Application of Fuzzy Delphi Method in Designing Interactive Infographic Module for Learning Arabic Grammar

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Abstract

The topic of Arabic grammar learning has detailed debates and requires more focus to be understood. The content of textbooks explained only by teachers causes students to feel bored and unattractive, diminishing their interest in learning Arabic grammar. Utilizing technology is now essential for creating a relaxed and effective learning environment, especially for complex course content such as Arabic grammar. Therefore, this study aims to achieve a consensus of experts on the main components and elements of each component as a basis for developing an interactive infographic module for learning Arabic grammar. The design phase is to obtain expert agreement on these components and elements by using the Fuzzy Delphi Method (FDM) with the use of a seven-point Likert scale. Ten experts from various fields of expertise were involved as respondents. Data obtained were analysed using Triangular Fuzzy Numbering, while ranking was determined through the Defuzzification process. The findings show that experts have reached a consensus with a threshold value of less than 0.2 (d<0.2), a consensus rate exceeding 75 per cent (%) and a fuzzy score value (A) exceeding 0.5. Overall, the main components and elements agreed upon by experts related to interactive infographic modules in learning Arabic grammar can produce a module that can provide fun not only for students but also for teachers because the module is interactive and contains full multimedia elements.

Keywords: *Arabic Grammar, Fuzzy Delphi Method, Interactive Infographics, Module, Technology.*

INTRODUCTION

In the 21st-century world, society's life is inseparable from the rapid development of increasingly sophisticated technological innovations. The use of technology has become the most important medium in life and also in learning and teaching (LnT) activities. The use of technology, especially in the field of education, has become a necessity for teachers and students. According to Osman (2017), among the factors driving the use of technology in LnT is the widespread exposure of technology to the current generation of students. They cannot be separated from technology and multimedia because of their characteristics that facilitate and attract their attention. Ismail et al. (2021) also stated that the implementation of technology-based LnT activities is increasing and given major emphasis in modern education worldwide. This situation demands a rapid change or transformation in all forms of the educational process, whether from the perspective of curriculum, communication, creativity, teaching methods, learning styles, forms of teaching aids, or teaching design that uses a technological approach (Zulkifli et al., 2020). The application of this technology is also in line with the needs of the young generation who tend to something fast, easily accessible, and can be achieved for free (Baharum et al., 2023). Today's students are more inclined towards learning materials that are easy and interesting, especially featuring innovation and technology. According to Rusli et al. (2021), the LnT process in the 21st century requires students who are capable of solving problems creatively and innovatively. Through the application of technology, teachers can convey ideas with attractive teaching aids and can motivate students. Indirectly, students will become active due to the fun learning methods, thus helping to enhance their understanding of the learned content. This statement is also supported by Syafri et al. (2022) who stated that

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innovative teaching through interesting approaches can help students be more active, motivated, and involved in the learning process comprehensively.

Despite the widespread use of technology in today's era, some pedagogical methods remain bound to traditional, teacher-centred approaches. The content of the lessons is fully elaborated by teachers without the aid of technology-based teaching materials. The pedagogy of Arabic grammar, synonymous with traditional methods involving teacher-centred learning, has become one aspect contributing to this issue (Zaini et al., 2019). Activities in teaching Arabic grammar still focus on textbook explanations by teachers and involve less two-way interaction. This does not align with current developments, especially for Generation Z students who prefer interactive, innovative, and diversified learning aids based on technology. The debates contained in the study of Arabic grammar are vast and sometimes unfocused due to the teaching practices, especially for non-native speakers, which are rigid and traditional (Husin et al, 2017). Arabic language textbooks contain detailed information presented in lengthy explanations, resulting in unfocused content. This contributes to the students' diminished interest in continuing to study the book's content. Therefore, the role played by teaching materials is crucial in understanding and delving into the learning syllabus (Sjahrony et al., 2017).

Diverse learning methods and the use of suitable learning aids that match students' abilities need attention (Jamaluddin & Baharudin, 2021). An interactive and innovative teaching approach is more appropriate and preferred by students in the current era compared to traditional methods that are solely centred on the teacher. One alternative in practising this approach is through the use of multimedia, which acts as a teaching aid (Sallehin & Ab Halim, 2018).

The use of multimedia can be practised through the delivery of information in the form of infographics. Information is presented in appealing graphic formats. Research by Mohd Noh et al. (2017) found that students are more inclined to understand information using effective visual communication and attractive graphic combinations. They believe that the information conveyed should emphasize the use of attractive colours along with concise and easy-to-understand texts aided by diagrams, charts, or related tables to produce systematic and effective information delivery.

This study focuses on constructing components and elements to develop an interactive infographic module through a website. The use of interactive infographics can arouse students' interest in understanding complex information, such as that of learning Arabic grammar. Through interactive infographics, students can select and focus on the information they need (Dur, 2014). According to Salsidu et al. (2018), the use of interactive multimedia modules like web-based interactive infographics is the best and most effective method for presenting information because it is easy to learn and understand. Known to be clear, through infographics, information is explained engagingly with visuals, making it easier to remember. Additionally, infographics have become an innovative application in education (Yildiz, 2024).

Literature Studies

Learning Modules

In the context of education, a module can be understood as units of media within a teaching plan designed to facilitate student understanding (Mohd Yazid et al. 2023). According to Ali (2023), a module is recognized as a teaching plan consisting of various units and small topics to ease the comprehension of students. These modules can be obtained either in the market or disseminated through educational institutions.

The utilization of modules is essential in ensuring teaching, learning, or training activities are directed and accompanied by specific guidelines to achieve outlined objectives. Modules are a requisite not only for schools and educational institutions but also for any organization that intends to execute a program. In language learning, the deployment of modules across various educational institutions has successfully enhanced student motivation to master the curriculum content (Yahya et al., 2016). Besides diversifying LnT strategies, modules also act as self-learning materials, reducing students' dependency on teacher lectures (Dahaman, 2014). The content of these modules, comprising several learning units, serves as a curriculum supplement and a guide in LnT activities, aiming towards self-directed learning for students (Mohd Noah & Ahmad, 2005; Ahmad, 2002).

The emphasis on self-learning in modules is part of an effort to produce independent, active, and creative learners (Ahmad Mokhtar, 2006).

Oliver (1999) suggests that learning modules must include resources, tasks, and support to fulfil the requirements for learning. For effective learning processes, tasks should involve the student in utilizing specific resources. The role of the educator, then, is to provide learning support. This integrated trio of components leads to interactive learning, which is vital for education.

Othman et al. (2006) have outlined principles to be incorporated into learning modules, which are:

Focus on the direct and active involvement of students with the learning content that is capable of providing a meaningful experience.

Provision of activities and sections that are divided into several learning units based on the specified syllabus.

Students are free to practice their learning patterns using the module without altering the outlined objectives of the module.

Students are allowed to use the module according to their abilities and styles in carrying out module learning activities.

Russell (1974) divides modules into three types: Individual Teaching Modules, Small Group Modules, and Large Group Modules. Ahmad (2002) differentiates modules based on the purpose for which a module is built. He categorises modules into four types:

Teaching Module

This module focuses on LnT activities to help students learn independently and emphasizes individual or group teaching.

Motivation Module

The motivation module focuses on enhancing self-motivation. This module has various activities and exercises and is managed by a facilitator or teacher. They play a role in ensuring the module's objectives are achieved.

Training Module

This module is in the form of training to enhance skills and does not involve LnT activities. Typically, training modules are managed by specific organizations involving short-term and long-term scopes.

Academic Module

This module focuses on the academic field at the university or college level. The academic module contains curriculum information, study semesters, notes, academic content, and proposed activities. Full-time or part-time students use this module.

The development of a module should follow the correct procedures and building methods to produce a valuable module. Various models can be used as a reference and guide for building modules, but the selection must depend on the type, target, and objectives of the module itself. Some of the module development models are as follows:

Russell's Approach (1974)

Sharifah Alwiah Alsagoff's Method (1981)

Sidek's Module Development Model (2001)

Infographics in Education

Infographics are widely used in various applications and information dissemination mediums. The concept, which combines text, images, and graphics, facilitates understanding and attracts interest to be viewed or read. This factor has led to its use not being limited to any particular field but has become a phenomenon as a method

of conveying information in the present time. The field of education is no exception, as teaching and learning activities are always seeking innovation and consistently searching for techniques to simplify understanding.

Technological applications are a key component in 21st-century learning methodologies (PAK21) (Ali et al., 2018). Infographic application in education is one such method to practice PAK21. Visual information is utilized to enhance retention in the learning process and knowledge acquisition. For instance, data presented visually using graphic illustrations communicate effectively, linking ideas and facts (Cleveland, 1985). In this context, infographics are contemporary visual information types that support learning activities by transforming complex and abstract concepts into intuitive knowledge (Smiciklas, 2012), aligning with the current learners' preference for visual cues in learning.

The use of infographics is a critical step toward developing a visually related pedagogical approach. This is important considering the following (Martix & Hodson, 2014):

This pedagogical approach is closely linked with various learning styles. For example, studies have shown that some students can achieve excellent performance when provided with resources or methods that meet aspects of knowing, conveying, and remembering information (Hawk & Shah, 2007). There is also research indicating that students who choose visual information can retain it effectively because the material is presented in the form of illustrations, slides, or graphics. This suggests that images or graphics can assist students in processing information in the form of flow charts, diagrams, and of course, infographics (Felder & Soloman, 2000).

Visual Pedagogical Strategy for Students: Using images or graphics can be a significant tool in promoting general visual literacy among all students (Thomas et al., 2008). Student engagement in producing images or graphics helps them understand visual culture or 'social visual construction', which is part of their daily experiences (Mitchell, 2002).

The concept of infographics can be readily employed in visual presentations of information. Knowledge derived from academic courses can be applied in visual designs in the form of static and animated infographics, which are then combined into interactive infographics. Such pedagogical methods enhance human comprehension and imagination. Moreover, students are capable of linking different subject matter elements. The use of infographics in producing electronic content offers a quick and widely accessible way to disseminate information. Its application in education is crucial because students' desire to comprehend certain topics visually rather than through reading has increased (Alshehri & Ebaid, 2016).

In addition, media-based infographics are highly effective in teaching because humans are visual beings, with half of the brain used for visual functions. When images are displayed, they are processed 60,000 times faster than text (Hamad, 2018).

OBJECTIVES

To acquire the necessary data for the development of an interactive infographic module, the objectives of this study are as follows:

To design an interactive infographic module based on a website for Arabic grammar learning.

This section addresses the following research questions:

What is the design of an interactive infographic module in Arabic grammar learning based on literature studies?

What are the main components in the design of an interactive infographic module for Arabic grammar learning based on expert consensus?

What are the elements within the main components in the design of an interactive infographic module for Arabic grammar learning based on expert consensus?

METHODOLOGY

The design phase in the Design and Development Research (DDR) approach (Richey & Klein, 2007) for this study focuses on designing an interactive infographic module for learning Arabic grammar. Data was collected using the Fuzzy Delphi Method as the research method for designing and developing the module. This method was chosen because it aligns with the goals of the phase, focusing on a detailed and in-depth assessment of the module to be developed.

The Fuzzy Delphi Method was pioneered by Murray et al. (1985) and further developed by Kaufmann and Gupta (1988). This method is a rebranded measurement tool based on the Delphi technique, which refers to a set of procedures for obtaining and refining a group of experts' views on an issue for content validity. In other words, the Fuzzy Delphi Method is an instrument that improves upon the existing Delphi Technique (Jamil & Mat Noh, 2020). This enhancement makes the Fuzzy Delphi Method an effective measurement tool, capable of resolving uncertainty issues in a study.

Sample of the Study

The study sample consisted of ten expert panel members: three experts in learning module development, four in educational technology, and three in Arabic language teaching and learning. A purposive sampling technique was utilized for expert selection. This technique was chosen to deeply understand the knowledge and experience of experts in the field being studied.

The number of experts for a Delphi study, according to Jones and Twiss (1978), ranges from 10 to 50 experts. This statement is further reinforced by Adler and Ziglio (1996), who stated that the number of experts should be between 10 and 15 for a high consensus value. Therefore, ten experts were chosen for this study as they fall within the permissible range of 10 to 50 experts.

Instrument of the Study

The research instrument used in this study was an expert assessment questionnaire built upon a literature review. The purpose of the instrument was to gather quantitative data regarding the learning module for Arabic grammar using interactive infographics. The use of questionnaires met the criteria and requirements of the Fuzzy Delphi Method, which involves using mathematical formulas to obtain expert consensus. Skulmoski et al. (2007) stated that the development of instruments could be based on literature reviews, pilot studies, and experiences.

Data Analysis

Before the distribution of the questionnaire to the ten experts involved, content validity was conducted by involving three experts to assess the suitability of the proposed elements in the Fuzzy Delphi questionnaire. Feedback and suggestions from the experts were recorded and acted upon for improvements in the questionnaire.

Data were analysed using the Fuzzy Delphi Method. Likert scale ratings were converted to fuzzy scales based on the received data. This data was analysed using Microsoft Excel software.

Steps in the Study

The Fuzzy Delphi Method was employed to analyse data obtained from the set questionnaire. To achieve this objective, several steps and procedures were followed. Adhering to these procedures ensured the empirical validity of the results. The sequence of steps followed in this study was as follows:

Fuzzy Delphi Method. These steps must be meticulously followed to ensure empirical outcomes. The sequence followed in this study is as follows:

Step 1:

Design the questions for the Fuzzy Delphi questionnaire using the following methods:

LITERATURE REVIEW

Existing Questionnaires (Adaptation)

The process of creating a Fuzzy Delphi questionnaire script is similar to that of a standard questionnaire. The Likert scale is used based on the research question requirements, measuring aspects such as agreement level, importance, or degree.

Step 2:

Assume experts K are invited to determine the importance of assessment criteria for variables to be measured using linguistic variables. The researcher can use their initiative in the process or methods to obtain information and data. In this study, the researcher chose to distribute questionnaires in person, and any questions about the questionnaire could be directly addressed.

Step 3:

This step involves converting all linguistic variables into triangular fuzzy numbers (triangular fuzzy numbers). The linguistic scale resembles the Likert scale used in other studies, but it is augmented with fuzzy numbering based on triangular fuzzy numbering. Three values, as shown in Figure 1:
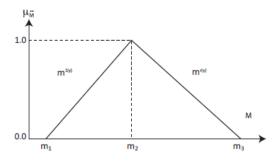

Figure 1. Triangular Fuzzy Number

The values represent m1 (minimum), m2 (moderate value) and m3 (maximum). The linguistic h-scale is used to convert linguistic variable scales into fuzzy numbers as mentioned in the Table 1.

Table 1. Example of Linguistic Variable Scale

Fuzzy Scale (7 points)		Triangular Fuzzy Numbers	
	m_1	m_2	m_3
Strongly Agree	0.9	1.0	1.0
Agree	0.7	0.9	1.0
Somewhat agree	0.5	0.7	0.9
Neither agree nor disagree	0.3	0.5	0.7
Somewhat disagree.	0.1	0.3	0.5
Disagree	0.0	0.1	0.3
Strongly disagree	0.0	0.0	0.1

Step 4:

Once all data from experts have been collected, Likert scales are converted into fuzzy scales. This data is then analysed using Microsoft Excel software. For each expert, the vertex method is used to calculate the distance between the average r_{ij} (Chen, 2000). The distance between two fuzzy numbers m = (m_1, m_2, m_3) and n = (m_1, m_2, m_3) is calculated using the following formula:

$$d(m, n) = \sqrt{\frac{1}{3}[(m_1 - n_1)^2 + (m_2 - n_2)^2 + (m_3 - n_3)^2]}$$

Step 5:

If the distance between the average and the expert's rating data is less than the threshold value of 0.2, it is considered that all experts have reached an agreement (Cheng & Lin, 2002). Moreover, if the percentage of group consensus among m x n experts exceeds 75% (Chu & Hwang, 2008; Murry Jr & Hammons, 1995), then move to step 6. Otherwise, a second round of the Fuzzy Delphi Method is needed, or the item is discarded.

Step 6:

The next phase is the defuzzification process, which uses the formula $A_{max} = 1/4 * (a_1 + 2a_m + a_2)$. If using Average Fuzzy Numbers or average response, the resulting score is a number on a scale from 0 to 1.

FINDINGS

There were three steps the researcher followed in determining the main components and elements in the design of the module. Table 2 shows the steps used in the findings of the module design.

Table 2. Steps in Module Design

Step	Activity
1	Development of main module components based on existing models.
2	Development of elements for each module component based on data from needs analysis and literature review.
3	Verification of module components and elements based on expert consensus using the Fuzzy Delphi Method.

Module Objectives

Table 3 displays the final findings for the module objectives components, which have undergone consensus and suggestions from the expert panel. The study's findings indicate the threshold value for each item, the percentage of group consensus among the experts, the average Fuzzy score, the consensus of the experts, and the ranking of each item.

Table 3. Analysis of Module Objectives

Item / Element	Threshold Value	Percentage of Group Consensus	Fuzzy Score (A)	Expert Consensus	Ranking
1. Explaining the use of Arabic syntax methods correctly.	0.073	100%	0.927	Accepted	2
2. Elaborating on Arabic syntax methods in understanding Quranic verses, Hadith, and Arabic reading materials.	0.140	90%	0.900	Accepted	3
3. Applying Arabic syntax methods in speaking and writing.	0.027	100%	0.957	Accepted	1

Table 3 shows that the expert consensus on the elements of the module objectives component is satisfactory. All elements of the module objectives component show a threshold value (d) < 0.2, meeting the first criterion. Meanwhile, the second criterion is also met, as all items exceed 75%, and the Fuzzy score value is above 0.5. All elements have been accepted by the expert consensus.

Module Content

Table 4 presents the final findings for the module content components, having undergone consensus and suggestions from the expert panel. The study's findings show the threshold value for each item, the percentage of group consensus among the experts, the average Fuzzy score, the consensus of the experts, and the ranking of each item.

Table 4. Analysis of Module Content

Item / Element	Threshold Value	Percentage of Expert Group Consensus	Fuzzy Score (A)	Expert Consensus	Position (Ranking)
4. Views of Arab scholars on the division of *Kalimah*.	0.181	90%	0.860	Accepted	9
5. The concept of *al-Ism, al-Fi'l*, and *al-Harf*.	0.000	100%	0.967	Accepted	1
6. Discussion/exercise on the concept of *al-Ism, al-Fi'l*, and *al-Harf*.	0.049	100%	0.947	Accepted	2
7. Introduction and concept of *Al-Mabniy wa al-Mu'rab*.	0.064	100%	0.937	Accepted	4
8. Division of types of *al-I'rab*.	0.049	100%	0.947	Accepted	2
9. *I'rab of al-Asma' al-Sittah* and *al-Muthanna*.	0.141	90%	0.890	Accepted	8
10. *I'rab of al-Jam'*.	0.064	100%	0.937	Accepted	4
11. *I'rab of al-'Af'al al-Khamsah*.	0.064	100%	0.937	Accepted	4
12. *I'rab of al-Fi'l al-Mu'tal*.	0.064	100%	0.937	Accepted	4

(Note: The terms *al-Ism, al-Fi'l, al-Harf, Al-Mabniy wa al-Mu'rab, al-I'rab, al-Asma' al-Sittah, al-Muthanna, al-Jam', al-'Af'al al-Khamsah,* and *al-Fi'l al-Mu'tal* are specific technical terms used in the study of Arabic grammar. They refer to different aspects of Arabic grammar such as nouns, verbs, particles, and various grammatical states.)

Table 4 shows that the expert consensus on the elements of the module content component is satisfactory. The threshold value for all elements of the module content component meets the first criterion, showing a value (d) < 0.2. The percentage of expert consensus for all elements also exceeds 75%, meeting the second criterion. The average Fuzzy score for all elements is above 0.5, and all elements have been accepted by the expert consensus.

Module Design

Table 5 shows the final findings for the design component of the module, which has gone through consensus and suggestions from the expert panel. The research findings indicate the threshold value for each item, the percentage of group consensus among the experts, the average Fuzzy score, the expert consensus, and the ranking of each item.

Table 5. Analysis of Module Design

Item / Element	Threshold Value	Percentage of Expert Group Consensus	Fuzzy Score (A)	Expert Consensus	Ranking
1. Use of lines and arrows to guide readers through the narrative or arrangement for easy understanding.	0.049	100%	0.947	Accepted	3
2. Enlarging the size of related graphic components.	0.076	100%	0.917	Accepted	14
3. Use of attractive colours.	0.064	100%	0.937	Accepted	8

4. Focus on the visual content of data, images, and words.	0.186	90%	0.880	Accepted	19
5. Use of concise text.	0.073	100%	0.927	Accepted	12
6. Use of clear graphics and images.	0.049	100%	0.947	Accepted	3
7. Use of text size that is easy to read.	0.027	100%	0.957	Accepted	1
8. Use of minimal text or graphic colours.	0.073	100%	0.927	Accepted	12
9. Limiting the number of font types used.	0.210	80%	0.843	Rejected	
10. Selection of font types that are easy to read	0.183	90%	0.890	Accepted	17
11. Selection of attractive font colours, icons, and graphics.	0.064	100%	0.937	Accepted	8
12. Use of audio or background sound for animated information movement.	0.141	90%	0.890	Accepted	17
13. Clarity of audio pronunciation.	0.049	100%	0.947	Accepted	3
14. Attractive and appropriate layout display.	0.049	100%	0.947	Accepted	3
15. Diversity of infographic types such as charts, mind maps, numbering, and comparisons.	0.103	90%	0.910	Accepted	15
16. Sequential image movement.	0.214	80%	0.853	Rejected	
17. Animated information movement can be read (display duration).	0.027	100%	0.957	Accepted	1

18. User-friendly website information search display.	0.087	90%	0.930	Accepted	11
19. Each topic is divided into its own page within the website.	0.064	100%	0.937	Accepted	8
20. Information needs to be concise on each page.	0.140	90%	0.900	Accepted	16
21. Each title has an easily accessible search button.	0.186	90%	0.880	Accepted	19
22. Interactive website can be accessed on all devices.	0.049	100%	0.947	Accepted	3

Table 5 displays the results of the analysis for the design elements of the module based on expert consensus, which are deemed satisfactory. All elements of the module design components exhibit a threshold value (d) < 0.2, meeting the initial criteria, except for the elements '*limiting the number of font types used*' and '*sequential image movement*'. Meanwhile, the second criterion is also met as it was found that all items exceed 75%. The average fuzzy score also surpasses 0.5, indicating that all elements are accepted except for two, which are rejected due to their failure to meet the first criterion.

Learning Activities within the Module

Table 6 illustrates the final findings for the learning activities component of the module, having gone through consensus and suggestions from the expert panel. The study's findings show the threshold value for each activity, the percentage of group consensus among the experts, the average Fuzzy score, the expert consensus, and the ranking of each activity.

Table 6. Analysis of Learning Activities within the Module

Activity / Element	Threshold Value	Percentage of Group Consensus	Fuzzy Score (A)	Expert Consensus	Ranking
1. Interactive quizzes such as Wordwall, Kahoot applications.	0.049	100%	0.947	Accepted	2
2. Interactive virtual discussions such as Padlet applications.	0.027	100%	0.957	Accepted	1
3. Group activities to produce infographic content using Canva.	0.049	100%	0.947	Accepted	2
4. Group activities to create creative videos using TikTok.	0.049	100%	0.947	Accepted	2
5. Language games in groups.	0.133	90%	0.910	Accepted	5

Table 6 indicates that the expert consensus on the elements of the learning activities within the module is satisfactory. All elements of the learning activities component show a threshold value (d) < 0.2, meeting the first criterion. The percentage of expert consensus for all activities exceeds 75%, satisfying the second criterion. The average Fuzzy score for all activities is above 0.5, meaning that all elements within the learning activities component are accepted and above 75%.

Module Evaluation

Table 7 displays the final findings for the evaluation component of the module, having gone through the consensus and suggestions from the expert panel. The study's findings reflect the threshold value for each item, the percentage of group consensus among the experts, the average Fuzzy score, the expert consensus, and the ranking of each item.

Table 7. Analysis of Module Evaluation

Evaluation / Element	Threshold Value	Percentage of Group Consensus	Fuzzy Score (A)	Expert Consensus	Ranking
1. Online objective tests	0.174	80%	0.883	Accepted	4
2. Oral tests	0.122	90%	0.920	Accepted	3
3. Written assignments	0.049	100%	0.947	Accepted	1
4. Video assignments	0.064	100%	0.937	Accepted	2

Table 7 above shows that the expert consensus on the elements of the module evaluation component is satisfactory. All elements of the module evaluation component show a threshold value (d) < 0.2, meeting the first criterion. Additionally, the percentage of expert consensus for all items exceeds 75%, satisfying the second criterion. The average Fuzzy score for all items is above 0.5, and the overall expert consensus is accepted.

DISCUSSION

The overall findings demonstrate that the expert panel agrees with the elements listed as guidelines in the development of the module. The listed elements and components are based on literature studies.

The panel of experts, through the Fuzzy Delphi Method, reached a consensus on the components listed, namely the objectives of the module, the content of the module, the selection of features and design of the module, the learning activities of the module, and the module evaluation. The components chosen by the researcher refer to literature studies.

In general, experts agree with the objectives outlined in the development of the module. The three objectives listed are the objectives contained in the course information for the Ibn 'Aqil Syntax Texts study course. Based on the analysis of expert consensus findings, applying Arabic syntax methods in speaking and writing is the top-ranked objective. The emphasis on this objective is considered very important because the purpose of learning Arabic grammar is to practice speaking and writing skills. According to Daud and Abdul Pisal (2014), weaknesses in mastering Arabic grammar lead to mistakes in language structure when speaking. Moreover, the level of mastery of Arabic grammar measures an individual's ability to use the Arabic language in speech and writing correctly (Syed Ab Hamid et al., 2017).

The next objectives are for students to be able to explain the use of Arabic syntax methods correctly and to elaborate on Arabic syntax methods in understanding Quranic verses, Hadith, and Arabic reading materials.

The analysis results show that all elements of the module content component are accepted by the expert panel. The topics chosen by the researcher are based on the syllabus for the *Ibn 'Aqil* Syntax Texts course at UniSZA's Arabic Language Studies Program. Although the ranking of topics chosen by experts according to emphasis and priority varies, the researcher selects topics starting with the earliest according to the order of the syllabus to ensure the module developed matches the sequence of student learning in class. The researcher divides the module topics based on the verses of *Alfiyah Ibn Malik*. According to Jabir (2002), the teaching of Arabic grammar should start with the most basic and simple topics with continuity between the preceding and following topics, to facilitate students in understanding the relationship between the topics.

For the module design components, the expert panel concurred with all elements of the interactive infographic design based on websites listed in the survey, with the exception of two elements *'limiting the number of font types used'* and *'sequential image movement'*. The elements that achieved this consensus form the basis for the module

development design. Interactive infographics combine the skills of presenting information succinctly in an interactive format that incorporates multimedia elements. Overall, the design of the module focuses on the elements that have received expert consensus according to the ranking in the Fuzzy Delphi analysis. The elements *'use of text size that is easy to read'* and *'animated information movement can be read (display duration)'* received the highest consensus.

There are five elements listed in the learning activities module component. All types of activities achieved expert consensus, with interactive virtual discussions such as Padlet applications ranked first. In line with the interactive website elements, the discussion application involves two-way interaction and is suitable for the module to be developed. Interactive quizzes using *Wordwall* applications are also provided. Practice activities are carried out through exercises contained in the *Wordwall* application with various types of questions that can test students' understanding of the module content. These exercises can be performed repeatedly, helping students quickly and easily understand and remember the content.

For the module evaluation component elements, all elements received consensus from the experts with the element 'writing assignments' ranked first. This is followed by video assignment evaluations, oral tests, and finally online objective tests. The production of assignments is an ongoing assessment that allows students to search, think, and evaluate a reference. Objective tests using online quizzes are also suitable for the current situation, not only because they are easy but also time-saving for teachers to check marks.

CONCLUSION

In conclusion, the expert consensus on all elements of the main components for designing an interactive web-based module in learning Arabic grammar serves as a guide and foundation in the module's development. Expert consensus on the proposed elements is critical to ensure that the module developed follows the correct and appropriate guidelines for student use. The basis of the components and elements outlined in the design phase of this study involves the process of needs analysis and literature review references. Once expert consensus is obtained, these components and elements become the basis for module development, and this process provides high validity and reliability for the resulting module. This process also involves theories and models that are the axis to produce the module and has theoretical implications for module development-based research.

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