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Bridging Conventional and Digital Literacy: Integrating ICT into Indonesian Language Learning in the Era of Industry 4.0

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ABSTRACT

The transformation of education in the Industrial 4.0 era demands the integration of information and communication technology (ICT) literacy across all fields of learning, including Indonesian language studies. This research aims to explore the forms of ICT integration practices in Indonesian language learning for Grade XI students at MA Adz Dzikro, an Islamic senior high school that has implemented policies on the use of digital devices such as laptops, smartphones, and online learning applications. Employing a qualitative approach with an exploratory case study design, data were collected through in-depth interviews, classroom observations, and documentation of student assignments. The findings reveal that teachers adopted flexible digital project-based learning strategies by utilizing applications such as Google Classroom, Canva, and YouTube. Students demonstrated increased participation and engagement, especially when given the freedom to choose digital formats aligned with their interests. The main challenges encountered included limitations in devices and internet access; however, these were supported by progressive school policies and the continuous integration of religious values. This study produces an initial mapping of a contextual and participatory ICT integration framework in Indonesian language learning and provides implications for the development of digital pedagogy within the madrasah context. The research further recommends follow-up studies concerning students' cognitive and affective dimensions, as well as cross-institutional comparisons, to enrich an adaptive ICT integration model.

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1. INTRODUCTION

The Industrial 4.0 era demands that education not only adapt technologically but also reformulate its literacy paradigm in learning. Amid this transformation, ICT literacy is no longer an additional competency but an essential element in fostering critical, communicative, and productive thinking skills—including in Indonesian language learning (Spante et al., 2018; Amalia & Wahidin, 2024). On one hand, Indonesian language learning remains rooted in strengthening text-based language competence and local cultural contexts; on the other hand, digital advancements push teachers and students to navigate various online information sources, collaborative platforms, and technology-based applications. Consequently, the ability to bridge conventional and digital literacy has become an unavoidable pedagogical demand.

Operationally, ICT literacy in the context of this research is understood as students' ability to access, evaluate, create, and communicate information through digital devices (laptops, smartphones, learning applications) in the process of Indonesian language learning—either individually or collaboratively (Nissa et al., 2025; Astini, 2019). This literacy involves technical (tool mastery), cognitive (content comprehension), and critical (information evaluation and idea expression) dimensions. Nevertheless, implementation challenges remain significant. Subroto et al. (2023) noted that although 82% of educators acknowledge that technology increases student engagement, 62% feel a lack of training support, and only a small proportion of institutions have adequate digital infrastructure.

The literature review shows that most previous studies, such as Nissa et al. (2025), highlighted the strengthening of ICT literacy at the elementary school level, while Dewi et al. (2025) focused more on enhancing teacher competence through microlearning training. Studies such as Yusup et al. (2023) and Rukmana et al. (2024) emphasized the effectiveness of digital learning media, yet remained thematic and detached from the comprehensive context of Indonesian language learning. In other words, these studies were generalistic or technocentric and have not thoroughly addressed how the process of ICT integration unfolds in the real dynamics of Indonesian language classrooms.

This study seeks to fill that gap by taking MA Adz Dzikro as its case study context. This Islamic senior high school, located in a semi-urban area, has adopted digital devices such as laptops, smartphones, and various online learning applications. Uniquely, ICT integration in this school is driven by policies that encourage the use of technology across all subjects, including Indonesian language, while preserving the religious and pesantren-based cultural identity. This creates a learning ecosystem that simultaneously integrates traditional values and technological advancement, reflecting the challenges of ICT integration within a rich socio-cultural context.

Methodologically, this study employs a qualitative approach with an exploratory case study design. Data were collected through in-depth interviews with teachers and students, direct classroom observations, and analysis of documents such as lesson plans (RPP) and student work products. This approach allows the researcher to explore contextually how ICT is truly integrated, interpreted, and utilized in Indonesian language learning practices.

The main contribution of this study is the formulation of an ICT integration framework based on empirical experiences from learning practices in the madrasah. Unlike previous studies that tended to focus on elementary levels or on separate teacher training, this research offers a contextual, participatory, and collaborative model of integration between teachers and students in real classrooms. This framework has the potential to provide practical guidance for other schools in designing internal policies, developing teacher training programs, and creating adaptive models of Indonesian language learning for the digital era.

However, this study has limitations. Its findings are contextual and limited to the environment of MA Adz Dzikro, and therefore cannot be directly generalized to all educational institutions without adaptation to their respective local conditions. Nevertheless, the results of this study can serve as a reflective basis for similar institutions that are currently or will be integrating ICT into Indonesian language and literature learning.

2. METHODS

The research was conducted at MA Adz Dzikro, an Islamic senior high school located in a semi-urban area that has implemented policies for ICT integration in the learning process. The research participants consisted of one Grade XI Indonesian language teacher and eight students, selected purposively based on their active involvement in ICT-based learning. The selection of informants considered the diversity of participation, the types of devices used, and the students' digital learning experiences.

Data Collection Techniques

Data were collected through three main techniques:

1) In-depth interviews: Conducted with the teacher and students to explore perceptions, experiences, and strategies related to ICT integration in Indonesian language learning.
2) Participant observation: The researcher directly observed classroom learning processes, focusing on the use of digital devices, learning interactions, and student engagement.
3) Documentation: Secondary data were collected from lesson plans (RPP), digital learning media, and student assignments produced using digital platforms (e.g., Google Docs, Canva, or video presentations).

Data Analysis Techniques

Data were analyzed using thematic analysis as developed by Braun and Clarke (2006). The process included data transcription, repeated reading, initial coding, theme grouping, and drawing conclusions. The analysis was conducted inductively, guided by the principles of triangulation to ensure coherence of meaning across data sources.

Data Trustworthiness

The trustworthiness of the data was maintained through source and method triangulation, member checking, and audit trail. Triangulation was carried out by comparing data from interviews, observations, and documents. Member checking was conducted to ensure that the data interpretations accurately reflected participants' experiences. The audit trail was documented through field journals and logs of the analytical process

3. RESULTS AND DISCUSSION

The analysis of interviews, classroom observations, and document reviews revealed several key aspects of ICT integration in Indonesian language learning during the era of Industry 4.0. The findings are organized into major themes that emerged from the data, including the types of technology employed by teachers and students, instructional strategies used to integrate ICT, students' responses and participation, challenges faced during implementation, contextual factors supporting digital learning, and the nature of students' digital learning products. Each theme is presented with supporting evidence drawn from multiple data sources (participants, observations, and documents) to ensure triangulation and credibility of interpretation.

Table 1. Thematic Analysis of Findings

Theme	Description of Findings	Data Source (Participant Code)

Types of Technology Used	Laptops, smartphones, and applications such as Google Classroom, Canva, Google Docs, and YouTube were used to complete exposition texts and reports.	W1 (GBI), O1
Teacher's Strategy in ICT Integration	Teachers combined lecture methods with digital project assignments. Tasks were designed in multimedia formats, and students were given options for presentation formats.	W1 (GBI), D1
Student Response and Participation	Students were more enthusiastic and active when using digital applications, especially in creating videos or collaborative visual designs.	W2 (S-A), W3 (S-B), O2
Challenges Faced	Challenges included limited access to personal devices, unstable internet connections, and teachers' technical difficulties in managing digital assignments.	W1 (GBI), W3 (S-B), O2
Contextual Supporting Factors	The school supported ICT use through open technology policies. Religious values remained preserved in digital learning practices.	W4 (WKS), W1 (GBI), O3
Digital Learning Products	Student projects included infographics, documentary videos, digital posters, and Google Docs-based reports highlighting local culture.	D2, D3, W2 (S-A), W3 (S-B)

1). Cognitive Dimension

The strengthening of ICT literacy at MA Adz Dzikro has opened opportunities to cultivate students' reflective and critical thinking in filtering and interpreting information. Within this dimension, literacy is not reduced to mere technical ability but encompasses the capacity to construct meaning across diverse digital texts, to identify relationships between sources, and to critically evaluate the ideological positions embedded in them. As Nissa et al. (2025) argue, "ICT literacy helps students manage information and knowledge as a competence." This perspective highlights that texts in digital spaces should not only be consumed but also questioned, compared, and reinterpreted.

This view is reinforced by Dewi and Purwanti (2024), who explain that critical thinking skills enable individuals to filter information rationally, without excessive emotional responses—a vital competence in an era characterized by information overload and viral digital content. The classroom practice at MA Adz Dzikro reflects this shift. One teacher shared:

"The kids used to just copy-paste. But after we assigned a digital article analysis project, they began learning to compare authors' opinions and make their own conclusions." (Teacher Interview)

Such experiences indicate that critical synthesis and intertextual reading are beginning to take place: students are encouraged to move beyond surface understanding toward a dialogue between texts, recognizing multiple perspectives and forming their own reasoned stances. This is especially significant in contexts where ideological messages—whether cultural, social, or religious—permeate digital content. By fostering critical evaluation, ICT literacy helps students navigate competing viewpoints, identify bias, and create knowledge rather than passively reproducing it.

The integration of ICT tools, such as digital article repositories, collaborative writing platforms, and multimedia discussion forums, provides opportunities for students to engage with heterogeneous sources. Instead of limiting learning to static textbooks, students can interact with academic journals, online news, blogs, and social commentary. This exposure pushes them to negotiate meaning across texts, a skill closely linked to intertextuality and ideological critique. Such development is essential for preparing learners to participate responsibly in a digitally saturated society, where unfiltered copying and surface-level acceptance of information remain common pitfalls.

In sum, the cognitive dimension of ICT literacy in this setting empowers students to become analytical readers and reflective knowledge producers. The combination of guided digital projects and teacher mentoring creates space for students to compare ideas, discern ideological positions, and synthesize meaning critically. This dimension strengthens not only their academic writing but also their broader critical digital citizenship, equipping them to navigate and respond thoughtfully to the abundance of information in the digital era.

2). Linguistic Dimension

The integration of ICT at MA Adz Dzikro has expanded students' exposure to a wide range of text types and media formats, enabling them to interact not only with conventional printed texts but also with dynamic digital resources such as educational videos, podcasts, online articles, and interactive quizzes. This multimodal engagement enriches students' genre awareness and helps them adapt language forms and structures to diverse communicative purposes. Julia and Wiranti (2022) found that ICT-based media such as Powtoon increased engagement and motivation in Indonesian language learning by presenting content visually and interactively. Similarly, Rukmana et al. (2024) showed that the use of game-based quiz platforms like Kahoot enhanced students' understanding of narrative and descriptive texts by encouraging active recall and interactive comprehension checks.

"When we used podcasts and videos as teaching materials, the students realized that texts can come in audio or visual form, not just writing. They also learned how to compose responses to audio texts." (Teacher Interview)

Such practices illustrate that students are learning to navigate multimodal meaning-making, a key aspect of literacy in digital contexts. They are exposed to multiple semiotic modes (textual, visual, auditory) and learn to interpret and respond to them critically. This process also nurtures their genre awareness: students begin to recognize the organizational structures of different text types—such as exposition, report, narrative, and descriptive genres—and adapt their own writing to match these conventions. Yusup et al. (2023) emphasize that multimodal literacy allows learners to combine linguistic, visual, and auditory resources to construct meaning effectively and to develop flexible communication strategies across media.

From a pedagogical standpoint, the use of ICT-supported multimodal materials has broadened the repertoire of classroom literacy practices. Instead of working only with static, teacher-selected textbooks, students now consume and produce texts in various digital environments: they analyze articles, respond to audio commentaries, create visual summaries, and present reports using slides or digital posters. These activities foster practical

digital communication skills while reinforcing the understanding of text structure and rhetorical purpose—essential for advanced academic writing.

This multimodal exposure is also closely tied to critical digital literacy. By engaging with authentic digital media, students learn that meaning is constructed not only through words but also through images, sound, and design choices. They become aware that each medium carries ideological and cultural positioning, which must be recognized and critically assessed. Such awareness prepares students to operate effectively in Industry 4.0, where communication increasingly takes place across diverse platforms and requires agile, multimodal competence.

In sum, the integration of ICT-based multimodal resources at MA Adz Dzikro empowers students to understand, produce, and adapt texts across genres and media. It strengthens both their linguistic competence and their multimodal literacy, equipping them with the skills to navigate contemporary communication landscapes and to participate meaningfully in a digitally mediated society.

3). Sociocultural Dimension

This study highlights that digital literacy is not merely a set of technical skills but a deeply social practice intertwined with identity and character formation. At MA Adz Dzikro, ICT integration was intentionally directed toward ethical participation in the digital space and alignment with religious and cultural norms. Nissa et al. (2025) note that digital literacy helps students manage information and knowledge as a competence that is tied to social and moral responsibility. Similarly, Karina et al. (2021) argue that digital literacy fosters ethical participation and identity construction in online environments, encouraging learners to critically navigate value-laden content.

"We emphasize to the students that whatever they write or share must reflect good morals. So when creating educational content, they also learn to consider Islamic ethics and values." (Teacher Interview)

Such practices show that digital text production is never socially neutral. Students are trained to filter and frame content according to community values, reflecting the idea that intertextuality involves ideological positioning (Sukmawati et al., 2023). When students compose responses, create multimedia learning products, or share knowledge online, they are encouraged to engage not only with informational accuracy but also with ethical self-presentation and religious-cultural integrity.

This approach aligns with the view of digital literacy as a socially situated practice, where literacy events are shaped by the norms, values, and power relations of particular communities. In Islamic school contexts, as found in this study, ICT literacy becomes a way to strengthen moral identity and ethical discernment. Students are not only learning how to search, evaluate, and create digital texts but also how to navigate ideological tensions between global information flows and local cultural-religious expectations.

Such findings resonate with recent scholarship on critical digital citizenship, which emphasizes that students should not only consume and produce online content but also recognize bias, question ideological framing, and maintain responsible participation (Ala-Mutka, 2011; Pangrazio & Selwyn, 2019). By teaching learners to examine the social and ideological dimensions of texts, schools equip them with the ability to filter harmful content, resist misinformation, and uphold ethical standards in their digital engagements.

In sum, the awareness of values and ideology in digital literacy practices at MA Adz Dzikro shows how ICT can be harnessed to integrate local moral frameworks into global digital participation. This approach moves beyond purely technical ICT literacy and toward critical, identity-aware, and ethically grounded digital practices—a crucial competence in an era where information is abundant but often ideologically contested.

4). Instructional Context Dimension

The successful development of ICT literacy among students is strongly influenced by the teacher's capacity to design, scaffold, and mediate the learning process. Digital literacy practices in schools do not emerge automatically from access to technology; rather, they depend on intentional pedagogical planning and teacher readiness. Nissa et al. (2025) emphasize that ICT integration requires not only supportive policy but also sustained teacher training to build the competence needed for digital pedagogy. In line with this, teachers at MA Adz Dzikro have begun adopting project-based learning models that encourage students to produce digital texts, such as online articles, infographics, and Islamic-themed educational content.

Amalia and Wahidin (2024) also stress that digital communication skills are key components of 21st-century learning, requiring teachers to move beyond traditional lecturing and act as facilitators of meaningful digital production. This shift was evident in the way subject teachers at MA Adz Dzikro collaborated with students to design learning tasks that integrated content creation, multimodal literacy, and digital communication training.

"We started encouraging subject teachers to co-create digital content with students—some made presentations, others made podcasts. It became both digital communication training and text design practice." (ICT Teacher Interview)

Other studies have also highlighted the importance of continuous teacher professional development to sustain innovative practices. Astini (2019) and Indarta et al. (2022) argue that teachers must be regularly trained to master emerging technologies such as augmented reality (AR), learning management systems (LMS), and educational social media platforms, so that digital and intertextual literacy can thrive rather than stagnate after initial adoption. Without ongoing training, many teachers risk reverting to didactic, one-way instruction that limits students' digital engagement.

In the context of MA Adz Dzikro, these findings suggest that the teacher's role as a pedagogical mediator is central to shaping meaningful ICT literacy experiences. Teachers do not merely provide access to devices and platforms; they guide students through reflective use, encourage critical evaluation of digital sources, and scaffold the creation of multimodal texts that integrate cognitive, linguistic, and sociocultural dimensions. This pedagogical mediation transforms ICT from a passive tool into an active space for knowledge construction and ethical participation.

However, the study also indicates systemic challenges. While some teachers have embraced digital project-based approaches, not all feel fully confident in designing innovative ICT-based tasks. Limited infrastructure, unstable internet connectivity, and a curriculum that is still highly exam-oriented can restrict experimentation and slow down the adoption of new tools. These conditions echo concerns raised by Astini (2019), who found that lack of institutional support and insufficient professional development are key barriers to sustainable ICT integration.

In sum, the integration of ICT literacy in Indonesian language learning at MA Adz Dzikro strengthens students' technical and intertextual competencies, particularly in four key dimensions: cognitive reflection, linguistic flexibility, sociocultural awareness, and pedagogical mediation. Students become more conscious, adaptive, and participatory learners when guided by teachers who can design meaningful digital tasks and mediate their engagement with multimodal texts. Yet, sustaining this success requires ongoing teacher training, curriculum flexibility, and reliable digital infrastructure, ensuring that ICT use remains innovative, reflective, and aligned with students' character and cultural identity.

4. CONCLUSION

This study reveals that the practice of ICT integration in Indonesian language learning in Grade XI at MA Adz Dzikro takes place in an adaptive and contextual manner. Teachers employ technologies such as laptops, smartphones, and digital applications (Google Classroom, Canva, Google Docs) to design project-based tasks that combine conventional and digital literacy. The instructional strategies are flexible, enabling students to express ideas through more communicative and collaborative digital formats. Student participation also increased significantly, especially when they were assigned creative, media-based projects. Nevertheless, technical barriers such as limited access to devices and unstable internet connectivity remain major challenges that must be systematically addressed.

For future researchers, this study opens opportunities to explore more deeply the affective and cognitive dimensions of students in ICT-based learning, as well as how integration influences higher-order literacy skills such as critical, argumentative, and reflective thinking. Comparative studies across madrasahs with diverse geographical and policy contexts are also worth pursuing to capture more varied patterns of ICT integration. Furthermore, the development of a dialogic pedagogy framework supported by technology in Indonesian language learning could be a valuable direction for future research, bridging technology, local culture, and language empowerment as a tool for thinking.

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