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Development of Lumi Education H5P Interactive Book for Multimodal Arabic Vocabulary Learning

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Abstract

This research aims to develop an interactive book based on Lumi Education H5P to support multimodal and contextual Arabic vocabulary learning for beginner students. The urgency of this research lies in the limitations of conventional media, which remain static and insufficient to support independent learning, while students' need for interactive and easily accessible digital learning tools continues to increase. The research employed a Research and Development (R&D) approach using the 4D model—Define, Design, Develop, and Disseminate. Validation was conducted by a content expert and a media expert, while the readability test involved nine students. Quantitative data were analyzed using feasibility percentages, and qualitative data were descriptively analyzed to support iterative product revisions. The findings indicate that the media obtained a feasibility score of 93% and 89% from experts and 82.78% from students, both categorized as Highly Feasible. The media was rated highly in terms of display clarity, navigation, and integration of interactive activities, although improvements to audio quality and visual consistency are still required. This research recommends further development through material expansion, increased activity variation, and enhanced multimedia quality to optimize its use for Arabic vocabulary learning across different learner levels.

Keywords: *Lumi Education; H5P; Arabic Vocabulary; Interactive Media.*

Introduction

In the world of education, which continues to move from the industrial era to the digital era, teachers as facilitators and implementers of educational activities and students are required to adapt to developments in learning technology, while many teaching media in the classroom are still conventional and unable to support students' independent learning needs outside of class hours in today's digital era(Sarah, S., Rizqia, A., Lisna, L., & Ali, 2024). This gap often leads to low student engagement, a lack of variety in learning experiences, and limited access to materials that can be flexibly reviewed at home. Additionally, students find it difficult to review lessons independently because the available materials tend to be static, non-interactive, and text-heavy, which makes them less enthusiastic about reviewing their lessons(Muhammad Rusli, Dadang Hermawan, 2020). Therefore, there is a need for media that is not only interactive but also easily accessible and capable of creating a new and more meaningful learning environment. H5P-based platform Lumi Education provides a solution that allows teachers to design learning materials rich in visual and audio elements and interactive activities, so that students can review the material taught in a more engaging, contextual

and 21st-century technology-appropriate manner(Sultoni, Ahmat, Riswandi, Muallimin, dan Fetry, 2021).

The urgency of this research lies in the need to provide learning media that is not only in sync with technological developments, but also has the ability to increase students' cognitive engagement in learning Arabic vocabulary in a more profound and meaningful way. Many previous studies have shown that vocabulary learning is often constrained by monotonous delivery methods and a lack of multimodal support that could strengthen conceptual understanding(Badi'ah, 2021). Therefore, this study aims to develop interactive learning media based on Lumi Education (H5P) that provides an integrated visual, auditory, and kinesthetic learning experience for students to independently study and review the material at home. This research is theoretically strengthened by Dual Coding Theory (Paivio, 1986), which emphasises the significance of verbal and visual information integration in enhancing retention, and Multimedia Learning Theory (Mayer, 2001), which states that learning will be more effective when students are exposed to various representations of information in a single learning environment(Yeni Nurhasanah, Khairunisa, Y. ., & Kuswoyo, 2022). By integrating these theories, this research offers a relevant and innovative scientific approach to support the development of adaptive and effective Arabic language learning media.

A number of previous studies have shown that the use of HTML5 and H5P-based interactive technology has a significant impact on improving the quality of digital learning. (Naidu, et al. 2021) emphasise that HTML5 has become the new standard in e-learning due to its ability to deliver responsive, interactive content that is compatible with various devices, making it highly relevant for use in distance and independent learning situations. These findings are supported by (Fitrah, et al. 2025), who found that the Lumi Education application has a positive influence on students' Arabic language skills, particularly in terms of speaking, motivation, and comprehension; 70.3% of students rated the application as helpful, and 59.5% felt that the content was interactive, thereby enhancing their learning experience. In addition, research (Sultoni, et al. 2021) shows that H5P-based learning media has been proven as an effective medium to increase student enthusiasm for learning, where the H5P product developed obtained an expert feasibility score of 93.75% and was assessed as capable of creating interesting learning and encouraging active participation. Similar findings were also shown by (Nurmala, 2025), which highlighted the potential of Lumi Education in developing interactive digital books for Arabic language learning. They stated that Lumi enables the integration of integrative, contextual, and adaptive learning strategies that support more comprehensive vocabulary and language skills mastery through user-friendly H5P content. Overall, these studies confirmed that the H5P-based Lumi Education platform has a high capacity to produce interactive, contextual, and multimodal learning that is in line with the needs of 21st-century students, making it highly relevant for use in the development of Arabic vocabulary learning media in this study(Mutawa, Al Muttawa, & Sruthi, 2023).

Although previous studies have shown that HTML5, H5P, and Lumi Education-based technologies are capable of improving students' interactivity, motivation, and Arabic language skills, most of these studies still focused on improving language skills in general, such as speaking skills, learning engagement, or student enthusiasm. There

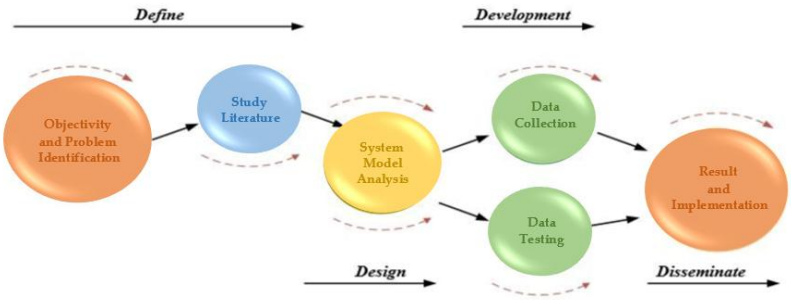
has not been much research specifically developing multimodal Arabic vocabulary learning media in the form of Lumi Education-based Interactive Books, especially those designed to support independent learning for beginner students at home. Moreover, the digital content in previous studies was generally limited to videos, quizzes, or simple interactive modules, without integrating visual-auditory-kinesthetic learning experiences in an integrated manner as proposed in this study(Nacimiento-Garcia, Gonzalez-González, & Caballero-Gil, 2021).

Therefore, there is a gap in the development of vocabulary media that is truly contextual, multimodal, structural, and guides students step by step in accordance with the Dual Coding and Multimedia Learning theories. Novelty of this research lies in the development of a Lumi Education-based Interactive Book version H5P designed to provide an integrated multimodal learning experience through visual, auditory, and kinesthetic interaction specifically for beginner students' independent learning of Arabic vocabulary(Shereen Kakish, et al. 2025). This study aims to fill this gap through the development of an interactive book based on Lumi Education H5P, which is not only valid in terms of content and design, but also specifically designed to improve students' independent learning ability in understanding body vocabulary in a more meaningful and contextual manner.

Method

This research employed the 4D Research and Development model (Define, Design, Develop, and Disseminate), which in this study was simplified to the Develop phase, in order to develop an interactive H5P-based book using the Lumi Education platform that is appropriate for Arabic vocabulary learning. It is a descriptive-evaluative study because it does not perform effectiveness tests but focuses on the process of designing, developing, and validating the product. The research procedure refers to established steps in developing learning media, with a number of modifications to suit the context of digital interactive books based on H5P(Kamal, 2020).

Fig 1 : 4D model R&D Research Roadmap



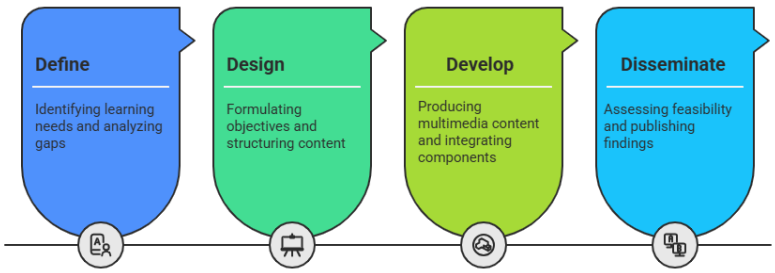
The research participants consisted of two expert validators and nine students as respondents for readability testing. The two validators were selected purposively based on their professional qualifications, namely an expert in Arabic language with teaching experience at Islamic boarding schools and an expert in learning media with competence in digital instructional design. Meanwhile, the student respondents were second-year

ITTC students at an Islamic boarding school in Kediri. Their eligibility criteria included basic Arabic vocabulary reading skills, active student status, and familiarity with digital technology. There were no specific exclusion criteria, and all participation was voluntary with the approval of the institution(Torang Siregar, 2023).

The research material consists of Lumi Education-based interactive books containing learning videos, digital posters, audio pronunciations, drag and drop, quizzes, and various other multimodal activities designed to support vocabulary learning in Arabic. The media was developed using laptops, a stable internet connection, and the desktop and web versions of the Lumi Education platform and Adobe Photoshop for character design. The H5P content used is a standard module that is already available, but its integration is based on the principles of Dual Coding Theory and Multimedia Learning, resulting in an integrated visual-auditory-kinesthetic learning experience(Boeriswati, E., Mayuni, I., Fahmi, A. K., & Surong, 2023).

The research procedure started with the analysis stage, which included identification of learning needs, media gaps in vocabulary material, and evaluation of the suitability of the material with the institution's curriculum. This phase also involved gathering preliminary information from teachers regarding students' difficulties in learning vocabulary independently. In the design phase, researchers formulate learning objectives, develop content flow, select relevant H5P activity types, and create interactive storyboards that guide students step by step. After that, the development stage is carried out through multimedia content production, integration of all elements in Lumi Education, prototype creation, validation by experts, revisions based on validator input, and readability testing with students to assess the clarity, appearance, and ease of use of the product(Bichi & Talib, 2018).

Fig 2 : Interactive Book Development Process



The quantitative data obtained from expert validation and student response questionnaires were analysed using the feasibility percentage formula, as follows:

$$Feasibility(\%) = \frac{Total\ Score\ Obtained}{Maximum\ Possible\ Score} \text{ X } 100$$

The feasibility interpretation category follows standard criteria in Likert scale research and development (R&D), namely:

Table 1 : Category Interpretation of Feasibility Score (Likert Scale)

Feasibility Category	Description
81–100%	Highly Feasible
61–80%	Feasible
41–60%	Moderately Feasible
≤40%	Not Feasible

All qualitative data from validators and students were analysed descriptively to identify content revision needs, media design improvements, necessary technical adjustments, and suggestions for learning enhancements. These qualitative findings were used as a basis for iterative product refinement until a better interactive book was produced(Creswell & Creswell, 2018).

Result and Discussion

Product Description

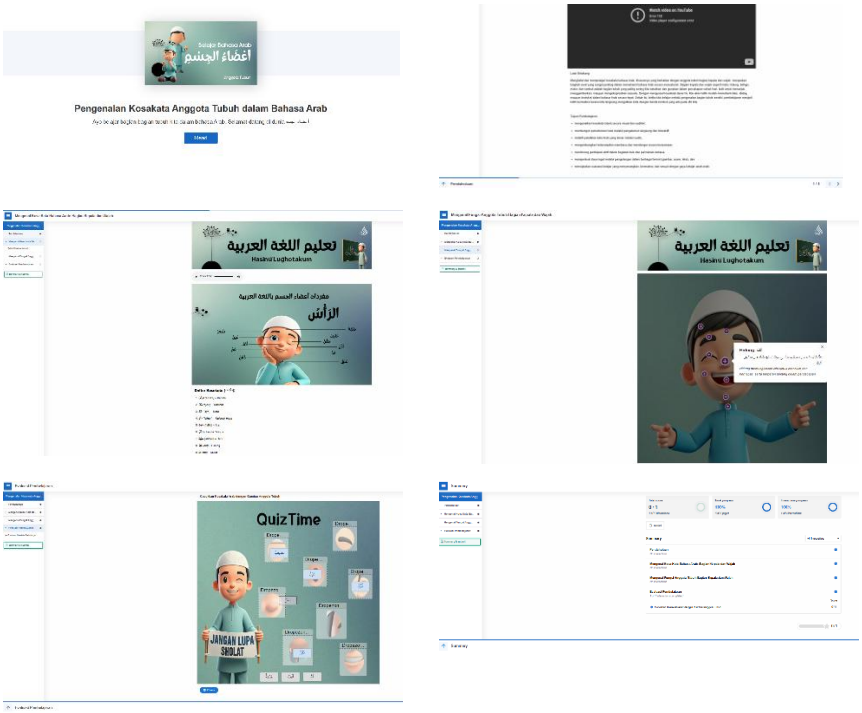
The product developed in this research is an interactive book based on Lumi Education (H5P) that is specifically designed to help beginner students learn Arabic vocabulary related to body parts. This interactive book is a digital medium that can be accessed via computers, laptops, or mobile phones, allowing students to study independently at home or use it as a learning aid in class. Its structure is organised systematically and interactively so that students gain a multimodal learning experience that combines visual, audio, and text elements as well as interactive activities, making the learning process more meaningful and enjoyable.

Fig 3 : Interactive Book cover page and clickable table of contents.

This interactive book is designed to make learning enjoyable. It combines short videos, images, Arabic text, transliteration, and audio pronunciation that can be played repeatedly to help students understand vocabulary clearly and contextually. A 4.48-minute video is used to introduce vocabulary through simple illustrations that are easy to understand without overloading students' memory. This product also features an

interactive poster in the form of a human body image with hotspots that display vocabulary, functions, meanings, and audio when touched, allowing students to receive visual and verbal information simultaneously. To help them retain what they've learnt, there are interactive drag-and-drop and image hotspot exercises that help students match words with pictures and identify body parts directly. The simple, neat, and easy-to-navigate interface makes this product easy to use for students, including those who are new to using digital media in Arabic language learning.

Fig 4 : Complete Interface Display of the Interactive Book



The interactive book was developed using the Lumi Education platform with H5P modules such as Course Presentation, Interactive Video, Drag and Drop, Image Hotspot, Multiple Choice, and Fill in the Blanks. All supporting media, such as images, audio, and video, are compressed to an optimal size so that they can be accessed via a standard internet connection without compromising quality. The product is also compatible with modern browsers such as Google Chrome, Firefox, and Microsoft Edge, and is responsive on mobile devices so it can be used anytime, anywhere.

From a pedagogical perspective, the entire design of this product follows modern learning principles, particularly the Dual Coding theory, which emphasises the importance of verbal and visual integration, and the Multimedia Learning Theory, which emphasises the presentation of information through multiple channels so as not to overload students' memory. Interactive activities are also designed to engage students in the active learning process, where they actively identify, select, match, and repeat

material through various forms of activities. This allows students to not only memorise vocabulary, but also understand it in a contextualised manner.

Although this product has many advantages, some limitations remain, such as dependence on an internet connection to play videos and audio, and compatibility issues with voice recording features on certain devices. However, in general, this product provides interactive and engaging Arabic language learning media that meets the 21st-century needs of students.

Define Phase Results

The define Phase is carried out to identify learning needs and fundamental problems faced by students and teachers in the process of mastering Arabic vocabulary, especially material related to body parts. (أعضاء الجسم).Based on the initial observations, it was found that students still had difficulty remembering vocabulary due to the limited variety of media used during learning. Most of the material was delivered through conventional methods such as blackboards, memorisation, and verbal explanations, so students tended to forget quickly, were less actively involved, and had difficulty when studying independently at home. In addition, students often encounter obstacles in recognising the relationship between words and their visual meanings, mainly due to the lack of supporting images, audio, and interactive activities that aid the gradual understanding process.

From the teachers' perspective, it was found that the use of printed media and verbal explanations in each meeting took a considerable amount of time and was not always effective in explaining the form and function of body vocabulary visually. Teachers also face limitations in providing varied repetitive exercises, as the available media tend to be stagnant and do not support direct interaction between students and the material. This condition makes it difficult for teachers to monitor students' understanding in real time and to provide quick feedback on students' mistakes. Thus, there is a strong need for media that can ease the burden of delivering material while increasing student independence in learning.

Analysis of the material shows that body vocabulary is one of the basic topics that requires visual understanding because it relates to body parts that can be directly seen and pointed to. Therefore, this material is ideally developed using a multimodal learning approach so that students can connect Arabic words, meanings, visual forms, and pronunciation simultaneously. This material also requires hands-on exercises such as matching, pointing, and identifying body parts, which are difficult to do using conventional methods alone.

Based on the identification of these needs, the learning objective is to provide media that enables students to understand and master body vocabulary through a richer, more interactive, and independent learning experience. The media developed must help students recognise vocabulary and its pronunciation, connect it with images, and practise it through repeated exercises without relying entirely on the teacher's explanations. Thus,

the use of the H5P-based Lumi Education platform is relevant and necessary because it is able to integrate text, audio, video, images, and interactive activities into one easy-to-use learning platform. This digital media not only meets students' needs for engaging and easy-to-repeat learning, but also helps teachers provide more efficient, flexible, and 21st-century learning materials.

Design Phase Results

The design phase focuses on designing the learning structure, selecting interactive activities, and developing visual displays so that the product developed can meet students' needs and support effective vocabulary learning. At this phase, the researcher first compiled specific, measurable instructional objectives that were in line with the learning outcomes for beginner-level Arabic. These objectives included the ability of students to recognise, pronounce, and identify body part vocabulary in Arabic independently. Based on these objectives, the researcher determined the types of H5P activities to be used, such as interactive videos for presenting material, pronunciation audio to strengthen phonological skills, interactive posters to introduce vocabulary visually, and drag-and-drop and image hotspot exercises to build understanding through direct practice. The activity selection was made by considering the effectiveness of each format in supporting multimodal vocabulary mastery.

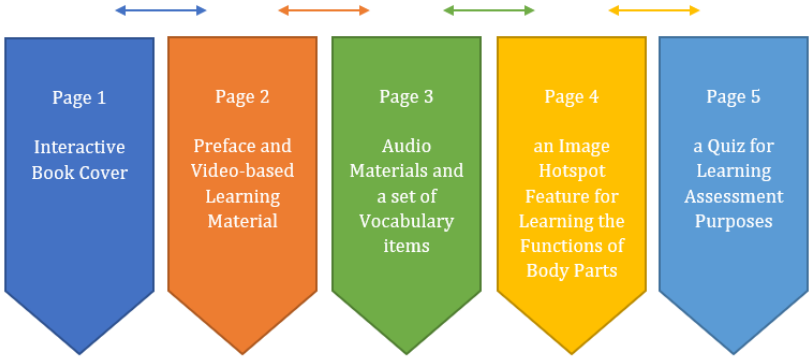
Table 2 : Summary of Components Developed

Aspects Compiled	Brief Explanation
Instructional Objectives	Set specific and measurable goals so that students are able to recognise, pronounce and identify body part vocabulary independently at beginner level.
Interactive Activity Selection (H5P)	Determining the most effective types of activities, including interactive videos for presenting material, audio pronunciation for phonological reinforcement, interactive posters for visualising vocabulary, and drag-and-drop and image hotspot exercises for hands-on practice.
Material Presentation Strategy	Organising the flow from vocabulary introduction → visual-audio reinforcement → interactive exercises, so that learning takes place in a gradual and structured manner.
Multimodal Approach	Integrating visual, audio, text, and kinesthetic interaction elements to strengthen vocabulary mastery in accordance with the principles of Dual Coding and Multimedia Learning.
Suitability to Student Needs	Ensuring that all design elements support independent learning, are easy to use, and are appealing to novice learners who

	previously struggled with conventional media.

Next, researchers compiled a storyboard as a learning flow guide so that each part of the material was arranged sequentially from the introduction stage to the evaluation stage. This storyboard contained screen display scenarios, activity sequences, information that appeared on each page, and transitions between sections, so that the product design was consistent and focused. Visual design was also an important part of this stage; colours were chosen from a soft palette with balanced contrast to be easy on the eyes, icons were used consistently to facilitate navigation, the layout was designed to be simple so as not to confuse students, and the typography was chosen to use clear Arabic letters and easy-to-read Latin characters. All of these visual elements were designed to minimise cognitive load and maximise student focus on the core material.

Fig 5 : Storyboard and Interactive Book Learning Sequence



Pedagogically, the design of this media is based on the principle of self-directed learning, where students can access, repeat, and evaluate their understanding independently through interactive features and automatic feedback. The integration of visual, audio, and kinesthetic activities also supports multimodal learning, which provides a richer learning experience in line with the Dual Coding and Multimedia Learning theories. In addition, the material flow is arranged in stages (scaffolding), starting with the presentation of vocabulary through interactive videos and posters, followed by drag and drop and hotspot exercises, until finally students complete a final quiz as a form of understanding application. This gradual approach ensures that students not only memorise vocabulary, but also understand, practise, and remember it through a structured learning process.

Develop Phase – Expert Validation Results

The Develop phase of this research focused on the product development process and testing through expert validation and readability testing by students to ensure that the interactive book produced had appropriate content quality, suitable media design, and a level of readability that matched the characteristics of the users. At this stage, two expert validators (subject matter experts and media experts) assess the suitability of the content,

the accuracy of the presentation, the visual appropriateness, and the effectiveness of the interactive elements used in the media. Input from experts is then used as a basis for revising the product to make it more optimal and in line with pedagogical standards. In addition, readability tests are conducted on students to determine the ease of use, comprehensibility of the display, and comfort of learning using interactive books. The results of this entire process become the main reference in refining the product so that the media developed is not only academically valid, but also practical, attractive, and easily used by students.

Content Expert Validation

Expert validation of Lumi Education H5P media shows that the vocabulary content presented is appropriate for beginner students learning multimodally. Experts assessed that the selection of body part vocabulary, presentation of images, Arabic text, transliteration, and audio pronunciation were arranged in a logical sequence, making it easier for students to understand the meaning and form of words. The media was assessed as capable of providing a clear and communicative learning experience because each vocabulary word was supported by appropriate visuals and audio that could be repeated according to independent learning needs. Quantitatively, experts gave a feasibility score of 93%, placing it in the Highly Feasible category, indicating that the content meets the standards of accuracy, clarity, and relevance for use in the Arabic vocabulary learning process in Islamic boarding schools. However, experts provided minor notes, such as improving some pronunciations and the consistency of visual details, so that the media would be more optimal and linguistically accurate.

In terms of qualitative aspects, subject matter experts provided a number of constructive suggestions for improving the content to better support the gradual learning process. Experts suggested adding a variety of examples of vocabulary usage in simple contexts that are familiar to students, so that the media not only introduces words separately, but also helps students understand their usage in real sentences. In addition, interactive exercises such as drag and drop and image hotspots were considered appropriate, but it was recommended that they be supplemented with applied questions that train students to connect words, meanings, and images in greater depth. This input formed the basis for iterative revisions so that the media would not only be academically valid, but also increasingly functional, interesting, and effective as a means of independent learning in Arabic vocabulary mastery.

Media Expert Validation

Expert validation involving a learning technology expert who assessed the suitability of the interface design, navigation, visual display, and integration of interactive elements in Lumi Education H5P Interactive Media. Quantitative assessment using a four-point Likert scale instrument shows that the media scored highly in terms of maintainability, usability, navigation, and visual clarity, while the audio and animation aspects scored 89% with some notes for improvement, thus falling into the Highly Feasible category and declared highly suitable for use as a medium for learning Arabic vocabulary.

Qualitatively, media experts provided constructive feedback for design improvements. Validators assessed that the media interface was simple, communicative, and in line with user-centred design principles, making it easy for novice students to operate the material independently. Navigation was considered clear and efficient, although it was recommended that some icons and transition elements be made more consistent to enhance the user experience. Visually, the balance of colours and typography is considered effective in supporting learning comfort, but some adjustments to Arabic fonts and icon sizes are recommended to improve readability, especially on mobile devices.

In addition, validators appreciated the integration of various interactive activities such as interactive videos, drag and drop, and image hotspots, which were considered capable of supporting multimodal vocabulary learning in accordance with the principles of Dual Coding and Multimedia Learning. However, experts suggested increasing the variety of questions and optimising audio quality using native speaker or AI voice sources to ensure more accurate pronunciation and help strengthen students' phonological skills. All of these quantitative and qualitative findings form the basis for product revisions during the development stage, so that the resulting media is not only technically and design-wise valid, but also aligned with the needs of beginner students in body vocabulary learning based on Lumi Education H5P.

Readability Test Results by Students

A total of 12 students participated in the initial validation of the Lumi Education H5P Interactive Media learning media developed in this study. The activity was carried out by filling out a response questionnaire covering several aspects, namely the appearance and attractiveness of the media, ease of use (usability), content quality, interactivity, and the benefits of the media for learning. All students filled out the questionnaire individually after trying the learning media independently according to the researcher's instructions. The questionnaire was completed in class with assistance to ensure that all instruments were filled out correctly. In addition to quantitative assessments, students were also asked to provide open comments and suggestions to identify content revision needs and technical improvements for the next stage of development. This validation activity was part of the research and development (R&D) procedure, which aimed to obtain direct user input before the media was revised in the next stage.

Fig 6 : Initial Media Validation Activities by the students

Student responses to learning media were analysed using quantitative and qualitative data. Initial analysis of the questionnaire was conducted by calculating the feasibility percentage using the standard research and development (R&D) feasibility formula. Nine students assessed 12 statements with a score range of 1–5. The total score obtained was 149 out of a maximum score of 180, resulting in a feasibility percentage of 82.78%. Based on the Likert scale interpretation category, this value falls within the range of 81–100%, which is classified as Highly Feasible. Thus, the H5P learning media is considered highly feasible for use by students.

The analysis continued by examining students' comments and suggestions. In general, students found this media interesting, interactive, and easy to use. Colours, images, text, and sound were considered helpful in understanding vocabulary. Quiz and exercise features such as drag and drop were considered fun and motivating for learning. However, some students provided feedback regarding audio clarity, the need for question variety, and the addition of visual elements to reinforce the explanation of the material. This feedback formed the basis for the iterative product revision process.

Overall, the combination of quantitative and qualitative findings shows that this interactive learning medium not only received a very high feasibility rating, but was also well received by students and has the potential to improve their Arabic vocabulary skills.

Discussion

The results of the study indicate that the development of interactive books based on Lumi Education (H5P) successfully addresses the needs of Arabic vocabulary learning, which was previously constrained by the limitations of conventional media. The define stage revealed that students had difficulty remembering and understanding vocabulary due to the lack of visual-auditory media and interactive activities that support independent learning. These findings are consistent with the assumptions of Multimedia Learning theory (Mayer, 2001), which emphasises the importance of presenting information through various channels of representation to reduce cognitive load and improve understanding(Setiyadi, A. C. ., Anhar , A. ., & Anwar, 2022).

At the design stage, the selection of H5P formats such as interactive video, image hotspot, drag and drop, and audio pronunciation resulted in a learning flow that was in line with the principles of scaffolding and Dual Coding Theory (Paivio, 1986). The gradual arrangement of content enabled students to connect verbal and visual representations simultaneously, thereby strengthening vocabulary retention. The simple interface design and structured navigation support the creation of an efficient and accessible learning experience, in line with previous research findings on the effectiveness of H5P-based digital media(Shereen Kakish, Zeyad Makhamreh, and Reem, 2025).

Subject matter experts and media experts provided empirical confirmation of the suitability of the developed product. Subject matter experts gave a score of 93% and assessed that the integration of images, text, audio, and transliteration met linguistic accuracy standards and was relevant for beginner students. Media experts also gave a Highly Feasible rating with notes on improvements to audio quality and icon consistency. Meanwhile, student readability tests resulted in a feasibility percentage of 82.78%, indicating positive acceptance of the appearance, interactivity, and ease of use. These findings are in line with literature stating that interactive media can increase motivation, engagement, and vocabulary comprehension in students(Bagus Sanjaya, M., Nasution, M. F. R., Maulana, A. D., & Nasution, 2024).

Overall, this research proves that Lumi Education-based interactive books are a viable and effective medium for supporting multimodal and contextual Arabic vocabulary learning. The integration of visual, audio, and interactive activities not only facilitates active learning but also strengthens students' independent learning abilities. This shows that the use of H5P can be a relevant pedagogical approach in the development of Arabic language media in the digital age.

Conclusion

The results of this research indicate that the development of interactive books based on Lumi Education (H5P) has successfully provided multimodal, contextual vocabulary learning media for Arabic and aligned with the needs of beginner students in the digital era. Through a simplified 4D development stage, the resulting product meets feasibility standards with expert validation scores of 93% and 89%, and a student response rate of 82.78%, all of which fall into the Highly Feasible category. The integration of visual, audio, video, and interactive activity elements has been proven to support the principles of Dual Coding and Multimedia Learning, thereby increasing student engagement and independence in learning. Expert and student feedback encouraged iterative refinement in terms of audio, visual consistency, and activity variety, resulting in a final product that is not only valid in terms of content and design, but also practical, engaging, and accessible. Therefore, Lumi Education H5P can be recommended as an effective pedagogical solution for the development of adaptive and relevant Arabic vocabulary learning media for 21st-century learning.

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