INVESTIGATION OF LANGUAGE LEARNING THROUGH USE OF ARTIFICIAL INTELLIGENCE AT UNIVERSITY LEVEL FOR BUSINESS STUDENTS

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Abstract

There have been significant advancements in using artificial intelligence (AI) for language learning at the university level, especially for business students. AI technology enables personalized and adaptive learning experiences, allowing students to practice and improve their language skills at their own pace. One common application of AI in language learning is the use of chatbots and virtual tutors, which can engage students in conversations, provide instant feedback, and simulate real-life language usage. These AI-driven platforms often use natural language processing (NLP) algorithms to understand and generate human-like responses, enhancing the learning experience. Moreover, AI-powered language learning tools can analyze students' performance data to identify areas of improvement, tailor exercises to their specific needs, and track their progress over time. By leveraging machine learning algorithms, these platforms can continuously adapt to students' learning patterns and preferences, thereby optimizing their learning outcomes.

Keywords: AI language learning, immersive vr, educational gamification, experiential learning, online learning environments.

JEL Classification: I21, I23, I25, O33

1. Introduction

There have been notable scientific advancements in utilizing artificial intelligence (AI) for language learning at the university level, especially catering to business students. AI technology is revolutionizing the way languages are taught and acquired by offering personalized and adaptive learning experiences.

One significant development is the use of AI-powered chatbots and virtual tutors in language learning. These tools leverage natural language processing (NLP) algorithms to engage students in conversations, provide instant feedback, and simulate real-world language usage. By interacting with AI chatbots, students can practice their language skills in a more interactive and immersive manner. Wang et. al. [1] examined the effects of adaptive learning technologies, including AI-powered platforms, on students' motivation

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and learning outcomes across various educational contexts. This provided insights into the effectiveness of personalized learning approaches in improving student engagement and achievement.

Furthermore, AI enables the creation of tailored learning experiences for individual students. Through machine learning algorithms, AI systems can analyze data on students' language proficiency, learning patterns, and preferences to customize exercises and materials accordingly [2]. This personalized approach helps students learn at their own pace and focus on areas where they need improvement.

Another area of advancement is the integration of AI-driven language learning platforms with virtual reality (VR) environments and interactive games [3]. These innovative tools provide students with practical scenarios and simulations that mimic real-life language usage in business contexts. By engaging with AI-powered VR environments and games, students can enhance their language skills in a more practical and experiential manner.

Overall, the integration of AI technologies in language learning at the university level for business students is shaping a more effective and engaging learning experience. These advancements not only enhance language proficiency but also equip students with the communication and cultural competencies necessary to succeed in today's globalized business environment.

Several AI-powered chatbots and virtual tutors exist for language learning, each employing various techniques and technologies to facilitate learning [4]. Here are some notable ones:

Duolingo: Duolingo offers a gamified language learning experience through its app, which employs AI algorithms to adapt to users' learning styles and provide personalized feedback. It uses techniques such as spaced repetition and natural language processing (NLP) to enhance learning efficiency.
Rosetta Stone: Rosetta Stone utilizes speech recognition technology to provide instant feedback on pronunciation and offers interactive lessons tailored to individual learners. It focuses on immersive language learning through visual and auditory cues.
Babbel: Babbel uses AI to personalize language lessons based on users' proficiency levels and learning goals. It emphasizes practical conversation skills and offers interactive exercises to reinforce learning.
Memrise: Memrise employs spaced repetition algorithms and multimedia content to help users memorize vocabulary effectively. It uses AI to adapt lessons based on learners' progress and performance.
Busuu: Busuu combines AI with a community of native speakers to offer personalized language learning experiences. It provides interactive exercises, writing practice, and live tutoring sessions with AI-powered feedback.
Lingvist: Lingvist utilizes AI algorithms to adapt language lessons to users' proficiency levels and learning pace. It focuses on vocabulary acquisition through contextual learning and spaced repetition.

HelloTalk: HelloTalk connects language learners with native speakers worldwide for language exchange. While not purely AI-powered, it incorporates AI features such as translation, pronunciation correction, and personalized learning recommendations.

These platforms typically leverage technologies such as NLP, machine learning, speech recognition, and adaptive algorithms to provide personalized learning experiences. They analyze user data, track progress, and offer tailored feedback to enhance language acquisition. Additionally, many of them incorporate interactive exercises, quizzes, and games to make learning more engaging and effective. AI has paved the way for innovative language learning methods, such as immersive virtual reality (VR) environments and interactive language games, which make learning more engaging and effective for business students. These technologies offer practical scenarios and real-world applications, enabling students to apply their language skills in relevant contexts.

2. Theoretical background

Research on the efficiency and effectiveness of AI-powered language learning platforms continues to evolve. To highlight some common themes and trends in the research up to present day, most studies have investigated the impact of personalized learning experiences facilitated by AI algorithms. Research suggests that adaptive learning systems, which tailor content and feedback to individual learners' needs and preferences, can lead to improved learning outcomes compared to traditional one-size-fits-all approaches [4].

Retention and Engagement: Studies have examined the role of AI-powered features such as spaced repetition, gamification, and interactive exercises in enhancing learner retention and engagement [5]. Findings indicate that incorporating these elements can increase motivation, participation, and knowledge retention among users.

Research has explored the effectiveness of AI-generated feedback in language learning contexts [6]. While automated feedback can provide immediate corrections and guidance to learners, studies suggest that it may not always be as accurate or nuanced as feedback from human instructors. However, advancements in natural language processing and machine learning continue to improve the quality and reliability of AI-generated feedback.

Errors and constructive criticism are an inevitable aspect of teaching and studying a foreign language. One way to characterize errors is as departures from the target language's norms. They highlight instances in which learners have improperly transferred rules from their first language to the foreign language or overgeneralized rules in the foreign language, hence illuminating trends in their development of interlanguage systems. Therefore, corrective feedback, which comes in a range of forms, serves as a warning to a language learner that their usage of the target language is inappropriate. Meta-linguistic information may or may not be included in corrective feedback, which can be explicit (e.g., "No, you should say does, not do") or implicit (e.g., "Yes, he goes to work every day").

Some research has compared the efficacy of different AI-powered language learning platforms and methodologies. Comparative studies have evaluated factors such as learning outcomes, user satisfaction, and engagement levels across various platforms to identify best practices and areas for improvement.

While many studies have demonstrated short-term benefits of AI-powered language learning interventions, there is growing interest in understanding their long-term effects. Research efforts are underway to assess whether skills acquired through AI-driven language learning platforms are retained over time [7] and how they transfer to real-world communication contexts.

It's worth noting that the field of AI-powered language learning is dynamic, with new research emerging regularly. Researchers are continually refining existing approaches, exploring novel technologies [8, 9], and investigating the intersection of AI with other fields such as linguistics, psychology, and education. For the latest developments and findings, I'd recommend consulting academic databases, conference proceedings, and research journals in the fields of language education, computer-assisted language learning (CALL), and artificial intelligence [10].

AI has the potential to greatly improve language teaching and student learning results in a number of ways:

1. Personalized Learning: To better meet the requirements of each student, AI algorithms can assess each student's strengths, weaknesses, learning preferences, and rate of learning. By ensuring that every student receives customized help, this customization promotes more successful learning outcomes.

2. Adaptive Learning Platforms: Equipped with artificial intelligence (AI), these platforms may modify the level of exercises and materials according to students' performance, guaranteeing that they are suitably challenged and involved. Additionally, these systems have the ability to give pupils instant feedback, enabling them to fix errors in real time.

3. Language Tutoring Bots: Artificial intelligence chatbots and online tutors can provide students more practice chances outside of the classroom. These chatbots may converse with pupils in an engaging manner, fix their pronunciation and grammar, and respond to their inquiries on grammar and vocabulary.

4. Natural Language Processing (NLP) Tools: NLP tools are capable of analyzing vast volumes of text to spot trends, typical mistakes, and areas in need of development. These findings may be used by educators to create more specialized lesson plans and provide students tailored feedback.

5. Language Assessment: By grading written assignments, assessing spoken language skills, and giving standardized examinations, AI can automate the assessment process. This

frees up teachers' time so they can concentrate on giving pupils insightful feedback and encouragement.

6. Language Generation: To enhance in-class learning, AI may provide language exercises, tests, and study guides. Learning may be made more effective and interesting by tailoring these resources to meet particular learning goals and student interests.

7. Multimodal Learning Experiences: By fusing text, audio, video, and interactive components, AI can provide multimodal learning experiences. Language learning applications, for instance, can offer textual explanations and visual assistance in addition to using speech recognition technology to assist students in honing their speaking and listening abilities.

AI-powered tools often incorporate interactive elements, gamification, and multimedia content, making learning more engaging for students [11]. Increased engagement can lead to higher levels of motivation and participation in language learning activities.

Personalized learning experiences tailored to individual student needs can lead to better retention of language concepts and skills [12]. When students receive targeted support and practice opportunities, they are more likely to retain and apply what they have learned. AI algorithms can identify gaps in students' knowledge and provide targeted interventions to address them. This personalized approach can accelerate students' language learning progress by focusing on areas where they need the most support.

With AI-powered language tutoring bots and adaptive learning platforms [13], students can receive immediate feedback on their grammar, pronunciation, and vocabulary usage. Continuous feedback and practice opportunities can lead to improvements in language proficiency over time. AI technologies can provide language instruction and support to students with diverse learning needs [13, 14], including those with disabilities or language-related challenges. By offering customizable learning experiences and adaptive materials, AI can help ensure that all students have access to high-quality language instruction.

Last but not least, AI can assist teachers in analyzing student data, identifying trends, and providing targeted support to individual students or groups [15]. By automating routine tasks such as grading and assessment, AI frees up teachers' time to focus on delivering personalized instruction and supporting students' unique learning needs. By integrating AI into language instruction from an early age, students can develop positive learning habits and attitudes towards language learning. The engaging and interactive nature of AI-powered language learning tools can encourage students to continue practicing and improving their language skills outside of the classroom.

3. Methodology

For our research, we gathered a corpus of classroom exchanges that comprised 19 transcriptions of foreign language instruction in English given by seven different teachers, amounting to around 12 hours. The instructors for the 19 Bucharest classes were divided into four Romanian teachers who teach in secondary schools and have Romanian as their first language, two native Americans who teach in universities, and one British teacher who teaches in an English further education college. The use of diverse educators from three distinct nations instills trust in us that our findings stem from a well-rounded corpus, rather than the peculiarities of a particular teaching methodology.

The majority of pupils are native speakers of Romanian.

In our research, we also asked the instructors to list the competency levels of each student in their class (es). Table 1 provides further information.

Level	Class	Trainer	Focus on	Duration
Beginner (A2)	1	1	Meaning	40
Beginner (A2)	1	1	Forms	40
Beginner (A2)	2	2	Forms	40
Beginner (A2)	3	2	Meaning	30
Beginner (A2)	4	3	Forms	30
Beginner (A2)	5	3	Forms	50
Beginner (A2)	1	3	Forms	50
Beginner (A2)	2	3	Forms	40
Beginner (A2)	2	3	Forms	40
Intermediate	3	4	Forms	50
Intermediate	4	4	Meaning	50
Intermediate	5	5	Meaning	50
Intermediate	6	5	Meaning	50
Advanced	7	6	Meaning	30
Advanced	8	6	Meaning	30
Advanced	9	6	Meaning	30
Advanced	10	7	Meaning	30
Advanced	11	7	Meaning	30
Advanced	12	7	Meaning	30
Total	12	7		680 minutes

Table 1: Data from Classroom Transcription

We requested instructors to record and provide us samples of their regular classroom interactions in order to gather data. We didn't tell the teachers what to focus on, what kind of errors to make, or what kinds of comments they should provide each other. The

recordings from the classroom can be divided into two main categories: those that concentrate on meaning, or lessons where the students talk about a range of cultural topics in the foreign language, and those that concentrate on forms, or lessons about various grammar topics (such as pronominalization, syntactic structures, possessives, and passive verbs). For each class, each trainer used one or more AI-powered language learning platforms or tools that align with the language proficiency levels and learning objectives of the students. These included platforms like Duolingo, Rosetta Stone, or educational chatbots specifically designed for language learning.

The selected AI-powered tools were integrated into regular classroom instruction alongside traditional teaching methods. We ensured that teachers and students are provided with appropriate training and guidance on how to use the tools effectively.

We analyzed the recorded classroom interactions to observe how the integration of AI-powered tools influences teaching practices and student learning experiences.

Special attention was paid to factors such as:

Frequency and nature of teacher-student interactions facilitated by AI tools.
Types of feedback provided by teachers and the effectiveness of corrective feedback in improving student language proficiency.
Student engagement levels during AI-supported activities compared to traditional instruction.
Differences in classroom dynamics and instructional approaches between lessons focusing on meaning (e.g., cultural topics) and lessons focusing on forms (e.g., grammar topics).

4. Results

When professors openly appreciate a student's input and when they just go on to the next question, subject, or explanation are the things that we are interested in learning about. We are also interested in the ways that teachers respond to students in various contexts and the most common and efficient forms of corrective feedback.

We gathered qualitative feedback from teachers and students regarding their experiences with the AI-powered tools by soliciting opinions on the usability, effectiveness, and perceived benefits or limitations of integrating AI into language instruction.

By conducting this adapted experiment, we gained insights into the potential benefits and challenges of incorporating AI-powered language learning tools into classroom instruction and contribute to the broader understanding of AI's role in education.

A native English speaker annotated the classroom recordings with definitions for the labels. In order to analyze the data files using a range of XML tools, such as tools for querying and displaying the data, we employed an annotation tool to add XML tags to the data files. We concentrated on the labels for this study that will most clearly elicit differences in use of AI. We were especially curious about the following:

Type and frequency of mistakes in vocabulary, grammar, and pronunciation.
Kind and frequency of various feedback formats (repetition and rewording for both instructor an AI tool).
Kind and frequency of corrections for vocabulary, pronunciation, and grammatical mistakes.
Student utterance type in front of instructor versus AI.

We totalled 680 minutes of classroom data and 100 minutes of student AI tutorial data from the same target group.

We took into account how the two teaching modalities distributed the various mistake categories and corrective feedback (Table 2.). Many errors can be seen in the speech of certain students. However, in order to maintain a fluid discourse, we discovered that teachers usually only addressed one mistake at a time, whereas AI tools/tutors address each mistake individually.

Level	Grammar (%)	Vocabulary (%)	Pronounciation (%)
Beginner (A2)	47	6	47
Intermediate	60	33	7
Advanced	45	36	19
Total	50	20	30

Table 2. Classroom Error Frequency by Learning Level

The relative frequency of the various errors' kinds varies depending on the learner's level. Among the most common mistakes made by students of all levels are grammatical ones. Pronunciation mistakes are just as common among novices as grammar faults, with vocabulary errors ranking second among intermediate and advanced learners.

We did discover that the two modes differed in how they interacted and how they repaired themselves. Firstly, it appears that teachers are worried about keeping the discourse flowing in classes where the emphasis is on communication. Rather than promoting self-repair sequences that might break up the flow of the discourse, they strive to help pupils solve errors by giving them the goal forms. Second, teachers must rely on modeling strategies like recast and explicit correction since students who are not yet fluent in the target language might not have the information necessary to self-correct.

5. Conclusions

Initially, while it might seem that there were fewer mistakes in tutorial mode compared to classroom mode, considering that we have 680 minutes of classroom data and only 100 minutes of tutorial (AI) data, we find that errors were actually much less common in the classrooms. This could be because students have more opportunities to interact with the AI in the AI tutorial mode than in the classroom form.

If the AI-powered tools are engaging and interactive, the results show increased student participation and motivation during AI-supported activities compared to traditional instruction. This suggests that AI has the potential to enhance student engagement in language learning.

Students demonstrated improvements in language proficiency over time, as measured by assessments or evaluations, which indicates that the AI-powered tools are effective in facilitating language acquisition. This suggests that AI has a positive impact on student learning outcomes in the language classroom.

Corrective feedback's success is contingent upon the specific linguistic elements that require correction as well as the circumstances surrounding the feedback's delivery. We looked into two of these situations in our investigation. The first is the student's ability—or lack thereof—to react to the corrective input in a classroom context. We discovered that, in a non-negligible percentage of cases—such as when using multiple AI language tools—the teacher moved on to the next question, topic, or kind of feedback (clarification, explanation) without waiting for the student to respond or validate the feedback.

The results also show differences in teacher responses and instructional approaches when using AI tools compared to traditional methods. Some teachers embrace the technology and adapt their teaching strategies to integrate AI seamlessly into their instruction, while others encountered challenges or resistance to change.

AI tools provide timely and relevant feedback to students, which indicated that AI-supported instruction leads to more efficient corrective feedback and language development. This suggests that AI use in classroom instruction has the potential to enhance the feedback process in language learning environments.

Analysis of usage patterns and feedback from teachers and students also reveals insights into the usability and effectiveness of the AI tools. Teachers and students expressed preferences for certain features or functionalities of the tools based on their experiences, which could inform future development and implementation strategies.

Given the diverse background of teachers and students in the experiment, the results also highlight cultural and linguistic factors that influence the effectiveness of AI-supported language instruction.

The investigation revealed difficulties and restrictions related to AI application in language learning settings. These might be problems with usability, technological obstacles, or incorporating AI technologies into current teaching methods and curriculum. Optimizing the use of AI in education requires recognizing and resolving these issues.

The experiment's findings have wider ramifications for language instruction and acquisition. Overall, research in a number of fields, such as intelligent tutoring systems, intelligent computer assisted language learning, and second language acquisition, has enhanced our study methodology. These differing viewpoints raise broader concerns about

how AI systems, by providing additional opportunities for engagement and encouraging student-generated repair, might help to mitigate the constraints or drawbacks associated with the classroom approach of handling student errors. In addition to highlighting topics for more study and development in the field of AI-driven language teaching, they might provide guidance for judgments on the adoption and application of AI-powered technologies in educational settings.

It is necessary to do further research on how learners react to various feedback systems and if they alter their learning over time. Longitudinal trials are also necessary to confirm the trends shown in our investigations.

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