ARTIFICIAL INTELLIGENCE AND LANGUAGE LEARNING APPS

Abstract. Technological advances are expanding the scope of education beyond the traditional classroom, offering different methods and updates for accessing knowledge. It is believed that knowledge serves as a catalyst for change, while technology serves as the driving force behind it, encouraging us to adapt our daily routines. One of the most significant aspects of this educational transformation is the integration of artificial intelligence (AI) into language learning applications. This paper examines the intersection of AI and language learning applications, with a particular focus on evaluating the effectiveness and features of prominent language learning platforms such as Babbel, Busuu, and Duolingo. AI, as a multidisciplinary field, seeks to replicate human-like intelligence in machines, and its implications for education are profound.

Language learning applications, driven by the capabilities of mobile devices, offer personalized and highly efficient language learning experiences. These apps have been instrumental in breaking down language learning barriers and making learning accessible to a global audience. Effectiveness research shows that apps like Babbel and Busuu are able to accelerate language learning and provide users with a fast track to language proficiency. Duolingo, in particular, has revolutionized language learning with its gamified approach. This innovative platform has seen explosive growth, especially during the pandemic, as learners seek engaging and effective ways to learn new languages. The gamification elements embedded in the Duolingo interface create an interactive and fun learning environment, making language learning less tedious and more appealing. These apps break down geographic and financial barriers, making language learning accessible and effective for people around the world. Language education is evolving, and AI-powered language learning apps are at the forefront of this transformation, reshaping the way people learn new languages and fostering a more connected and linguistically diverse world.

Keywords: artificial intelligence, language learning applications, Babbel, Busuu, Duolingo.
Смуглякова Марина Костянтинівна старший викладач, Національний університет кораблебудування імені адмірала Макарова, https://orcid.org/0000-0001-9998-9346

Пономаренко Наталія Миколаївна викладач, Національний університет кораблебудування імені адмірала Макарова, https://orcid.org/0000-0002-2765-8211

ШТУЧНИЙ ІНТЕЛЕКТ ТА ДОДАТКИ ДЛЯ ВИВЧЕННЯ МОВ

Анотація. Технологічний прогрес розширює сферу освіти, вводячи її за межі традиційної аудиторії та пропонуючи різноманітні методи та оновлення для доступу до знань. Прийнято вважати, що знання слугують каталізатором змін, а технології – їх рушійною силою. Одним із важливих аспектів цієї освітньої трансформації є інтеграція штучного інтелекту (ШІ) у програми для вивчення мов. У цій статті розглядається взаємодія між ШІ та додатками для вивчення мов, з особливим акцентом на оцінці ефективності та особливостей таких відомих платформ для вивчення мов, як Babbel, Busuu та Duolingo. Штучний інтелект, як міждисциплінарна галузь, прагне відтворити людський інтелект у машинах, і його вплив на освітню сферу є вагомим.

Додатки для вивчення мов, що спираються на можливості мобільних пристроїв, пропонують персоналізований та високоефективний досвід вивчення мов. Ці додатки стали важливим інструментом у подоланні бар'єрів на шляху до вивчення мови, забезпечуючи доступність навчання для глобальної аудиторії. Результати досліджень ефективності показують, що такі додатки, як Babbel і Busuu, дозволяють прискорити вивчення мови, пропонуючи користувачам швидкий шлях до мовної компетенції.

Duolingo, зокрема, здійснив революцію у вивченні мов завдяки своєму гейміфікованому підходу. Ця інноваційна платформа зазнала стрімкого зростання, особливо під час пандемії, оскільки студенти шукають цікаві та ефективні способи вивчення нових мов. Елементи гейміфікації, вбудовані в інтерфейс Duolingo, створюють інтерактивне та приємне навчальне середовище, що робить вивчення мови привабливим та менш виснажливим. Ці додатки дозволяють географічні та фінансові бар’єри, роблячи вивчення мов доступним та ефективним для людей з усього світу.

Ключові слова: штучний інтелект, додатки для вивчення мов, Babbel, Busuu, Duolingo.
Introduction. The advent of the 21st century has brought significant changes in the field of education, particularly in terms of learning processes and outcomes. Intelligent machines, a product of AI, are playing a significant role in reshaping the functions of schools, educators, and students. They are poised to revolutionize both traditional and virtual modes of interaction within the educational landscape. Educators and students engage with interactive machines to share educational experiences and achieve educational goals. These machines provide dynamic learning platforms that engage in discussions with students and respond to their questions and feedback. They address long-standing classroom challenges such as maintaining student attention, encouraging motivation, accommodating individual learning differences, and supporting students with special needs. Through feedback mechanisms, they improve student performance levels and cultivate positive attitudes toward the teaching and learning process. In addition, AI applications offer solutions to the problem of interaction in large classrooms. These aspects experience direct and beneficial effects through the integration of AI applications into the teaching and learning process [14, P. 106].

Literature review. Several works touch upon the application of artificial intelligence in language learning apps. G. Al-Gayyar highlights that AI applications in education encompass various intelligent systems, with online electronic learning systems being particularly crucial. These systems represent one of the most significant applications of AI in education, resulting from the integration of multiple AI components, such as Intelligent Tutoring Systems, internet activation, hypermedia utilization, and distance e-education [3, P. 503-504]. N. Muhammad provides a comprehensive view of AI applications, which include electronic neural networks, hybrid systems, developmental algorithm applications, electronic auto-copying, adaptive electronic platforms, bio-robots, nanotechnology, chemical and organic systems, and advanced control systems [23, P. 18].

Discussing the importance of AI applications in student evaluation processes at both university and pre-university levels, N. Borge states that AI facilitates precise assessment of student proficiency, a task often challenging to accomplish manually. It empowers university educators to evaluate the effectiveness of educational processes, pinpoint deficiencies in lectures, scientific content, and educational materials, and tailor assignments to individual student abilities and needs. AI’s intelligent programs can identify common mistakes, provide instructors with insights into problem areas, and offer instant feedback through individualized files for each student. Furthermore, AI tools and programs are capable of managing high classroom volumes [9, P. 10-11]. A. Singh and R. Shree emphasize the use of natural language processing in AI to improve machine learning’s ability to recognize and process different languages [27].

Z. Yang focuses on the use of an intelligent learning assistant based on automatic speech recognition to improve translation and dialogue accuracy in
language learning apps [33]. A. Gangopadhyay et al.’s work discusses an app framework that uses machine learning to democratize language learning, allowing users to freely choose source and target languages and providing real-time feedback on pronunciation [16]. These papers demonstrate the potential of AI in language learning apps, including features such as translation, pronunciation feedback, conversation platforms, and natural language processing.

The aim of the article is to explore and discuss the use of artificial intelligence and language learning applications. It provides an overview of the role of AI in education, particularly language learning, and discusses the features and effectiveness of prominent language learning apps like Babbel, Busuu, and Duolingo.

The methodology for this article involves a comprehensive analysis of three prominent language learning apps including Duolingo, Babbel, and Busuu. The research also includes a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to provide insights into the key attributes, challenges, and potential areas for growth and improvement for these apps.

The Notion of Artificial Intelligence. The term “artificial intelligence” was first coined in 1956 by John McCarthy and his colleagues [18, P. 57]. During that period, researchers gathered to provide clarity and coherence to the concepts surrounding thinking machines, which had previously been quite diverse and fragmented. McCarthy is credited with choosing the term “artificial intelligence” due to its neutral nature. This choice aimed to avoid favoring any specific approach among the various paths being explored in the field of thinking machines, which included cybernetics, automata theory, and complex information processing.

The proposal for the conference where the term was introduced stated that the study was to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. This statement reflects the ambitious belief that all aspects of human learning and intelligence could be described in such detail that machines could be created to replicate them. This foundational idea laid the groundwork for the development of the field of artificial intelligence.

AI indeed encompasses a vast and multidisciplinary field of science, drawing from various domains such as computer science, psychology, philosophy, linguistics, mathematics, etc. Given its interdisciplinary nature and the rapid advancements in the field, it is no surprise that there are numerous viewpoints and a multitude of definitions of AI. These diverse perspectives reflect the complexity and evolving nature of AI as researchers and practitioners from different backgrounds contribute to its development and understanding. As a result, AI remains a dynamic and continually evolving field, with ongoing debates and discussions about its scope, capabilities, and implications.
Dictionary definitions highlight that AI is a sub-discipline within computer science that revolves around the replication of human-like intelligence in machines. This involves the simulation of intelligent behaviors within computers and the capacity of machines to mimic intelligent human actions [4].

In accordance with the definition found in The Cambridge Handbook of Artificial Intelligence, artificial intelligence, often referred to as AI, is an interdisciplinary approach aimed at comprehending, modeling, and generating various forms of intelligence [28]. It serves as a vital component of cognitive science, and its impact is increasingly extending into other domains, including the humanities. The applications of AI are revolutionizing our interactions with one another and with our surroundings, and the pursuit of artificially modeling intelligence is yielding fresh insights into the human mind while uncovering novel manifestations of cognitive processes.

Amidst the varied viewpoints and diverse perspectives found in these definitions of AI, a common thread emerges. The overarching idea shared among them is that AI is a cross-disciplinary field of scientific inquiry with the objective of instilling forms of intelligence akin to humans into various types of non-biological machinery, including robots, computers, and other apparatuses. This pursuit aims to generate systems and applications that prove beneficial to our species. In essence, AI seeks to replicate and apply human-like intelligence to advance technology for the benefit of humanity.

Mobile Apps in Learning. The rapid evolution of media communication, especially the rise of mobile media since the turn of the millennium, coupled with the growing digital literacy of newer generations, has created opportunities for integrating virtual and augmented realities into various mobile applications. The widespread adoption of smartphones has revolutionized many aspects of our daily lives, including personal communication, banking, shopping, navigation, and transportation. Similarly, education is being transformed by the influence of these technologies. Digital communication now plays a central role in our daily activities, and in an educational context, there is potential to employ this to promote healthy competition, as suggested by H. Leligou et al. [21, P. 3].

In traditional learning, communication has typically been limited to face-to-face interactions between the instructor and the learner within a specific physical environment. However, the integration of technology into this environment has brought about significant changes in the way we approach learning as a communicative process. This shift has given rise to new concepts such as edutainment, e-learning and interactive learning, as highlighted by Z. Okan [25, P. 256]. In addition, there is a discernible trend away from the use of traditional technologies such as desktop computers in favor of mobile technologies such as mobile phones.
Mobile learning is considered effective in improving educational outcomes because it amplifies the opportunities for education and promotes personalized, widely accessible, and collaborative learning, all centered around the learner [8, P. 614]. This approach is tailored to align with the learners’ objectives, as well as their preferred timing, location, and pace of learning. However, previous research has primarily highlighted the mobile aspects by characterizing learning as ubiquitous through mobile wireless information systems [32].

Mobile learning is gaining acceptance as an effective strategy for creating highly engaging educational experiences, supported by a growing body of evidence. However, challenges in mobile language learning can be categorized into three domains: physical, educational, and psychosocial [7, P. 612].

Physical challenges encompass issues related to factors like screen size, input methods, storage capacity, processor speed, and battery life. Many of these limitations have been common findings in prior research, and as a result, many research recommendations focus on providing affordable mobile devices that maximize technological capabilities.

On the other hand, psychosocial aspects pertain to the social dimension and impact of mobile learning. While laptops or desktop computers are often shared for formal education or work-related purposes, mobile devices are more personal, customized, and socially interactive. Mobiles have the ability to connect users through social platforms with others who share common interests and languages, enhancing user interaction.

The term ‘computer-assisted language learning’ (CALL) was initially coined in the early 1980s when the field primarily revolved around desktop computers with basic software programs. However, as technology evolved, the field expanded to include online websites, video blogs, digital courses, online learning platforms, and applications. The emergence of mobile technology further extended this domain, leading to the concept of ‘mobile-assisted language learning’ (MALL). MALL is applicable in both formal and informal language education contexts [20]. It shifted the focus towards personalized learning, emphasizing the continuous accessibility of learning materials on portable devices, creating new opportunities for language learning. Although people have been using personal mobile devices for a while, MALL is considered a relatively new research area.

One significant advantage of MALL over traditional face-to-face learning or skill acquisition is the flexibility it offers. This flexibility allows learners to access learning materials at their convenience, along with additional interactivity features that enhance connectivity and language learning possibilities.

Research studies have observed that mobile devices equipped with language learning apps can serve as effective tools for language learners. For example, A. Azar and H. Nasiri found that mobile learning improved learners’ listening
skills [5, P. 1842]. They investigated how English learners perceived mobile-assisted language learning (MALL) in terms of its efficiency for audio comprehension, concluding that it was a practical learning approach.

In a different study, the efficiency of MALL stemmed from its ability to provide access to study materials at any time and place, aided by technology. M. Alemi, S. Anani, and Z. Lari approached mobile language learning uniquely by examining the impact of sending and receiving short text messages containing foreign words [2]. They explored various aspects such as word meanings, sentences, vocabulary choices, and memory retention. Their results indicated that in the short term, there was no significant difference between learning vocabulary through short text SMS messages and using a traditional dictionary. However, in terms of long-term retention, vocabulary acquired through SMS messages was better recalled than that learned through the conventional dictionary method.

MALL boasts several appreciated advantages. Mobile devices are readily available, portable, and relatively affordable, making access to study materials easier. Key merits of MALL include personalization, control over when and where to study, self-testing, and quicker feedback. This approach is engaging and interactive, fostering learner motivation and encouraging active learning [13, P. 86].

The overview of the main language apps – Babbel, Busuu, and Duolingo. Babbel entered the app market in 2007, positioning itself as a pioneer in the language learning app industry. It has since become the highest-earning language learning app globally. With over 10 million downloads and 14 different language courses, it ranks as the third most used language learning app, offering courses in seven learning languages. Babbel boasts a high rating of 4.5 out of 5 based on approximately 582,005 user reviews and was recognized as the best app by both the Apple Store and Google Play in 2014. In 2015, it was declared the favorite app of the year in nine countries. Furthermore, in 2016, the American business journal Fast Company awarded Babbel the title of the most innovative company of the year in the education sector [22].

Efficiency research on Babbel was conducted by John Grego and Roumen Vesselinov, who also studied the efficiency of Duolingo and Busuu. Their research sparked a debate on whether Babbel app users, particularly those at the beginner level of a foreign language, could meet the outcome requirements of one semester of college training in just 21 hours of learning using Babbel within two months [31]. According to their published data, Babbel was ranked as more effective than both Duolingo and Busuu. Busuu required 22.5 hours, while Duolingo needed approximately 34 hours to achieve similar outcomes. This research placed Babbel at the top of the hierarchy as the most efficient app for language learning beginners [31].

Babbel’s approach combines communicative didactics, behaviorism, cognitivism, and constructivism, branding itself as a powerful app that offers “the
shortest path to real-life conversation” [6]. What sets Babbel apart is its use of real human voices and dialogues from native speakers, providing a genuine and non-robotic learning experience. The app promises to empower users, helping them gain confidence. Babbel’s structured approach involves short learning units that cover topics like travel, local cuisine, culture, and nature, engaging users on a daily basis. Each unit includes interactive lessons lasting approximately 5 to 10 minutes, encompassing all four language learning skills: reading, speaking, writing, and listening. Voice recognition technology is utilized to develop proper conversations [6].

The learning method is rooted in cognitive psychology scientific approach, with each phase of training connecting to the next to build a robust knowledge model. All tasks involve dialogues and scenarios users might encounter in real life, with a focus on practical, everyday conversations [6].

While Babbel offers a unique and effective service, it is not open-access; access to course content is contingent on subscription payments. The subscription fees are variable, depending on factors such as the selected language, the purpose of learning (e.g., travel or academic requirements), and duration (e.g., per month, quarterly, or annually). Babbel’s value proposition lies in its personalized platform tailored to individual needs [6].

The Busuu app was first launched in 2008 by Bernhard Niesner and Adrian Hilti. It is currently the largest social language learning website globally, as highlighted by Vesselinov & Grego [30]. The name “Busuu” originates from a nearly extinct native language in Cameroon. Its primary development focus is on integrating social communication elements into personalized digital language learning. Busuu achieves this through chat rooms and video rooms where users can have their language tasks corrected by native speakers. The idea is that a native speaker can provide better assistance and corrections to language learners compared to another learner.

Busuu has been downloaded over 80 million times and offers courses in 12 languages, making it the second most downloaded language learning app. As of January 2019, it had over 90 million registered members on its social network and an average rating of 4.3 out of 5, with approximately 260,000 reviews [10].

Busuu courses consist of around 61 training sessions and approximately 340 units [30]. Each lesson includes grammar and vocabulary units, along with conversation practice for advanced proficiency. The communicative aspect is reinforced through exchanges with native speakers. Unlike Duolingo, Busuu is not free, and users must purchase monthly or annual subscriptions, which may explain why it has fewer positive reviews. However, Busuu offers certifiable classes for proficiency levels ranging from A1 to B2 as per the Common European Framework of Reference (CEFR). Their partnership with McGraw-Hill Education, a prominent educational publisher, starting in 2015, further supports Busuu’s claim that it can help learners reach a higher B2 level.
Busuu courses cover essential aspects of language learning, helping learners improve listening, speaking, reading, writing, grammar, vocabulary, and pronunciation skills. The last three skills – grammar, vocabulary, and pronunciation – are considered the most crucial and receive more extensive practice [11].

Busuu vision is built around four core elements. Firstly, it emphasizes high-quality learning achieved through collaboration with experienced teams. Secondly, it promotes learning directly with native speakers to facilitate authentic communication. Thirdly, Busuu positions itself as highly efficient in the mobile-assisted language learning (MALL) market, with research indicating that just 22 hours of Busuu learning can achieve results equivalent to a full semester of traditional language training. Finally, it emphasizes accessibility, allowing users to learn anywhere and anytime, with courses available online and offline [11].

Research conducted by John Grego and Roumen Vesselinov indicates that Busuu users require an average of 22.5 hours of learning over two months to cover the material equivalent to a single language college semester. This is approximately 1.5 times more efficient than Duolingo, which may take up to 34 hours to achieve the same level of learning. The research utilized the Web-Based Computer Adaptive Placement Exam (WebCAPE test) and the university fundamental arrangement test to assess language proficiency [30].

The founders of the Duolingo app, von Ahn and Hacker, initially conceived the idea while working on their doctoral studies to develop educational apps [17, P. 44]. Their primary goal was to create a platform for 100% free language learning. Currently, Duolingo boasts the highest user popularity, with over 150 million users worldwide. In the United States, more people are using the Duolingo app to learn or practice a new language than those enrolled in the public school system. Initially, von Ahn aimed to find a more efficient way for internet users to interpret English-language websites, but there were not enough bilingual individuals available for accurate translations. Duolingo emerged as a project that unexpectedly diverged from Hacker's original doctoral research goals [26].

A. Randall and M. Jašková describe Duolingo as a descriptive linguistics translation platform with a structured progression system similar to a gaming architecture [19]. Learning progress depends on mastering basic levels and advancing through branching tree levels. Duolingo utilizes algorithmic systems to tailor user experiences based on individual preferences. Collaborative filtering is a commonly used algorithm, and memory-based filtering is the conventional prediction model [34].

Duolingo incorporates elements of gamification, inspired by digital puzzle games like Candy Crush, where users earn points for completing tasks. However, Duolingo differs from immersive role-playing games as it breaks lessons into bite-sized activities that can be completed anywhere, making learning feel more engaging and less tedious [12].
The transition from a typical descriptive linguistics translation approach to the most prevalent language learning platform in 2016–2017 has attracted a significant number of language learners, particularly due to the new affordances of mobile media. P. Ajisoko found that over 75% of learners strongly believe that Duolingo helps them understand and practice vocabulary [1, P. 153]. Another study involving students from two learning institutions showed that learners found Duolingo easy, enjoyable, and beneficial for their studies, preferring it over traditional books and written homework [24, P. 86].

Duolingo allows users to set the language of instruction to their language of preference, providing lessons in that chosen language. The app offers basic modules like Basics 1, Basics 2, and Phrases. Users progress step by step through essential course prerequisites before gaining access to more advanced levels. The tasks involve activities such as word matching, dictation, translation between two languages, gap filling, and grammatical tips [15].

Duolingo offers courses in 32 languages for English learners, with 21.8 million active members, constituting 7.2% of all users. As of 2020, the platform boasted a total of 500 million users, with around 40 million active users on a monthly basis. The platform also offers courses in various languages, although many are still in development. As of the end of 2019, Duolingo provided 39 learning languages, all facilitating English learning as a foreign language, with additional languages based on user preferences [29].

Duolingo user base surged during the initial wave of the global pandemic in March 2020, with 30 million new users turning to the app for language learning [29]. Duolingo’s vision centers on three essential elements. Firstly, it aims to provide personalized learning accessible to all users, regardless of their learning abilities, through modern technology. The app uses data analysis of user feedback to adapt the learning experience. Secondly, Duolingo strives to make learning enjoyable by integrating puzzles into the interface, creating engaging alternatives to traditional textbook learning. Lastly, it emphasizes universal accessibility, offering a free service with no hidden fees and affordable subscription options [15].

Duolingo offers three types of accounts: Regular, For Schools, and Duolingo Plus. The For Schools account allows educators to track students’ progress, specifically designed for educational institutions. Duolingo Plus provides additional features such as offline courses, ad-free browsing, maintaining monthly streaks, and progress tracking quizzes. Duolingo Plus is the only paid version, available at $6.99 per month. The app also offers a one-week free trial for the premium account, but the Regular account will always remain free [15].

Duolingo has an “Incubator” section where users can contribute to the development of language courses. The company also provides flashcards, a
dictionary, reading exercises, and podcasts. Duolingo maintains an active presence on social media, particularly on Twitter, and engages with users through platforms like Facebook and YouTube. The platform also hosts forums and blogs for discussions and language-related conversations, encouraging member interaction [15].

Using SWOT analysis, we will explore the strengths that have propelled these apps to prominence, examine the weaknesses that may hinder their growth, uncover the opportunities for further development, and assess the threats that loom on the horizon for these language learning giants. It will help to gain valuable insights into the features of language learning applications and the strategies employed by these apps to promote language acquisition.

**Table 1**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>User Base:</strong> Collectively, these apps have amassed a vast user base, with Duolingo boasting over 150 million users, Babbel with its pioneer status, and Busuu's social language learning approach.</td>
<td>1. <strong>Monetization Models:</strong> Duolingo relies heavily on a free model with monetization challenges, while Babbel and Busuu use subscription-based models, potentially limiting access for cost-conscious users.</td>
</tr>
<tr>
<td>2. <strong>Effective Learning Approaches:</strong> Each app offers unique and effective language learning approaches. Duolingo engages users through gamification, Babbel provides a structured and comprehensive learning experience with real human voices, and Busuu integrates native speaker interactions for authenticity.</td>
<td>2. <strong>Limited Language Selection:</strong> While they offer multiple languages, the range of languages available on these apps is still limited compared to the total number of languages spoken worldwide.</td>
</tr>
<tr>
<td>3. <strong>Global Accessibility:</strong> All three apps aim to provide global accessibility, with various language offerings and offline access options.</td>
<td></td>
</tr>
<tr>
<td>4. <strong>Research-Backed:</strong> Both Babbel and Busuu have research supporting their effectiveness in language learning, appealing to users seeking evidence-based approaches.</td>
<td></td>
</tr>
<tr>
<td>OPPORTUNITIES</td>
<td>THREATS</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>1. Expanded Language Offerings:</strong> All three apps could expand their language offerings to cater to a more diverse user base, especially by including less commonly taught languages.</td>
<td><strong>1. Competition:</strong> The language learning app market is highly competitive, with new entrants frequently emerging and established players continually improving their offerings.</td>
</tr>
<tr>
<td><strong>2. Advanced Learning Modules:</strong> Introducing more advanced and specialized learning modules could attract users seeking higher proficiency levels.</td>
<td><strong>2. Price Sensitivity:</strong> As users increasingly seek cost-effective or free language learning solutions, subscription-based models may face challenges.</td>
</tr>
<tr>
<td><strong>3. Collaborative Learning Features:</strong> Implementing collaborative learning features that facilitate interactions between users could enhance the social aspect of language learning.</td>
<td><strong>3. Changing User Preferences:</strong> Shifting user preferences and learning trends could impact the popularity and relevance of these apps over time.</td>
</tr>
<tr>
<td><strong>4. Flexible Pricing:</strong> Offering more flexible pricing options, such as tiered subscription plans or discounts, may make the apps more accessible.</td>
<td></td>
</tr>
</tbody>
</table>

Thus, Duolingo, Babbel, and Busuu each have their strengths and weaknesses, but they collectively represent a diverse range of language learning options catering to various user preferences and needs. To remain competitive and relevant in this dynamic market, these apps need to continually adapt to changing user demands and explore opportunities for expansion and innovation.

**Conclusion.** The intersection of artificial intelligence and language learning apps has introduced us to a new era of accessible, personalized, and efficient language education. Language learning is evolving rapidly, and technology, particularly mobile apps, is at the forefront of this transformation. AI-powered tools offer personalized platforms that engage students, enhance learning outcomes, and address various educational challenges. From intelligent tutoring systems to online learning platforms, AI is transforming the roles of educators, students, and institutions [35].

Mobile learning, facilitated by smartphones and tablets, is a pivotal component of this educational transformation. Language learning apps like Babbel, Busuu, and Duolingo have harnessed the power of AI and mobile technology to provide effective language education. These language apps have undergone
efficiency research, with Babbel and Busuu showing promise in providing accelerated language learning experiences. Duolingo, with its engaging and gamified interface, has experienced explosive growth, particularly during the pandemic.

In summary, the synergy of AI and language learning apps is reshaping how individuals acquire new languages. These apps offer accessible, efficient, and engaging language education experiences, democratizing language learning for people around the world. As technology continues to advance, we can expect further innovations in AI-driven language education, making it more accessible and effective than ever before.

References:
Література: