

## HARNESSING AI TO TEACH ENGLISH IN LOW-RESOURCE AREAS OF PONTIANAK URBAN: STRATEGIES FOR SUCCESS

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### *Abstract*

*This study explores the strategies and potential of harnessing artificial intelligence (AI) to enhance English language learning in low-resource urban areas of Pontianak, Indonesia. It seeks to provide in-depth insights into the practical realities of integrating AI tools into English language instruction under resource constraints, focusing on a single teacher's experiences. A qualitative case study approach was employed, utilizing in-depth interviews with one English teacher in a low-resource public school. Data were analyzed using narrative analysis to capture the nuanced experiences of the participant, revealing the challenges and opportunities of using AI in this context. The study uncovered a complex landscape of promising applications and significant obstacles in implementing AI-assisted language learning. Key challenges included unreliable infrastructure, limited access to devices, and difficulties in pedagogical integration. Innovative strategies emerged, such as leveraging mobile technologies, adopting blended learning approaches, and adapting AI tools to the local context. The teacher's journey from skepticism to cautious optimism highlighted AI's transformative potential in low-resource settings. The research suggests a need for context-specific strategies, targeted professional development, policy interventions addressing infrastructure limitations, and flexible implementation approaches. It offers insights for educators, policymakers, and researchers working to harness AI's potential in resource-constrained environments, emphasizing the need for further research into long-term impacts on student learning outcomes.*

**Keywords:** *Artificial Intelligence, English Language Teaching, Low-Resource Areas*

### **INTRODUCTION**

The rapid development of artificial intelligence (AI) has revolutionized various fields, including education, by enabling personalized learning, instant feedback, and adaptable teaching methods (Petersen & Ostendorf, 2019). In English language teaching, AI presents transformative possibilities, particularly for addressing challenges in low-resource areas. Pontianak, the capital of West Kalimantan province in Indonesia, serves as an illustrative context for examining the interplay of AI, English language instruction, and resource limitations.

The importance of English proficiency is growing in Indonesia as it becomes essential for participation in the global economy (Lie, 2017). However, socioeconomic disparities significantly impact the quality of English language education across different regions and demographics. In low-resource settings, such as parts of Pontianak, teachers often encounter significant challenges due to

limited access to up-to-date teaching materials, professional development, and technological resources (Sun & Rachmajanti, 2018). This situation creates a need for innovative solutions to bridge the educational gaps that hinder students' English language acquisition.

The integration of AI in language education is seen as a promising solution to address these challenges by enabling access to resources that would otherwise be unavailable in such contexts. For example, AI-powered tools can provide tailored language practice, automated feedback on pronunciation, and interactive exercises that can foster engagement and improve learning outcomes (Godwin-Jones, 2017). However, implementing AI technologies in low-resource areas requires a nuanced understanding of the local context and constraints to make these tools effective and sustainable (Qureshi et al., 2020).

Educational technology in low-resource areas faces particular barriers, including infrastructure limitations, limited device availability, and unreliable internet connectivity (Tauson & Stannard, 2018). Studies indicate that low-cost, mobile-based solutions might be viable alternatives in such environments, allowing for educational content delivery via smartphones rather than more expensive or less accessible devices (Munene, 2018). Additionally, leveraging technologies that require minimal data usage, like offline AI applications or downloadable content, may further facilitate access in resource-constrained environments (Raja & Nagasubramani, 2018).

In Indonesia, teachers' willingness to adopt AI tools is often tempered by a lack of training and technical support (Muslem et al., 2018). Professional development programs that focus on AI-driven pedagogies, paired with improved infrastructure, could equip educators to better implement these tools. Research suggests that to support sustainable AI integration in teaching, educators need both the practical skills and pedagogical frameworks to adapt these technologies effectively in their unique classroom contexts (Tondeur et al., 2019).

AI-enhanced language learning provides a unique opportunity to address inequities in English language education. By offering personalized support and access to extensive language resources, AI can potentially elevate language proficiency among students in low-resource settings. However, more research is needed to develop context-specific strategies for implementing AI in a way that aligns with local needs, resources, and educational goals. This study aims to explore these strategies, focusing on the perspectives and experiences of a single teacher in Pontianak as they navigate the complexities of using AI in their English language classroom.

The study aims to explore the strategies and potential of harnessing AI to enhance English language learning in low-resource areas of Pontianak's urban environment. By focusing on the experiences and perspectives of a single teacher working in this context, the research seeks to provide insights into the practical realities of integrating AI tools into English language instruction under resource constraints. To guide this investigation, the following research questions have been formulated:

1. How does a teacher perceive the use of AI in teaching English in low resource urban areas?
2. What are the challenges and opportunities encountered by a teacher when integrating AI tools?

## **METHOD**

### **Research Design**

The research design is based on a case study methodology, focusing on a single teacher in a low-resource urban area of Pontianak. This approach allows for a comprehensive exploration of the specific context, capturing the nuances of using AI in English language teaching (Yin, 2018). The case study design enables an in-depth investigation of the participant's experiences, perceptions, and strategies, providing rich, contextual data that can illuminate the complexities of AI integration in resource-constrained environments.

### **Population and Sample OR Subject\***

The participant in this study is an English teacher working in a public school located in a low-resource area of Pontianak. The teacher was selected based on their experience teaching English in this context and their willingness to explore the use of AI tools in their teaching practice. To maintain anonymity, the participant will be referred to as "Teacher A" throughout the study.

Teacher A has been teaching English for eight years, with the last five years spent in their current school. They have experience working with students from grades 7 to 12 and have recently begun experimenting with AI tools in their classes. This background makes Teacher A an ideal participant for exploring the challenges and opportunities of AI integration in low-resource settings.

### **Data Collection**

In-depth interviews were conducted with Teacher A to explore their perceptions of AI, teaching methods, challenges, and success factors in using AI tools for English instruction. Three semi-structured interviews, each lasting approximately 90 minutes. Topics included:

1. Teacher A's background and experience in English language teaching
2. Familiarity with AI tools in education
3. Perceptions of AI's potential contribution to English teaching in low-resource areas
4. Challenges in accessing and implementing AI tools
5. Observations of student responses to AI tools
6. Technical issues encountered when using AI-based platforms
7. Perceived benefits of AI in personalizing learning experiences
8. Need for support and training for effective AI integration
9. Perspectives on AI's future role in English language teaching, especially in low-resource environments

The interviews were conversational, allowing for follow-up questions and deeper exploration of emerging themes. This flexible approach enabled capturing nuanced insights into Teacher A's perspectives and experiences.

### **Data Analysis**

Narrative analysis was used to analyze the data collected from the interviews. This qualitative method focuses on how individuals tell their stories, looking at how the participant structures their accounts and what these stories reveal about their experiences and worldviews (Riessman, 2008). The analysis process involved the following steps:

1. Transcription of the interviews
2. Close reading and re-reading of the transcripts to familiarize with the data
3. Identification of key narratives and themes within Teacher A's account

4. Analysis of how these narratives are constructed and what they reveal about Teacher A's experiences and perceptions
5. Interpretation of the narratives about the research questions and existing literature

Throughout the analysis process, attention was given to both the content of Teacher A's account and how it was presented, including language use, emotional tone, and the sequencing of events

## RESEARCH FINDINGS AND DISCUSSION

The findings of this study are presented and discussed about the research questions, drawing on the narrative provided by Teacher A during the in-depth interviews. The analysis reveals several key themes that shed light on the experiences of integrating AI into English language teaching in a low-resource urban area of Pontianak.

### Teacher's Perceptions of AI in English Language Teaching

Teacher A's narrative reveals a complex and evolving perception of AI's role in English language teaching. Initially cautious about the integration of AI tools, their views have been shaped by both positive experiences and ongoing challenges.

"When I first heard about using AI in teaching, I was skeptical," Teacher A recalls. "I thought it was just another trend that wouldn't work in our context. But as I learned more and started experimenting with some basic tools, I began to see the potential" (Interview 1).

This initial skepticism, followed by cautious optimism, aligns with findings from other studies on teacher attitudes towards educational technology in developing contexts (Sánchez-Cruzado et al., 2021). Teacher A's journey reflects a growing recognition of AI's potential to address some of the persistent challenges in English language teaching in low-resource environments.

Teacher A particularly emphasized the potential of AI to provide personalized learning experiences for students:

"What excites me most about AI is the possibility of giving each student the individual attention they need. In a class of 40 students, it's impossible for me to tailor my teaching to each student's level and learning style. But AI tools can potentially do that" (Interview 2).

This perspective aligns with research highlighting the potential of AI to provide adaptive learning experiences in language education (Bax, 2018). However, Teacher A also expressed concerns about the ethical implications of AI in education, particularly regarding data privacy and the potential for AI to replace human teachers:

"While I see the benefits, I also worry about how student data is being used and whether we're becoming too reliant on technology. It's important that AI remains a tool to support teachers, not replace us" (Interview 3).

These concerns echo broader debates in the field of AI in education regarding ethics, privacy, and the changing role of teachers (Zhai et al., 2021). Teacher A's reflections highlight the need for a balanced approach to AI integration that leverages its benefits while addressing potential drawbacks.

### Challenges in Implementing AI Tools

Teacher A's narrative revealed several significant challenges in

implementing AI tools for English language teaching in their low-resource context. These challenges can be categorized into three main areas: infrastructure limitations, resource constraints, and pedagogical integration.

### **Infrastructure Limitations**

The most immediate challenge identified by Teacher A was the lack of reliable technological infrastructure:

"Our biggest problem is simply getting online. The internet connection at school is unreliable, and many students don't have internet access at home. It's frustrating when I plan a lesson using an AI tool, and then we can't even log in because the connection is down" (Interview 1).

This experience aligns with findings from other studies on technology integration in low-resource contexts, where inadequate infrastructure often poses a significant barrier to implementation (Tauson & Stannard, 2018). The unreliable internet connection not only hinders the use of AI tools during class time but also limits students' ability to engage with these tools for independent learning outside of school hours.

### **Resource Constraints**

Beyond infrastructure, Teacher A highlighted resource constraints as a major challenge:

"We don't have enough computers or tablets for all students to use simultaneously. Sometimes, we have to group students, which isn't ideal for personalized learning. And many AI tools require subscriptions that our school simply can't afford" (Interview 2).

The lack of devices and the cost of AI tools create significant barriers to widespread implementation. This situation reflects the broader issue of the digital divide, where economic constraints limit access to educational technologies (Talaee & Noroozi, 2019).

### **Pedagogical Integration**

Teacher A also described challenges in effectively integrating AI tools into their existing pedagogical practices:

"It's not just about having the tools; it's about knowing how to use them effectively. I often feel like I'm not using the AI to its full potential because I'm not sure how to best incorporate it into my lessons" (Interview 3).

This sentiment highlights the need for targeted professional development to support teachers in leveraging AI tools effectively. The challenge of pedagogical integration is consistent with research suggesting that the successful implementation of educational technology requires not only access to tools but also the development of teachers' technological pedagogical content knowledge (TPACK) (Tondeur et al., 2019).

### **Opportunities and Strategies for Success**

Despite the challenges, Teacher A's narrative also revealed several opportunities and strategies for successfully harnessing AI in English language teaching in their low-resource context.

#### **Leveraging Mobile Technologies**

One successful strategy identified by Teacher A was the use of mobile-based AI tools:

"Since most students have smartphones, even if they don't have computers at home, we've had some success with mobile apps that use AI for language

learning. It's not perfect, but it's a start" (Interview 2).

This approach aligns with the growing body of research on mobile-assisted language learning (MALL) in developing contexts, which highlights the potential of mobile technologies to increase access to educational resources (Hwang & Fu, 2019). Teacher A's experience suggests that mobile-based AI tools can serve as a bridge to overcome some of the infrastructure and resource limitations in low-resource areas.

Teacher A elaborated on their use of mobile AI tools:

"We've been using an app that provides personalized vocabulary practice based on each student's performance. The students enjoy it because it feels like a game, but it's actually adapting to their individual needs" (Interview 2).

This use of adaptive learning technology on mobile devices demonstrates a practical application of AI in a resource-constrained environment, supporting findings by Kukulska-Hulme et al. (2021) on the potential of mobile technologies to support personalized language learning.

### **Blended Learning Approaches**

Teacher A also described success with blended learning approaches that combine AI-powered online activities with traditional classroom instruction:

"I've found that using AI tools for homework or independent study and then discussing and building on that work in class, works well. It allows students to benefit from personalized practice without relying entirely on technology during class time" (Interview 3).

This blended approach addresses some of the infrastructure limitations while still leveraging the benefits of AI for personalized learning. It aligns with research by Atmacasoy and Aksu (2018) on the effectiveness of blended learning in various educational contexts, including those with limited resources.

### **Adapting AI Tools to Local Context**

Teacher A emphasized the importance of adapting AI tools to the local context and curriculum:

"We can't just use these tools as they come. I spend time customizing content in the AI platforms to match our curriculum and include culturally relevant materials" (Interview 3).

This strategy of localization aligns with research by Talaei and Noroozi (2019) on the importance of contextualizing educational technology for effective implementation in diverse settings. Teacher A's efforts to tailor AI tools to their students' needs and cultural context demonstrate a critical aspect of successful technology integration in low-resource environments.

### **Implications for Practice and Policy**

Teacher A's experiences and the strategies they have developed have several implications for both teaching practice and educational policy in low-resource contexts.

### **Professional Development and Teacher Support**

The challenges faced by Teacher A in effectively integrating AI tools into their teaching highlight the critical need for targeted professional development. As they noted:

"We need more than just access to these tools. We need ongoing training and support to use them effectively" (Interview 3).

This suggests a need for comprehensive professional development

programs that not only introduce teachers to AI tools but also provide continuous support in their implementation. Such programs should focus on developing teachers' technological pedagogical content knowledge (TPACK) specifically in relation to AI tools (Tondeur et al., 2019).

### **Infrastructure Development**

The infrastructure limitations experienced by Teacher A point to a need for broader policy interventions to improve technological infrastructure in low-resource areas. As they stated:

"For AI to really make a difference, we need reliable internet and enough devices for our students. This requires support from policymakers and school administrators" (Interview 2).

This highlights the need for coordinated efforts between educational institutions, local governments, and potentially private sector partners to address infrastructure gaps in low-resource urban areas.

### **Flexible and Adaptive Implementation Strategies**

Teacher A's success with mobile-based tools and blended learning approaches underscores the importance of flexible and adaptive strategies in implementing AI in low-resource contexts. Educational policies should encourage and support such flexible approaches, recognizing that one-size-fits-all solutions are unlikely to be effective across diverse low-resource environments.

### **Ethical Considerations and Data Privacy**

Teacher A's concerns about data privacy and the ethical implications of AI in education point to the need for clear policies and guidelines on the use of student data in AI-powered educational tools. As they noted:

"We need clear guidelines on how student data is used and protected when we use these AI tools" (Interview 3).

This suggests a need for policy development in the areas of data protection and ethical use of AI in education, particularly in contexts where such regulations may be less developed.

## **CONCLUSION**

This study provides insights into the complex realities of integrating AI into English language teaching in a low-resource urban area of Pontianak, Indonesia. Through the experiences and perspectives of Teacher A, we gain a nuanced understanding of both the

challenges and opportunities presented by AI in this context.

The findings highlight significant barriers to AI implementation, including infrastructure limitations, resource constraints, and challenges in pedagogical integration. However, they also reveal promising strategies for overcoming these barriers, such as leveraging mobile technologies, adopting blended learning approaches, and adapting AI tools to the local context.

These insights have important implications for teaching practice and educational policy in low-resource environments. They underscore the need for:

1. Targeted professional development programs that focus on developing teachers' technological pedagogical content knowledge (TPACK) specifically in relation to AI tools.
2. Infrastructure improvements to address connectivity issues and increase access to devices.

3. Flexible implementation strategies that consider local contexts an resource constraints.
4. Policy development in the areas of data protection and ethical use of AI in education.
5. Further research into the long-term impacts of AI integration on student learning outcomes in these contexts.

While this study focuses on the experiences of a single teacher, it provides a rich, in-depth exploration of AI integration in a specific low-resource context. Future research could build on these findings by investigating the experiences of multiple teachers across different low-resource settings, or by examining the long-term impacts of AI integration on student learning outcomes in these contexts.

As AI continues to evolve and shape the landscape of language education, we must consider how these technologies can be effectively and equitably implemented in diverse educational contexts, including low-resource urban areas. By understanding and addressing the unique challenges and opportunities in these environments, we can work towards harnessing the potential of AI to enhance English language teaching and learning for all students, regardless of their socioeconomic background or geographic location.

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