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Needs Analysis of AI Vision-Based Mufradat Media for Maharah Istima' and Kalam among Arabic Education Students at Universitas Negeri Malang

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ABSTRACT

Vocabulary (mufradat) mastery underpins listening (maharah istima') and speaking (maharah kalam), yet conventional media offer limited support for independent practice of both skills. This preliminary needs-analysis study examined first-semester Arabic Language Education students' needs for AI Vision-based vocabulary media. A descriptive quantitative survey enriched with qualitative data was conducted using a questionnaire of 25 closed and 6 open-ended items, completed by 55 purposively sampled students at Universitas Negeri Malang. Listening difficulty was high ($\bar{X}$ = 2.65), especially in distinguishing similar-sounding words (72.7%), whereas speaking difficulty was low ($\bar{X}$ = 2.35); the need for practice was high in both skills, with speaking opportunities the strongest need (98.2%). Students strongly needed interactive, digital, object-based media for independent learning ($\bar{X}$ = 3.47) and responded very positively to the AI Vision concept ($\bar{X}$ = 3.40). These findings inform the specifications of the Arabic Lens prototype; its effectiveness remains untested.

Keywords: mufradat, AI Vision, listening skills, speaking skills.

مستخلص البحث

يُعَدُّ إِتْقَانُ الْمُفْرَدَاتِ أَسَاسًا لِمَهَارَتَيِ الِاسْتِمَاعِ وَالْكَلَامِ، إِلَّا أَنَّ وَسَائِلَ التَّعَلُّمِ التَّقْلِيدِيَّةَ تُوَفِّرُ دَعْمًا مَحْدُودًا لِلْمُمَارَسَةِ الْمُسْتَقِلَّةِ لِكِلْتَا الْمَهَارَتَيْنِ. تَهْدِفُ هَذِهِ الدِّرَاسَةُ الِاسْتِطْلَاعِيَّةُ لِتَحْلِيلِ الِاحْتِيَاجَاتِ إِلَى التَّعَرُّفِ عَلَى احْتِيَاجَاتِ طُلَّابِ الْفَصْلِ الدِّرَاسِيِّ الْأَوَّلِ فِي قِسْمِ تَعْلِيمِ اللُّغَةِ الْعَرَبِيَّةِ إِلَى وَسَائِلَ تَعَلُّمِ الْمُفْرَدَاتِ الْقَائِمَةِ عَلَى تِقْنِيَّةِ الرُّؤْيَةِ الْحَاسُوبِيَّةِ بِالذَّكَاءِ الِاصْطِنَاعِيِّ (AI Vision). وَاعْتَمَدَتِ الدِّرَاسَةُ عَلَى مَنْهَجِ الْمَسْحِ الْوَصْفِيِّ الْكَمِّيِّ الْمُعَزَّزِ بِبَيَانَاتٍ نَوْعِيَّةٍ، مِنْ خِلَالِ اسْتِبْيَانٍ تَكَوَّنَ مِنْ ٢٥ فَقْرَةً مُغْلَقَةً وَ٦ فَقَرَاتٍ مَفْتُوحَةٍ، وَشَارَكَ فِيهِ ٥٥ طَالِبًا وَطَالِبَةً مِنْ جَامِعَةِ مَالَانْجَ الْحُكُومِيَّةِ، تَمَّ اخْتِيَارُهُمْ بِاسْتِخْدَامِ الْعَيِّنَةِ الْقَصْدِيَّةِ. أَظْهَرَتِ النَّتَائِجُ أَنَّ صُعُوبَةَ مَهَارَةِ الِاسْتِمَاعِ كَانَتْ مُرْتَفِعَةً، ($\bar{X}$ = ٢,٦٥) وَلَا سِيَّمَا فِي التَّمْيِيزِ بَيْنَ الْكَلِمَاتِ الْمُتَشَابِهَةِ فِي أَصْوَاتِهَا، (٧٢,٧٪) فِي حِينِ كَانَتْ صُعُوبَةُ مَهَارَةِ الْكَلَامِ مُنْخَفِضَةً. ($\bar{X}$ = ٢,٣٥) وَكَانَتِ الْحَاجَةُ إِلَى التَّدْرِيبِ مُرْتَفِعَةً فِي كِلْتَا الْمَهَارَتَيْنِ، وَكَانَتْ فُرَصُ مُمَارَسَةِ الْكَلَامِ أَكْبَرَ الِاحْتِيَاجَاتِ. (٩٨,٢٪) كَمَا أَظْهَرَ الطُّلَّابُ حَاجَةً كَبِيرَةً إِلَى وَسَائِلَ تَعَلُّمٍ تَفَاعُلِيَّةٍ وَرَقْمِيَّةٍ تَعْتَمِدُ عَلَى الْأَشْيَاءِ الْمَحْسُوسَةِ وَتُنَاسِبُ التَّعَلُّمَ الْمُسْتَقِلَّ، ($\bar{X}$ = ٣,٤٧) وَأَبْدَوْا اسْتِجَابَةً إِيجَابِيَّةً جِدًّا لِمَفْهُومِ تِقْنِيَّةِ الرُّؤْيَةِ الْحَاسُوبِيَّةِ بِالذَّكَاءِ الِاصْطِنَاعِيِّ. ($\bar{X}$ = ٣,٤٠) وَتُسْهِمُ هَذِهِ النَّتَائِجُ فِي تَحْدِيدِ مُوَاصَفَاتِ النَّمُوذَجِ الْأَوَّلِيِّ لِوَسِيلَةِ «عَرَبِيكْ لِينْس (Arabic Lens)»، مَعَ الْإِشَارَةِ إِلَى أَنَّ فَاعِلِيَّتَهَا لَمْ تُخْتَبَرْ بَعْدُ.

الْكَلِمَاتُ الْمِفْتَاحِيَّةُ :الْمُفْرَدَاتُ، الرُّؤْيَةُ الْحَاسُوبِيَّةُ بِالذَّكَاءِ الِاصْطِنَاعِيِّ، مَهَارَةُ الِاسْتِمَاعِ، مَهَارَةُ الْكَلَامِ.

Introduction (المقدمة)

Arabic is one of the foreign languages studied in Indonesia, both in formal and nonformal educational institutions. In learning it, learners are required to master various language components, including mufradat (vocabulary), qawa'id (nahwu and sharaf rules), and ashwat (the sound and pronunciation system). Mastery of these components provides the foundation for developing the four language skills, namely listening (maharah istima'), speaking (maharah kalam), reading (maharah qira'ah), and writing (maharah kitabah). These four skills are interrelated and rest on language components so that learners can communicate effectively.

Among these components, mufradat is the most basic element to be mastered because learners need to understand information and express ideas in Arabic. Limited vocabulary can make it difficult for learners to understand utterances or to express something orally. This problem is potentially greater for beginner learners, including first-semester Arabic Language Education students who are expected to master a large amount of mufradat in a relatively short time. Moreover, classroom learning time is limited, and opportunities for independent practice are not necessarily well directed.

This condition hinders the development of maharah istima' and maharah kalam, the two skills that depend most on mufradat mastery, accurate pronunciation, and repeated practice. Listening requires the ability to recognize sounds, understand vocabulary, and grasp information from what is heard, whereas speaking requires the ability to recall and use vocabulary appropriately. Conventional media such as written vocabulary lists and textbooks do not yet fully provide interactive learning experiences that support independent listening and speaking practice.

Artificial Intelligence (AI) opens opportunities for more interactive media. One such technology is AI Vision, a technology that enables computer systems to recognize objects through images or a camera. In mufradat learning, this technology can connect objects around learners with Arabic vocabulary, so that learning does not rely solely on memorization but also involves visual and audio experiences.

Previous studies have developed mufradat media and digital Arabic media in the form of an Android-based game (Nurdiansyah et al., 2022), a Canva-based comic

(Panjaitan & Rasyid, 2023), the interactive educational game Wordwall (Prasipi et al., 2025), and an AI-based 3D educational game (Al Kahfi et al., 2026). These media generally center on games or the presentation of images and do not directly link vocabulary with real objects around the learner. Needs analyses of AI Vision-based mufradat media that recognize objects in real time to support maharah istima' and kalam remain limited. Yet applying cutting-edge technology cannot rely on the sophistication of the system alone; it must be rooted in the difficulties and characteristics of its users.

This article aims to answer three research questions: (1) what are the difficulties and needs of first-semester Arabic Language Education students in learning maharah istima' and kalam; (2) what are their needs regarding digital Arabic learning media; and (3) how do they respond to the concept of AI Vision-based mufradat learning media. The results serve as the basis for formulating the specifications of an initial prototype of a web-based medium named Arabic Lens. This article does not test the effectiveness of the medium.

Methods (منهجية البحث)

2.1 Research Design

This study is a preliminary study (preliminary research) at the needs analysis stage. The design used is a descriptive quantitative survey enriched with qualitative data (Creswell & Creswell, 2018). The study aims to map objective conditions and user needs as an empirical foundation for media design, so it does not extend to testing product effectiveness.

Data were collected simultaneously through a single questionnaire distributed to first-semester Arabic Language Education students. Quantitative data were obtained from 25 closed-ended questions on a four-point ordinal scale, while qualitative data were gathered through 6 open-ended questions about specific obstacles, expectations regarding features, and suggestions for development. Quantitative data were analyzed using descriptive statistics, and qualitative data were analyzed descriptively and narratively to complement and contextualize the quantitative findings.

2.2 Research Site and Participants

This study was conducted in the Arabic Language Education Study Program (PBA) at Universitas Negeri Malang. The participants were 55 first-semester students selected using purposive sampling. The sample was chosen based on certain criteria, namely students who were taking foundational Arabic language skills courses. This group was considered the most representative for providing factual assessments of learning obstacles and needs for new media. Participants completed the questionnaire between 6 and 9 October 2026. Details of the participants' characteristics are presented in Table 1.

Table 1. Participants and Data Sources

Characteristic	Number	Percentage
Female	38	69.1%
Male	17	30.9%
Had previously studied Arabic	54	98.2%
Had not previously studied Arabic	1	1.8%
Total	55	100%

2.3 Data Collection Techniques and Instruments

The instrument was a questionnaire consisting of 31 items. Part 1 consisted of closed-ended questions measured on a four-point ordinal scale: Strongly Agree (SS) = 4, Agree (S) = 3, Disagree (TS) = 2, and Strongly Disagree (STS) = 1. Items 1–2 measured the need for mufrodat learning, items 3–5 difficulties in mastering mufrodat, items 6–7 the learning context, items 8–9 learning media, item 10 technology-based media, item 11 technology use, item 12 AI use, items 13–14 object recognition, item 15 Arabic vocabulary, item 16 pronunciation, item 17 comprehension of meaning, item 18 usage examples, items 19–20 practice, item 21 vocabulary delivery, item 22 learning motivation, items 23–24 AI Arabic Lens, and item 25 the need for media. Part 2 consisted of open-ended questions: items 26–27 difficulties in mastering mufrodat, items 28–29 media needs, item 30 the advantages and disadvantages of AI for learning, and item 31 suggestions for developing AI-based applications.

2.4 Data Collection Procedure

Data were collected from 6 to 9 October 2026. The questionnaire was completed independently by participants through a Google Form link. Before completing it,

participants were given an introductory explanation that the questionnaire aimed to map their experiences and obstacles in learning Arabic, especially in mastering mufrodat, as well as their views on the urgency of interactive learning media. This approach focused on factual conditions in the field so that students could express their learning needs naturally and objectively. Of the distribution, all 55 questionnaires received were declared completely filled in and thus ready for the analysis stage.

2.5 Data Analysis

2.5.1 Quantitative data

Quantitative data obtained from closed-ended statements were analyzed using descriptive statistics. The analysis included calculating the mean for each item and the percentage of agreement among participants, accumulated from the combined 'Agree' and 'Strongly Agree' responses. Next, the mean per aspect was calculated based on the overall mean of the items that make up that aspect. Given the absence of standard interpretation criteria, score interpretation was based on equal intervals on the four-point scale (as presented in Table 3).

Table 2. Interpretation of Mean Scores (four-point scale)

Option	Description	Score
SS	Strongly Agree	4
S	Agree	3
TS	Disagree	2
STS	Strongly Disagree	1

In presenting the results, data on the items on “learning difficulties” and “media needs” were analyzed and reported separately to avoid bias or overlapping interpretation. In the difficulty aspect, a high mean score indicates a high level of obstacles experienced by students. Conversely, in the need aspect, a high mean score represents students’ strong urgency for such learning media innovation.

2.5.2 Qualitative data

Meanwhile, qualitative data from the open-ended questions were analyzed descriptively and narratively. Participants’ answers were reduced, coded, and grouped by thematic similarity. These qualitative findings were then integrated to complement, deepen, and provide real context for the results of the quantitative data analysis.

2.6 Research Ethics

Students' participation in this study was voluntary, without coercion from any party. Before completing the questionnaire, participants were given an explanation of the purpose and use of the research data and were asked to give informed consent. Participants' identities were kept confidential and are not included in the presentation of the results; codes are used instead to protect privacy. The data obtained were used only for research purposes and are presented as a whole without revealing individual identities.

Results & Discussion (نتائج البحث ومناقشتها)

3.1 Respondent Characteristics and Overview of Questionnaire Results

There were 55 respondents, all first-semester students of the Arabic Language Education Study Program, consisting of 38 women (69.1%) and 17 men (30.9%). A total of 54 respondents (98.2%) had studied Arabic before and 1 respondent (1.8%) had not. This means that almost all respondents already had some initial grounding in Arabic, so the difficulties and needs reported reflect ongoing learning experience more than first impressions of an entirely new language. This prior grounding cannot be detailed because the questionnaire report does not include the level or length of previous study.

Table 3 summarizes the results for the four questionnaire aspects. The need for learning media obtained the highest mean ($\bar{X}$ = 3.47; 99.3% agree; very high), followed by the response to the media concept ($\bar{X}$ = 3.40; 97.8%; very high). The maharah istima' aspect ($\bar{X}$ = 2.85; 71.5%) and the maharah kalam aspect ($\bar{X}$ = 2.86; 68.2%) fall in the high category. The means of the last two aspects are lower because they contain both difficulty items and need items.

Table 3. Summary of Questionnaire Results by Aspect (n = 55)

Aspect	Item	$\bar{X}$	% Agree	Category
Need for maharah istima'	1–6	2.85	71.5%	High
Need for maharah kalam	7–12	2.86	68.2%	High
Need for learning media	13–20	3.47	99.3%	Very High
Response to the media concept	21–25	3.40	97.8%	Very High

3.2 Learning Problems and Facilities

3.2.1 Maharah istima'

Listening difficulty was high (mean 2.65; 60.9% agree), while the need for listening practice was also very high (mean 3.26; 92.7% agree). The greatest difficulty lay in distinguishing similar-sounding vocabulary (item 3: 2.84; 72.7% agree), followed by understanding the use of vocabulary in sentences that are heard (item 6: 2.69). Difficulty understanding vocabulary when heard (item 1) was at the border of the low category (2.49). The greatest need was for more frequent listening practice (item 5), agreed by 94.5% of participants, and 90.9% of participants needed audio repetition (item 4) (Table 5).

Table 4. Results for items 1–6 (items 1, 2, 3, 6: difficulty; items 4, 5: need)

No	Statement	SS	S	TS	STS	Mean	% Agree	Category
1	I have difficulty understanding Arabic vocabulary when I hear it	1	27	25	2	2.49	50.9%	Low Difficulty
2	I have difficulty understanding the meaning of Arabic sentences that I listen to	2	28	24	1	2.56	54.5%	High Difficulty
3	I have difficulty distinguishing the sounds of Arabic words that sound similar	6	34	15	0	2.84	72.7%	High Difficulty
4	I need audio repetition when learning Arabic vocabulary	12	38	5	0	3.13	90.9%	High Need
5	I need to practice listening to Arabic vocabulary more often	26	26	2	1	3.40	94.5%	Very High Need

No	Statement	SS	S	TS	STS	Mean	% Agree	Category
6	I have difficulty understanding the use of Arabic vocabulary when I hear it in a sentence	4	32	17	2	2.69	65.5%	High Difficulty

Open-ended answers reinforce this pattern. In item 26, the most frequently mentioned obstacles were vocabulary not yet known (16 participants), unclear sound or pronunciation in the audio (11), similar-sounding vocabulary (9), and difficulty understanding the meaning of sentences (8). Five participants mentioned speakers who talked too fast. One participant wrote that the pronunciation of the words "sounds similar to one another," while another felt that the speaker in the audio spoke too fast, which left them confused. These findings show that students' listening difficulties stem not only from vocabulary not yet mastered but also from sound discrimination and audio quality.

3.2.2 Maharah kalam

In contrast to listening, speaking difficulty was low (mean 2.35; 40.9% agree). A total of 61.8% of participants did not find it difficult to pronounce vocabulary (item 7) and 56.4% did not find it difficult to use it in sentences (item 8). However, the need for practice was high (mean 3.11; 81.8% agree), with the strongest need being opportunities to practice speaking (item 12), agreed by 98.2% of participants.

Table 5. Results for items 7–12 (items 7, 8: difficulty; items 9–12: need)

No	Statement	SS	S	TS	STS	Mean	% Agree	Category
7	I have difficulty pronouncing Arabic vocabulary correctly	1	20	29	5	2.31	38.2%	Low Difficulty
8	I have difficulty using Arabic vocabulary in a sentence	2	22	27	4	2.40	43.6%	Low Difficulty
9	I need pronunciation examples before pronouncing Arabic vocabulary	9	27	19	0	2.82	65.5%	High Need

No	Statement	SS	S	TS	STS	Mean	% Agree	Category
10	I need practice to imitate the pronunciation of Arabic vocabulary	11	32	12	0	2.98	78.2%	High Need
11	I need simple example sentences to help me speak Arabic	17	30	8	0	3.16	85.5%	High Need
12	I need more opportunities to practice speaking using Arabic vocabulary	27	27	1	0	3.47	98.2%	Very High Need

In item 27, limited vocabulary was the most dominant obstacle, especially difficulty recalling words when about to speak (25 participants), followed by grammar (9), sentence construction (8), and pronunciation (8). One participant explained that the idea was already in their mind, but they often forgot or did not yet know the Arabic equivalent. Thus, speaking obstacles appear to stem from a still-weak active vocabulary, so mufradat media are relevant for supporting maharah kalam.

3.3 Questionnaire Results

3.3.1 Questionnaire Results

The questionnaire analysis shows several student needs in learning mufradat, particularly to support the skills of maharah istima' and maharah kalam. The analysis was based on four aspects, namely listening needs, speaking needs, learning media needs, and response to the AI Vision-based media concept.

Overall, the analysis shows that the need for learning media was the aspect with the highest mean. Details of the results for each aspect are presented in Table 4, while the distribution of students' responses to each questionnaire statement is presented in Table 5.

Based on Table 4, the need for media had the highest mean ($\bar{X}$ = 3.47; very high category), followed by the response to the media concept ($\bar{X}$ = 3.40; very high category), speaking needs ($\bar{X}$ = 2.86; high category), and listening needs ($\bar{X}$ = 2.85; high category). Meanwhile, Table 5 shows that all eight statements about media needs obtained agreement percentages of 98.2–100% from the 55 students.

Table 6. Questionnaire Results by Aspect

Aspect	Item	Mean	Category	Key Findings
Listening needs	1-6	2.85	High	Difficulty distinguishing similar sounds was agreed by the most respondents (72.7%); 94.5% needed more frequent listening practice
Speaking needs	7-12	2.86	High	Low difficulty (38.2–43.6%); 98.2% needed more opportunities to practice speaking
Media needs	13-20	3.47	Very High	Interactive, digital, multimedia, surrounding-object-based media for independent learning were agreed by 98.2–100%
Response to the media concept	21-25	3.40	Very High	Object recognition, audio, example sentences, replay, and speaking practice were agreed by 96.4–100%

In the listening aspect, the difficulty items had a mean of $\bar{X}$ = 2.65 (60.9% agree), while the need items had $\bar{X}$ = 3.26 (92.7%). Difficulty distinguishing similar sounds was strongest (item 3; 72.7%; $\bar{X}$ = 2.84), followed by understanding the use of vocabulary in sentences that are heard (item 6; 65.5%; $\bar{X}$ = 2.69). Difficulty understanding vocabulary when heard (item 1; 50.9%; $\bar{X}$ = 2.49) was the only listening difficulty item in the low category. More frequent listening practice (item 5; 94.5%; $\bar{X}$ = 3.40) and audio repetition (item 4; 90.9%; $\bar{X}$ = 3.13) were widely needed.

In the speaking aspect, difficulty was low ($\bar{X}$ = 2.35; 40.9%): only 38.2% found it difficult to pronounce vocabulary (item 7) and 43.6% found it difficult to use it in sentences (item 8). However, the need was high ($\bar{X}$ = 3.11; 81.8%). The strongest need was opportunities to practice speaking (item 12; 98.2%; $\bar{X}$ = 3.47), followed by simple example sentences (item 11; 85.5%), imitation practice (item 10; 78.2%), and pronunciation examples (item 9; 65.5%). On the media concept, practice in pronouncing and using vocabulary in sentences (item 25) was agreed by all 55 students ($\bar{X}$ = 3.47).

Table 7. Responses per Item (SS = strongly agree, S = agree, TS = disagree, STS = strongly disagree)

No.	Statement	SS	S	TS	STS	n	% agree	Mean	Category
1	I have difficulty understanding Arabic vocabulary when I hear it	1	27	25	2	55	50.9	2.49	Low
2	I have difficulty understanding the meaning of Arabic sentences that I listen to	2	28	24	1	55	2.56	2.41	High

No.	Statement	SS	S	TS	STS	n	% agree	Mean	Category
3	I have difficulty distinguishing the sounds of Arabic words that sound similar	6	34	15	0	55	72.7	2.84	High
4	I need audio repetition when learning Arabic vocabulary	12	38	5	0	55	90.9	3.13	High
5	I need to practice listening to Arabic vocabulary more often	26	26	2	1	55	94.5	3.40	Very High
6	I have difficulty understanding the use of Arabic vocabulary when I hear it in a sentence	4	32	17	2	55	65.5	2.69	High
7	I have difficulty pronouncing Arabic vocabulary correctly	1	20	29	5	55	38.2	2.31	Low
8	I have difficulty using Arabic vocabulary in a sentence	2	22	27	4	55	43.6	2.40	Low
9	I need pronunciation examples before pronouncing Arabic vocabulary	9	27	19	0	55	65.5	2.82	High
10	I need practice to imitate the pronunciation of Arabic vocabulary	11	32	12	0	55	78.2	2.98	High
11	I need simple example sentences to help me speak Arabic	17	30	8	0	55	85.5	3.16	High
12	I need more opportunities to practice speaking using Arabic vocabulary	27	27	1	0	55	98.2	3.47	Very High
13	I need Arabic learning media that are more interactive	28	27	0	0	55	100.0	3.51	Very High
14	I need media that use surrounding objects as part of learning Arabic	21	33	1	0	55	98.2	3.36	Very High
15	I need media that combine images, text, and sound in learning Arabic	27	27	1	0	55	98.2	3.47	Very High
16	I need Arabic learning media that utilize digital technology	25	30	0	0	55	100.0	3.45	Very High
17	I need media that can help me practice listening and speaking Arabic simultaneously	24	31	0	0	55	100.0	3.44	Very High
18	I need learning media that can be used to learn Arabic independently	28	27	0	0	55	100.0	3.51	Very High
19	I need media that help me learn Arabic vocabulary through objects around me	29	25	1	0	55	98.2	3.51	Very High
20	I need learning media that make learning Arabic vocabulary easier to understand	28	27	0	0	55	100.0	3.51	Very High
21	I need media that can recognize surrounding objects and connect them with Arabic vocabulary	21	32	2	0	55	96.4	3.35	Very High
22	I need media that provide audio for listening to the pronunciation of Arabic vocabulary	19	35	1	0	55	98.2	3.33	Very High

No.	Statement	SS	S	TS	STS	n	% agree	Mean	Category
23	I need media that provide Arabic example sentences based on the vocabulary being learned	24	30	1	0	55	98.2	3.42	Very High
24	I need media that allow me to listen to the pronunciation of vocabulary repeatedly	25	28	2	0	55	96.4	3.42	Very High
25	I need media that help me practice pronouncing and using Arabic vocabulary in sentences	26	29	0	0	55	100.0	3.47	Very High

Note. n = number of responses to the item; % agree = (SS + S)/n.

Open-ended answers (items 26–30) point in the same direction. For listening (item 26), the most frequently mentioned obstacles were vocabulary not yet known (16 students), unclear audio (11), similar-sounding vocabulary (9), and difficulty understanding the meaning of sentences (8); five students mentioned speakers who talked too fast. For speaking (item 27), limited vocabulary and difficulty recalling words dominated (25), followed by grammar (9), sentence construction (8), and pronunciation (8). The most requested features (item 28) were audio and pronunciation (21), dictionary and word search (15), and speaking practice with correction (13). The ideal medium (item 29) was described as audio-visual media (17), with live speaking practice (13) and games, quizzes, or gamification (12). Suggestions (item 30) emphasized attractive and interactive media (9) and easy, free, or offline access for independent learning (9).

3.4 Triangulation of Findings and Needs for the Product

Because this study used only a questionnaire, no technique or source triangulation was conducted. Consistency was checked within a single instrument, namely between the closed-ended items and the open-ended answers. Convergent evidence appears in three areas. First, the need for clear and repeatable audio (items 3, 4, 5, 22, and 24; 11 respondents complained of unclear audio). Second, the need for vocabulary and speaking practice (items 9–12 and 25; 25 respondents mentioned limited vocabulary). Third, the need for interactive media that can be used independently (items 13, 16, and 18; nine respondents hoped the media would be easy to access). Divergence appears in speaking difficulty: the closed-ended items reported low difficulty ($\bar{X}$ = 2.35), whereas the open-ended answers recorded difficulties with vocabulary, grammar, and sentence construction. A possible explanation is that the closed-ended items asked about pronunciation and vocabulary use in general, whereas the obstacles written

spontaneously were more about recalling vocabulary and constructing sentences; this conjecture still needs to be tested.

Table 8 maps the questionnaire items onto the recommended features. All features fall in the high to very high need categories ($\bar{X}$ = 3.19–3.49; 85.5–100% agree); only voice recording falls in the high category. Support for the quiz and voice recording is indirect because the questionnaire contains no specific items on either. The recommendation for these two features is derived from the practice-need items (items 5, 9, 10, 12, and 25) and the open-ended answers, and needs to be confirmed in the next questionnaire, for example through the items "I need a quiz to test the vocabulary I have just learned" and "I need a feature for recording my voice so that I can compare my pronunciation with an example."

Table 8. Questionnaire Data Support for the Recommended Media Features

Media feature	Item	$\bar{X}$	% Agree	Need category
Object scan: the camera recognizes objects and the mufradat appears	14, 19, 21	3.41	97.6%	Very High
Mufradat display: Arabic script, meaning, image, and sound	15, 20	3.49	99.1%	Very High
Use of mufradat in sentences	11, 23	3.29	91.8%	Very High
Pronunciation listening feature (audio, replay)	4, 5, 22, 24	3.32	95.0%	Very High
Quiz and exercises	5, 12, 25	3.45	97.6%	Very High
Mufradat voice recording (voice note/VN): record and replay pronunciation	9, 10, 12, 25	3.19	85.5%	High
Interactive web for independent learning	13, 16, 18	3.49	100.0%	Very High

Table 9 translates the findings into media needs and specifications. The needs column contains what students require, while the specifications column contains features recommended for development; neither constitutes a claim that the features have been proven helpful.

Table 9. Findings, Needs, and Media Specifications

Key finding (source)	Student need	Recommended specification/feature
Unknown vocabulary is an obstacle in listening (16 respondents) and speaking (25); 98.2% need media based on surrounding objects (items 14, 19, 26, 27)	To learn the mufradat of surrounding objects quickly and in context	Object scanning via camera; mufradat cards (vowelized Arabic script, Indonesian meaning, image); manual correction when an object is misidentified
Similar sounds are hard to distinguish (72.7%); unclear audio (11) and speakers who are too fast (5); audio repetition 90.9% and listening practice 94.5% (items 3, 4, 5, 26)	Clear audio at a reasonable tempo that can be repeated; more frequent listening practice	Clear pronunciation audio with a replay button and speed options; exercises for distinguishing similar sounds
Difficulty using vocabulary in sentences (item 6: 65.5%; item 8: 43.6%); example sentences needed (item 11: 85.5%; item 23: 98.2%)	Simple example sentences from the mufradat being learned	An example sentence for each mufradat, with audio and meaning
Opportunities to practice speaking needed by 98.2% (item 12); correction requested (13 respondents in item 28); shyness/fear of making mistakes (3 respondents in item 27)	Opportunities to practice pronouncing and imitating with safe feedback	Mufradat voice recording: record, replay, and compare with the sample audio; constructive feedback
Practice needed (items 5, 12, 25: 94.5–100%); 15 respondents (27.3%) mentioned quizzes, games, or gamification (items 28–30)	Practice that is engaging and not boring	Quizzes from newly scanned mufradat, with scores or levels
All respondents (100%) need interactive, digital, and independent media (items 13, 16, 18); nine respondents hope the media will be easy to access, free, or offline (item 30)	Easy access for independent learning	A web app that opens easily on a phone and is free; the possibility of an offline mode to be studied at the design stage

3.5 Design Implications and Discussion

ArabicLens specifications are in line with multimedia learning principles, which explain that combining visual and verbal elements can support information processing and memory (Mayer, 2009; Paivio, 1986). In this design, students can scan real objects through the application's camera to obtain Arabic script, the meaning of the vocabulary,

example sentences, and audio pronunciation. The need for vocabulary derived from surrounding objects (items 14, 19, and 21; 96.4–98.2%) is consistent with studies on contextual vocabulary learning [citation]. Likewise, students' difficulty in distinguishing similar sounds relates to studies on Arabic listening problems [citation]. The findings of this study provide the basis for designing ArabicLens features according to students' needs. The effectiveness of using the medium to support improvement in listening and speaking skills can be examined further through the product development and testing stages.

Three matters need attention in developing ArabicLens. First, object recognition accuracy needs attention because misidentification can lead students to obtain incorrect mufradat. A manual correction mechanism and accuracy testing on objects commonly found in students' environments are therefore needed. Second, a quiz feature can be considered to support the need for repeated practice (items 5, 12, and 25). Twelve students also mentioned games, quizzes, or gamification in their answers to item 29. However, because the need for this feature was not asked about specifically, its usefulness still needs further study. Third, given that students' needs in both skills relate more to opportunities for practice, ArabicLens should be positioned as a medium that supports classroom learning by providing facilities for independent practice, not as a replacement for the role of the instructor.

3.6 Limitations

This study was limited to one group of first-semester students (n = 55) of Arabic Language Education, Faculty of Letters, Universitas Negeri Malang, so the results cannot be generalized. The data came only from a self-report questionnaire without observation, interviews, or ability tests, so the reported difficulties and needs have not been confirmed by other techniques or sources. The questionnaire contained no specific items on the quiz and voice recording, and its validity and reliability have not been tested empirically, so the reliability of the instrument cannot yet be ascertained. In addition, the maharah istima' and maharah kalam aspects contain both difficulty and need items, so their aspect means should be read together with the means of their item groups. Further research needs to develop the medium, test its validity and practicality, and test its effectiveness on istima' and kalam abilities.

Conclusions (الخاتمة)

This study found that (1) first-semester students' listening difficulty was high ($\bar{X}$ = 2.65), especially in distinguishing similar-sounding vocabulary (72.7%), while speaking difficulty was low ($\bar{X}$ = 2.35), but the need for practice was high in both, with opportunities to practice speaking as the strongest need (98.2%); (2) students strongly need media that are interactive, digital, combine images, text, and sound, are based on surrounding objects, and can be used for independent learning ($\bar{X}$ = 3.47; 99.3% agree); and (3) the AI Vision-based media concept was received very well ($\bar{X}$ = 3.40; 96.4–100% agree on all items).

These needs are addressed through ArabicLens features, namely camera-based object scanning that displays Arabic script, meaning, example sentences, and clear, repeatable pronunciation audio, complemented by a quiz and mufradat voice recording, in the form of an application easily accessible via mobile phone. The questionnaire data support the need for each of these features, although support for the quiz and voice recording is indirect. These findings are preliminary and limited to one group of students; they do not show that ArabicLens improves listening or speaking ability. Developers are advised to build a prototype and assess it together with Arabic language and media experts and to test object recognition accuracy; researchers are advised to test its usability and effectiveness through observation or istima' and kalam ability tests; and course lecturers are advised to take part in the trial so that its practicality can be assessed.

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