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O'zbekiston Milliy Pedagogika Universiteti

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13.00.00 Pedagogika fanlari
13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
13.00.03 Maxsus pedagogika
13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohalari va bosqichlari bo'yicha)
13.00.07 Ta'limda menejment
13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
13.00.09 Ijtimoiy pedagogika
07.00.00 Tarix fanlari
19.00.00 Psixologiya fanlari
01.00.00 Fizika-matematika fanlari
02.00.00 Kimyo fanlari
03.00.00 Biologiya fanlari
09.00.00 Falsafa fanlari
10.00.00 Filologiya fanlari
11.00.00 Geografiya fanlari

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Pedagogika, psixologiya fanlariga ixtisoslashgan ilmiy jurnal

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ENHANCING ENGLISH LEARNERS' PRONUNCIATION THROUGH AI-BASED LANGUAGE APPLICATIONS

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Abstract: This study examines the efficacy of AI-based language learning tools in improving pronunciation abilities among English learners. Most language learning programs increasingly use AI-powered applications to provide learners with individualized, real-time feedback on pronunciation, as accurate pronunciation is essential for effective communication. This research explores how these programs support young learners, the advantages they offer compared to conventional approaches, and the challenges encountered. The results indicate that AI-driven applications significantly enhance pronunciation through interactive, user-friendly activities, thereby promoting learner confidence and fluency.

Key words: English language learning, AI-based language applications, tailored feedback, speech recognition, pronunciation.

Annotatsiya: Ushbu tadqiqot ingliz tilini o'rganuvchilar orasida talaffuz qobiliyatini yaxshilashda sun'iy intellektga asoslangan til o'rganish vositalarining samaradorligini o'rganadi. Ko'plab til o'rganish dasturlari mukammal talaffuz samarali muloqot uchun muhim bo'lgani sababli, talabalarga talaffuz bo'yicha individual va real vaqt rejimidagi fikr-mulohazalarni taqdim etish uchun tobora ko'proq sun'iy intellektga asoslangan ilovalardan foydalanmoqda. Tadqiqotda ushbu dasturlarning yosh o'quvchilarga ko'rsatadigan yordami, ularning an'anaviy yondashuvlarga nisbatan afzalliklari hamda duch kelinadigan to'siqlar tahlil qilinadi. Natijalar shuni ko'rsatadiki, sun'iy intellektga asoslangan ilovalar interaktiv va foydalanuvchilar uchun qulay mashg'ulotlar orqali talaffuzni sezilarli darajada yaxshilab, o'quvchilarning o'ziga ishonchi va nutq ravonligini oshiradi.

Kalit so'zlar: ingliz tilini o'rganish, sun'iy intellektga asoslangan til ilovalari, moslashtirilgan fikr-mulohaza, nutqni aniqlash, talaffuz.

Аннотация: В данном исследовании изучается эффективность инструментов изучения языков на основе искусственного интеллекта в улучшении произношения у изучающих английский язык. Большинство программ изучения языков всё чаще используют приложения на основе ИИ для предоставления обучающимся индивидуальной обратной связи в режиме реального времени по произношению, поскольку точное произношение имеет важное значение для эффективной коммуникации. В исследовании рассматриваются способы, с помощью которых данные программы поддерживают молодых обучающихся, их преимущества по сравнению с традиционными подходами, а также возникающие трудности. Результаты показывают, что приложения на основе ИИ существенно улучшают произношение благодаря интерактивным и удобным для пользователя заданиям, повышая уверенность и беглость речи обучающихся.

Ключевые слова: изучение английского языка, языковые приложения на основе ИИ, индивидуальная обратная связь, распознавание речи, произношение.

INTRODUCTION

Pronunciation is an essential component of language learning, as it directly influences the effectiveness of communication. For learners–particularly those acquiring English as a second language–it is crucial to develop accurate pronunciation skills at an early stage in order to prevent communication difficulties later on. Traditional instructional approaches, such as mechanical repetition or limited in-class practice, often fail to provide learners with sufficient opportunities to receive individualized and constructive feedback. However, advancements in artificial intelligence (AI) are transforming the way languages are learned. Accurate pronunciation helps minimize misunderstandings and enhances clarity in complex communication, ensuring that the speak-

er's intended message is conveyed precisely to the listener with little or no ambiguity. This ability has numerous positive effects and contributes to success in various contexts. In academic settings, accurate pronunciation enables students to understand lectures more effectively, while in workplace environments it is indispensable for delivering team presentations, participating in successful negotiations, and building rapport with clients and colleagues [1]. Despite the significant impact of accurate pronunciation on personal and professional development, many learners–especially those studying English as a second language–continue to struggle to achieve the desired level of accuracy.

In recent years, AI-based learning tools have gained increasing popularity because they facilitate learning across various subjects, including pronunciation training [2]. AI-assisted English pronunciation learning is highly flexible, as it can be accessed anytime and anywhere, including outside regular school hours. AI systems can demonstrate correct pronunciation of words, phrases, and sentences using multiple models and dialects. Moreover, some applications provide feedback on learners' recorded speech, identify specific pronunciation errors, and offer targeted suggestions for improvement. Numerous studies, such as those conducted by Abimanto and Sumarsono [3] and Rusmiyanto et al. [4], indicate that AI-assisted pronunciation learning is effective. However, most of these studies focus primarily on performance differences before and after AI integration, without examining the specific types of AI employed. This study, therefore, investigates the effectiveness of AI-based language applications in improving English pronunciation accuracy and explores learners' perceptions after engaging with two different types of AI. In particular, the paper examines how AI-based language apps support primary-level English learners in developing pronunciation skills by providing immediate, personalized feedback and adaptive practice activities that respond to individual learner needs. In addition, it discusses potential challenges associated with implementing such applications in primary education and offers recommendations for optimizing their use.

LITERATURE REVIEW

AI-based language apps represent an innovative approach to supporting students in acquiring accurate pronunciation skills. These applications utilize speech recognition and machine learning technologies to analyze learners' pronunciation and provide immediate feedback. As a result, they enhance traditional instructional approaches in several important ways. One of the most significant advantages of AI-based applications is the provision of immediate feedback. These apps deliver real-time responses, identifying specific sounds or words with which learners may experience difficulty, unlike conventional classroom methods. Such feedback enables students to quickly recognize errors and adjust their pronunciation accordingly. Immediate correction facilitates better retention of learning outcomes and contributes to the development of a solid phonetic foundation.

Another important benefit is the individualized learning experience offered to each student. AI-powered language applications can adapt to learners' performance levels and specific pronunciation challenges. For instance, an application may provide targeted practice for sounds such as /th/ or /r/, which are often difficult due to learners' linguistic backgrounds. This adaptability increases learner engagement and prevents frustration caused by tasks that are either excessively challenging or overly simplistic. The interactive nature of these applications further enhances learning effectiveness. Gamification is a common feature in AI-based programs designed for young learners. Rewards, badges, and interactive challenges are employed to increase motivation and sustain interest. For example, pronunciation-based games that encourage repeated practice and award points can significantly motivate learners to engage more frequently in pronunciation exercises. Additionally, visual and auditory cues further support pronunciation practice, making the language-learning process more engaging and accessible.

AI-based pronunciation practice tools also contribute to the development of listening skills, even though their primary focus is speaking. Prior to achieving native-like pronunciation, learners must attentively listen to accurate pronunciation models. This combined emphasis on listening and speaking supports a more holistic and balanced language acquisition process. Despite their numerous advantages, AI-driven language applications also present several challenges in language acquisition. Some learners may lack adequate access to technological resources, which can limit their ability to use such applications effectively. In addition, excessive screen time may pose a concern, particularly for younger learners. Certain students may also experience difficulties using these applications independently without appropriate guidance. Another challenge is that AI-generated feedback, while useful, may lack the depth and explanatory detail typically provided by a human instructor. Although an application may indicate that a particular sound is incorrect, it may not always explain the precise method required for correction. Therefore, integrating AI-based applications with teacher support is likely to be the most effective approach, as it combines technological efficiency with personalized pedagogical guidance.

RESEARCH METHODOLOGY

This study was guided by the following research inquiries: Do AI-driven mobile applications significantly enhance students' pronunciation accuracy compared to conventional pronunciation instruction? This inquiry aims to determine whether the use of AI-driven mobile applications leads to measurable improvements in learners' pronunciation, including segmental features (vowels and consonants) and suprasegmental features (stress and intonation), in comparison with traditional classroom methodologies. What are students' perceptions of using AI-driven mobile applications to enhance their pronunciation? This inquiry explores learners' perceptions, focusing on enjoyment, engagement, and satisfaction when using AI-driven mobile applications for pronunciation practice, as understanding student attitudes is essential because positive perceptions can influence motivation and sustained learning outcomes. Does AI-driven mobile pronunciation instruction enhance students' confidence and autonomy in learning? This inquiry investigates whether mobile AI technologies increase learners' confidence in speaking English and promote independence in managing their pronunciation practice, as well as whether learners experience reduced anxiety and an increased willingness to engage in speaking practice beyond the classroom.

This study involved 30 learners of English as a Second Language (ESL) from secondary schools and higher education institutions, aged 14–22 years, with diverse academic backgrounds including both high school and college students, whose English proficiency levels ranged from A2 to B1 according to the Common European Framework of Reference for Languages (CEFR). The participants were divided into two equal groups to ensure balanced comparison: an experimental group (n = 15), whose members used AI-driven mobile applications for pronunciation improvement during their practice sessions, and a control group (n = 15), whose members received conventional pronunciation instruction without mobile or AI-assisted tools. The AI-driven applications incorporated automatic speech recognition, immediate feedback, native-speaker pronunciation models, and adaptive exercises, enabling students to practice both inside and outside the classroom through repetitive and personalized training, whereas the control group relied on teacher-led pronunciation modeling, repetition drills, textbook-based tasks, and limited individualized feedback. Both groups were taught by the same instructors and followed identical curricular objectives to minimize instructional variability, ensuring that any observed differences in pronunciation development could be attributed more reliably to the use of AI-based mobile technologies rather than external factors. The AI-driven mobile applications were specifically designed to support pronunciation development through advanced speech recognition technologies and focused on segmental aspects, such as individual vowel and consonant sounds, as well as suprasegmental features including word stress, rhythm, and sentence intonation. Students could listen to native-speaker models, record their own speech, and receive immediate automated feedback identifying pronunciation errors and areas for improvement.

These applications employed adaptive learning mechanisms that adjusted task difficulty according to learner performance, allowing personalized practice tailored to individual pronunciation needs, and similar tools have been widely used in previous studies with proven effectiveness in improving pronunciation accuracy and intelligibility [5]. In contrast, traditional methods used in the control group, although providing exposure to correct pronunciation, offered limited opportunities for individualized feedback and extensive practice, particularly in large classes. The intervention lasted eight weeks, during which both groups participated in two pronunciation-focused sessions per week, each lasting approximately 45–60 minutes, with instructional content, learning objectives, and targeted pronunciation features standardized across groups to ensure comparability. At the beginning of the study, all participants completed a pre-test to assess their initial pronunciation proficiency, after which the experimental group engaged in classroom activities followed by independent practice using AI-based mobile applications outside the classroom, while the control group followed the same classroom schedule without mobile-based practice and relied solely on teacher feedback. At the end of the eight-week period, a post-test was administered to both groups to evaluate changes in pronunciation performance, and a questionnaire was distributed to the experimental group to collect data on motivation, confidence, engagement, and perceptions of the usefulness of AI-based pronunciation tools. The collected data were analyzed using both quantitative and qualitative methods: descriptive statistics, including mean scores and score differences, were used to examine pre- and post-test results to identify changes in pronunciation performance within and between groups, while questionnaire responses were analyzed thematically to identify recurring themes related to motivation, confidence, learner autonomy, and overall satisfaction with AI-driven mobile pronunciation practice. By integrating test results with learner perceptions, the study provides a comprehensive understanding of the effectiveness of AI-based mobile applications in pronunciation acquisition.

ANALYSIS AND RESULTS

The study's results reveal that participants in the experimental group exhibited markedly superior improvement in overall pronunciation accuracy compared to those in the control group. Students utilizing AI-driven mobile pronunciation applications demonstrated greater clarity in articulating English phonemes, particularly vowels and consonants that are either nonexistent or significantly different in their native language. These phonetic elements often pose challenges for ESL learners and require extensive, focused practice, which was effectively supported by the AI applications.

In addition to segmental accuracy, significant improvements were observed in suprasegmental aspects such as word stress, rhythm, and phrase intonation. Participants in the experimental group showed increased consistency in applying appropriate stress patterns, resulting in speech that was more natural and comprehensible. Their intonation patterns also displayed greater variation and appropriateness in both declarative and interrogative statements [9]. In contrast, the control group demonstrated only moderate improvement, primarily in the articulation of sounds that were explicitly practiced during instructional sessions. Enhancements in suprasegmental features were limited, indicating that conventional instructional approaches may be insufficient in providing adequate exposure or individualized practice opportunities for the development of prosodic elements in pronunciation.

Post-intervention questionnaire data indicated a significant increase in learner confidence among participants in the experimental group. Many students reported reduced anxiety related to pronunciation practice when using AI-driven mobile applications. Independent practice via mobile devices enabled learners to repeat tasks multiple times without fear of negative evaluation or embarrassment in front of peers. Students emphasized that immediate, automated feedback was one of the most valuable features of the applications. The ability to visually and audibly receive corrections in real time helped learners identify pronunciation errors and implement prompt improvements. This finding supports previous studies highlighting the importance of timely and explicit feedback in pronunciation development [6]. Furthermore, opportunities for autonomous practice fostered a stronger sense of learner independence. Students reported increased responsibility for their own learning and engaged in pronunciation practice beyond classroom requirements.

The majority of participants described the AI-driven pronunciation activities as highly engaging and motivating. Features such as progress tracking, visual reinforcement, and gamification elements (e.g., scores, levels, and achievement badges) encouraged sustained and frequent practice. A substantial number of learners reported practicing pronunciation more frequently than they had prior to the intervention [8]. This elevated level of engagement suggests that AI-driven mobile applications can effectively promote learner autonomy and sustained involvement in pronunciation acquisition. The flexibility of mobile learning allowed students to practice at their own pace, time, and location, thereby making pronunciation training more accessible and seamlessly integrated into daily routines. The findings of this study contribute to existing research on the effectiveness of AI-driven mobile applications in pronunciation instruction. A defining advantage of these technologies lies in their ability to provide immediate and personalized feedback, which is often difficult to achieve in traditional classroom settings, particularly in large or heterogeneous classes.

AI-based systems facilitate the rapid identification and correction of pronunciation errors, thereby enhancing phonological awareness and improving speech accuracy. This result aligns with previous research underscoring the role of computer-assisted pronunciation training in improving intelligibility and accuracy [5]. Another notable benefit identified in this study is the low-anxiety learning environment fostered by mobile pronunciation applications. Private practice reduces performance anxiety and increases learners' willingness to communicate. This is especially beneficial for reticent learners or individuals experiencing pronunciation-related anxiety, a factor known to negatively affect oral performance [7]. Personalization also emerged as a key factor in the effectiveness of AI-driven tools. The adaptive nature of AI applications allows tasks to be tailored to learners' individual needs and proficiency levels. This personalization aligns with learner-centered approaches in contemporary language education and supports differentiated instruction, which is essential in diverse learning contexts. Despite these advantages, the findings emphasize that AI-based technologies should not be regarded as replacements for teachers. Human instructors remain essential for providing contextual explanations, pragmatic guidance, and emotional support. Therefore, the most effective instructional model appears to be a blended approach in which AI tools complement, rather than replace, traditional classroom instruction.

CONCLUSION

This research illustrates that AI-driven mobile pronunciation applications can markedly improve students' pronunciation abilities, especially in terms of segmental precision, suprasegmental characteristics, learner confidence, and engagement. By providing prompt feedback, tailored practice, and opportunities for inde-

pendent learning, these tools assist learners in cultivating clearer, more assured, and more fluent speech. When intelligently integrated with conventional teaching approaches, AI-assisted pronunciation practice offers a robust solution to enduring challenges in pronunciation training. It facilitates more frequent practice, alleviates learner anxiety, and accommodates personalized learning trajectories that are difficult to achieve through traditional approaches alone. As AI technology continues to advance, educators and curriculum developers should consider integrating mobile pronunciation tools into language curricula. Future research should investigate the long-term impacts of AI-assisted pronunciation learning, its effects across various proficiency levels, and its implementation in English for Specific Purposes (ESP) and professional communication contexts.

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13.00.00 Pedagogika fanlari
13.00.01 Pedagogika nazariyasi. Pedagogik ta’limotlar tarixi
13.00.02 Ta’lim va tarbiya nazariyasi va metodikasi (sohalar bo‘yicha)
13.00.03 Maxsus pedagogika
13.00.04 Jismoniy tarbiya va sport mashg‘ulotlari nazariyasi va metodikasi
13.00.05 Kasb-hunar ta’limi nazariyasi va metodikasi
13.00.06 Elektron ta’lim nazariyasi va metodikasi (ta’lim sohalari va bosqichlari bo‘yicha)
13.00.07 Ta’limda menejment
13.00.08 Maktabgacha ta’lim va tarbiya nazariyasi va metodikasi
13.00.09 Ijtimoiy pedagogika
07.00.00 Tarix fanlari
19.00.00 Psixologiya fanlari
01.00.00 Fizika-matematika fanlari
02.00.00 Kimyo fanlari
03.00.00 Biologiya fanlari
09.00.00 Falsafa fanlari
10.00.00 Filologiya fanlari
11.00.00 Geografiya fanlari

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