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ENHANCING ENGLISH LANGUAGE LEARNING FOR YOUNG LEARNERS THROUGH ARTIFICIAL INTELLIGENCE

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Abstract: This study investigates the effectiveness of AI-assisted instruction in improving vocabulary and speaking fluency among 8-10-year-old young English as a second language learners. Through a quasi-experimental design, 30 students were placed in an experimental group using AI-based apps (Lingokids and Google Read Along) and a control group using traditional teacher-led instruction. Data were collected through standardized vocabulary tests, CEFR-based speaking rubrics, and observational checklists. Results revealed that the experimental group had significantly higher gains in vocabulary and speaking performance compared to the control group. The findings highlight the pedagogical potential of AI technologies in early language acquisition, particularly in providing personalized, interactive, and adaptive learning experiences. While the study supports the use of AI tools in primary language classrooms, it also affirms that careful implementation, teacher training, and further longitudinal research are required to ensure sustainable learning outcomes and address ethical concerns.

Key words: Artificial intelligence (AI), language acquisition, young learners, quasi-experimental design, vocabulary acquisition, fluency, gamification, speech recognition, pedagogical practices, engagement

Данное исследование направлено на оценку эффективности использования технологий искусственного интеллекта (ИИ) в расширении словарного запаса и развитии беглой речи у детей в возрасте от 8 до 10 лет, изучающих английский язык. В рамках квазиэкспериментального дизайна 30 учащихся были распределены на две группы: экспериментальную, в которой применялись ИИ-инструменты (Lingokids и Google Read Along), и контрольную, получавшую традиционное обучение под руководством преподавателя. Сбор данных осуществлялся с использованием стандартизированных тестов на знание лексики, шкал оценки устной речи, основанных на CEFR, а также наблюдательных чек-листов. Результаты показали, что учащиеся экспериментальной группы достигли существенно более высоких показателей в усвоении лексики и развитии речевых навыков по сравнению с контрольной группой. Полученные данные свидетельствуют о высоком педагогическом потенциале ИИ-технологий в начальном языковом образовании, особенно в аспектах персонализации, вовлеченности и адаптивности учебного процесса. Вместе с тем, исследование подчёркивает необходимость тщательной интеграции ИИ-инструментов в учебную практику, подготовки педагогов, а также проведения долгосрочных исследований для обеспечения устойчивых образовательных результатов и учёта этических аспектов.

Ushbu tadqiqot sun’iy intellekt (SI) yordamida o‘tkazilgan o‘qitishning 8–10 yoshli ingliz tilini o‘rganuvchi bolalar orasida lug‘at boyligini oshirish va gapirish ravonligini yaxshilashdagi samaradorligini o‘rgandi. Kvazieksperimental dizayn asosida 30 nafar o‘quvchi ikki guruhga bo‘lingan: tajriba guruhi (Lingokids va Google Read Along kabi SI asosidagi vositalardan foydalangan) va nazorat guruhi (an’anaviy o‘qituvchi tomonidan o‘tiladigan mashg‘ulotlarga qatnashgan). Ma’lumotlar standartlashtirilgan lug‘at testlari, CEFR asosidagi og‘zaki nutq mezonlari va kuzatuv ro‘yxatlari orqali yig‘ildi. Natijalar shuni ko‘rsatdiki, tajriba guruhi nazorat

guruhiga nisbatan lug‘at va gapirish ko‘rsatkichlarida sezilarli darajada yuqori yutuqlarga erishdi. Tadqiqot natijalari SI texnologiyalarining boshlang‘ich til ta’limidagi pedagogik imkoniyatlarini, xususan, shaxsga moslashtirilgan, qiziqarli va moslashuvchan o‘rganish tajribalarini ta’minlashdagi rolini ta’kidlaydi. Tadqiqot natijalari SI vositalarini boshlang‘ich sinf til mashg‘ulotlariga integratsiya qilishni qo‘llab-quvvatlasa-da, barqaror o‘rganish natijalarini ta’minlash va axloqiy masalalarni hal qilish uchun ehtiyotkorlik bilan joriy etish, o‘qituvchilarni tayyorlash va uzoq muddatli tadqiqotlar zarurligini ko‘rsatadi.

Introduction and Background

In accordance with the growing global emphasis on English language proficiency, early language learning has become a priority in the majority of education systems. As English continues to be a lingua franca of global communication, there is a growing necessity to equip young learners (YLs) with proficient language skills from an early age. This trend has set off a variety of innovations in language teaching, among which the integration of technology, more precisely Artificial Intelligence (AI), has drawn significant attention. AI has already started making its mark on tertiary education and adult learning, but its application in the area of young learners is still relatively untapped territory. Consequently, while AI technologies have been under much discussion and use in more advanced learning settings, their impact on young children, specifically on language development, is an aspect that must be investigated.

AI technologies have the potential to revolutionize early English language learning through interactive, personalized learning experiences that can cater to individual needs. AI tools can support young learners through interactive, multimodal, and engaging environments that are central to fostering early language learning. Young learners benefit from experiences that provide opportunities for repeated practice, instant feedback, and engaging content—features that a number of AI-based tools have the potential to offer. Research from cognate disciplines demonstrates AI-powered tools such as chatbots (Lee & Warschauer, 2020), speech recognition software (Lin et al., 2021), and AI-supported games (Kukulska-Hulme, 2022) have shown promising results in supplementing language input and promoting learner motivation. By simulating real-life language experiences, these technologies offer students the chance to practice language in a risk-free, controlled environment, which can be especially valuable for children who may otherwise be shy or intimidated in traditional classroom settings.

In particular, learning software with AI is able to provide personalized learning paths, adjust according to students' progress, and provide instant feedback, which not only assists with language acquisition but also with motivating learners. Interactive software like this is designed to track the pace and ability of the learner, with scaffolded support able to simulate the role of a teacher. Hence, AI tools can potentially bridge gaps that could exist in traditional language teaching methods, which at times are limited by the constraints of class size, time, and teacher availability.

The theoretical framework informing application of AI to support young children's language acquisition will generally draw on the work of Lev Vygotsky and his sociocultural theory. Vygotsky especially emphasized the functions of social conversation, scaffolding, and Zone of Proximal Development (ZPD), inside which children can perform tasks with a degree of assistance from a more knowledgeable other, e.g., instructor or peer. AI, in this case, is also a form of technological scaffolding, providing individualized support that allows children to incrementally build new language abilities. Moreover, Vygotsky's ideas about the importance of interactive, dynamic learning environments are reinforced by how AI technologies can provide

immersive, engaging learning experiences. By offering students the capacity to interact with language through chatbots, games, and adaptive learning programs, AI facilitates the social and collaborative aspects of language learning while encouraging individual language practice.

Despite these promising theoretical foundations and the growing use of AI tools for language learning, empirical studies assessing the measurable effects of AI-based learning on specific language skills, such as vocabulary acquisition and speaking proficiency, among children remain scarce. Though research has been conducted on the overall effect of AI on language acquisition, little has been done to examine particularly the effects of AI tools on developing critical language in children in the 8-10 year group. In addition, most available literature would dwell on adult learners or adolescent groups, which means there is a large body of research yet to be carried out on how AI contributes to developing young learners' language capacities.

This study seeks to fill this gap by evaluating the effect of AI-driven instruction on two key areas of language acquisition: learning vocabulary and speaking fluency among children aged 8 to 10. The research will examine whether AI-driven instruction offers a measurable advantage over traditional methods of instruction, which are typically textbook-based and face-to-face interaction between instructors and students. The findings from this research have the ability to inform future teaching practices, highlighting the specific strengths and challenges in using AI resources for early language development.

By investigating the measurable and functional impact of AI learning on early English language learning among children, this study aims to offer quality insights into the future of AI transforming early English language education and improving the learning achievements of young children globally. Furthermore, it will present evidence-based recommendations regarding the incorporation of AI tools within the classroom environment effectively to promote the overall efficacy of educational reform in the 21st century.

Literature Review

As AI technologies continue to be increasingly implemented in the classroom setting, empirical research directly on young children in English as a Foreign Language (EFL) contexts is still limited in scope. Nonetheless, an increasingly larger body of recent studies have begun to investigate how AI-based tools influence the language learning among children aged from 6 to 12.

Lee and Warschauer (2020) conducted a landmark study examining the impact of AI-mediated learning on the acquisition of the English language by primary school students. The study involved controlled comparison of participants with AI chatbots versus participants under conventional instruction. The experiment found that vocabulary development and sentence construction were much improved in the chatbot group. Surprisingly, participants demonstrated increased willingness to communicate, which they attributed as a result of the low-stakes and interactive character of conversational AI.

Kukulska-Hulme (2022) expanded on this work in investigating AI-driven mobile applications that adapt content delivery based on learner input. In her study, young learners using personalized AI learning applications showed improvement in both pronunciation accuracy and lexical recall. The adaptive nature of the applications—combined with gamified interaction—was found to support scaffolded learning in a manner consonant with Vygotskian principles of the Zone of Proximal Development (ZPD).

An additional empirical study by Sandoval et al. (2022) evaluated the efficacy of an intelligent virtual agent designed to support vocabulary acquisition among preschool English language learners. Children using the virtual agent achieved statistically significant vocabulary gains compared to a control group. Importantly, the study highlighted the importance of emotional design and character-driven storytelling in maintaining the interest and motivation of young learners.

Most recently, Cerezo et al. (2024) used a holographic mobile application with a speech-enabled 3D avatar that helped children practice pronunciation via interactive reading exercises. Quasi-experimental results showed that students who used the AI-supported tool exhibited significantly better post-test scores on pronunciation accuracy and fluency. The authors noted that in-time corrective feedback by the AI agent played a crucial role in supporting self-monitoring and prolonged practice.

Panda et al. (2024) explained the role of AI-based language learning systems in shaping linguistic development in children. According to the research, AI-based tools, such as interactive computer programs and automatic translation software, complemented traditional language teaching by providing flexible and interactive learning environments. The integration of AI provided customization, where students could learn independently and improve overall language competence.

Haq (2023) researched how an Augmented Reality English Words Learning (AREWL) system would influence elementary school pupils learning English as a Second Language in rural China. The system employed 3D virtual entities and animations in teaching English spelling and pronunciation. The study came to the conclusion that the app based on AR significantly improved the motivation and motivation of learners and learning outcomes, respectively. However, it further noted that cognitive attainment was reasonably low, signifying that more work needs to be done fine-tuning such technologies.

Qayyum et al. (2024) examined educators' attitudes toward AI-based applications used in early childhood education. The study suggested that while 80% of the educators were of the view that AI applications enhanced learning, concerns were raised about AI's inability to perceive social cues and its requirement of human interaction at early stages of learning. The study emphasized balancing the adoption of AI with human perception and education training in implementing AI.

In addition, Kutahya (2024) addressed the ethical considerations of AI-aided early childhood education. The study cited the benefit of AI in simplifying problem-solving and critical thinking but raised a concern about being careful regarding data privacy and unequal access to technology. It called for these ethical concerns to be resolved so that AI can be utilized equitably and responsibly in learning.

Empirical observations indicate that AI applications can potentially contribute significantly towards the English language learning of children through personalized, interactive, and stimulating experiences. Virtual intelligent agents, holographic apps, and augmented reality spaces have been indicated to be helpful in improving the learning of vocabulary, pronunciation, and motivation levels among learners. However, certain limitations are also there, such as cognitive progress, solving of ethical problems, and maintaining the function of human interaction in initial learning. Future studies must work on improving AI technologies to assist in comprehensive language development and designing frameworks that equilibrate technological innovation with teaching best practices.

Methods

This study utilized a quasi-experimental design to assess the effectiveness of AI-assisted language learning on vocabulary acquisition and speaking fluency among young learners. A total of 30 primary school students aged 8-10, recruited from two comparable schools in an urban area, participated in the study. The participants were randomly assigned to either the experimental group, which received AI-assisted instruction, or the control group, which received traditional teacher-led instruction. There were 15 students in each group, thus an equivalent sample size for statistical comparison.

The intervention was for six weeks, and the two groups received two 40-minute English lessons each per week. The experimental group utilized AI-based language learning software, including Lingokids—a platform that offers games, videos, and activities designed to teach English vocabulary and grammar—and Google Read Along, a speech recognition app that provides personalized reading practice and feedback. These platforms were selected for their focus on stimulating vocabulary development and speaking competence, augmented by AI components that phase themselves to each learner's pace and provide immediate feedback. The control group, in contrast, used a typical curriculum of textbook-based instruction that included a combination of vocabulary practice, reading drills, and speaking exercises taught by the teacher.

To have a general measure of the language ability of students, three data collection tools were used in this research:

1. Vocabulary Test: A normed vocabulary test, pegged to the Cambridge Young Learners English (YLE) levels, was employed to assess the learning of the target vocabulary words. The test included receptive (multiple-choice) and productive (fill-in-the-blank) tasks to assess learners' understanding and use of new vocabulary. The Cambridge YLE levels provided a good benchmark to ensure that the test was appropriate for the age group and represented developmental expectations.

2. Speaking Rubric: Fluency in speaking was assessed via a speaking rubric adapted from Common European Framework of Reference for Languages (CEFR) A1 level descriptors, typically used on beginner-level language learners. The rubric touched on three major criteria: fluency (ability to produce language spontaneously, with little effort and little unemployment of time needed for speech-planning), pronunciation (accuracy and clarity of individual sounds), and vocabulary (scope and appropriateness of words used). Each child's speaking ability was tested using formal exercises, such as picture description and role-plays, both before and after the intervention.

3. Observation Checklist: Teacher observations were made during the intervention to assess the students' participation and engagement. The observation checklist had items for students' participation in the lesson, their willingness to engage in activities, and their interaction with learning materials (either textbooks or AI tools). This checklist provided qualitative data regarding the students' attitude towards the learning process and how motivated they were, which are major determinants of language acquisition.

Data collected from these tools were compared through paired-sample t-tests to examine the pre- and post-test scores within each group and between the experimental and control groups. Paired-sample t-tests allowed for an examination of the within-group changes for vocabulary gain and speaking fluency, as well as comparing the AI-supported and traditional instruction groups' differences in improvement. The statistical level of significance was set at 0.05 for all tests.

By employing both quantitative (vocabulary test and speaking rubric) and qualitative measures (engagement checklist), the study aimed to provide a comprehensive view of how AI-assisted language learning software influences young learners' language growth, specifically in vocabulary enrichment and speaking fluency.

Results

The results of this study demonstrated clear improvements in experimental group learners' vocabulary acquisition and speaking performance, who were provided with AI-assisted instruction, compared to the control group learners, who were given traditional teacher-led instruction.

Vocabulary Acquisition:

The findings of the vocabulary test revealed that the experimental group achieved notable improvement in their vocabulary scores over the course of the six-week intervention. The mean score of the experimental group on the pre-test was 11.4, and it increased significantly to 17.8 on the post-test. The difference was found to be statistically significant, as a paired-sample t-test revealed a t-value of 4.53 ($p < .01$), indicating a large effect of AI-based tools on vocabulary learning.

In comparison, the control group's vocabulary scores increased more modestly. The pre-test mean score of the control group was 11.2 and the post-test mean score was 13.6. Statistical calculation showed that such improvement was not significant with a t-value of 1.78 ($p > .05$), which showed that traditional instruction had a less apparent impact on vocabulary gain.

Group	Pre-test mean	Post-test mean	t-value	p-value
Experimental	11.4	17.8	4.53	<.01
Control	11.2	13.6	1.78	>.05

Speaking Performance:

In fluency of speaking and vocabulary use, 73% of the experimental group students had manifested noticeable improvement in both areas. This was evidenced in their ability to speak more fluently with fewer hesitations and to utilize more diverse vocabulary during speaking activities. The experimental group also manifested better overall pronunciation and more confidence in using English during guided activities such as role-play and picture description.

Conversely, the control group achieved only moderate gains in speaking performance, with the majority of learners achieving limited progress. Although some of the students in the control group were able to produce more fluent speech and use more vocabulary, the gains were not significant statistically and did not show the same level of improvement achieved by the experimental group. Teacher observations also indicated that the control group's involvement in speaking tasks was relatively passive, whereas the experimental group seemed to be more motivated and involved.

Statistical Summary of Speech Performance:

- Experimental Group: Improved in usage of vocabulary and fluency: 73% of the students.
- Control Group: There was some improvement, but there was no statistical difference in disparity in the post-test results.

Overall, the statistical treatment and teacher evaluation show that AI-aided instruction positively influenced vocabulary acquisition and speaking skills, with the experimental group showing far greater improvement compared to the control group. The findings point to the reality that AI-based programs can enhance language learning achievements, particularly in captivating young learners and promoting active participation in the process of learning language.

Discussion and Conclusion

The results of this study validate the hypothesis that AI-assisted language learning environments support the development of better vocabulary and speaking fluency in young English learners. AI tools used within the intervention provided adaptive feedback, multimodal inputs (with audio-visual scaffolds), and interactive task designs that are developmentally appropriate for early learners. These features are consistent with constructivist learning theories, particularly Vygotsky's (1978) Zone of Proximal Development (ZPD), in which learners are assisted by scaffolded interaction that is tailored to their individual needs. The ability of AI to personalize content presentation is key to maximizing the effectiveness of such scaffolding.

The observed improvements in vocabulary retrieval and spoken language production are consistent with findings by Lee and Warschauer (2020), who found more linguistic gain in digitally mediated environments. Along a similar line, Kukulska-Hulme (2022) was eager to point out the affordances of AI for language learning, such as its potential to model purposeful communication and provide corrective feedback in real time, both of which are essential to young learners' development of fluency.

Moreover, the incorporation of gamified elements probably encouraged higher learner motivation, a factor widely established in the literature as central to effective second language acquisition among children (Reinhardt, 2019; Sundqvist & Sylvén, 2016). Interactive story-based activities and games engage children's intrinsic interest, helping to sustain attention and engagement—central factors in environments with low adult supervision or high student-to-teacher ratios.

Despite the promising results, there are several weaknesses with this study. The sample size (N = 30) and its location in a single urban community reduce the external validity of the findings. Moreover, the relatively short intervention period (six weeks) limits conclusions concerning long-term effects of learning, especially retention of vocabulary and maintained gains in fluency. Similarly, the same problems have been indicated in other short-term studies (Godwin-Jones, 2020), which caution that digital tool gains are lost unless they are embedded and supported in the long term.

Future research needs to aim for longitudinal designs which track students across a long period and through many different types of learning environments. Such research needs to include variables such as socio-economic status, household access to technology, and teacher training in the incorporation of AI, factors that influence the effectiveness of technology-based learning interventions.

In conclusion, the study points out the capabilities of AI instruments to assist in early English language acquisition. Their self-adjusting, interactive, and learner-centered features make them particularly well-suited for young learners who enjoy multimodal and real-time feedback mechanisms. Educators and curriculum developers are encouraged to explore AI integration as an ancillary instrument that can enhance pedagogical effectiveness, not a replacement for human instruction. Careful planning, education of teachers, and equitable access must be given the

highest importance to make the benefits of AI felt broadly and sustained in early childhood education.

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