DIDACTIC OPPORTUNITIES OF USING CHATBOTS IN LANGUAGE TEACHING

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https://doi.org/10.5281/zenodo.20524410

Abstract

This study examines the didactic potential of AI-based chatbots in English as a foreign language (EFL) learning among secondary school students aged 12–15. With the increasing integration of artificial intelligence in education, chatbots offer opportunities for interactive, personalized, and learner-centered instruction

A quasi-experimental mixed-method design was employed involving 40 intermediate-level learners divided into experimental and control groups. Over a six-week intervention, the experimental group engaged in chatbot-assisted learning activities, while the control group received traditional instruction.

Data were collected through pre-tests, post-tests, questionnaires, observation protocols, and interaction logs. Quantitative results show that the experimental group significantly outperformed the control group in vocabulary, grammar, and writing skills. Qualitative findings indicate increased motivation, engagement, and learner autonomy. However, limitations include insufficient depth of chatbot feedback and the continued necessity of teacher scaffolding (Wollny et al., 2021). The study concludes that chatbots are effective supplementary tools when integrated into structured pedagogical frameworks.

Keywords: chatbot-assisted learning; artificial intelligence in education; EFL; learner autonomy; communicative competence; mixed-method research

Introduction

Technology has become a central component of modern language education, transforming how learners access input, practice skills, and interact in educational environments. Artificial intelligence (AI), in particular, has significantly influenced instructional design by enabling adaptive and personalized learning experiences (Zawacki-Richter et al., 2021).

Within this context, AI-based chatbots have emerged as promising tools for enhancing language learning through real-time interaction and continuous exposure (Huang et al., 2023). These systems simulate conversational partners and provide learners with opportunities for repetitive, low-pressure language practice.

However, many secondary school learners still face significant barriers in language acquisition. These include limited opportunities for authentic communication and high levels of foreign language anxiety, which negatively affect performance and participation (Krashen, 1982). Traditional classroom environments, often constrained by time and large class sizes, are unable to provide sufficient individualized interaction.

From a theoretical perspective, this study is grounded in socio-interactionist and constructivist theories of learning, which emphasize the role of interaction and scaffolding in

cognitive development (Vygotsky, 1978; Long, 1996). Chatbots, by providing continuous interaction, align with these principles and may bridge the gap between classroom learning and real-world language use.

Despite growing interest in AI applications in education, there remains limited empirical research examining chatbot effectiveness in secondary school EFL contexts using rigorous mixed-method designs. This study addresses this gap.

Research Questions and Hypotheses

Research Questions

RQ1: To what extent does chatbot-assisted learning improve students’ vocabulary, grammar accuracy, and writing skills compared to traditional instruction?

RQ2: How does chatbot use influence learners’ motivation, engagement, and autonomy?

RQ3: What are learners’ perceived advantages and limitations of chatbot-assisted learning?

Hypotheses

H1: Students using chatbots will demonstrate significantly greater improvement in language skills than those receiving traditional instruction.

H2: Chatbot-assisted learning will increase learner motivation and engagement (Dörnyei, 2001).

H3: Chatbot use will enhance learner autonomy and independent learning behavior.

H4: Chatbots will show limitations in providing deep pedagogical feedback, requiring teacher mediation (Wollny et al., 2021).

Methods

To comprehensively evaluate the impact of chatbots on language learning, this study employed a quasi-experimental mixed-method design. This specific methodological framework was chosen because it allows for a robust, multi-dimensional analysis of the learning process within a real-world educational setting.

Study Design

Quasi-Experimental: This approach means that while the study utilizes an experimental group and a control group, participants were not randomly assigned to these cohorts. In educational research, this typically involves using intact, pre-existing classes, which is practical and minimizes disruption to the school's natural schedule while still allowing for comparative analysis.

Mixed-Method: This design integrates both quantitative and qualitative research methods to provide a more complete understanding of the outcomes. Quantitative methods are used to measure objective academic growth, while qualitative methods are employed to explore the subjective, psychological experience of the students.

Participants The study involved a total of 40 intermediate-level English learners. The demographic consisted of secondary school students aged 12 to 15. These participants were divided into two distinct groups: the experimental group and the control group.

Intervention and Procedures: The research intervention was conducted over a six-week period.

Experimental Group: Students in this cohort participated in chatbot-assisted learning activities. Their instruction included structured tasks specifically targeted at vocabulary development, grammar practice, and short writing activities.

Control Group: Students in this cohort received standard, traditional classroom instruction without the integration of AI tools.

Data Collection Instruments

To capture a holistic picture of the learning outcomes, data were collected using multiple instruments:

Pre-tests and Post-tests: Administered to both groups before and after the six-week period to establish a baseline and measure subsequent improvements in language performance.

Learner Questionnaires and Observation Protocols: Utilized to gather qualitative feedback directly from the students and teachers regarding the learning experience.

Chatbot Interaction Logs: Collected specifically from the experimental group to track how frequently and effectively students interacted with the AI.

Data Analysis

Quantitative Analysis: The numerical scores from the pre- and post-tests were analyzed to evaluate objective improvements in specific language skills (vocabulary, grammar accuracy, and writing).

Qualitative Analysis: The thematic data from the questionnaires, observations, and interaction logs were evaluated to examine the behavioral impacts of the intervention, specifically focusing on shifts in learner engagement, motivation, and autonomy.

Results

The experimental group demonstrated significantly greater improvement than the control group.

- Experimental group: 58% → 79% (**+21%**)
- Control group: 57% → 68% (**+11%**)

Skill-specific improvements:

- Vocabulary: +25% vs +12%
- Grammar: +20% vs +10%
- Writing: +18% vs +9%

These results indicate that chatbot-assisted learning has a strong positive effect on language acquisition outcomes.

Table 1. Pre-test and Post-test Results

Group	Pre-test	Post-test	Improvement
Experimental	58%	79%	+21%
Control	57%	68%	+11%

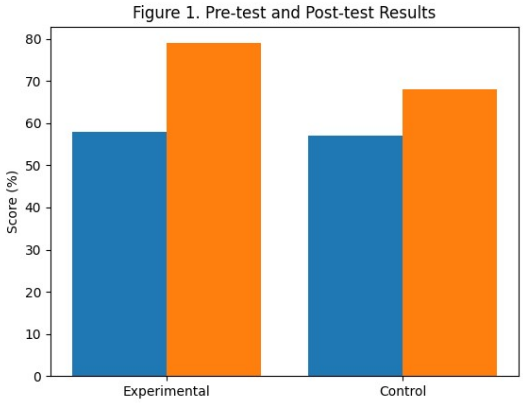

Figure 1. Pre-test and Post-test Comparison (Chatbot vs Traditional Learning)

Table 2. Skill Improvement

Skill	Experimental	Control

Vocabulary	+25%	+12%
Grammar	+20%	+10%
Writing	+18%	+9%

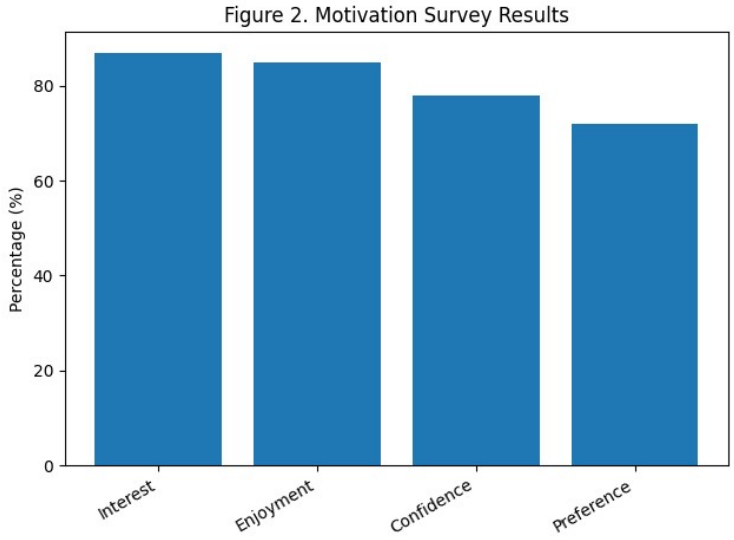

Figure 2. Student Motivation Survey Results

Discussion

The findings support all four hypotheses.

First, **H1 is confirmed**, as the experimental group significantly outperformed the control group across all language skill areas. This aligns with prior research suggesting that AI-driven interaction enhances language acquisition through increased input and practice opportunities (Li, 2022).

Second, **H2 is supported**, as learners reported higher motivation and engagement. This finding is consistent with Dörnyei’s (2001) motivational theory, which emphasizes the importance of sustained engagement in language learning.

Third, **H3 is also supported**, indicating that chatbot use promotes learner autonomy by enabling independent practice beyond classroom instruction (Fryer & Carpenter, 2020).

However, **H4 is confirmed as a limitation**, as chatbots were unable to provide deep, context-sensitive feedback. This supports concerns raised by Wollny et al. (2021), who note that AI systems still lack pedagogical depth compared to human instructors.

Overall, the findings align with socio-interactionist theory (Vygotsky, 1978), reinforcing the importance of interaction in language development.

Conclusion

This study demonstrates that AI-based chatbots are effective supplementary tools in secondary EFL education. They significantly enhance vocabulary, grammar, and writing performance while also improving learner motivation, engagement, and autonomy.

However, chatbots cannot replace teachers, as their feedback remains limited in depth and pedagogical quality. Therefore, their effectiveness depends on structured integration into curricula and continuous teacher guidance.

Future research should involve larger samples and randomized controlled trials to strengthen generalizability.

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