



The Effectiveness of Digital Learning Media in Teaching Arabic at Madrasah Tsanawiyah and Madrasah Aliyah: A Systematic Literature Review

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Abstract

Digital learning media are increasingly used to teach Arabic in Indonesian madrasahs, yet evidence of their effectiveness at the madrasah tsanawiyah (MTs) and madrasah aliyah (MA) level has not been systematically synthesized. This review maps evidence on the effectiveness of digital media for vocabulary and the four language skills among MTs-MA students, following a PICO framework and PRISMA 2020. Searches covered 2016-2026 using AI-assisted tools (Consensus, Scholar Gateway) and Indonesian databases (Garuda, Moraref). Of 25 records screened, 19 studies met the eligibility criteria. Quality appraisal with the Mixed Methods Appraisal Tool showed most studies had some concerns, one was low risk, and three were high risk. Thematic synthesis found the strongest evidence for vocabulary and speaking gains through mobile-assisted and AI-based tools, while writing and reading showed more varied evidence. Listening skill showed the clearest gap, with no controlled study found. Findings call for more balanced, rigorous research across skills.

Keywords digital learning media; Arabic language; madrasah tsanawiyah; madrasah aliyah; systematic literature review

مستخلص البحث

تزايد الاستعانة بالوسائط التعليمية الرقمية في تدريس اللغة العربية بالمدارس الإسلامية في إندونيسيا، إلا أن الأدلة على فعاليتها في المدرسة المتوسطة الإسلامية (MTs) والمدرسة الثانوية الإسلامية (MA) لم تُجمع بعد بشكل منهجي. تهدف هذه المراجعة إلى رسم خريطة الأدلة المتعلقة بفعالية الوسائط الرقمية في تعليم المفردات والمهارات اللغوية الأربع لدى طلاب هذين المستويين، باتباع إطار PICO وبروتوكول PRISMA 2020. شملت عملية البحث الفترة من 2016 إلى 2026 باستخدام أدوات مدعومة بالذكاء الاصطناعي وقواعد بيانات إندونيسية. من بين 25 سجلاً تم فحصها، استوفت 19 دراسة معايير الأهلية. أظهر تقييم الجودة أن معظم الدراسات ذات مخاوف منهجية متوسطة، ودراسة واحدة منخفضة الخطورة، وثلاث دراسات عالية الخطورة. أظهر التوليف الموضوعي أقوى الأدلة في تحسين المفردات ومهارة الكلام، بينما كانت الأدلة الخاصة بالكتابة والقراءة أكثر تنوعاً. وتُعد مهارة الاستماع الفجوة الأوضح، إذ لم يُعثر على أي دراسة تجريبية ضابطة لها.

كلمات أساسية الوسائط التعليمية الرقمية؛ اللغة العربية؛ المدرسة المتوسطة؛ المدرسة الثانوية؛ المراجعة المنهجية

المقدمة

Digital technology integration in Arabic language instruction in Indonesia has grown rapidly, driven by madrasah digitalization policies and the increasing accessibility of smartphone-based learning applications. Teachers of Arabic at the madrasah tsanawiyah (MTs) and madrasah aliyah (MA) level now widely use educational games, interactive videos, and online learning platforms to teach vocabulary as well as the four language skills. This development raises a fundamental question, namely to what extent empirical evidence actually supports claims about the effectiveness of such media, particularly at the secondary madrasah level, which has its own curricular and learner characteristics.

A review of the literature landscape shows that systematic reviews on digital technology and Arabic language learning have in fact been published fairly extensively between 2024 and 2026, covering topics such as digital games, mobile-assisted language learning, computer-assisted learning in general, gamification for non-native speakers, audiovisual media, and digital media for speaking skill in higher education. However, none of these reviews specifically targets the MTs-MA level as a single population while also covering vocabulary and all four language skills in an integrated manner. Most existing reviews focus on higher education, Arabic as a foreign language learners in general, or only a single type of media or a single skill. This gap forms the basis for the present review, which is intended not to repeat what has already been studied, but to fill the population and scope gap that remains unaddressed.

Based on the above, this review addresses three research questions. First, to what extent does evidence support the effectiveness of digital learning media on Arabic vocabulary mastery and each language skill among MTs-MA students. Second, what types of digital learning media have most frequently been studied at this level. Third, what is the methodological quality of the available studies. Answers to these three questions are expected to provide an evidence map that is useful for teachers and media developers in choosing well-tested approaches, while also indicating directions for further research that remain needed. The remainder of this article is organized as follows: the Method section describes the review protocol, the Results and Discussion section presents the study selection process, study characteristics, quality appraisal, and thematic synthesis, and the Conclusion summarizes the main findings and future research directions.

طريقة البحث

This review followed the PRISMA 2020 protocol using a thematic narrative synthesis approach rather than statistical meta-analysis. This choice was made because the primary studies identified were highly heterogeneous in design, including quasi-experiments, research and development (R&D), classroom action

research, and descriptive qualitative studies, so that statistically pooling the numbers would risk being misleading.

Eligibility criteria were formulated using a PICO framework: Population, students of Madrasah Tsanawiyah (MTs) and Madrasah Aliyah (MA); Intervention, digital learning media such as applications, multimedia, learning management systems, interactive video, and educational games; Comparison, with or without a control/comparison group, recorded as a variable rather than an exclusion filter; Outcome, mastery of vocabulary and/or the four language skills, namely listening, speaking, reading, and writing; eligible designs included quantitative, qualitative, and mixed methods studies published between 2016 and 2026.

Searches were conducted through two channels, AI-assisted search tools (Consensus, which indexes Semantic Scholar, part of Scopus, and PubMed; and Scholar Gateway, which indexes the Wiley full-text corpus) and web searches of Indonesian databases (Garuda and Moraref). The query was built from four concept blocks, namely education level, digital media intervention, Arabic language subject, and vocabulary/skill outcome, combined with the Boolean AND operator between blocks and OR within blocks. One additional record was obtained through citation chasing. It should be stated openly that this search strategy is AI-assisted and is not a fully reproducible Boolean query against reputable databases such as Scopus or Web of Science. This decision was made deliberately together with the author given a tight preparation deadline, with the methodological consequences explained in the limitations below.

Study selection was carried out in two stages. The first stage was title and abstract screening of all compiled records, resulting in an include or exclude status based on fit with the PICO criteria. The second stage was a closer examination of the full abstract and citation context of every record that passed the first stage. It is important to note that this second-stage examination was not always based on a full downloaded and fully read PDF document, but rather on the full abstract and text snippets available through the search channels, a limitation that is further explained below.

Data extracted from each study included study identity, education level and school name, research design, presence or absence of a control group, type of digital media intervention, outcome construct measured, sample size, pretest and posttest results or thematic findings, and statistical test results where available.

Study quality was appraised using the Mixed Methods Appraisal Tool (MMAT) 2018 version, because it can assess quantitative, qualitative, and mixed-methods designs within a single consistent framework, matching the diversity of designs in this corpus. Each study was first categorized into one of the five MMAT categories, then rated on five category-specific criteria with yes, no, or cannot tell as the answer options.

Findings were synthesized narratively and grouped into five main themes, namely vocabulary, listening, speaking, reading, and writing skill. Greater

interpretive weight was given to studies rated low risk or some concerns, while high-risk studies were treated as weaker supporting evidence.

This review has several limitations that should be stated upfront. First, the review protocol was not registered on PROSPERO or OSF prior to conduct. Second, the search strategy is AI-assisted and is therefore not fully reproducible as a formal Boolean query against reputable databases. Third, the second-stage screening was based on full abstracts rather than full PDF documents for all studies. Fourth, one study (Erfianti et al., 2022) was obtained from secondary data through citation chasing and has not been directly verified against its original source. Readers and users of this review are advised to re-verify the findings against the original documents before using them as a basis for policy or broad decision-making.

النتائج والمناقشة

Out of 83 record occurrences across all search channels, 25 records were compiled as initial candidates after a relevance filter applied during the compilation stage. Title and abstract screening excluded 3 records because the population was not formally MTs-MA or the subject was not students. Further examination of the remaining 22 records excluded 3 more records, two because the intervention turned out to be a physical board game rather than digital media, and one because the population was not a formally registered MA under the Ministry of Religious Affairs. A total of 19 studies were ultimately included in the synthesis, as shown in Figure 1.

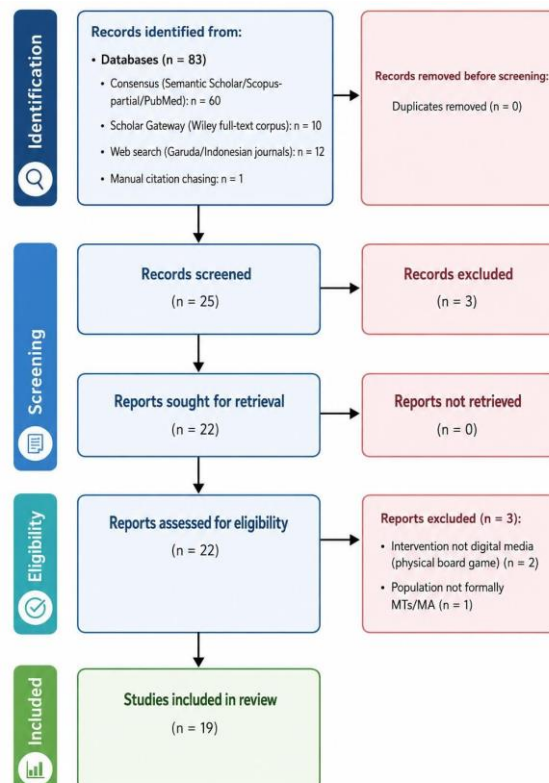


Figure 1. PRISMA 2020 flow diagram of the study selection process.

Study Characteristics

The characteristics of the 19 included studies are summarized in Table 1. Studies were published between 2018 and 2026, with 14 studies at the MTs level, 4 at the MA level, and 1 in a pesantren setting whose formal education level was not explicitly stated.

No	Study	Level	Design	Intervention	Outcome	N	Key finding
1	Fakhruddin et al. (2021)	MTs/JHS	Quasi-experiment (one-group)	Wordwall	Vocabulary	NA	N-Gain 56.6% (fairly effective)
2	Salahuddin et al. (2021)	MTs	Quasi-experiment (one-group)	Kinemaster video animation	Vocabulary	21	N-Gain 56.60% (medium category)
3	Nopriansyah et al. (2024)	MTs	Literature/descriptive	Google Sites	Listening	NA	Claimed to support independent learning (non-empirical)
4	Makruf (2020)	MA	Descriptive qualitative	General ICT (PPT, LCD, audio, video, games)	General motivation	NA	Positive impact on motivation and confidence (descriptive)
5	Rini (2018)	MTs	Qualitative R&D	Interactive CD	Listening	NA	Product rated feasible by experts, not yet tested on students
6	Habib (2025)	MTs	Quasi-experiment (control)	AI pronunciation, gamification, AR	Speaking	30	Experimental +32.5% vs control +12.3%
7	Nurmalia et al. (2026)	MTs	Quasi-experiment (control)	Kaleela Arabic App	Vocabulary	44	$t(42)=3.284$; $p=0.002$; $d=0.99$ (large)
8	Nofarmansyah et al. (2026)	MTs	Quasi-experiment (control)	Durusullughoh application	Speaking	54	Sig. (2-tailed)=0.001
9	Salam et al. (2021)	MTs	R&D (Borg & Gall)	Canva video	Media feasibility	NA	Content validation 4.66/5; student response 3.78/5
10	Wicaksana et al. (2023)	MTs	Quasi-experiment (before-after)	Kodular (Android)	General learning outcome	NA	$t=12.55$ & $t=10.38$, significant in 2 schools
11	Rinawati et al. (2025)	MA	R&D ADDIE + experiment	H5P interactive video	Reading	30	$t=12.45$; $p<0.001$
12	Masnun (2025)	MA	Qualitative case study	Visual/contextual media	Reading & speaking	NA	Increased engagement and vocabulary retention
13	Saskiyah et al. (2025)	MA	CAR (2 cycles)	Articulate Storyline 3	Writing	25	Achievement 40%–80%; interest 56%–88%
14	Fatkurrohima et al. (2025)	MTs	Descriptive qualitative	Simple digital media	Reading	NA	Increased participation and text comprehension

15	Akbar & Din (2025)	MTs	Descriptive qualitative	Quizizz	Writing	NA	Increased enthusiasm and exercise variety
16	Soleha et al. (2025)	MA	Quasi-experiment (one-group)	Word Square	Writing	22	p=0.000 (paired t-test)
17	Jariyah & Asrori (2022)	MTs	Descriptive qualitative	Mixed online & offline media	Media use pattern	NA	WhatsApp most commonly used by teachers
18	Hasanuddin (2024)	Pesantren	Quasi-experiment (control)	General digital media	Comprehension & motivation	NA	Experimental mean higher than control
19	Erfianti et al. (2022)*	MTs	Quasi-experiment	Word Square	Vocabulary	NA	Secondary citation data, needs verification

Table 1. Characteristics of included studies (n=19).

Types of Digital Learning Media Most Frequently Studied (Research Question 2)

Across the 19 included studies, digital learning media can be grouped into four broad types. Gamified vocabulary and writing tools were the most frequently studied, appearing in four studies: Wordwall (Fakhruddin et al., 2021), Quizizz (Akbar & Din, 2025), and Word Square (Soleha et al., 2025; Erfianti et al., 2022). Interactive video and multimedia-authoring tools were equally common, appearing in four studies: Kinemaster animation (Salahuddin et al., 2021), H5P-based interactive video (Rinawati et al., 2025), Articulate Storyline (Saskiyah et al., 2025), and Canva (Salam et al., 2021). Dedicated mobile-assisted language learning applications appeared in two studies, Kaleela (Nurmalia et al., 2026) and Durusullughoh (Nofarmansyah et al., 2026), both tested against a control group. The remaining studies used general information and communication technology, learning management systems, or mixed online-offline media, such as Google Sites (Nopriansyah et al., 2024), Kodular (Wicaksana et al., 2023), general ICT tools (Makruf, 2020), and a combination of platforms including WhatsApp (Jariyah & Asrori, 2022), while only one study combined AI-based pronunciation tools with gamification and augmented reality (Habib, 2025), and one used an offline interactive CD (Rini, 2018). This distribution shows that gamification-based tools and interactive video are the two dominant categories in this corpus, while AI-based and augmented-reality tools remain rare.

Methodological Quality of Included Studies (Research Question 3)

The results of the MMAT quality appraisal are presented in Figure 2 and Table 2. One study (Nurmalia et al., 2026) met all criteria and was rated low risk because it used a control group, a pretest equivalence test, complete statistical assumption tests, and effect size reporting. Fifteen studies were rated some concerns, generally because there was no independent control group or sample representativeness was not explained. Three studies were rated high risk, namely one literature review without primary data, one R&D study that had not reached

the student-effectiveness testing stage, and one study whose data were only obtained secondarily through citation.



Figure 2. Traffic-light quality appraisal based on the Mixed Methods Appraisal Tool (MMAT) 2018.

Study	C1	C2	C3	C4	C5	Overall
Fakhruddin et al. (2021)	Y	?	Y	N	?	Some concerns
Salahuddin et al. (2021)	?	Y	Y	N	?	Some concerns
Nopriansyah et al. (2024)	?	N	?	?	N	High
Makruf (2020)	Y	Y	?	?	Y	Some concerns
Rini (2018)	Y	Y	?	?	?	High
Habib (2025)	?	Y	Y	N	Y	Some concerns
Nurmalia et al. (2026)	Y	Y	Y	Y	Y	Low
Nofarmansyah et al. (2026)	?	Y	Y	N	Y	Some concerns
Salam et al. (2021)	Y	Y	Y	?	Y	Some concerns
Wicaksana et al. (2023)	?	Y	Y	N	Y	Some concerns
Rinawati et al. (2025)	?	Y	Y	N	Y	Some concerns
Masnun (2025)	Y	Y	?	?	?	Some concerns
Saskiyah et al. (2025)	?	Y	Y	?	Y	Some concerns
Fatkurrohima et al. (2025)	Y	Y	?	?	?	Some concerns
Akbar & Din (2025)	Y	Y	?	?	?	Some concerns
Soleha et al. (2025)	?	Y	Y	N	Y	Some concerns
Jariyah & Asrori (2022)	Y	Y	?	?	Y	Some concerns
Hasanuddin (2024)	?	Y	Y	N	?	Some concerns
Erfianti et al. (2022)*	?	?	?	?	?	High

Table 2. Summary of study quality appraisal (Y=yes, N=no, ?=cannot tell).

Effectiveness of Digital Learning Media by Language Skill (Research Question 1)

Vocabulary mastery. Four studies examined digital media for vocabulary mastery. The strongest evidence comes from Nurmalia et al. (2026), showing that the Kaleela mobile-assisted language learning application produced significantly higher posttest scores than the control group with a large effect size. Other studies such as Fakhruddin et al. (2021) and Salahuddin et al. (2021) reported medium-category gains using one-group designs without a comparison group, so the strength of their causal conclusions is weaker than that of the controlled study.

Speaking skill. Speaking skill is supported by two controlled quasi-experiments with significant results, namely Habib (2025), which combined AI-based pronunciation tools, gamification, and augmented reality, and Nofarmansyah et al. (2026), which tested the Durusullughoh application. Both studies consistently showed the experimental group outperforming the control group, making speaking one of the skills with the most convincing quantitative evidence in this review.

Reading skill. Evidence for reading is mixed. Rinawati et al. (2025) reported a significant improvement using H5P-based interactive video with a one-group design. Two other studies, Masnun (2025) and Fatkurrohima et al. (2025), are descriptive qualitative and do not specifically isolate the contribution of digital media from other accompanying teaching strategies.

Writing skill. Three studies highlight writing with generally positive results despite varied methods. Saskiyah et al. (2025) reported improved learning outcomes and writing interest through two cycles of classroom action research using Articulate Storyline. Soleha et al. (2025) reported a significant improvement using Word Square in a one-group design. Akbar and Din (2025) reported improved writing motivation descriptively using Quizizz without measurable writing-score data.

Listening skill. Listening skill is the most important finding of this review precisely because of its absence. Only two studies touch on listening, namely Nopriansyah et al. (2024), which is a literature review without direct empirical data, and Rini (2018), a development study for an interactive CD that had only reached the expert-validation stage and had not yet been tested for impact on students. No controlled quasi-experimental or experimental study testing the effectiveness of digital media on listening skill at the MTs-MA level was found in this review's corpus.

Overall, this review found that digital learning media tend to have a positive impact on Arabic vocabulary and language skill mastery among MTs-MA students, with the strongest evidence for vocabulary and speaking, supported by controlled quasi-experiments with measurable effect sizes. This pattern is consistent with similar reviews at other education levels, such as reviews of mobile-assisted

language learning in the Indonesian context and reviews of computer-assisted language learning in general, which also report positive impacts of digital technology on vocabulary mastery.

The most notable finding of this review is the sharp imbalance of evidence across language skills. While vocabulary and speaking are relatively well researched with fairly rigorous designs, listening is almost untouched by quality intervention research at the MTs-MA level. This imbalance deserves attention because listening is one of the foundational skills that underpins mastery of the other skills, and the absence of evidence does not mean digital media is ineffective for listening, but rather indicates a genuinely underexplored research area.

Comparative Discussion and Implications

Compared with similar systematic reviews that have discussed digital technology and Arabic language learning more broadly, for instance at the higher education level, among Arabic-as-a-foreign-language learners in general, or focused on a single type of media such as Kahoot or gamification alone, this review contributes differently by centering attention on the MTs-MA level while integrating vocabulary and all four language skills. This position allows readers to see a more comprehensive evidence map specific to the secondary madrasah education level in Indonesia.

Practically, these findings suggest that MTs-MA teachers and media developers consider mobile-assisted language learning applications and AI-based tools as fairly well-tested options for vocabulary and speaking, while remaining cautious in judging effectiveness claims for reading and writing media whose evidence is more methodologically varied, and being aware that media choices for listening still lack strong empirical references.

Limitations and Directions for Further Research

This review has limitations at both the process and evidence levels that must be stated honestly. At the process level, as explained in the Method section, the search was AI-assisted rather than a fully reproducible Boolean query, the second-stage screening was based on abstracts rather than full PDFs, and one study came from an unverified secondary source. At the evidence level, many primary studies used one-group designs without a comparison group, making them vulnerable to selection bias and regression to the mean, and statistical reporting in several studies was incomplete, making precision assessment difficult.

Further research should fill the gap in listening skill with controlled quasi-experimental or experimental designs, and should consider registering the protocol on PROSPERO with full access to reputable databases such as Scopus or Web of Science to produce a more methodologically reproducible review than this AI-assisted one.

الاستنتاج والخلاصة

This systematic literature review synthesized 19 studies on the effectiveness of digital learning media in teaching Arabic to MTs-MA students. The strongest evidence was found for vocabulary mastery and speaking skill, supported by controlled quasi-experiments with large effect sizes. Writing and reading skills are supported by positive but more methodologically varied evidence. Listening skill is the clearest research gap, as no controlled intervention study for this skill at the MTs-MA level was found.

These findings underline the need for more balanced research across language skills and more methodologically rigorous designs at the secondary madrasah education level in Indonesia. Future studies are encouraged to prioritize listening skill, employ controlled experimental designs, and register their protocols on platforms such as PROSPERO to strengthen the reproducibility of future reviews in this area.

كلمة الشكر والتقدير

The author(s) would like to express their sincere gratitude and appreciation to the Department of Arabic Language Education (PBA) at Universitas Islam Negeri Siber Syekh Nurjati Cirebon (UIN SSC) for providing the academic support and resources necessary to complete this research. Special thanks are extended to the lecturers of the PBA Department for their valuable insights, guidance, and constructive feedback throughout the research process. The author(s) are also deeply grateful to the students of the PBA Department who actively participated in this study, provided assistance during data collection, and contributed to the proofreading and language refinement of the manuscript. Their support and collaboration were invaluable to the success of this work.

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