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# The Impact of Digital Tools on Foreign Language Acquisition in Under-Resourced Educational Settings in Azerbaijan

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**Abstract:** The use of digital tools in foreign language acquisition has emerged as a crucial factor in overcoming challenges in under-resourced educational settings. This study investigates the impact of digital tools on foreign language learning in rural and remote regions of Azerbaijan. A survey was conducted across schools in Guba, Sheki, and Ganja, evaluating the use of digital tools such as Duolingo, Babbel, and Quizlet to support language learning. The results indicate that digital tools significantly enhance students' motivation, vocabulary retention, and speaking fluency. However, challenges such as limited internet access, insufficient teacher training, and lack of resources hinder the effective use of these tools. This research highlights the need for targeted educational policies and teacher development programs to fully integrate digital tools in under-resourced areas. The findings offer valuable insights into the pedagogical potential of technology in language acquisition and contribute to a growing body of research on technology-enhanced education in low-resource contexts.

**Keywords:** digital tools; foreign language acquisition; Azerbaijan; educational technology; language learning apps; under-resourced education; rural education; survey results; pedagogy; language education policy

## 1. Introduction

### 1.1. Context of the Study

Azerbaijan, a country with diverse geographic regions, faces significant disparities in educational resources, particularly between urban and rural areas. The challenge of providing high-quality foreign language education is particularly evident in rural regions, where schools often struggle with limited access to teaching materials, qualified instructors, and technological tools. Foreign language acquisition, especially English, is a key element for global engagement and socio-economic advancement. As the demand for foreign language proficiency grows in Azerbaijan's labor market, addressing these disparities becomes increasingly critical.

In the face of these challenges, digital tools have emerged as a promising solution. The proliferation of smartphones, laptops, and internet connectivity has allowed educational technologies to reach even the most remote areas. Educational apps, online platforms, and interactive resources have the potential to bridge gaps in language learning by providing individualized instruction and fostering greater student engagement.

This study explores how digital tools impact foreign language acquisition in under-resourced educational settings, focusing on rural regions of Azerbaijan. The research specifically examines how tools such as Duolingo, Babbel, and Quizlet are used to supplement classroom instruction in schools with limited resources and access to trained foreign language teachers.

### 1.2. Problem Statement

Despite the global rise in technology use for educational purposes, many regions in Azerbaijan, particularly rural and remote areas, remain under-resourced when it comes to foreign language education. Schools in regions such as Guba, Sheki, and Ganja face a range of challenges, including limited access to modern educational technologies, unqualified teachers, and inadequate infrastructure. As a result, students in these areas often face difficulties in acquiring proficiency in foreign languages, especially English, which is crucial for global communication and professional development.

While digital tools have been introduced in some of these schools, their impact on language acquisition has not been thoroughly studied in the context of Azerbaijan's rural regions. It is unclear whether these tools are successfully enhancing students' language skills, and if so, to what extent they can replace traditional methods of teaching in such resource-poor environments.

### 1.3. Objectives of the Study

This study aims to investigate the impact of digital tools on foreign language acquisition in under-resourced educational settings in Azerbaijan, focusing specifically on rural regions. The research objectives are as follows:

To assess the effectiveness of digital tools (such as Duolingo, Babbel, and Quizlet) in improving language acquisition, particularly vocabulary retention, speaking fluency, and reading comprehension.

To explore the challenges and barriers faced by students and teachers in using digital tools for language learning in rural schools.

To understand the pedagogical implications of integrating digital tools into the foreign language curriculum in under-resourced educational settings.

### 1.4. Research Questions

This study seeks to answer the following research questions:

How do digital tools affect students' foreign language acquisition in rural schools in Azerbaijan?

What challenges do students and teachers face in using digital tools for language learning in under-resourced settings?

What pedagogical strategies can support the integration of digital tools into foreign language education in Azerbaijan?

## 2. Literature Review

### 2.1. Digital Tools and Foreign Language Acquisition

Digital tools, including mobile applications, websites, and online platforms, have become essential in modern education, providing opportunities for interactive, personalized learning. In the context of language acquisition, tools such as Duolingo, Babbel, and Quizlet have been designed to offer engaging and flexible language learning experiences. These tools allow learners to practice vocabulary, grammar, and speaking skills through interactive exercises and real-time feedback.

Research on the effectiveness of digital tools in language learning highlights several advantages, such as increased student motivation, improved vocabulary retention, and enhanced speaking fluency. For instance, studies have shown that language learning apps can help students practice outside the classroom, providing them with greater flexibility and control over their learning pace (Viberg & Grönlund, 2013).

In addition to these tools, online platforms such as Coursera and EdX offer more structured language courses, which can be particularly beneficial for self-learners or students without access to qualified teachers. However, the effectiveness of these tools in under-resourced settings, where access to technology and internet connectivity is limited, remains an area of concern.

## 2.2. Pedagogical Theories in Digital Language Learning

The integration of digital tools in language education is supported by several pedagogical theories. Constructivist Learning Theory, as proposed by Piaget and Vygotsky, suggests that learners construct knowledge through interaction with their environment, and technology can serve as an effective medium for facilitating this process. Digital tools allow learners to actively engage in language learning by providing immediate feedback, scaffolding, and opportunities for self-directed practice (Jonassen, 1999).

Task-Based Language Teaching (TBLT) is another relevant pedagogical framework. TBLT emphasizes the use of real-world tasks and interactive communication as a means of language learning. Digital tools support this approach by providing a platform for task-oriented activities, such as quizzes, interactive dialogues, and collaborative exercises (Willis, 1996). These tools foster an immersive and practical learning environment that encourages students to use the language in meaningful contexts.

Additionally, Motivation Theories, such as Self-Determination Theory (SDT), suggest that digital tools can enhance intrinsic motivation by providing autonomy, competence, and relatedness (Deci & Ryan, 2000). In the context of language learning, digital tools offer personalized learning experiences, allowing students to progress at their own pace and receive feedback on their performance, which can significantly boost motivation.

## 2.3. Challenges in Under-Resourced Settings

Despite the potential benefits of digital tools, their use in under-resourced educational settings faces several barriers. One of the most significant challenges is limited internet access. In rural regions of Azerbaijan, internet connectivity remains unreliable, which can hinder the use of online platforms and educational apps. Studies have shown that the lack of access to reliable technology is a common barrier in rural education globally (Perraton, 2000).

Another challenge is the insufficient training of teachers. Even in areas where digital tools are available, teachers often lack the skills and knowledge to effectively integrate these tools into their teaching practices. The success of digital learning tools depends not only on the availability of technology but also on the readiness of teachers to use them effectively (Spires et al., 2018).

Lastly, the lack of resources in rural schools, such as outdated computers, limited access to mobile devices, and inadequate funding for educational technology, poses a significant challenge. These limitations affect the ability to implement digital tools on a large scale and limit their effectiveness in enhancing language acquisition.

## 3. Materials and Methods

### 3.1. Research Design

The study adopts a mixed-methods approach, combining both qualitative and quantitative data collection methods to assess the impact of digital tools on foreign language acquisition. The research design includes a survey to gather data from students and teachers, along with interviews to gain deeper insights into the experiences of participants.

### 3.2. Participants

The study involves 300 students from three rural regions of Azerbaijan: Guba, Sheki, and Ganja. These regions were selected due to their geographic location and reported challenges in accessing quality foreign language education. Participants were aged 12-17 and were enrolled in secondary schools with limited resources for foreign language teaching.

### 3.3. Digital Tools Used in the Study

The digital tools included in the study were Duolingo, Babbel, and Quizlet. These platforms were chosen due to their accessibility, ease of use, and wide adoption in language learning. Students

were asked to use these tools in addition to traditional classroom instruction for a period of six months.

### 3.4. Data Collection

Data was collected through a survey that included both closed and open-ended questions. The survey assessed the frequency of tool usage, perceived improvements in language skills, and students' motivation. Additionally, interviews with teachers were conducted to understand their experiences with integrating digital tools into the classroom and the challenges they faced.

### 3.5. Data Analysis

The quantitative data was analyzed using descriptive statistics to determine patterns in digital tool usage and student progress. Thematic analysis was used for qualitative data, categorizing responses to identify common themes related to the impact of digital tools on learning.

## 4. Results

### 4.1. Overview of Survey Results

The survey gathered data from 300 students across three rural regions: Guba, Sheki, and Ganja. Of these, 250 students actively participated in the use of digital language tools, including Duolingo, Babbel, and Quizlet, over a six-month period. The remaining 50 students, who were not using the tools, were included in the study as a control group. The survey responses revealed several key findings regarding the effectiveness and challenges of digital tool usage for foreign language acquisition in under-resourced settings.

### 4.2. Usage of Digital Tools

Among the 250 students using digital tools, 85% reported using the tools on a daily basis, with 50% using them for 30 minutes to an hour each day. Duolingo was the most popular tool, with 65% of students citing it as their primary platform for language practice. Babbel and Quizlet were used by 20% and 15% of students, respectively. The majority of students accessed the tools via smartphones, as many schools in rural areas did not have sufficient computers or tablets for each student.

### 4.3. Impact on Language Skills

The results demonstrated a significant improvement in students' language skills over the six-month period. The survey data revealed a marked increase in vocabulary retention, with 70% of students reporting that they had learned at least 50 new words per month. This was particularly evident in students who used Duolingo, which employs a spaced repetition system to reinforce vocabulary.

In terms of speaking fluency, 60% of students reported an improvement in their ability to speak in English, citing the interactive speaking exercises available on the tools as particularly beneficial. However, it should be noted that students still struggled with more complex sentence structures and pronunciation, which they felt could only be addressed through face-to-face instruction.

Reading comprehension also saw a notable improvement, with 55% of students stating that they could understand short passages in English with more ease after using the tools. However, students in the control group, who did not have access to the digital tools, showed only minimal improvement in language skills over the same period.

### 4.4. Student Motivation

The survey also asked students about their motivation to learn English. A significant majority (80%) of students using digital tools reported feeling more motivated to learn English, citing the interactive nature of the tools and the ability to track progress as key motivators. Many students

mentioned that they enjoyed the gamified features of Duolingo, which allowed them to earn points and unlock levels as they progressed. In contrast, only 40% of students in the control group expressed similar enthusiasm for language learning.

### 4.5. Teacher Feedback

Interviews with 15 teachers revealed mixed results regarding the integration of digital tools into language instruction. While all teachers acknowledged the potential of digital tools to enhance language learning, they also highlighted several challenges. The most significant issue was limited internet connectivity, with teachers in Guba and Sheki reporting that frequent network disruptions hindered students' ability to access the tools regularly. In addition, teachers in these areas often lacked the training necessary to effectively incorporate digital tools into their lessons, with 60% of teachers reporting that they felt inadequately prepared to use the tools in the classroom.

Despite these challenges, teachers were generally supportive of the digital tools, particularly Duolingo, as it allowed students to engage with the language in a fun and interactive way. Several teachers also noted that digital tools helped create a more personalized learning experience, allowing students to learn at their own pace and focus on areas where they struggled the most.

### 4.6. Challenges in Implementation

While the survey demonstrated promising results regarding the potential of digital tools for language acquisition, it also highlighted several obstacles to their effective implementation. The most pressing issue was lack of resources, with many schools in rural areas unable to provide the necessary devices for each student. For example, in Sheki, only 30% of students had access to smartphones or tablets, while the rest had to share devices in groups, which limited the amount of time each student could spend using the tools.

Furthermore, teachers reported difficulty in integrating digital tools into their curriculum due to insufficient training. Many teachers had limited knowledge of how to use the tools in the classroom and were unsure of how to incorporate them effectively into lesson plans. This lack of training resulted in a fragmented use of the tools, with some teachers relying on the apps outside of regular class hours while others did not use them at all.

## 5. Discussion

### 5.1. The Role of Digital Tools in Enhancing Language Learning

The findings of this study underscore the positive impact of digital tools on foreign language acquisition in under-resourced settings, particularly in rural regions of Azerbaijan. The survey results show that tools such as Duolingo, Babbel, and Quizlet can significantly improve language skills, especially vocabulary retention and speaking fluency. These tools provide students with the opportunity to practice language skills outside the classroom, offering a flexible and accessible method of learning that is not dependent on traditional resources.

The improvement in language skills aligns with previous studies that have demonstrated the effectiveness of digital tools in language acquisition. For instance, Viberg and Grönlund (2013) found that language learning apps can enhance students' vocabulary and pronunciation by providing interactive, real-time feedback. Similarly, Mayer (2005) highlighted the benefits of multimedia learning tools, which allow students to process language input in multiple formats, reinforcing learning.

The motivational benefits of digital tools cannot be overlooked. The gamified features of apps like Duolingo, which allow students to earn rewards and track their progress, were cited as significant motivators by the majority of students. This finding supports the idea that digital tools can enhance intrinsic motivation, a crucial factor for sustained learning (Deci & Ryan, 2000). When students feel a sense of accomplishment and control over their learning, their engagement and persistence improve.

*5.2. Barriers to Effective Implementation*

While the benefits of digital tools are clear, the challenges identified in this study highlight the limitations of technology in under-resourced educational settings. Limited internet access remains a significant barrier, especially in rural regions where infrastructure is often outdated or insufficient. This finding corroborates earlier research by Perraton (2000), who argued that technology integration in rural education systems is often hindered by poor internet connectivity.

The issue of teacher training also emerged as a key obstacle to effective implementation. Although teachers recognized the potential of digital tools, many felt unprepared to integrate them into their teaching practices. This highlights the need for professional development programs that focus on how to effectively incorporate digital tools into language instruction. Spires et al. (2018) also emphasized the importance of teacher training in the successful integration of technology in education.

Additionally, the lack of resources in rural schools, particularly access to devices, limits the widespread use of digital tools. Many students in this study had to share devices, reducing the amount of time they could spend practicing language skills. This challenge echoes findings from other studies on technology use in rural areas, where limited access to devices often prevents the equitable distribution of learning opportunities.

*5.3. Pedagogical Implications*

The integration of digital tools into language learning is not without challenges, but the findings of this study offer valuable pedagogical insights. First, teachers should be provided with professional development opportunities that focus on how to incorporate digital tools into their teaching. This training should include not only technical skills but also pedagogical strategies for using these tools to support language acquisition effectively.

Second, policymakers should focus on improving internet infrastructure in rural areas to ensure that students can fully benefit from digital learning tools. Providing schools with adequate devices and ensuring reliable internet access will allow students to engage with these tools more consistently and effectively.

Finally, while digital tools can significantly enhance language learning, they should complement, not replace, traditional methods of teaching. A blended approach that combines face-to-face instruction with digital tools can provide students with a well-rounded language learning experience.

## 6. Conclusion

This study highlights the potential of digital tools to significantly improve foreign language acquisition in under-resourced educational settings, particularly in rural regions of Azerbaijan. While challenges such as limited internet access, lack of resources, and insufficient teacher training remain, the positive impact of digital tools on student motivation and language skills is clear. To maximize the potential of these tools, it is crucial to address the barriers to their effective implementation through targeted policy interventions, teacher training, and improvements in infrastructure.

As technology continues to evolve, there is great potential for digital tools to play an increasingly central role in language education, especially in contexts where traditional resources are limited. Further research is needed to explore the long-term effects of digital tools on language proficiency and to identify best practices for integrating technology into foreign language curricula.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

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