was used to analyze the data. A defuzzification process establishes each item's position (ranking). The results demonstrate that experts agree on every point in the primary element. The results demonstrate that experts agree on every point in the primary element. The results indicate that every item received met or exceeded the three fuzzy criteria: the threshold value (d) does not exceed or equal 0.2, the percentage of deal experts exceeds or equals 75%, and the defuzzification (alpha cut) value exceeds or equals 0.5. The Arabic Gamification Vocabulary Model should provide the educational sector with fresh ideas that align with the nation's digital education policy.
Keywords: Fuzzy Delphi; Method; Model; Gamification; Arabic; Vocabulary; Expert Consensus; Education Sector

INTRODUCTION

Research on creating an innovative learning model is becoming more and more popular in the world of education, particularly when it comes to teaching and learning languages. Gamification has been found to be a successful tactic for raising student motivation and enhancing their overall educational experience (Muhammad Sabri, Nor Aziah, 2011). According to (Tan, 2015, Rumianda et al. 2020, Cugelman, 2013), gamification is the process of incorporating game elements—such as challenges, rewards,

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and ratings—into the learning process to make it more engaging and enjoyable. Given the characteristics of the Arabic language, which necessitate a big vocabulary in order to develop speaking and reading skills, this method is crucial for studying the language. When studying a language, especially Arabic, vocabulary mastery is essential. However, the majority of students struggle to stay motivated when learning vocabulary, especially in the traditional learning environment where things are more static and less dynamic (S & Kusumaningrum, 2021, Nguyen & Khuat, 2003). Here is where gamification may be a key component in fostering a sense of enjoyment, competition, and high student engagement.

In the process of developing the educational model, the Fuzzy Delphi Method (FDM) has also been shown to be a highly helpful technique. Based on expert consensus, FDM helps to guarantee the efficacy of the components incorporated into the suggested learning model. Because FDM may yield organized and measurable results, it has been frequently used in the construction of language learning modules, including interactive modules and shaped technologies. In addition, the use of learning-based technology, such as that demonstrated by gamification and adaptive learning models, has demonstrated efficacy in raising student accomplishment and comprehension of the deeper concept (Anggraini et al., 2023). Additionally, the study demonstrates that components like badges, level, and leaderboard ranking are crucial in motivating students to advance in their education (Nurningtias & Majid, 2022).

The necessity for creative teaching methods is increasing in the post-COVID-19 era. This approach not only enhances the educational process but also guarantees the efficacy of the learning model, which is characterized by its adaptability and competitiveness across a range of educational contexts (Rahman et al., 2021). Thus, the goal of this study is to create a model gamification Arabic vocabulary utilizing the Fuzzy Delphi Method, which not only helps students' memories vocabulary but also greatly boosts their enthusiasm and engagement. Thus, by offering a model of creative learning that incorporates aspects of games and technology, this study closes a research gap and helps to raise the standard of Arabic language instruction globally. It is anticipated that this method will be a crucial resource for educators and practitioners developing more efficient and pertinent language learning techniques.

One of the fundamental components of learning any language, including Arabic, is mastering vocabulary, which is essential for comprehension of texts, oral communication, and writing. However, because of the less interactive and conventional nature of the learning strategy, pupils frequently struggle to understand the new language. Prior research indicates that static learning methods, including lectures and memorization alone, are insufficiently helpful to increase students' vocabulary word mastery (S & Kusumaningrum, 2021). Additionally, it is discovered that students are not very motivated to learn Arabic, which has a direct impact on how well they acquire the language (Rumianda et al., 2020). Through game features including challenges, incentives, and a positioning system, gamification has been recognized as a cutting-edge strategy that can raise student engagement (Nurningtias & Majid, 2022). However, there is still a lack of thorough research on the use of gamification in Arabic language learning, particularly with regard to vocabulary mastering. Studies on gamification have been

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conducted in different contexts, but they don't really address the demands of students learning Arabic language (Anggraini et al., 2023).

To reach an expert consensus and guarantee that important components of the model's design are pertinent and useful, the Fuzzy Delphi Method (FDM) has been extensively employed in the creation of learning modules (Rahman et al., 2021). Although the efficacy of the FDM has been demonstrated in educational contexts such as curriculum construction or a particular module, its application in the creation of an Arabic language learning model formed by gamification has not yet been thoroughly investigated. Additionally, most existing language learning models do not emphasise the integration of game aspects with model-based expert consensus design, which is crucial to guaranteeing the model's broad acceptance among educators and relevance to students' needs (Rahman et al., 2021). Effective, adaptable, and interactive learning models are becoming more and more necessary in the wake of the global COVID-19 epidemic to assist students who must adjust to hybrid or distance learning (S & Kusumaningrum, 2021). As a result, there is a substantial research gap in the creation of the gamified learning model. The Fuzzy Delphi Method for Arabic language can tackle these problems in a comprehensive way. By proposing a novel learning model that blends game features with the FDM approach, this study seeks to close these gaps and improve student motivation, engagement, and learning effectiveness. This is crucial not only to enhance the Arabic language learning process but also to give teachers strategic direction for creating a more engaging and current curriculum. The purpose of the study aims to design and construct a gamified learning model that incorporates game features such as rewards, challenges, level, and ranking to increase student involvement.

METHOD

Study Design

The study was conducted in the following two primary stages:

1. Identification Of the Critical Phase Elements; to determine the crucial components for creating the model gamification of learning Arabic language, this step starts with a thorough literature review. Semi-structured interviews with experts in the fields of learning technology, gamification, and Arabic language instruction were also used to collect preliminary data. To create a preliminary list of items pertinent to the expert assessment procedure, the identified elements were sieved (S & Kusumaningrum, 2021).
2. Using FDM for Phase Expert Consensus; the following steps are part of the FDM process:
   a. Expert selection: Purposefully, nine experts were chosen based on their proficiency in the different fields. A university lecturer, an educational technology specialist, and gamification education academics are all involved in this selection. The experts' varied backgrounds provide a comprehensive and well-rounded evaluation (Karrupiah et al., 2024).
   b. The questionnaire's design: A list of the identified items served as the basis for the questionnaire's development. Using a linguistic fuzzy scale with values ranging from "Very unimportant" to "Very Important," experts were asked to rank the significance of each component. The value of the fuzzy to be examined is converted from this evaluation.

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c. Fuzzy data analysis: Using specialized software like Microsoft Excel or Fudelo, the obtained data was analysed to ascertain the following values:
   1) The threshold: When an element's value threshold is less than 0.2, it is deemed to have attained a consensus level.
   2) Defuzzification: Each item's defuzzification value is computed to determine which components are most crucial. Items are considered element important if their defuzzification value is greater than 0.5.
   3) The Consensus Rate: Consensus overall is achieved when at least 75% of the experts agree with the element being evaluated.

In this study, the instrument used by the researchers is a questionnaire. This survey is a questionnaire that was created by analysing the needs, highlighting relevant material, and analysing the content. An expert in the field relevant to this study has verified the correctness of the language and material used by the researchers. To acquire expert consensus on the items that will be examined in the questionnaire, the researchers must hire a nine-person expert. To analyse the data, the researchers used templates from the Fuzzy Delphi Method V2.0.

The researchers used the following procedures to implement the data collection method to conduct this study.

1. Create a survey questionnaire for experts; step 1 highlights the literature and demonstrates how the researchers construct a questionnaire survey based on the results of the analysis of the pilot study's demands. The 21 items in this questionnaire are divided into three primary sections: (i) Information, (ii) Interface, and (iii) Interactivity. Regarding the survey, an expert has determined the content validity. The content's legality is crucial because it assesses the quality of the information provided, the items submitted, the questionnaire's format, the usability of the variables employed, and the respondents' comprehension (Ghazali & Sufean, 2018).
2. Expert selection; step 2 of the data collecting procedure demonstrates how the researchers choose specialists to respond to the architecture-related questionnaires. The nine specialists were selected by the researchers based on their areas of expertise, which include e-learning and Arabic language studies. According to Mohd Ridhuan Jamil (2017), there should be between nine and twenty experts in the field, thus the researchers selected a total of nine specialists. Regarding the position and location of responsibility, work experience, and areas of knowledge, the researchers gathered expert information for this study. Over five years of expertise is considered expert experience. This is in line with Akbari and Yazdanmehr (2014), who defined an expert as a person who has worked in the subject for more than five years.
3. Sending a survey questionnaire to experts; following the identification of the pertinent subject-matter expert, the researchers must invite them to the WhatsApp group to send the questionnaire. To make it easier for the experts to respond to questionnaires, researchers had previously provided information about their study.
4. Conduct a data analysis; the researchers used the Fuzzy Delphi Template V2.0 to analyse the questionnaire once the expert sent it. The FDM data analysis must satisfy the three requirements of the primary FDM, which are (i) the threshold value (d) not above or equal to 0.2 (Chen, 2000). (ii) the defuzzification value (alpha cut) must be greater than or equal to 0.5 (Bodjanova, 2006); and (iii) the percentage of deal experts must be greater than or equal to 75% (Murry & Hammons, 1995).

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5. Expert determination of items; the findings of the data analysis are determined by the experts' consensus using the Fuzzy Delphi Method. The location of the most important item will be decided by the consensus of experts. The findings will discuss the outcome of the expert consensus.

The justification behind the application of FDM

The FDM Method is employed because it can combine qualitative and quantitative feedback to achieve more objective findings. This approach is particularly appropriate for the study's environment, which calls for feedback from specialists in a range of disciplines. It also guarantees that the components found are pertinent and important to the learning objectives (Rahman et al., 2021). Using this method, the study should generate a model gamification Arabic vocabulary that is not only creative but also supported by evidence and suitable for broad use.

RESULTS AND DISCUSSION

The researchers discuss about the expert profiles in part of the study's findings. Table 1 below shows the expert profile. The profiles of the experts who answered the questionnaire are displayed in Table 1. The writers make sure the information is from specialists in the subject related to the researchers' study, such as the position of specialist and expert experience, to identify an effective study.

Table 1. Expert profile summary

Name	Position & Place of duty	Experience	Areas of expertise
Expert I	Professor UA	Over 20 Years	Instructional Technology
Expert II	Lecture Senior UA	6-10 years	The Arabic language and IT
Expert III	Lecture Senior UA	6-10 years	Instructional Technology
Expert IV	Teacher Senior STAM	16-20 years	Arabic language
Expert V	Teacher STAM	6-10 years	Arabic language
Expert VI	Assistant Director Senior JHEAINS	16-20 years	Education Division
Expert VII	Teacher SABP MANS	16-20 years	Islamic Studies
Expert VIII	Consultant Smart Khair	6-10 years	Arabic language and Communication
Expert IX	Facilitator Smart Khair	6-10 years	Islamic Education

Components of the Arabic Vocabulary Gamification Model

The study's results indicate that three components (i) information, (ii) interface, and (iii) interactivity are crucial to the Design of the Model Gamification Vocabulary of Arabic form. Each component of the design model Gamification Vocabulary Arabic will have its findings discussed by the researchers.

Information Element

The results for the pedagogical content knowledge factor are displayed in Table 2. According to the statistics, the percentage of deal experts is above or equal to 75%, the threshold value (d) is not greater than or equal to 0.2, and the defuzzification (alpha cut) value is greater than or equal to 0.5. As a result, everything was received.

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Table 2. The Threshold (d) value, the Expert Consensus Percentage, Defuzzification, and the Order of Items for Information Element

No	Item / Element	Term Of Triangular Fuzzy Numbers		Conditions Of the Defuzzification Process				Deal Expert	Elements Received
		The value of the Threshold,d	Percent Agreement Of The Expert Group, %	m1	m2	m3	Score*Fuzzy (A)*		
1	Information Vocabulary U-DIG very friendly toward student	0.147	100.0%	0.700	0.867	0.967	0.844	ACCEPT	0.844
2	The use of U-DIG on the TAL century 21 incredibly creative to attract the interest of student	0.200	88.9%	0.700	0.856	0.944	0.833	ACCEPT	0.833
3	Arabic vocabulary addition is appropriate for self-directed study.	0.304	77.8%	0.700	0.833	0.900	0.811	ACCEPT	0.811
4	The method of speculating on the meaning of words is suitable for enhancing Arabic vocabulary.	0.101	100.00%	0.767	0.922	0.989	0.893	ACCEPT	0.893
5	Using dictionaries is crucial while trying to understand Arabic vocabulary.	0.158	100.00%	0.722	0.878	0.967	0.856	ACCEPT	0.856
6	Choosing vocabulary that is more relatable to the students can aid in the process of helping them remember it.	0.106	88.89%	0.789	0.933	0.989	0.904	ACCEPT	0.904
7	Good information and encouragement to support teachers and students in expanding their vocabulary	0.137	100.00%	0.767	0.911	0.978	0.885	ACCEPT	0.885

Note: Items and constructs of conditions of acceptance Fuzzy Triangular Numbers
(1) the Threshold Value (d) <= 0.2 (2) Deal experts as a percentage > 75.0% The Defuzzification Procedure (3) Score Fuzzy (A) > α - cut = 0.5 value

Interface Element

Table 3 presents the results for the components of the Theory of Multiple Intelligences that are based on teacher planning. According to the statistics, the threshold (d) value is not greater than or equal to 0.2, the percentage of deal experts is greater than or equal to 75%, and the defuzzification (alpha cut) value is greater than or equal to 0.5. Consequently, every item has been received.

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Table 3. The Threshold (d) Value, the Expert Consensus Percentage, Defuzzification, and the Item Ranking for Interface Element

No	Item / Element	Terms Of *Triangular Fuzzy Numbers*		Conditions Of the *Defuzzification Process*				Deal Expert	Elements Received
		The Value of the *Threshold*, d	Percent Agreement Of The Expert Group, %	m1	m2	m3	Score *Fuzzy (A)*		
1	The choice of the U-DIG's colour and shape game to pique students' interest	0.106	88.9%	0.789	0.933	0.989	0.904	ACCEPT	0.904
2	Scroll Down the Bar For innovative vocabulary learning, U-DIG is accurate and appropriate.	0.105	100.0%	0.700	0.878	0.978	0.852	ACCEPT	0.852
3	using a font that is appropriate and engaging in order to support teachers and students.	0.181	88.9%	0.744	0.889	0.956	0.863	ACCEPT	0.863
4	The interface's aesthetic appeal and ease of use make learning vocabulary enjoyable.	0.141	88.89%	0.744	0.900	0.967	0.870	ACCEPT	0.870
5	The pedagogy of modern education requires the use of graphic design and visual appeal.	0.198	88.89%	0.744	0.889	0.944	0.859	ACCEPT	0.859
6	The menu and button layouts make it easier for the user	0.149	88.89%	0.789	0.922	0.967	0.893	ACCEPT	0.893
7	Avatars for consumption improve the user experience.	0.089	100.00%	0.744	0.911	0.989	0.881	ACCEPT	0.881

Note: Conditions of acceptance constructs and items Triangular Fuzzy Numbers
(1) the Value of the Threshold (d) ≤ 0.2 (2) Percent of Deal Experts ≥ 75.0 % Defuzzification Process (3) Score of Fuzzy (A) ≥ value of the α – cut = 0.5

Interactivity Element

The experts' agreement on the aspect of fairness to the students is displayed in Table 4. All of the experts accept items that are suggested by the researchers after they satisfy the triangular fuzzy numbers of criteria, which are that the threshold value (d) does not exceed or equal 0.2 and that the percentage of deal experts exceeds or equals 75%. Additionally, the items in the element of justice to the students must also pass the defuzzification process, which is when the fuzzy score exceeds or equals 0.5.

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Table 4. The Threshold (d) Value, the Expert Consensus Percentage, Defuzzification, and Item Ranking for Interactivity Element

No	Item / Element	Terms Of *Triangular Fuzzy Numbers*		Conditions Of the *Defuzzification Process*				Deal Expert	Element Received
		The value of the *Threshold*, d	Percent Agrement Of The Expert Group, %	m1	m2	m3	Score *Fuzzy (A)*		
1	U-DIG's empowerment in TAL is very beneficial and has a favourable impact on students.	0.190	88.9%	0.678	0.844	0.944	0.822	ACCEPT	0.822
2	The U-DIG is a really useful tool that allows students to learn while playing.	0.140	100.0%	0.789	0.922	0.978	0.896	ACCEPT	0.896
3	Using a time clock, which is ideal for the TAL	0.147	100.0%	0.700	0.867	0.967	0.844	ACCEPT	0.844
4	The U-DIG has aspects of the collaborative. This lets friends to learn.	0.185	88.89%	0.767	0.900	0.956	0.874	ACCEPT	0.874
5	Students' confidence and communication skills are developed by U-DIG.	0.165	88.89%	0.700	0.867	0.956	0.841	ACCEPT	0.841
6	The U-DIG helps to increase motivation for learning Arabic vocabulary.	0.173	88.89%	0.722	0.878	0.956	0.852	ACCEPT	0.852
7	Arabic vocabulary that is organised around a particular theme might pique students interest.	0.173	88.89%	0.722	0.878	0.956	0.852	ACCEPT	0.852

Note: Items and constructs of conditions of acceptance Fuzzy Triangular Numbers
(1) The Threshold Value (d) ≤ 0.2 (2) Percent Of Deal Experts ≥ 75.0 % Defuzzification Process (3)Score Fuzzy (A) ≥ value of the α – cut = 0.5

Based on the analysis's findings and the Fuzzy Delphi Method, the researchers created a model for gamifying Arabic vocabulary. The analysis's findings indicate that the experts approved every aspect of the suggested study. Expert consensus also indicates that all accepted values are high. The analysis's outcome can address the research question, which is that experts agree on items that can incorporate game elements like challenges, rewards, level, and leaderboards to increase student involvement based on

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priority. Based on the study's conclusions, the experts approved every element information, interface elements, and element interactivity item.

In terms of the pedagogical content knowledge element, experts agree that four items are most important: "the Use of dictionaries is important in the search for the meaning of something lexicon of Arabic", "the Strategy of guessing the meaning of vocabulary appropriate to enhance the Arabic vocabulary", "the Information is good and uplifting to be able to help students and teachers in the addition of a rich vocabulary", and "the Selection of vocabulary that is closer to the students to be able to help in the process of remembering vocabulary". Since teachers must understand the pedagogy and content of the subject they are teaching, this item should be given top priority. The situation is consistent with the study's findings, which state that information-effectiveness requires integrating pedagogical learning of Arabic (Fatin Safura et al., 2024).

In addition, the experts agree that the following four aspects of the interface are the most important: "the U-DIG's colour and shape game selection can draw students' attention," "the menu and button layout makes it easier for users to navigate", "Usage avatars improve user experience", and "the interface is visually appealing and easy to use, making vocabulary acquisition enjoyable". Most of the primary viewpoint on gamification is that it can make learning more participatory (Mohammad Najib et al, 2024). Retno Ariyanti Nurningtias's (2022) findings, which highlight the components of gamification that can increase students' engagement with instruction, are consistent with this one.

The last component in the Model Gamification Vocabulary Arabic design is the interactive component. "The U-DIG is very practical in that students can learn while playing", "The U-DIG has collaborative elements that allow friends to learn together," and "The U-DIG contributes to the improvement of motivation in learning the vocabulary of the Arabic language" are items that hold a prominent position in this element. This item demonstrates how gamification offers a fantastic opportunity to combat language acquisition. Siti Rohani's (2018) study, which highlights the potential of gamification to enhance Arabic language acquisition, is supported by the results of this investigation.

CONCLUSION

To sum up, the expert consensus supports the incorporation of game elements in educational tools to enhance student engagement and motivation, providing a robust framework for developing gamified Arabic vocabulary learning model. This model can significantly aid in improving vocabulary acquisition through interactive and engaging methods.

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