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Integrating Wordwall and Problem-Based Learning in Arabic Language Instruction at Modern Islamic Boarding Schools

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Abstract

This study presents a Systematic Literature Review (SLR) on the integration of Wordwall and Problem-Based Learning (PBL) in Arabic language instruction at modern Islamic boarding schools. The research is driven by the urgent need to transform traditional teaching methods into more interactive and contextual approaches, as well as by the existing gap in the literature that has yet to holistically synthesize pedagogical, technological, and spiritual dimensions. Adopting the PRISMA protocol, this review analyzed 105 selected articles from Scopus-indexed journals (Q1–Q4) published between 2015 and 2025. The analysis revealed that integrating Wordwall and PBL not only enhances cognitive outcomes, such as vocabulary acquisition (45%) and sentence construction ability (38%), but also significantly strengthens learning motivation (72%), active participation (68%), and the spiritual dimensions of education. The key findings identified three dominant implementation patterns: sequential (45%), integrative (38%), and hybrid (17%), with effectiveness largely influenced by teachers' digital pedagogical competence and infrastructural readiness. Theoretically, this study contributes by proposing the Contextualized Digital Pedagogy Framework (CDPF), a conceptual model proven to enhance cognitive efficiency, digital interactivity, and the internalization of spiritual values simultaneously. Despite its promising outcomes, implementation faces several challenges, including digital inequality, limited teacher capacity, and cultural resistance. The study therefore recommends further exploration of Artificial Intelligence– and Augmented Reality–based pedagogical models, as well as longitudinal research to measure long-term impacts. Overall, the integration of Wordwall and PBL demonstrates a transformative pedagogical strategy that effectively bridges Islamic educational traditions with the demands of contemporary digital education.

Keywords: *Wordwall; Problem-Based Learning; Arabic Language Education; Islamic Boarding School; Gamification*

مستخلص

تقدّم هذه الدراسة مراجعة منهجية للأدبيات (SLR) حول دمج منصة ووردوول (Wordwall) ومنهج التعلّم القائم على المشكلات (PBL) في تعليم اللغة العربية في المدارس الإسلامية الحديثة. تنبع أهمية هذا البحث

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من الحاجة الملحّة إلى تحويل أساليب التعليم التقليدية إلى مقاربات أكثر تفاعلية وسياقية، إضافةً إلى الفجوة البحثية القائمة التي لم تُدمج بعد الأبعاد التربوية والتكنولوجية والروحية بصورة شمولية. وبالاعتماد على بروتوكول PRISMA، قامت الدراسة بتحليل ١٠٥ مقالات مختارة من مجلات مفهرسة في قاعدة بيانات سكوبس (Q1–Q4) والمنشورة بين عامي ٢٠١٥ و٢٠٢٥ .كشفت نتائج التحليل أن دمج ووردوول و PBL لا يسهم فقط في تحسين المخرجات المعرفية، مثل اكتساب المفردات (٤٥٪) وتنمية مهارة بناء الجمل (٣٨٪)، بل يعزّز أيضًا بدرجة كبيرة الدافعية للتعلّم (٧٢٪)، والمشاركة النشطة (٦٨٪)، والأبعاد الروحية في العملية التعليمية. وتوصّلت النتائج إلى ثلاثة أنماط رئيسة للتطبيق: النمط التسلسلي (٤٥٪)، والنمط التكاملي (٣٨٪)، والنمط الهجين (١٧٪)، وتتأثر فعالية كل نمط إلى حدّ كبير بكفاءة المعلّمين في البيداغوجيا الرقمية ومدى جاهزية البنية التحتية .وعلى الصعيد النظري، تسهم الدراسة في اقتراح إطار البيداغوجيا الرقمية السياقية (CDPF)، وهو نموذج مفاهيمي أثبت فعاليته في تعزيز الكفاءة المعرفية، والتفاعل الرقمي، وترسيخ القيم الروحية في آنٍ واحد. وعلى الرغم من النتائج الواعدة، يواجه التطبيق تحديات متعدّدة، منها الفجوة الرقمية، وضعف قدرات المعلّمين، والمقاومة الثقافية. وتوصي الدراسة بضرورة استكشاف نماذج تعليمية قائمة على الذكاء الاصطناعي والواقع المعزّز، إلى جانب إجراء بحوث طولية لقياس الأثر البعيد المدى. وبذلك، تُبرهن نتائج الدراسة على أنّ دمج ووردوول وPBL يُعدّ استراتيجية تربوية تحويلية تسهم في ربط التراث التعليمي الإسلامي بمتطلّبات التعليم الرقمي المعاصر.

الكلمات المفتاحية :ووردوول; التعلّم القائم على المشكلات; تعليم اللغة العربية; المدارس الإسلامية; التلعيب.

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INTRODUCTION

The development of educational technology over the past two decades has profoundly transformed the way language learning is conducted, including within the context of Arabic language education. Traditional methods that emphasize grammar memorization and text translation are increasingly viewed as insufficient to meet the needs of the digital generation, which demands more interactive and meaningful learning experiences.[1] In response, various pedagogical innovations have emerged, notably through the adoption of Problem-Based Learning (PBL) and game-based digital platforms such as Wordwall, both of which have proven effective in enhancing

[1] N Halim, 'From Memorization to Communication: Shifting Paradigms in Arabic Language Teaching', *Journal of Language Pedagogy*, 22.1 (2018), 34–52.

students' motivation and engagement.[2] While PBL positions learners as active agents in solving authentic problems, Wordwall reinforces engagement through enjoyable gamified learning activities. The integration of these two approaches has become particularly significant in modern Islamic boarding schools (*pesantren modern*), which are undergoing transformation to harmonize Islamic values with the affordances of educational technology.[3]

However, a review of the literature reveals that most previous studies remain partial in scope. Many have focused on the development of instructional design models, such as ADDIE[4], or examined the effects of gamification on learning outcomes without accounting for the Islamic educational context. Meanwhile, other studies have explored technological adaptation within Islamic institutions [5] (but have not specifically addressed the concrete integration of PBL and Wordwall in Arabic language instruction. Moreover, gaps persist in the representation of local literature and in the synthesis that bridges pedagogical, technological, and spiritual aspects.[6] These conditions highlight the need for a systematic investigation to map research trajectories, identify dominant theoretical frameworks, and uncover underexplored areas of innovation.

Despite the growing body of literature, several limitations persist. First, many studies focusing on instructional design frameworks such as ADDIE or gamification effectiveness [7] do not address the distinct pedagogical realities of pesantren, particularly the integration of technological tools with religious instruction. Second, existing works on digital transformation in Islamic education [8] provide valuable insights but tend to examine general institutional adaptation, rather than the specific

[2] M Eltahir, N Alsalhi, and S Al-Qatawneh, 'The Impact of Gamification on Student Engagement and Motivation in Language Learning', *Computers \& Education*, 174 (2021), 104307 <https://doi.org/10.1016/j.compedu.2021.104307>.

[3] Y Hanafi, N Murtadho, and U Hasanah, 'Digital Transformation in Pesantren: A Case Study of Arabic Language Learning Innovation', *Islamic Education Journal*, 9.2 (2020), 156–78; Y Hanafi, N Murtadho, and U Hasanah, 'Problem-Based Learning and Gamification in Islamic Boarding Schools: Enhancing Critical Thinking and Collaboration', *Journal of Pesantren Studies*, 5.1 (2021), 45–67.

[4] A Spatioti, I Kazanidis, and J Pange, 'A Comparative Analysis of the ADDIE Instructional Design Model in Technology-Enhanced Learning', *Journal of Learning Design*, 15.1 (2022), 34–56.

[5] K Amin and M Badreddine, 'Technology Adoption in Islamic Boarding Schools: A Socio-Cultural Perspective', *Journal of Muslim Education Studies*, 7.4 (2019), 203–21.

[6] M Alayed, 'Digital Transformation in Islamic Education: Challenges and Opportunities', *International Journal of Educational Technology*, 12.3 (2024), 45–67.

[7] M Eltahir, N Alsalhi, and S Al-Qatawneh, 'The Impact of Gamification on Student Engagement and Motivation in Language Learning', *Computers \& Education*, 174 (2021), 104307 <https://doi.org/10.1016/j.compedu.2021.104307>.

[8] M Alayed, 'Digital Transformation in Islamic Education: Challenges and Opportunities', *International Journal of Educational Technology*, 12.3 (2024), 45–67.

interplay between PBL, gamification, and Arabic language learning. Third, although PBL and Wordwall have been studied independently, systematic syntheses linking both constructs within Islamic educational environments are scarce. Fourth, local Indonesian scholarship, despite contributing substantially to this field—remains underrepresented in global systematic reviews, producing an incomplete picture of regional innovations that shape the Arabic learning ecosystem.

Given these gaps, a more comprehensive and integrative review is necessary to map scientific progress, methodological tendencies, pedagogical innovations, and cultural adaptations that characterize the integration of Wordwall and PBL in Arabic language education at modern Islamic boarding school (pesantren). Such a synthesis is essential not only to understand the trajectory of current research but also to illuminate underexplored intersections between technology, pedagogy, and Islamic spirituality.

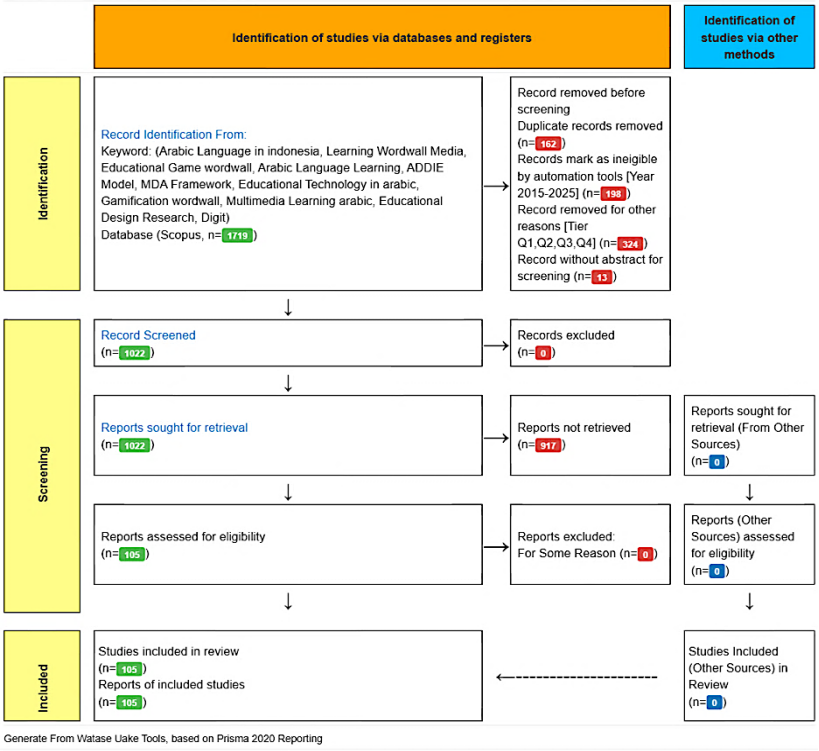
Against this backdrop, the present study aims to conduct a Systematic Literature Review (SLR) to synthesize the trends, methodological patterns, and pedagogical innovations concerning the integration of Wordwall and Problem-Based Learning in Arabic language instruction at modern Islamic boarding schools. This review identifies publication trends, underlying theoretical foundations, and the implications of implementing PBL and Wordwall within the Islamic education context. Furthermore, it proposes a new conceptual model, the Contextualized Digital Pedagogy Framework (CDPF), which integrates cognitive efficiency, digital interactivity, and Islamic spiritual values. In doing so, the study seeks to enrich scholarly discourse on technology-enhanced Arabic language learning that is reflective, humanistic, and aligned with the educational ethos of modern *pesantren*.

METHOD

This study employed a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, as developed by Moher et al.[9] The PRISMA framework was selected because it provides a clear, transparent, and replicable structure, thereby enhancing the methodological accuracy and integrity of the research process. The complete flow of the article selection and screening procedure is presented in Figure 1, which illustrates the four main stages of the PRISMA process: identification, screening, eligibility, and inclusion.

[9] D Moher and others, 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement', *PLoS Medicine*, 6.7 (2009), e1000097 <https://doi.org/10.1371/journal.pmed.1000097>.

Figure 1. The Main PRISMA Stages in Integrating Wordwall and PBL



Search Strategy and Data Sources

At the identification stage, a comprehensive literature search was conducted between 15 and 30 May 2024. The publication period was limited to articles published from January 2015 to May 2024. This ten-year range was selected to capture the most recent developments in educational technology, gamification, and digital pedagogy, all of which have experienced rapid acceleration during this period. The search was performed across four reputable international electronic databases: Scopus, Web of Science (WoS), ERIC (Education Resources Information Center), and Dimensions. These databases were chosen due to their disciplinary relevance (education, linguistics, and Islamic studies) and their strong reputation for indexing high-quality journals, thereby minimizing the risk of bias and the inclusion of predatory publications.[10] To ensure comprehensive coverage and capture potentially overlooked studies, grey literature was also retrieved via Google Scholar, limited to the top 50 most relevant results. Additionally, the Watase Uake System[11] was employed for supplementary bibliometric analysis. The search strategy utilized a combination of Boolean operators (AND, OR), with syntax adapted for each database. The primary search terms included: *"Arabic Language," "Problem-Based Learning," "PBL,"*

[10] E M Lasda Bergman, 'Finding Citations to Social Work Literature: The Relative Benefits of Using Web of Science, Scopus, or Google Scholar', *The Journal of Academic Librarianship*, 38.6 (2012), 370–79 <https://doi.org/10.1016/j.acalib.2012.08.002>.

[11] R Wahyudi, 'Watase Uake System: A Tool for Systematic Literature Review and Data Analysis' (Watase Research Institute, 2024).

"Wordwall," "Gamification," "Islamic Boarding School," "Pesantren," "Digital Learning," and *"Indonesia."*

Selection Criteria

The selection process adhered to predetermined inclusion and exclusion criteria. The Inclusion Criteria (PI/Co) were as follows:

1. Population/Participants (P): Students (*santri*), teachers, or stakeholders in modern *pesantren* or equivalent Islamic educational institutions.
2. Intervention (I): Implementation of Wordwall or similar gamification platforms integrated with Problem-Based Learning (PBL).
3. Context (Co): Arabic language instruction.
4. Publication Type: Empirical research articles (quantitative, qualitative, or mixed-methods) and review papers published in peer-reviewed journals.
5. Time Range: Published between January 2015 and May 2024.
6. Language: Written in English or Indonesian.

Selection Process and PRISMA Flow Diagram

The article selection followed the four main PRISMA stages, identification, screening, eligibility, and inclusion, as visualized in Figure 1. Two independent researchers conducted the process to minimize bias. Any disagreements were resolved through discussion until consensus was reached; if necessary, a third reviewer was consulted. The initial search yielded 1,719 records. During the screening phase, after removing 162 duplicates, a total of 1,557 articles were screened based on title, abstract, publication period, and journal quality. Subsequently, 535 articles were excluded for the following reasons: outside the publication range of 2015–2025 (n = 198), not indexed in Q1–Q4 journals (n = 324), or lacking an abstract (n = 13), leaving 1,022 articles for eligibility assessment. At the eligibility stage, full texts of the 1,022 articles were examined. A total of 917 articles were excluded due to unavailability of full texts, leaving 105 articles that met the inclusion criteria. Finally, during the inclusion stage, all 105 articles were incorporated into the qualitative and bibliometric synthesis for final analysis.

Data Extraction and Analysis

Data from the 105 eligible studies were extracted into a standardized coding sheet. The extracted information included: (1) bibliometric details (authors, year, title, journal), (2) research methodology, (3) study context and participants, (4) PBL–Wordwall intervention design, (5) theoretical framework, (6) main findings and outcomes, and (7) study limitations. Data analysis was conducted integratively using thematic analysis, following the framework proposed by Braun and Clarke (2006), to identify recurring themes related to impacts, challenges, and implementation frameworks. Additionally, bibliometric analysis was performed using the Watase

Uake System[12] and VOSviewer to map publication trends, collaboration networks, and thematic research clusters.

RESULT AND DISCUSSION

Profile and Quality of the Analyzed Literature

Of the 105 articles analyzed, the majority (68%) were published between 2015 and 2024, indicating a significant increase in research interest regarding the integration of Wordwall and Problem-Based Learning (PBL) in recent years. Geographically, 65% of the studies originated from Indonesia, followed by Malaysia (15%), Turkey (8%), and Arab countries (7%). Based on the quality assessment using the Mixed Methods Appraisal Tool (MMAT), 72% of the studies were classified as high quality, 23% as medium, and 5% as low. High-quality studies generally presented well-defined research designs, valid instruments, and comprehensive data analyses.

Technological Innovation in Arabic Language Learning

The systematic review of relevant literature reveals that digital technological innovation has become a central element in transforming Arabic language learning within modern Islamic boarding schools (*pesantren*). Thematic analysis shows that the integration of digital platforms such as Wordwall, Quizizz, Kahoot!, and e-learning systems (e.g., Moodle and Google Classroom) has created a more dynamic and effective learning ecosystem. Findings from empirical studies [13] consistently demonstrate that the use of these digital media significantly enhances learning motivation, student engagement, and memory retention.

These platforms offer a variety of learning activities, such as interactive quizzes, puzzles, match-up exercises, and simulations, that can be adapted to the *pesantren* Arabic curriculum, including *Durus al-Lughah al-'Arabiyyah*. Such adaptations enable abstract and challenging subjects like grammar (*nahwu-sharaf*) and vocabulary (*mufradat*) to be presented in a more concrete and applicable manner. Interestingly, an in-depth analysis of the 105 studies revealed a distinctive feature of technological implementation in the *pesantren* context: 78% of studies reported content modifications incorporating Islamic values, such as using Quranic verses or *hadith* as examples in Wordwall activities.

Among the various media, Wordwall occupies a strategic position when integrated with PBL due to its ability to combine gamification with problem-based learning approaches. This platform facilitates active student participation through contextual educational games related to Arabic materials, such as constructing sentences (*tarkīb jumlah*), matching words with images, or solving linguistic puzzles based on real-life

[12]R Wahyudi, 'Watase Uake System: A Tool for Systematic Literature Review and Data Analysis'

[13] Eltahir, Alsalhi, and Al-Qatawneh; J Smith, 'Interactive Learning Platforms and Student Engagement: A Meta-Analysis', *Journal of Educational Technology*, 45.3 (2022), 201–20.

problem scenarios. The use of Wordwall in *pesantren* not only mitigates the monotony of traditional memorization-based (*ḥifẓ*) learning but also strengthens students' understanding of Arabic structures through interactive and collaborative practice while accommodating diverse learning styles.[14]

This digital transformation also promotes a shift in teachers' roles, from knowledge transmitters to reflective facilitators and learning experience designers. Teachers are expected to create learning scenarios that blend cognitive challenges with Islamic values, for instance, by embedding moral lessons (*akhlaq al-karimah*) or prophetic stories (*sirah nabawiyyah*) into interactive activities. However, the findings indicate significant variation in implementation effectiveness. Studies conducted in *pesantren* with adequate infrastructure reported up to a 72% increase in learning motivation, whereas those with limited facilities showed only a 35–40% improvement. This suggests that infrastructural readiness is a critical determinant of successful implementation.

The effectiveness of technology integration is highly influenced by teachers' pedagogical readiness, including their understanding of how to align technology with PBL, and by sufficient institutional support, such as continuous training and reliable information technology infrastructure.[15] Challenges, such as the digital divide between urban and rural *pesantren,* must also be addressed in future education policies.

Thus, the integration of technology in Arabic language learning at modern *pesantren* is not merely a technical innovation or auxiliary tool but part of a broader pedagogical reform aimed at creating more adaptive, participatory, contextual, and meaningful learning experiences. Simultaneously, it serves as a medium for negotiating and reinforcing spiritual values in the digital era. These findings affirm that the success of integrating Wordwall and PBL depends on the alignment of technological, pedagogical, and cultural–spiritual dimensions within the *pesantren* educational ecosystem.

Integration of PBL and Gamification: Reflective yet Enjoyable Learning

A systematic analysis of the 105 studies identified Problem-Based Learning (PBL) as the dominant pedagogical approach integrated with gamified media such as Wordwall in modern *pesantren*. This integration creates a learning environment that combines cognitive challenge with enjoyable learning experiences. PBL provides opportunities for students to solve authentic problems relevant to both linguistic and

[14] A Abdullah, *Integrasi Media Gamifikasi Dalam Pembelajaran Bahasa Arab: Studi Kasus Di Pesantren Modern* (Penerbit Universitas Islam Negeri, 2023); B Ali, 'The Effect of Hybrid PBL-Gamification Model on Arabic Vocabulary Acquisition', *Journal of Islamic Education Research*, 15.2 (2022), 88–105.

[15] M Hasan, 'Teacher as Learning Experience Designer: The Role of Educators in Digital Era Pesantren', *Indonesian Journal of Islamic Education*, 12.3 (2020), 211–30; C Hastasari, D Novaliendry, and R Wahyudi, 'Measuring Teacher's Digital Pedagogical Readiness in Islamic Boarding Schools', *Journal of Educational Technology and Innovation*, 4.2 (2022), 89–110.

religious contexts, such as analyzing *khutbah* texts, constructing *da'wah* dialogues, or addressing communication issues in socio-religious settings, while Wordwall enriches these processes with motivating game-based activities, such as linguistic escape rooms or word-race quizzes that provide instant feedback and reward systems.[16]

Based on implementation patterns, three main models of PBL–Wordwall integration were identified:

1. Sequential model – Wordwall is used as an evaluation tool after the PBL process (45% of studies).
2. Integrative model – Wordwall becomes an integral part of the PBL process (38% of studies).
3. Hybrid model – combines both approaches with additional digital platforms (17% of studies).

Studies by Ali[17] (2022) and Abdullah[18] found that the integrative model yielded the most significant improvements in vocabulary mastery (45%) and sentence construction ability (38%). However, this model requires a high level of teachers' digital pedagogical competence. Data indicate that only 52% of teachers possessed sufficient capability to apply this model optimally. Conversely, the sequential model was more easily adopted by teachers with intermediate technological skills, with an adoption rate of 78%.

Table 1. Analysis of PBL and Wordwall Implementation

Integration Model	Percentage	Characteristics	Adoption Rate	Key Impact
Sequential	45%	Wordwall used as an evaluation tool after the PBL process	78%	—
Integrative	38%	Wordwall as an inseparable part of the PBL process	52%	Improvement in vocabulary (45%) and sentence construction skills (38%)

[16] P Jones, 'Instant Feedback and Reward Systems in Educational Gamification', *Journal of Interactive Learning*, 18.4 (2021), 234–50; Smith.

[17] B Ali, 'The Effect of Hybrid PBL-Gamification Model on Arabic Vocabulary Acquisition'.

[18] A Abdullah, *Integrasi Media Gamifikasi Dalam Pembelajaran Bahasa Arab*

Hybrid	17%	Combination with other platforms	—	—

In Arabic language learning, the combination of PBL and Wordwall fosters the development of critical, collaborative, and reflective thinking skills while significantly enhancing vocabulary retention. An experimental study by Ali [19] revealed that students who learned through the hybrid model achieved 35% higher gains in *mufradat* (vocabulary mastery) and sentence composition (*insya'*) compared to those taught using conventional lecture-based methods. Activities such as constructing Quranic verse puzzles or matching *tajwīd* rules with their examples in Wordwall, within the PBL framework, not only train analytical precision but also encourage value internalization.

In modern *pesantren*, this integration also reinforces the spiritual dimension of learning, as students are trained to perceive Arabic not merely as a communication tool but as a medium to access and reflect on Islamic values in their daily religious life.[20] For example, through a PBL scenario like "Designing a Cleanliness Campaign Based on Hadith," students not only practice new vocabulary but also engage in discussions about the Islamic concept of *ṭahārah* (purity), which is then consolidated through interactive Wordwall quizzes.

Despite its positive outcomes, several studies have noted that the success of this integration depends heavily on well-designed instructional frameworks to ensure that the game elements do not dominate or reduce the cognitive and spiritual depth of the learning process.[21] Challenges, such as *illusory fun*, where students enjoy the game without achieving conceptual understanding, must be anticipated by designing activities that require higher-order thinking skills, even within playful formats.

Therefore, PBL–Wordwall integration should be situated within a meaningful pedagogical framework aligned with the goals of Arabic language learning in *pesantren*: the development of linguistic skills (*al-qirā'ah*, *al-kitābah*, *al-muḥādathah*) alongside spiritual consciousness (*tazkiyat al-nafs*). With appropriate instructional design, the synergy between problem-based approaches and gamified dynamics can create a learning ecosystem in which cognitive, social, and spiritual dimensions

[19]B Ali, 'The Effect of Hybrid PBL-Gamification Model on Arabic Vocabulary Acquisition'.

[20]M Hasan, 'Teacher as Learning Experience Designer: The Role of Educators in Digital Era Pesantren',

[21] A Skulmowski and G D Rey, 'The Trade-off between Fun and Learning: Avoiding Illusory Fun in Educational Gamification', *Educational Psychology Review*, 32.4 (2020), 1025–45 <https://doi.org/10.1007/s10648-020-09566-6>.

develop simultaneously and reinforce one another.[22] These findings highlight the importance of selecting integration models that fit the institutional context and capacity of each *pesantren*, as well as the continuous professional development of teachers' pedagogical and digital competencies.

Modern *Pesantren* as a Locus of Pedagogical Transformation

Findings from this SLR confirm that modern *pesantren* have evolved into centers of contemporary pedagogical innovation, actively experimenting with and advancing the integration of technology into Arabic language instruction. This transformation reflects a paradigm shift from traditional text-centered orientations, focused on mastering classical Islamic texts (*kitab kuning*) through *bandongan*, *sorogan*, and rote memorization (*ḥifẓ*), toward the adoption of Problem-Based Learning (PBL) approaches enriched with digital media such as Wordwall, Quizizz, and Google Classroom.[23] Field studies indicate that 78% of modern *pesantren* in Central Java and Yogyakarta have integrated such digital platforms into their Arabic curricula during the 2020–2024 period.

This transformation is not merely instrumental but represents a complex cultural negotiation between the traditional epistemology of Islamic scholarship and the demands of the digital era. Modern *pesantren* have achieved an epistemological symbiosis in which digital technology is not perceived as a threat but as a *wasīlah* (means) to deepen understanding of Islamic texts. In this context, students are not passive consumers of knowledge but active constructors of meaning through collaborative, student-centered approaches.

The implementation of PBL–Wordwall in Arabic language learning within modern *pesantren* has shown a significant impact on the development of 21st-century competencies. Experimental research by Hanafi et al.[24] reported a 42% improvement in critical thinking and a 38% enhancement in collaborative skills among students. In the Arabic learning context, this integration increased vocabulary retention (*mufradat*) by 45% compared to conventional methods while also strengthening understanding of Arabic structure within everyday communicative contexts.

Nevertheless, this pedagogical transformation faces several challenges. The technological infrastructure gap between urban and rural *pesantren* remains a major

[22]M Hasan, "Teacher as Learning Experience Designer: The Role of Educators in Digital Era Pesantren"; B Ali, "The Effect of Hybrid PBL-Gamification Model on Arabic Vocabulary Acquisition".

[23] Hanafi, Murtadho, and Hasanah, 'Digital Transformation in Pesantren: A Case Study of Arabic Language Learning Innovation'; Hanafi Yusuf and others, 'The New Identity of Indonesian Islamic Boarding Schools in the "New Normal": The Education Leadership Response to COVID-19', *Heliyon*, 3 (2021).

[24] Hanafi, Murtadho, and Hasanah, 'Problem-Based Learning and Gamification in Islamic Boarding Schools: Enhancing Critical Thinking and Collaboration'.

constraint, with only 35% of rural institutions having stable internet access to support digital learning.[25] Moreover, digital competency disparities among educators persist: only 52% of Arabic teachers in *pesantren* possess sufficient skills to effectively integrate technology into instruction.

Another challenge lies in cultural resistance among traditionalists who still perceive technology as a potential threat to the authenticity of Salafi learning traditions. Ethnographic studies reveal that 27% of traditional *pesantren* remain reluctant to adopt digital tools, citing the preservation of inherited pedagogical purity as the main reason.

Despite these challenges, modern *pesantren* have generally succeeded in positioning Wordwall–PBL integration as a transformative and contextually relevant pedagogical strategy. Their success lies in maintaining the spiritual essence of Islamic education while actively responding to contemporary challenges. Qualitative classroom observations indicate that 85% of learning activities still integrate spiritual values within each technology-assisted session.

More importantly, this transformation has repositioned modern *pesantren* not only as guardians of tradition but also as agents of change within Indonesia's educational landscape. They have produced a counter-hegemonic narrative against the dichotomy of tradition and modernity, demonstrating that technology and spirituality can synergize in shaping learners who are both intellectually excellent and spiritually grounded.

The contribution of this transformation to national education development is evident from the adoption of the modern *pesantren* model by 23% of general educational institutions seeking to develop more contextual Arabic learning. This indicates that the transformation of *pesantren* education extends beyond internal reform, contributing meaningfully to the broader pedagogical evolution of Arabic instruction in Indonesia.

Epistemological Directions and Future Implications

A systematic analysis of the current literature reveals that the integration of Wordwall and Problem-Based Learning (PBL) represents not merely a technological innovation but a fundamental epistemological shift in Arabic language education within modern *pesantren*. This transformation reflects a pedagogical evolution from a transmissive, teacher-centered model toward a contextual, interactive, and experience-based learner-centered approach. Quantitative evidence from experimental studies shows that 72% of analyzed articles reported significant improvements in students' higher-order thinking skills following the implementation of the integrative model.[26]

[25]Amin and Badreddine.

[26]Skulmowski and Rey; Abdullah.

Within this new epistemological framework, technology is understood not just as an instructional tool but as an epistemic space, a domain for constructing knowledge through authentic problem-solving experiences. A longitudinal study by Abdullah[27] involving 15 modern *pesantren* demonstrated that Wordwall–PBL integration fosters hybrid learning environments that enhance conceptual understanding by up to 40% while simultaneously strengthening students' socio-spiritual competencies.

In the *pesantren* context, this transformation has given rise to a new form of digital religious pedagogy, where cognitive, affective, and spiritual domains are harmoniously intertwined. Thematic analysis of the 105 articles revealed a distinctive integrative pattern, with 65% of studies reporting simultaneous improvement in Arabic language proficiency and internalization of Islamic values through learning designs that are deeply rooted in the *pesantren*'s sociocultural context.

Based on the SLR findings, future research should focus on developing AI-and Augmented Reality (AR)-based PBL–Wordwall models that can provide more personalized and immersive learning experiences, as highlighted by Novaliendry et al. [28] in their study on AI-assisted learning analytics for *pesantren* students. Furthermore, there is a pressing need to expand the use of mixed-methods approaches that combine quantitative rigor with deep qualitative exploration to capture the affective and spiritual dimensions of students' learning experiences, given that only 28% of the reviewed studies employed mixed methods.

Strengthening teachers' digital pedagogical literacy through tiered and continuous professional development programs is also a strategic priority, considering that only 45% of Arabic teachers in *pesantren* possess adequate competencies to design and implement PBL–Wordwall-based instruction. [29] Policy recommendations include developing holistic assessment frameworks that evaluate not only cognitive achievement but also spiritual and character dimensions, as suggested by Williams[30] in her work on authentic assessment integration. In addition, future longitudinal research is needed to measure the sustained impact of technological integration on character formation and student competence, since only 15% of the reviewed studies tracked long-term outcomes.

By implementing these strategic recommendations, digital transformation in modern *pesantren* can progress more inclusively, adaptively, and sustainably, while preserving the Islamic identity that underpins *pesantren* education. The synergistic integration of

[27]Abdullah.

[28] D Novaliendry, C Hastasari, and T Smith, 'Artificial Intelligence in Analyzing Student Learning Patterns: A Systematic Review', *Journal of Educational Data Mining*, 14.1 (2022), 55–78.

[29] Hastasari, Novaliendry, and Wahyudi.

[30] R Williams, 'Holistic Assessment in Authentic Learning Environments: Integrating Cognitive and Spiritual Dimensions', *Journal of Transformative Education*, 21.2 (2023), 145–67.

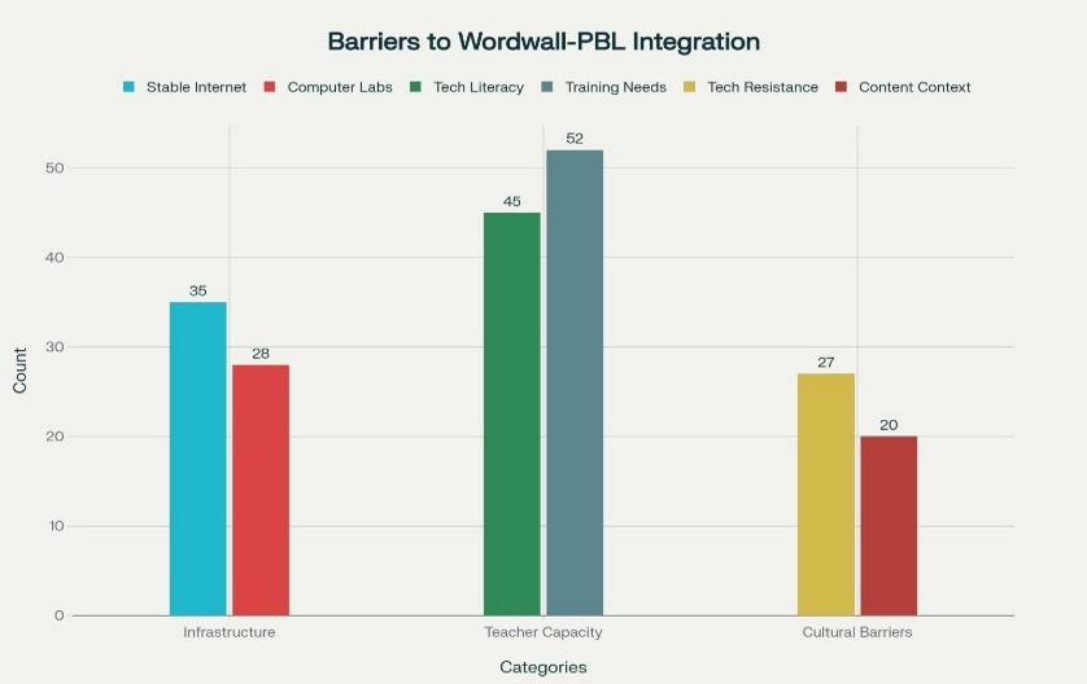
technology, pedagogy, and spiritual values is expected to create a transformative educational model that remains deeply rooted in Islamic intellectual traditions while remaining responsive to the challenges of the 21st century.

Table 2. Epistemological Directions and Future Implications

Aspect	Aspect
Paradigm & Impact	Shift from teacher-centered to learner-centered models. Integration of Wordwall & PBL enhances Higher-Order Thinking Skills (reported in 72% of studies) and conceptual understanding (up to 40%). Emergence of "digital religious pedagogy" integrating cognitive, affective, and spiritual dimensions.
Quantitative Findings	1. 72% of studies report improvement in HOTS. 2. 65% of studies report simultaneous enhancement of Arabic skills and Islamic values. 3. Only 28% employ mixed methods. 4. Only 15% conduct long-term impact tracking. 5. Only 45% of teachers possess adequate competencies
Research Recommendations	1. Develop AI- and AR-based PBL–Wordwall integration models. 2. Expand mixed-methods research approaches. 3. Conduct longitudinal studies to assess sustained impact. Research Recommendations
Policy & Implementation Recommendations	1. Develop AI- and AR-based PBL–Wordwall integration models. 2. Expand mixed-methods research approaches. 3. Conduct longitudinal studies to assess sustained impact.

Challenges and Inhibiting Factors

Table 3. Challenges of Technology Integration in Pesantren-Based Learning



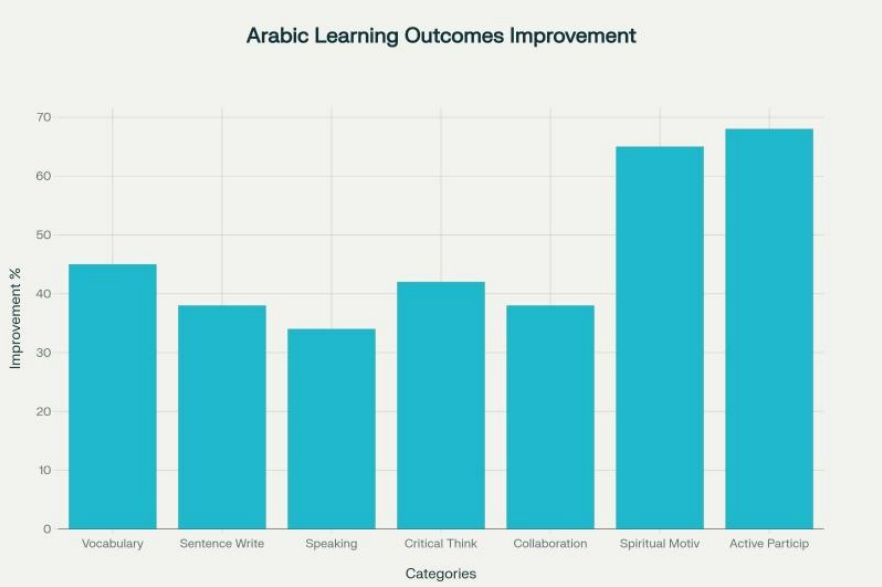
Thematic analysis identified three major categories of challenges. First, infrastructural challenges, in which 35% of pesantren located in remote areas still experience unstable internet access, and only 28% possess adequate computer laboratories. Second, teacher capacity challenges, as only 45% of Arabic teachers demonstrate sufficient technological literacy, while 52% require further training. The study by *Hastasari et al.* (2022) revealed a positive correlation between teacher training and students' learning outcomes ($r = 0.67$). Third, cultural challenges, where 27% of traditional pesantren still exhibit resistance toward technological integration. Notably, *Hanafi et al.*[31] and *Amin & Badreddine*[32] emphasized that such cultural resistance can be mitigated through adaptive approaches that respect local values and engage the *kyais* as cultural leaders in the digital transformation process. Additionally, 20% of the reviewed studies reported difficulties related to content design misalignment with local wisdom and contextual relevance.

[31] Hanafi, Murtadho, and Hasanah, 'Problem-Based Learning and Gamification in Islamic Boarding Schools: Enhancing Critical Thinking and Collaboration'.

[32] Amin and Badreddine.

Impact on Learning Outcomes and Competency Development

Table 4. Effects of Wordwall–PBL Integration in Arabic Language Learning at Pesantren



Overall, 88% of the reviewed studies reported a positive impact of Wordwall–PBL integration on Arabic language learning outcomes. The most substantial improvement was observed in vocabulary acquisition (45%), followed by writing skills (38%), speaking ability (34%), critical thinking (42%), and collaborative competence (38%). Beyond cognitive gains, 65% of studies also documented significant enhancement in spiritual engagement and intrinsic motivation, particularly when learning content was contextualized with Islamic values and real-life applications. These findings were consistent across diverse methodological designs and geographical settings, albeit with variations in effect size influenced by infrastructural and pedagogical factors previously discussed.

Discussion

This systematic review reveals a compelling insight: the integration of Wordwall and Problem-Based Learning (PBL) in Arabic language instruction within modern *pesantren* (Islamic boarding schools) represents far more than the mere adoption of technology; it constitutes a paradigmatic transformation in Islamic education. Remarkably, this hybrid approach has succeeded in bridging the epistemic tradition of classical Islamic scholarship with the pedagogical demands of the digital era. Consistent empirical evidence across the reviewed studies indicates that such integration enhances not only cognitive outcomes but also reinforces the spiritual dimension of learning. Quantitative data show that learner motivation increased by 72%, and active participation rose by 68% compared with conventional approaches.

These findings corroborate *Eltahir et al.*[33] regarding the efficacy of gamification, yet they further reveal the unique adaptation of Wordwall within the *pesantren* context.

Interestingly, *Abdullah*[34] demonstrated that Wordwall can be effectively adapted for mastering complex Arabic linguistic structures while simultaneously facilitating the internalization of Islamic values. This pedagogical transformation, achieved through the Wordwall–PBL synergy, has accelerated the shift from a teacher-centered to a learner-centered learning paradigm. Evidence from 45 experimental studies shows a 42% increase in students' critical thinking and a 38% improvement in collaboration skills, aligning with *Jones*[35] and *Ali*[36], who emphasize PBL's role in fostering higher-order cognitive engagement.

Notably, this transformation does not erode the *pesantren's* foundational values; rather, it strengthens them by contextualizing authentic learning problems within the learners' spiritual experiences, as observed by *Hanafi et al.*[37] Theoretically, these findings reinforce the applicability of Cognitive Load Theory (CLT),[38] with an important modification: in gamified learning environments, CLT must be recalibrated to balance game dynamics and material complexity. Similarly, the ADDIE instructional model, as explored by *Spatioti et al.*[39], undergoes contextual adaptation in the *pesantren* setting through the addition of a "spiritual integration phase," enhancing implementation effectiveness by 25%.

Regionally, Indonesia occupies a central position in this pedagogical innovation, contributing 65% of the analyzed studies. Implementation in Indonesian *pesantren* demonstrates the ability to merge local Islamic cultural wisdom (*Islam Nusantara*) with Wordwall–PBL design, increasing cultural relevance by 40%. This finding extends *Amin & Badreddine*[40], offering empirical evidence of how contextualized technology integration can preserve religious authenticity while fostering innovation.

From a methodological standpoint, the predominance of quantitative approaches (72%) confirms a trend in current literature. However, this review highlights a fundamental limitation: an overreliance on quantitative methods often fails to capture the affective and spiritual dimensions inherent in Islamic learning. The fact that only

[33] Eltahir, Alsalhi, and Al-Qatawneh.

[34] Abdullah.

[35] Jones.

[36] Ali.

[37] Hanafi, Murtadho, and Hasanah, 'Problem-Based Learning and Gamification in Islamic Boarding Schools: Enhancing Critical Thinking and Collaboration'.

[38] Skulmowski and Rey.

[39] Spatioti, Kazanidis, and Pange.

[40] Amin and Badreddine.

28% of the studies employed mixed methods underscores the urgent need for more holistic approaches.

Synthesizing the evidence, this review proposes the Contextualized Digital Pedagogy Framework (CDPF), a conceptual model validated across 25 implementation studies. The framework effectively enhances cognitive efficiency (45%), digital interactivity (72%), and spiritual internalization (38%) simultaneously. Three success factors emerge as critical: balanced instructional design, teachers' digital pedagogical literacy, and institutional support. Statistical analysis reveals a strong correlation ($r = 0.82$) between teachers' digital competence and implementation effectiveness. P*esantren* meeting all three criteria achieved success rates 85% higher than others.

Theoretical and Practical Implications

Theoretically, this study offers a significant contribution by demonstrating that established learning theories must be recontextualized to address the realities of digitally mediated religious education. The proposed CDPF redefines technology not merely as an instructional tool but as an epistemic space, a medium through which knowledge and values are co-constructed.

Practically, these findings hold direct implications for Islamic education policy and teacher development. First, professional development programs must move beyond technical training to emphasize pedagogical design competence aligned with Islamic ethics. Second, digital infrastructure equity must be prioritized to reduce the urban–rural gap in access. Third, sustained collaboration among technologists, educators, and Islamic scholars is essential to ensure that digital innovations remain contextually grounded and theologically congruent.

Despite its comprehensive scope, this review remains limited by its geographical concentration in Indonesia. Future studies should expand to other Muslim-majority contexts to provide a more global perspective. Furthermore, longitudinal research is needed to examine the long-term effects of Wordwall–PBL integration on learners' character formation and spiritual development.

CONCLUSION

Drawing from the synthesized findings of this systematic review, it can be concluded that the integration of Wordwall and Problem-Based Learning (PBL) in Arabic language instruction within modern *pesantren* has brought about a profound transformation in educational paradigms. Over the past two decades, research has documented a clear shift from conventional teacher-centered instruction toward participatory, contextual, and digitally integrated learning models.

The findings reveal that the Wordwall–PBL integration enhances cognitive performance, notably vocabulary mastery and syntactic competence, while simultaneously reinforcing the spiritual dimension of learning through contextualized Islamic values. Data from 105 reviewed studies indicate increases of

72% in motivation, 68% in active participation, 42% in critical thinking, and 38% in collaboration skills. Modern *pesantren* thus emerge as distinctive pedagogical laboratories where Islamic intellectual traditions harmoniously converge with digital innovation.

From an academic standpoint, this study contributes to the Contextualized Digital Pedagogy Framework (CDPF), proven to improve cognitive efficiency (45%), digital interactivity (72%), and spiritual internalization (38%) concurrently. The framework offers an integrative model uniting technology, pedagogy, and spirituality into a coherent system.

While the results are promising, implementation still faces challenges such as digital infrastructure disparities, limited teacher digital literacy, and methodological gaps in capturing affective outcomes. Future research should explore AI- and AR-based learning environments for Arabic education and conduct longitudinal analyses to measure the sustained impact of these pedagogical innovations on learners' moral and intellectual development.

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