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Multidimensional Integration of EdTech in Indonesian Language Instruction: Forms, Implications, and Challenges in Secondary Schools

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Abstract

The development of Educational Technology (EdTech) has shifted the paradigm of Indonesian language learning from conventional methods toward an interactive digital ecosystem. However, previous research has tended to evaluate the use of digital media in isolation. This qualitative case study aims to comprehensively analyze the forms of multidimensional EdTech integration—including self-directed learning applications, digital-based collaborative projects, and immersive media—as well as their implications for Indonesian language learning. Data were collected through in-depth interviews with 15 randomly selected Indonesian language teachers, Focus Group Discussions (FGDs) with students, and classroom observations at several high schools in Banyuwangi, Bondowoso, and Jember Regencies. Data analysis utilized the interactive model developed by Miles, Huberman, and Saldana. The research findings revealed three primary forms of EdTech implementation: (1) self-directed learning apps (Duolingo, Babbel, Rosetta Stone) that facilitate the flipped classroom model and enhance vocabulary and grammar retention; (2) digital collaborative platforms (Google Docs, Microsoft Teams) that promote social constructivism and facilitate real-time formative assessment by teachers; and (3) immersive media (Augmented Reality and Virtual Reality) that have the potential to provide contextual learning. The practical implications of this research underscore the importance of shifting the teacher's role to that of a network facilitator, as well as the need for equitable access to digital infrastructure and digital pedagogy training in rural areas.

Keywords

EdTech, Indonesian Language Learning, Educational Apps, Collaborative Projects, Immersive Media.

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1. Introduction

Advances in information technology have transformed the global educational landscape, including the teaching of the Indonesian language. Language learning is no longer limited to conventional methods that rely on lectures and printed textbooks; rather, it has been transformed through the integration of Educational Technology (EdTech). EdTech provides interactive tools and multimedia resources that foster active student engagement and enhance classroom management. UNESCO (2022) notes that the flexible use of technology has been shown to improve the accessibility and inclusivity of education for students from diverse backgrounds. Platforms such as interactive language-learning apps, digital collaboration tools, and media based on Augmented Reality (AR) and Virtual Reality (VR) offer a more dynamic approach. Various studies show that the integration of these technologies effectively improves students' motivation, vocabulary retention, and understanding of grammar (Palyanti, 2023; Hermanto & Arifin, 2023).

In Indonesia, the adoption of technology in education has accelerated significantly alongside increasing internet penetration (ITU, 2023). A report by the Ministry of Education and Culture notes that more than 70% of secondary schools in urban areas have integrated technology into the teaching and learning process (Purba et al., 2023). This trend has spurred the development of research exploring the effectiveness of EdTech in teaching the Indonesian language. However, most previous studies have focused on evaluating a single type of medium in isolation, such as the use of interactive applications alone or social media alone. There remains a limited body of research that comprehensively examines multidimensional combinations of EdTech—which integrate self-directed learning apps, digital-based collaborative projects, and the integration of immersive media (AR/VR)—particularly in the context of developing regions such as Banyuwangi, Bondowoso, and Jember.Penggunaan EdTech secara fleksibel memungkinkan siswa mengakses materi pembelajaran kapan saja dan di mana saja sesuai dengan ritme belajar masing-masing. Di sisi lain, proyek berbasis digital memfasilitasi kerja sama tim dan kreativitas siswa dalam lingkungan digital. Selain itu, integrasi teknologi imersif seperti AR/VR menjanjikan pengalaman belajar yang imersif dan kontekstual, meskipun penerapannya masih menghadapi tantangan infrastruktur dan kesiapan pendidik. Oleh karena itu, pemahaman mendalam mengenai integrasi beragam bentuk EdTech beserta implikasinya menjadi sangat krusial untuk mengoptimalkan kualitas pembelajaran Bahasa Indonesia.

This study aims to analyze the various forms of EdTech implementation, including language-learning apps (such as Duolingo, Babbel, and Rosetta Stone), digital collaborative projects (such as Google Docs and Microsoft Teams), and examples of immersive media integration (AR/VR), while also uncovering their implications for language skills and classroom management in secondary schools in the Banyuwangi, Bondowoso, and Jember regions. The results of this study are expected to provide both theoretical and practical contributions to educators and policymakers in designing effective and inclusive digital-based Indonesian language learning strategies

2. Research Methods

This study employs a qualitative approach using a case study design to conduct an in-depth examination of the various forms of Educational Technology (EdTech) use and their implications for Indonesian language learning. The qualitative approach was chosen because it provides a rich, detailed, and contextual understanding of the experiences and perceptions of teachers and students in integrating EdTech both inside and outside the classroom.

This study was conducted at a number of senior high schools (SMA) located throughout eastern East Java, specifically in the regencies of Banyuwangi, Bondowoso, and Jember. The primary subjects of the study consisted of 15 Indonesian language teachers selected at random (random sampling) from schools that had implemented digital technology in the learning process. In addition to teachers, this study also involved students from various grade levels at these schools to provide user perspectives on the effectiveness and challenges of using EdTech.

This study employs a qualitative approach using a case study design to conduct an in-depth examination of the various forms of Educational Technology (EdTech) use and their implications for Indonesian language learning. This study was conducted in several high schools (SMA) located in the regencies of Banyuwangi, Bondowoso, and Jember. The primary research subjects consisted of 15 Indonesian language teachers selected through random sampling from schools that had implemented digital technology, supplemented by the participation of students from various grade levels to provide the users' perspective.

Data collection was conducted comprehensively using three main techniques: in-depth interviews with 15 Indonesian language teachers to explore teaching strategies and challenges in integrating EdTech; focus group discussions (FGDs) with groups of students to explore their engagement and learning responses; and direct classroom observations to examine the dynamics of interaction and classroom management when digital platforms were used. Subsequently, the qualitative data obtained were analyzed using the interactive model proposed by Miles, Huberman, and Saldana (2014) through three systematic stages: data reduction by coding interview transcripts and field notes into key themes; data presentation in the form of coding matrices and descriptive narratives; and drawing conclusions to map patterns of relationships between EdTech use and improvements in students' language skills.

3. Results And Discussion

The integration of Educational Technology (EdTech) into Indonesian language instruction in secondary schools in the Banyuwangi, Bondowoso, and Jember regions reveals a variety of implementation models and significant implications. Based on a qualitative analysis of in-depth interviews with 15 Indonesian language teachers and focus group discussions (FGDs) with students, the forms

of EdTech implementation were categorized into three main domains: language learning applications, digital-based collaborative projects, and the integration of immersive media (augmented reality and virtual reality).

3.1. Language Learning Apps

The use of language-learning apps such as Duolingo, Babbel, and Rosetta Stone is one of the most widely used forms of EdTech by students, both as a tool for independent learning and as a supplement to classroom material. A summary of the data from the interviews and focus group discussions is presented in Table 1.

Table 1 Koding Data Wawancara Penggunaan Aplikasi Pembelajaran Bahasa

App Development	Sources of Information	Transcript of Key Findings
Duolingo	Teacher	To help students practice vocabulary and grammar on their own at home, so that class time can be focused on discussion and practice.
Duolingo	Student	The app is easy to use and fun; daily exercises help build study habits and confidence in speaking
Babbel	Teacher	Provides structured and systematic content to introduce grammar and strengthen communication skills through realistic conversation exercises.
Babbel	Student	Learning becomes flexible and engaging thanks to interactive exercises that reinforce understanding of grammar.
Rosetta Stone	Teacher	A visual and audio-based immersive approach, with minimal use of other languages, improves students' listening and speaking skills.
Rosetta Stone	Siswa Student	It feels like communicating directly with native speakers through audio and images, which boosts students' confidence in participating in class.

The findings of this study confirm that gamification- and immersion-based language learning apps serve as powerful catalysts in shifting the instructional paradigm from Teacher-Centered Learning (TCL) to Student-Centered Learning (SCL). One teacher in Jember highlighted the practical impact of these apps:

> *"Kehadiran Duolingo dan Babbel membuat porsi ceramah teori tata bahasa di kelas berkurang hingga 30%. Siswa sudah mempelajari dasar-dasar kosakata di rumah, sehingga alokasi waktu di kelas dapat dialihkan penuh untuk*

aktivitas diskursif dan simulasi percakapan." (Informan G-04, Guru SMA Jember)

Theoretically, this phenomenon reflects the flipped classroom model proposed by Bergmann and Sams (2012), in which the delivery of procedural content is moved outside the classroom via digital media, while the classroom is utilized for higher-order thinking skills. The improvement in vocabulary and grammar retention reported by students is also consistent with Krashen's (1982) perspective on the Affective Filter Hypothesis. The gamified learning exercises provided by the app reduce anxiety and increase intrinsic motivation, allowing for optimal absorption of comprehensible input.

However, there are critical observations regarding the use of these self-directed apps. Reinders and Benson (2017) point out that while self-directed apps facilitate learner autonomy, there is a risk of "fragmented learning"—where students excel at answering short vocabulary quizzes but struggle when constructing coherent narratives or understanding complex syntactic structures. Therefore, the effectiveness of these apps depends heavily on the teacher's ability to integrate students' self-directed learning outcomes into authentic and comprehensive language tasks in the classroom.

3.2. Proyek Kolaboratif Berbasis Digital (Digital-Based Collaborative Projects)

The second form of EdTech implemented was the use of cloud-based platforms, such as Google Docs and Microsoft Teams, to facilitate group work and he simultaneous drafting of written assignments. A summary of the findings from the interviews is presented in Table 2.

Tabel 2. Koding Data Wawancara Proyek Kolaboratif Berbasis Digital

App Development	Sources of Information	Transcript of Key Findings
Google Docs	Teacher	Enables collaborative story writing and real-time feedback, making it easier to monitor students' writing progress
Google Docs	Student	Facilitates direct collaboration with friends, exchanging ideas and revising each other's writing, and boosting self-confidence.
Microsoft Teams	Student	Memfasilitasi diskusi kelompok virtual dan pemecahan masalah bahasa, serta mempermudah monitoring partisipasi siswa.

Microsoft Teams	Teacher	Facilitates virtual group discussions and language problem-solving, and makes it easier to monitor student participation.

The use of Google Docs and Microsoft Teams indicates a significant shift in the writing and speaking learning processes. Conventional writing instruction, which tends to be solitary and focused on the final product (product-based approach), has evolved into a communicative and process-oriented approach (process-based approach). One student shared their experience during a focus group discussion (FGD):

> *"In the past, when we had an assignment to write a short story, we would just wait patiently for the teacher's feedback the following week. But with Google Docs, my groupmates can immediately add comments or correct my spelling while I'm typing. That helps me quickly identify where my grammatical errors are." (Informant S-02, High School Student in Banyuwangi)*

From an epistemological perspective, these findings are highly relevant to Vygotsky's (1978) Theory of Social Constructivism, particularly the concepts of the Zone of Proximal Development (ZPD) and scaffolding. The real-time commenting and co-authoring features in Google Docs create a space for interaction where students with higher literacy levels can spontaneously provide assistance (peer scaffolding) to their peers.

From a classroom management perspective, these findings support Siemens' (2005) view within Connectivism theory, which states that in the digital age, learning occurs through the formation of networks of connections between individuals and digital tools. Teachers no longer function as the sole evaluators but rather as network orchestrators who monitor students' version histories to provide precise and transparent formative feedback.

3.3. An Overview of Immersive Media Integration

Although its implementation has not yet been as widespread as that of self-paced applications or collaborative platforms, the use of AR- and VR-based immersive media is beginning to be introduced in Indonesian language instruction. AR media is used to project three-dimensional visualizations of local cultural objects or descriptive texts, while VR is used to create simulations of authentic environments for teaching creative writing or drama.

The introduction of AR and VR technologies offers great potential for facilitating context-based language learning (Contextual Teaching and Learning / CTL). In line with Dede's (2009) perspective on immersive learning environments, immersive technologies can provide experiences of situated cognition—where students do not merely read descriptive texts about a cultural object or event, but virtually "find themselves" within that situation. This strengthens long-term memory retention and triggers positive emotions that deepen students' appreciation of literature and culture.

However, a critical analysis of field findings reveals a gap between theoretical potential and the reality of implementation in developing regions such as Banyuwangi, Bondowoso, and Jember. Teachers in these regions have identified three main barriers. First is the hardware gap: the availability of VR headsets or smart devices that support AR sensors remains very limited in non-referral schools. Second is the content gap: most AR/VR applications on the market are designed for English language or science learning, while applications specifically tailored to Indonesian language and local literature are still very limited. Third is educators' technical readiness (Pedagogical Digital Competence); some teachers feel they have not received adequate training to design VR/AR-based learning scenarios.

This situation aligns with Selwyn's (2016) warning regarding digital inequality in education. Selwyn emphasizes that the integration of advanced technology without equitable access to resources and structured training risks widening the gap in educational quality between well-equipped urban schools and schools in outlying areas. Therefore, the adoption of immersive media in these areas must be balanced with inclusive and phased educational policies.

4. Conclusions And Suggestions

This study concludes that the integration of Educational Technology (EdTech) into Indonesian language instruction in secondary schools in the Banyuwangi, Bondowoso, and Jember regions has proven to bring about a significant transformation from conventional approaches toward an interactive, flexible, and student-centered digital learning ecosystem. This integration takes three main forms:

First, self-paced language learning apps (Duolingo, Babbel, Rosetta Stone) effectively support the flipped classroom model, improve classroom time efficiency, and reinforce students' vocabulary and grammar retention*. Second,* digital-based collaborative projects (Google Docs and Microsoft Teams) that promote a shift toward social constructivism, strengthen communicative writing and speaking skills, and facilitate teachers' formative assessments through real-time feedback. *Third,* Immersive Media (AR/VR) offer great potential for delivering context-based language and literature instruction (contextual teaching and learning), although their implementation is still hampered by challenges related to infrastructure limitations and the readiness of educators in rural areas*.*

The findings of this study have important implications for Indonesian language educators: they should not merely view technology as a presentation tool, but rather design its use as a means of social interaction and to foster students' autonomy in learning. For school administrators and education policymakers, these findings underscore the importance of providing equitable digital infrastructure and ongoing training in pedagogical digital competence for teachers to minimize the digital divide in rural areas.

This study has limitations due to its qualitative scope, which focuses on the subjective perceptions and experiences of teachers and students in a specific region. Therefore, future research is recommended to employ a quantitative or mixed-methods approach with a broader sample size to objectively measure the impact of EdTech combinations on students' learning outcomes and digital literacy skills.

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