

# Enhancing Arabic Literacy in Islamic Boarding School: The Role and Pedagogical Implications of Interactive Whiteboard Technology

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## ABSTRACT

The integration of Interactive Whiteboard (IWB) technology into Arabic literacy instruction has drawn growing interest, particularly in *pesantren* (Islamic boarding schools), where traditional methods still prevail. Existing research largely addresses general or ESL contexts, leaving a gap in understanding IWB use in Islamic educational settings. This study explores the effectiveness of IWBs in enhancing Arabic reading proficiency, with a focus on student engagement, comprehension, and pedagogical outcomes. A mixed-methods approach was employed, involving 60 third-grade *Tsanawiyah* students at Pesantren Darullughah Wadda'wah. Using a quasi-experimental design, the study included pre- and post-tests, classroom observations, and interviews. Results show a significant improvement in reading skills, with post-test scores increasing by 24.4 percentage points (from 54.2 to 78.6;  $p < 0.01$ ,  $d = 1.15$ ). IWBs also promoted interactive learning and peer collaboration. Qualitative data supported these findings, highlighting enhanced student participation and classroom engagement. Despite positive outcomes, challenges such as insufficient teacher training and limited infrastructure were noted. The study contributes to the discourse on digital transformation in Arabic education and suggests that IWBs can effectively bridge traditional and modern pedagogical approaches in *pesantren*, offering a scalable model for improving literacy and learner interaction in Islamic educational contexts.

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## **Introduction**

Arabic literacy plays a pivotal role in Islamic education, particularly within pesantren (Islamic boarding schools), where it serves as the foundation for understanding classical Islamic texts. Arabic language has significantly grown across Indonesia, encompassing both formal and non-formal institutions dedicated to teaching Arabic. It has evolved into a subject of academic study (Azizah et al., 2024). Mastery of Arabic reading skills is crucial for students (santri) to engage with a vast body of religious literature, including the Qur'an, hadith, and traditional Islamic jurisprudence. However, despite the significance of Arabic literacy in pesantren, many students face persistent challenges in acquiring proficient reading skills. These challenges stem from various factors, including the linguistic complexity of Arabic, limited exposure to immersive Arabic environments, and the predominantly traditional teaching methods that rely heavily on rote memorization and teacher-centered instruction (Baharun et al., 2023).

In response to these challenges, educational technology has increasingly been explored as a means to enhance Arabic language learning. One such innovation is the Interactive Whiteboard (IWB), a digital tool that facilitates interactive and visually engaging instruction. Unlike conventional whiteboards, IWBs enable teachers to integrate multimedia elements such as digital annotations, real-time illustrations, interactive exercises, and audio-visual aids. Previous studies on the use of IWBs in language learning have demonstrated their effectiveness in fostering student engagement and improving comprehension. However, much of the existing research has focused on Western educational settings or on teaching English as a second language, leaving a gap in the exploration of IWBs within the context of Arabic literacy development in Islamic educational institutions, particularly in pesantren (Teng, 2021).

The integration of Interactive Whiteboards (IWBs) in education has been widely studied, highlighting their effectiveness in enhancing engagement, comprehension, and pedagogical efficiency. Masnun et al. (2025) investigated IWBs in Nahwu learning, demonstrating their role in improving student engagement, cognitive retention, and instructional effectiveness through dynamic diagrams and real-time feedback. While their research focused on Arabic grammar, the present study extends the application of IWBs to Arabic literacy, specifically reading comprehension in pesantren.

The majority of knowledge and expertise on innovative education existing in the scientific community, and a considerable amount of licensed learning materials, exercises, and programs, all originate from Western countries (Choong & Leung, 2022; Kraus et al., 2021; Sofi-Karim et al., 2023; Kraus et al., 2021). Indonesia is a South East Asian, predominantly Moslem country, that has its own esteemed educational roots based on traditional Islamic

schools, or Pesantren. Archaic institutions usually concentrated on Arabic literacy, religious teachings, and traditional methods of professional craftsmanship. As consequence of globalization and liberalization, many Pesantren in Indonesia face the challenge of modernizing and adapting to the current technological era. Interactive Whiteboard technology is a digital learning aid that is still underexposed and underexploited in Indonesia. To prepare Pesantren students to comprehend an increasing amount of Western knowledge and licensed materials, they should be guided in acquiring adequate reading skills of both Arabic and Latin texts. However, current secular reforms of Indonesian education focus almost exclusively on the improvement of Latin literacy, only implicitly promoting the neglect of equally important Arabic literacy proficiency (Kosim et al., 2023). With increasing commercial and public availability of modern Arab and Mecca oriented education, the acquisition of Arabic literacy based on Pesantren heritage may become an unique selling point (Panakkal, 2024).

Several studies reinforce the educational advantages of IWBs. Al-Kahlan & Khasawneh (2023) explored teachers' perspectives on IWB implementation, finding that they enhance interaction, engagement, and learning outcomes. Similarly, Kühl & Wohninsland (2022) discovered that IWBs positively influence vocabulary acquisition, motivation, and reduce foreign language anxiety, aspects crucial for Arabic literacy development. Luo et al. (2023) examined the Seewo IWB for ESL teaching, highlighting how IWBs facilitate multimedia-based language learning and student participation. However, implementation challenges persist. Mokoena et al. (2022) identified technical barriers, insufficient teacher training, and infrastructure limitations as key obstacles to IWB adoption in classrooms.

Beyond Interactive Whiteboards, recent research explores the role of Artificial Intelligence (AI) in Arabic language education. Solehudin, Hanifansyah, and Izzuddin (2024) studied AI-generated music via Suno AI in enhancing Arabic listening skills and vocabulary acquisition at Pesantren Darullughah Wadda'wah. Their findings indicate that AI-powered music significantly boosts motivation, engagement, and vocabulary retention, suggesting that technology-driven approaches can enhance receptive language skills. This study aligns with the broader shift toward technology-assisted Arabic learning, reinforcing the idea that digital tools like IWBs and AI-powered applications can modernize Arabic pedagogy and address challenges in language acquisition.

Building on these insights, the present study explores how IWBs can enhance Arabic reading comprehension in pesantren, analyzing both pedagogical benefits and implementation challenges. By bridging traditional pesantren literacy instruction with modern digital innovations, this research contributes to the ongoing discourse on technology-enhanced Arabic education..

This study aims to examine the role of Interactive Whiteboard Technology in enhancing Arabic literacy among pesantren students. Specifically, it seeks to assess the effectiveness of IWBs in improving reading comprehension, identify the pedagogical challenges associated with their implementation, and explore their impact on students' motivation and learning engagement. By addressing these research questions, this study contributes to the growing discourse on technology-assisted language learning in Islamic education. Furthermore, it seeks to bridge the gap between traditional and modern pedagogical approaches by offering insights into how pesantren can integrate digital tools without compromising their deeply rooted educational traditions.

Given the evolving nature of Arabic language instruction in Islamic educational institutions, this study holds significant implications for educators, curriculum developers, and policymakers. By addressing the research questions namely the effectiveness of IWB in improving Arabic reading comprehension, the pedagogical challenges of its implementation, and its impact on student motivation, this study provides a focused perspective on how technology can be meaningfully integrated into pesantren-based literacy programs. Ultimately, it offers practical recommendations for pesantren administrators seeking to enhance Arabic language education while preserving the authenticity of their educational philosophy.

This study is theoretically grounded in the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler et al., 2013), which emphasizes the need for teachers to integrate technology effectively by balancing three domains: content knowledge (Arabic literacy), pedagogical knowledge (traditional pesantren instruction), and technological knowledge (Interactive Whiteboard tools). The TPACK model provides a lens to analyze how pesantren teachers navigate the intersection of Islamic educational values and contemporary digital pedagogy. By using TPACK, this study highlights how IWBs can be pedagogically aligned with Arabic literacy goals without compromising the traditional ethos of pesantren education.

## **Method**

### **Research Design**

Quantitative and Qualitative methods to provide a comprehensive understanding of the effectiveness of Interactive Whiteboard Technology (IWB) in enhancing Arabic literacy among students in pesantren (Creswell, 2021). A quasi-experimental design is used to measure the impact of IWB on students' Arabic reading proficiency, while qualitative observations and

interviews explore their experiences, challenges, and perceptions regarding this digital tool (De Paoli, 2024).

### **Data Collection Techniques**

The participants of this study consist of 60 students from Pondok Pesantren Darullughah Wadda'wah, specifically from Grade 3 Tsanawiyah (equivalent to junior high school level). These students, aged approximately 15 years old, have a minimum level of Arabic reading proficiency, meaning they can recognize Arabic script but struggle with fluency, comprehension, and pronunciation. They are selected through purposive sampling, ensuring that the study focuses on students who face significant challenges in Arabic literacy.

To assess the effectiveness of IWB in enhancing Arabic reading skills, several instruments are utilized. A pre-test and post-test are administered to measure students' Arabic reading comprehension, including word recognition, sentence structure understanding, and passage reading. Scores from both tests are compared to determine improvements. Additionally, classroom observations are conducted to analyze students' engagement, participation, and interaction with IWB, using a structured observation checklist. A Likert-scale student questionnaire is distributed to assess attitudes, motivation, and perceived effectiveness of IWB in improving Arabic reading skills. Furthermore, semi-structured teacher interviews are conducted to gather insights into instructional strategies, challenges, and pedagogical adjustments made during the implementation of IWB in the classroom.

The research procedure begins with the pre-test administration, where students take a baseline Arabic reading test to assess their initial proficiency. This is followed by the implementation phase, where structured reading lessons using IWB are conducted over a period of six weeks. These lessons incorporate interactive reading exercises, vocabulary building, digital annotations, and real-time feedback mechanisms facilitated through the whiteboard. The instruction follows a gradual release model, beginning with teacher-led demonstrations, followed by guided student practice, and concluding with independent reading activities using the IWB. After the intervention, students take the post-test to evaluate their progress in reading comprehension. In addition, qualitative data from observations, student surveys, and teacher interviews are collected to further understand the impact of IWB on student engagement and learning behavior.

### **Data Analysis Techniques**

For data analysis, the quantitative data from pre-test and post-test scores, as well as survey results, are analyzed using paired sample t-tests to determine statistical significance in reading proficiency improvement. Meanwhile, qualitative data from observations and teacher

interviews are examined through thematic coding, identifying key patterns in student engagement, motivation, and learning behavior.

Ethical considerations are strictly followed in this study. Informed consent is obtained from students and school administration before conducting the research, ensuring that all participants voluntarily take part without coercion. The confidentiality and anonymity of participants are protected, and the study adheres to ethical guidelines for educational research, ensuring no harm or undue pressure on students during participation. This methodological framework aims to provide a holistic understanding of how Interactive Whiteboard Technology can enhance Arabic literacy in pesantren, offering valuable insights into its pedagogical impact, challenges, and practical applications in Islamic education.

## **Result and Discussion**

Pondok Pesantren Darullughah Wadda'wah, known for its strong emphasis on Arabic language mastery and Islamic studies, has increasingly embraced technological advancements in its educational approach (Baharun & Hanifansyah, 2024). Traditionally, Interactive Whiteboards (IWBs) have been widely used in universities and higher education institutions, where digital learning tools are integrated into modern classrooms. However, in a groundbreaking shift, Darullughah Wadda'wah has incorporated IWB technology into its pesantren-based curriculum, making it one of the few Islamic boarding schools where almost every classroom is now equipped with an IWB.

This widespread adoption of IWBs has significantly influenced the learning culture within the pesantren. Santri, who previously relied on textbook-based rote learning, are now becoming increasingly familiar with digital tools from an early stage (Qusairi et al., 2025). The availability of IWBs in nearly all classrooms has created an environment where technology is no longer a foreign concept but rather an integral part of the learning process. As a result, students are exposed to interactive learning experiences that enhance engagement, comprehension, and digital literacy, preparing them for future academic and professional pursuits in an increasingly technology-driven world (Alhumsy & Shabdin, 2016; Giannikas, 2021; Nella Syahputri et al., 2020; Pratama et al., 2024; Shi et al., 2021).

However, this technological transformation has also posed challenges for teachers at Darullughah Wadda'wah, many of whom come from traditional pesantren backgrounds where exposure to digital instructional tools is limited. Unlike educators in urban or university settings, pesantren teachers are generally less accustomed to using IWBs in their teaching methodologies. The shift towards technology-enhanced pedagogy has placed new demands on educators, requiring them to develop digital competencies to effectively utilize IWB features,

multimedia integration, and interactive lesson planning. This transition highlights the urgent need for teacher training programs to ensure that pesantren educators can maximize the pedagogical potential of IWBs, thereby bridging the gap between traditional Islamic education and modern digital learning methods.

Interactive Whiteboards (IWBs) offer a unique potential in implementing mnemonic strategies, particularly in enhancing Arabic reading skills through memory-based learning techniques. One of the key advantages of IWBs is their ability to visually reinforce mnemonic aids, allowing students to associate Arabic vocabulary and grammatical structures with memorable experiences (Mahmudah & Hanifansyah, 2024). Through the integration of images, color-coded text, animated sequences, and interactive exercises, IWBs create a multisensory learning environment that strengthens long-term memory retention. This is particularly beneficial in Arabic literacy development, where students often struggle with word recognition, sentence structuring, and fluency. By engaging multiple cognitive pathways, IWBs enable students to form mental associations with the material, ensuring that their learning experiences become more vivid and easier to recall during future reading exercises (Mahmudah et al., 2024).

Beyond mnemonic applications, IWBs also play a crucial role in facilitating peer learning, an essential component of collaborative education. The interactive nature of IWBs allows students to actively participate in lessons by engaging in group discussions, peer-led reading sessions, and collective problem-solving activities. Through peer learning, students can support each other in mastering Arabic pronunciation (Nur Hanifansyah et al., 2024), comprehension, and fluency, which fosters a more dynamic and student-centered learning experience. The ability to highlight, annotate, and manipulate text in real-time on the IWB screen encourages students to actively contribute to the lesson, making learning more engaging and socially interactive. This peer-driven approach not only reinforces comprehension but also builds confidence in reading aloud, making Arabic literacy acquisition a more collaborative and engaging process.

### **Improvement in Arabic Reading Proficiency**

The pre-test and post-test results indicate a significant improvement in Arabic reading proficiency among the 60 participating students. Before the intervention, students demonstrated limited ability to recognize and comprehend Arabic texts, with an average pre-test score of 54.2. Following six weeks of Interactive Whiteboard (IWB) integration, the average post-test score increased to 78.6, reflecting an improvement of 24.4 percentage points.

The most notable progress was observed in word recognition and sentence comprehension, where students showed increased accuracy in deciphering Arabic syntax and morphological structures. However, fluency and pronunciation still posed challenges,

suggesting that while IWBs facilitate structural understanding, additional oral practice remains necessary for holistic literacy development.

**Table 1.**  
**Quantitative Data on IWB Effectiveness in Pesantren**

| Aspect                                      | Value |
|---------------------------------------------|-------|
| Pre-Test Score (Average)                    | 54.2  |
| Post-Test Score (Average)                   | 78.6  |
| Improvement (%)                             | 24.4  |
| Students Reporting Increased Engagement (%) | 85.0  |
| Students Finding IWB Useful (%)             | 90.0  |
| Teachers Requiring Additional Training (%)  | 75.0  |

The findings from this study provide compelling evidence of the effectiveness of Interactive Whiteboards (IWBs) in enhancing Arabic literacy among pesantren students. The pre-test results revealed that students initially struggled with Arabic reading comprehension, achieving an average score of 54.2, indicating a limited grasp of fundamental reading skills. However, after six weeks of structured lessons incorporating IWB technology, students' post-test scores significantly improved to 78.6, marking a 24.4% increase in reading proficiency. This substantial improvement suggests that IWBs play a critical role in making Arabic literacy more accessible and comprehensible for students who may otherwise find the language challenging due to its complex script and diacritical system.

Beyond measurable improvements in reading skills, student engagement and motivation also saw a remarkable boost. A large majority (85%) of students reported a higher level of engagement, expressing that the interactive nature of IWBs made learning more enjoyable and less intimidating. Additionally, 90% of students acknowledged that IWBs helped them grasp Arabic reading concepts more effectively, particularly in areas such as word recognition, sentence structuring, and grammatical rules. These findings reinforce the notion that technology-enhanced learning methods foster a more dynamic and immersive educational experience, encouraging students to actively participate in their learning process rather than passively memorizing content.

However, despite these positive outcomes, the study also identified challenges in IWB implementation, particularly regarding teacher adaptation and digital literacy. Three out of four



teachers (75%) indicated a need for additional training to effectively integrate IWB-based teaching strategies into their instruction. Many educators, particularly in pesantren settings, come from traditional teaching backgrounds where digital tools have not been a standard part of their pedagogy. This highlights the need for comprehensive teacher training programs that equip educators with the necessary technical and pedagogical skills to maximize the potential of IWBs in Arabic literacy instruction.

In conclusion, this study underscores the transformative role of IWBs in modernizing Arabic literacy education in pesantren. The substantial improvements in reading proficiency, increased student engagement, and positive reception of interactive learning demonstrate that technology can serve as a powerful tool in bridging traditional and contemporary pedagogical approaches. However, for sustainable and widespread adoption, pesantren must also invest in teacher development programs and digital infrastructure to ensure that the benefits of IWB technology can be fully realized in Arabic language education.

### **Student Engagement and Learning Motivation**

Observations during the intervention phase revealed that IWBs significantly enhanced student engagement and participation. Prior to the study, students were passive learners, often reluctant to read Arabic texts aloud in class. The introduction of interactive elements such as digital annotations, audio-visual aids, and real-time exercises led to a noticeable shift in classroom dynamics. Qualitative interviews with students confirmed these findings. One student remarked: *"Before using the Interactive Whiteboard, I found Arabic texts intimidating. Now, with digital tools breaking down complex words, I feel more confident reading and understanding passages."*

Similarly, a teacher at Pesantren Darullughah Wadda'wah noted: *"The use of IWB allows students to engage visually and interactively, which is very different from traditional rote learning. It has helped them grasp reading concepts faster, especially when combined with digital annotation tools."* These responses highlight the role of IWBs in reducing reading anxiety and fostering a more student-centered learning environment.

### **Pedagogical Challenges in IWB Implementation**

Despite the observed benefits, certain challenges emerged in the implementation of IWBs in the pesantren setting. The primary concerns included: Limited teacher proficiency in IWB utilization, requiring additional training for effective integration. Dependence on stable electricity and digital infrastructure, which remains inconsistent in some pesantren. Students' initial difficulty in adapting to interactive learning, as many were accustomed to static, text-heavy instruction methods. One teacher noted: *"Some students struggled initially with the transition from textbooks to digital screens. However, after a few days, they became more*

*comfortable using interactive tools.*" These findings underscore the need for teacher training programs and incremental technology integration strategies to ensure smooth adaptation.

The results of this study align with previous research emphasizing the educational advantages of IWBs in language learning. The observed increase in reading comprehension parallels the findings of Masnun et al. (2023), who demonstrated that IWBs enhance student engagement and cognitive retention in Nahwu learning. Similarly, this study confirms Al-Kahlan & Khasawneh (2023)'s conclusions that IWBs improve student motivation and interaction in educational settings.

Moreover, the impact on vocabulary acquisition observed in this study resonates with Kühl & Wohninsland (2022), who found that IWBs support vocabulary development and mitigate language anxiety. The multimedia integration strategies used in this study further support Luo et al. (2023), who highlighted the effectiveness of Seewo IWBs in fostering participation in ESL classrooms.

Beyond traditional interactive learning tools, recent research suggests that AI-based applications can complement IWB-assisted instruction. Solehudin et al. (2024) demonstrated that AI-powered music enhanced Arabic listening skills and vocabulary retention at Pesantren Darullughah Wadda'wah. This aligns with the present study's findings, suggesting that technology-driven learning environments, whether through AI-generated music or IWBs, significantly enhance Arabic literacy acquisition.

### **Implications for Islamic Educational Institutions**

Islam emphasizes the importance of reading and writing, as literacy is deeply embedded in its teachings (Felsenthal & Agbaria, 2023). In Indonesia, pesantren serve as a cornerstone for Islamic education, preserving religious knowledge while adapting to modern educational advancements (Darwanto et al., 2024). Traditionally, pesantren relied on rote memorization and teacher-centered learning, particularly in Arabic literacy (Yuliana et al., 2024). However, with the emergence of digital tools, there is a growing necessity to integrate technology-enhanced learning strategies to support Arabic literacy development (Hawamdeh & Abdelhafid, 2024; Hurley, 2021).

Despite the strong literacy development in Bahasa Indonesia and English, Arabic literacy remains a challenge in many pesantren due to limited exposure, the complexity of Arabic script, and traditional teaching methods that emphasize memorization over comprehension (Bukhori Muslim et al., 2024). Many pesantren students struggle with deciphering Arabic syntax and diacritical marks, which are essential for proper reading and pronunciation (Tabroni et al., 2023). This aligns with the phenomenon of "grammar phobia",

where students feel intimidated by complex grammatical structures, leading to low motivation in Arabic writing and speaking.

This study's results suggest that IWBs significantly mitigate these challenges by providing interactive, visual, and structured approaches to learning Arabic syntax and morphology. Similar to the findings of Masnun et al. (2023), who demonstrated that IWBs enhanced cognitive retention in Nahwu learning, the current study highlights that students engaged more actively with Arabic texts when presented through multimedia-based lessons. Furthermore, peer collaboration facilitated by IWBs allowed students to overcome literacy anxiety, making reading and writing Arabic more approachable and accessible.

Despite these advantages, the integration of IWB technology in pesantren remains limited due to insufficient teacher training and infrastructure constraints. Many pesantren educators come from traditional backgrounds with minimal exposure to educational technology, as also noted in Mokoena et al. (2022) regarding similar challenges in high school classrooms. To maximize the pedagogical benefits of IWBs, pesantren need comprehensive teacher training programs and sustainable technology integration strategies that align with Islamic education values.

The findings of this study emphasize the urgent need for pesantren to modernize their Arabic literacy instruction while maintaining the integrity of traditional Islamic education. The successful integration of Interactive Whiteboards (IWBs) in pesantren highlights a promising pathway for bridging classical Arabic instruction with contemporary pedagogical innovations. However, sustainable implementation requires institutional support, structured training for educators, and investment in digital infrastructure.

Islamic educational institutions must recognize the potential of IWBs and other digital learning tools in enhancing Arabic literacy, particularly as the demand for technological competence increases among pesantren graduates. As global access to digital Arabic content expands, pesantren must equip students with the necessary skills to navigate and comprehend Arabic texts efficiently, ensuring that they can engage with classical Islamic literature while also accessing contemporary Arabic resources.

To fully harness the potential of technology-assisted Arabic literacy, policymakers and Islamic educational leaders should consider integrating digital literacy programs, establishing training centers for teachers, and developing interactive curricula that incorporate IWBs. By doing so, pesantren can not only preserve their rich educational traditions but also prepare students for the modern academic and professional landscape, reinforcing their role as institutions that blend Islamic scholarship with 21st-century learning methodologies.

These findings highlight the potential of IWBs to bridge traditional Arabic literacy instruction with modern pedagogical innovations. However, for sustainable implementation in

pesantren, institutions must address infrastructure challenges and teacher training gaps. This research suggests that a hybrid approach, integrating IWBs, AI tools, and conventional reading instruction, may provide an optimal strategy for enhancing Arabic literacy while maintaining the authenticity of pesantren education.

In summary, IWBs have a positive impact on Arabic reading comprehension, engagement, and motivation among pesantren students. However, their successful implementation requires institutional support, teacher training, and incremental adaptation strategies. Future research should explore long-term effects of IWB-assisted literacy development and its integration with AI-driven educational tools to create a comprehensive digital learning ecosystem in Islamic education.

## **Conclusion**

This study examined the role of Interactive Whiteboard (IWB) technology in enhancing Arabic literacy among pesantren students, particularly in reading comprehension and engagement. The findings indicate that IWB integration significantly improved students' reading proficiency, with notable progress in word recognition, sentence structuring, and comprehension. Additionally, IWBs facilitated mnemonic-based learning, allowing students to form lasting mental associations with Arabic texts, thereby enhancing retention and recall. The study also highlighted how IWBs support peer learning, enabling students to collaborate, discuss, and reinforce their Arabic reading skills collectively. Furthermore, the integration of IWBs in Pesantren Darullughah Wadda'wah, where technology adoption is uncommon, has exposed students to modern pedagogical tools, fostering digital literacy from an early stage. However, the study also revealed challenges, particularly the lack of technological proficiency among teachers, requiring targeted training programs to ensure effective IWB implementation.

Despite these advancements, certain limitations must be acknowledged. The study was conducted over a relatively short period, limiting its ability to assess the long-term impact of IWB-based Arabic literacy instruction. Additionally, while quantitative data demonstrated improvement, further research could explore students' cognitive and affective responses to IWB learning in more depth. Future studies should also investigate the integration of AI-driven tools alongside IWBs, potentially creating a comprehensive, technology-enhanced Arabic learning ecosystem. Given the increasing role of digital tools in Islamic education, the findings of this study underscore the importance of bridging traditional and modern pedagogical approaches, ensuring that pesantren students benefit from both classical methodologies and contemporary innovations in language instruction.

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