UDC 001.891.32:167.2 (37) https://www.doi.org/10.69927/BNFE5274

*S. Abisheva[1], N. Mirza[2]
[1,2] NJSC "Karaganda University named after academician Ye.A. Buketov", Karaganda, Kazakhstan
[1]ORCID 0000-0001-7993-9333
[2]ORCID 0000-0001-8938-1812
*(E-mail: sandugash.abisheva@gmail.com)

ENHANCING EARLY CHILDHOOD SPEECH DEVELOPMENT THROUGH DIGITAL TECHNOLOGIES: A SYSTEMATIC REVIEW

Abstract

The rapid integration of digital technologies into educational structures significantly changes traditional methods of speech development in early childhood. This systematic review examines the field of digital tools and their application in supporting language acquisition and the development of speech skills in young children. Based on selected empirical and theoretical studies published from 2020 to 2024, this article synthesizes the results from publications in peer-reviewed journals to analyze the impact, benefits and problems of using digital technologies in speech development in early childhood. The main conclusions show the significant role of interactive applications, games and advanced technologies in expanding vocabulary, pronunciation accuracy and communicative competence. In addition, the review highlights the role of parental involvement in the digital space to ensure balanced and high-quality interaction with digital content. Despite the positive results, the article also lists potential drawbacks, including concerns about screen time and the educational quality of available apps. In conclusion, the review suggests a reasonable integration of digital technologies into early development of young children, focusing on the need for high-quality content, parental guidance and balance with interaction in the real world.

Keywords: early childhood education, speech development, digital technologies, parental involvement, screen time, interactive learning, digital game-based learning

Introduction. In the digital age, the integration of technology into educational practices has opened new avenues for enhancing learning and developmental processes, particularly in early childhood. Speech development during early years is crucial for cognitive development, social interaction, and academic success. As traditional methods of speech development evolve, digital technologies emerge as powerful tools to support and enhance these processes. This paper explores the modern methods and tools for speech development in early childhood, focusing on the utilization of digital technologies [1].

The significance of speech and language skills in early childhood cannot be overstated. These skills are foundational for effective communication, emotional expression, and the development of reading and writing abilities. However, the landscape of speech development is changing rapidly with the advent of digital technologies. These technologies offer innovative approaches to engage children in speech and language activities, providing interactive, personalized, and contextually rich experiences [2].

By bridging the gap between traditional speech development methods and modern digital solutions, this systematic review aims to provide insights into the potential benefits and drawbacks of digital technologies in early childhood speech development. Through a comprehensive review of the literature, we seek to contribute to the ongoing discussion on best practices for integrating technology into early childhood education [3].

Methods and materials. The database Dimension was used for the analysis of the existing studies. The inclusion criteria were designed with precision, focusing on identifying peer-reviewed articles that embody the integration of modern methods and digital tools in the speech development of early childhood. Specifically, the criteria for inclusion were as follows:

Peer-Reviewed Articles: Only articles that have undergone the rigorous peer-review process were considered. This criterion guarantees the credibility and academic integrity of the research findings.

Modern Methods and Tools: The focus was on studies that explore the use of digital technologies in speech development, reflecting current trends and innovations in the field.

Early Childhood: The age range was strictly defined to early childhood, ensuring the research directly relates to the critical developmental stage relevant to our study.

Publish between 2020-2024: Articles published between 2020 and 2024 were targeted. This timeframe ensures the inclusion of the most recent studies, reflecting the latest developments and understanding in the field.

Empirical and Theoretical Research: Both empirical studies, which provide observable data, and theoretical research, which offer deep insights into underlying principles and frameworks, were included.

Field of Research: The scope was limited to studies within the realms of Language and Communication, Education, and Screen and Digital Media, directly aligning with our research objectives.

To further refine our dataset and eliminate studies that do not meet our specific research needs, several exclusion criteria were also applied:

Non-Peer-Reviewed Materials: Proceeding papers, book reviews, book chapters, and editorial materials were excluded to maintain a focus on peer-reviewed articles only.

Accessibility: Articles not available in full text were omitted from our selection to ensure that a comprehensive analysis could be conducted.

Based on our research topic, we chose key terms like speech development, digital tools, early childhood, language apps, and educational technology. Using these terms, we found 1 284 articles. After a detailed review, we selected 65 articles that closely matched our research area. Out of these, 10 articles directly answered our research question. To make our analysis clear and well-organized, we used the PRISMA flowchart [4], which stands for "Preferred Reporting Items for Systematic Reviews and Meta-Analyses," as shown in Figure 1. We initially removed any records related to automatic tools at the start (Figure 1).

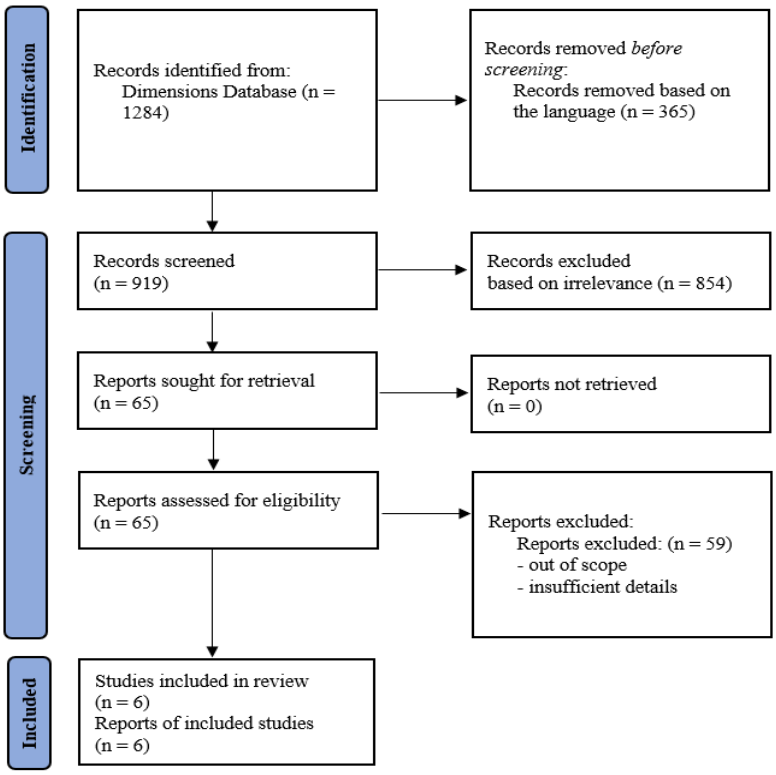

Figure 1. Search strategy PRISMA flow diagram

Source: Template [4]. Data: the authors

Results and Discussions. The table below presents a synthesized overview of key findings from recent studies on the role of digital technologies in early childhood development, specifically focusing on speech development. It categorizes the insights into six distinct areas: the impact of

digital tools, the importance of parental involvement, the application of innovative technologies, the benefits of digital game-based learning (DGBL), the educational quality of children's apps, and the effects of screen time on young learners. Each category is assessed for its impact, ranging from high to moderate, and is accompanied by a brief summary of the relevant details. This structured approach offers a comprehensive snapshot of the current research landscape, highlighting both the opportunities and challenges presented by the integration of digital technologies in early childhood education (Table 1).

Table 1. Impact of Digital Technologies on Early Childhood Speech Development: Key Insights

No.	Keypoint	Impact	Details
1	Digital Tools	High	Vocabulary expansion, pronunciation feedback, enhanced communication through interactive apps and games.
2	Parental Involvement	Significant	Guidance in digital technology use, screen time balance, and high-quality content engagement.
3	Innovative Technologies	High	AI, cloud computing, IoT, and AR for personalized, interactive learning experiences.
4	Digital game-based learning	Significant	Improves cognitive abilities and educational outcomes, fostering intellectual development.
5	Digital App Quality	Moderate	Need for more engaging and educational app development due to low quality and advertisements.
6	Screen Time	Moderate	Passive screen time is detrimental, while active screen time does not negatively impact phonological memory.

Source: created by the authors

Based on our findings, the review collectively underscores the multifaceted impact of these technologies, spanning from vocabulary enhancement to cognitive development, while also highlighting the indispensable role of parental involvement and the need for careful consideration of screen time and app quality.

Nikolaeva et al. highlight the effectiveness of interactive applications and games in promoting vocabulary expansion, word learning, and communication skills, along with the integration of speech recognition technology for feedback on pronunciation and language use, thus supporting speech development in early childhood.

The importance of parental involvement in guiding the use of digital technologies for speech development, ensuring engagement with high-quality educational content, and balancing screen time is emphasized, underlining the role of parents in fostering a conducive learning environment [5].

Li and Jan's research introduces an innovative language education resource management system leveraging AI, cloud computing, IoT, and AR, aimed at offering personalized and interactive learning experiences for preschool children, signifying a promising future for early childhood language education [6, 7].

Behnamnia et al. discuss the substantial improvements in cognitive abilities and educational outcomes facilitated by digital game-based learning, underscoring its potential as a powerful tool for intellectual development in early childhood education [8].

Meyer et al. evaluate the educational quality of children's apps, noting the low ratings often attributed to free apps due to intrusive ads and a lack of engaging content, highlighting the need for more substantial educational app development [9].

Veraksa et al. examine the differential impacts of passive and active screen time on preschool children's phonological memory, suggesting a nuanced approach to screen time's role in early childhood speech development [10].

These references provide a solid foundation for understanding the multifaceted impacts of digital technologies in early childhood education, from enhancing language development to the critical role of parental involvement and the need for high-quality educational apps.

Conclusion. The systematic review demonstrates how digital tools and technologies can positively impact early childhood language and speech development. Interactive apps and games, along with advanced technologies like AI and augmented reality, provide unique opportunities for learning and growth. However, the involvement of parents is crucial to guide this digital interaction and ensure a healthy balance of screen time. The studies also call attention to the quality of educational apps and the varied effects of screen time, emphasizing the need for careful consideration and quality control in digital content for children. Moving forward, it's clear that leveraging digital tools effectively requires a balanced approach, where the benefits are maximized, and potential drawbacks are carefully managed to support the comprehensive development of young learners.

REFERENCES

1 Bochicchio V. Digital media inhibit self-regulatory private speech use in preschool children: The “digital bubble effect” / V. Bochicchio, K. Keith, I. Montero, C. Scandurra, A. Winsler // Cognitive development. — 2022. — Vol. 62. — DOI: 10.1016/j.cogdev.2022.101180

2 Kucker, S. C. (2021). Processes and pathways in development via digital media: Examples from word learning. Infant Behavior and Development, 63, Article 101559. https://doi.org/10.1016/j.infbeh.2021.101559

3 Mahmoud, A. M., Al-Tohamy, A. M., & Abd-Elmonem, A. M. (2021). Usage time of touch screens in relation to visual-motor integration and the quality of life in preschool children. Journal of Taibah University Medical Sciences, 16(6), 819–825. https://doi.org/10.1016/j.jtumed.2021.06.003

4 Page M.J. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews / Page M.J., McKenzie J.E., Bossuyt P.M., Boutron I., Hoffmann T.C., Mulrow C.D., et al. // BMJ 2021. – Vol. 372. - N.71. – P. 1-9. http://dx.doi.org/10.1136/bmj.n71

5 Nikolaeva, E.I., Kalabina, I.A., Progackaya, T.K., Ivanova, E.V. (2023). Ground Rules for Preschooler Exposure to the Digital Environment: A Review of Studies. Psychology in Russia: State of the Art, 16(4), 37–54. http://doi.org/10.11621/pir.2023.0403

6 Li, Q., & Jan, N. (2022). A study on mobile resources for language education of preschool children based on wireless network technology in artificial intelligence context. Computational and Mathematical Methods in Medicine, 2022, Article 6206394. https://doi.org/10.1155/2022/6206394

7 Luo, W., Yang, W., & Berson, I. R. (2024). Digital transformations in early learning: From touch interactions to AI conversations. Early Education and Development, 35(1), 3-9. https://doi.org/10.1080/10409289.2023.2280819

8 Behnamnia, N., Kamsin, A., Ismail, M.A.B., et al. (2023). A review of using digital game-based learning for preschoolers. Journal of Computer Education, 10, 603–636. https://doi.org/10.1007/s40692-022-00240-0

9 Meyer, M., Zosh, J. M., McLaren, C., Robb, M., McCaffery, H., Golinkoff, R. M., Hirsh-Pasek, K., & Radesky, J. (2021). How educational are “educational” apps for young children? App store content analysis using the Four Pillars of Learning framework. Journal of Children and Media, 15(4), 526-548. https://doi.org/10.1080/17482798.2021.1882516

10 Veraksa N, Veraksa A, Gavrilova M, Bukhalenkova D, Oshchepkova E and Chursina A (2021) Short- and Long-Term Effects of Passive and Active Screen Time on Young Children’s Phonological Memory. Front. Educ. 6:600687. http://doi.org/10.3389/feduc.2021.600687

*Абишева С.К.[1], Мирза Н.В.[2]
[1,2] «Академик Е.А.Бөкетов атындағы Қарағанды университеті» КЕАҚ, Қарағанды, Қазақстан

ЖАС БАЛАЛАРДЫҢ ТІЛДІК ДАМУЫН ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАРДЫҢ КӨМЕГІМЕН НЫҒАЙТУ: ЖҮЙЕЛІК ШОЛУ

Аннотация

Цифрлық технологиялардың білім беру құрылымдарына жылдам интеграциясы ерте балалық шақта сөйлеуді дамытудың дәстүрлі әдістерін айтарлықтай өзгертуде. Бұл жүйелі шолуда цифрлық құралдар және оларды ерте жастағы балаларда тілді меңгеруді және сөйлеу дағдыларын дамыту үшін қолдану процесі қарастырылады. 2020 жылдан 2024 жылға дейін жарияланған эмпирикалық және теориялық зерттеулерге сүйене отырып, бұл мақалада ерте балалық шақта сөйлеуді дамытуда цифрлық технологияларды қолдану әсерін, артықшылықтары мен мәселелерін талдау үшін жарияланымдардың нәтижелері синтезделеді. Негізгі тұжырымдар интерактивті қосымшалардың, ойындардың және озық технологиялардың сөздік қорын, дыбыстау дәлдігін және коммуникативті құзыреттілікті кеңейтудегі маңызды рөлін көрсетеді. Сонымен қатар, жүйелік шолу ерте жастағы балалардың сандық мазмұнмен теңдестірілген және сапалы қарым-қатынасын қамтамасыз етудегі ата-аналар бақылауының рөлін атап көрсетеді. Оң нәтижелерге қарамастан, мақалада ықтимал кемшіліктер, соның ішінде экран уақытына және қол жетімді қолданбалардың білім сапасына қатысты мәселелер де атап өтіледі. Қорытындылай келе, жүйелік шолу сапалы сандық мазмұнның, ата-ана басшылығының және нақты әлемдегі өзара әрекеттесу тепе-теңдігінің қажеттілігіне назар аудара отырып, цифрлық технологияның ерте жастағы балаларды дамытумен ақылға қонымды интеграциясын ұсынады.

Түйін сөздер: ерте балалық шақтағы білім беру, тілді дамыту, цифрлық технологиялар, тілді меңгеру, ата-аналардың бақылау, экран алдындағы өткізген уақыт, интерактивті оқыту, цифрлық ойындарды қолдана отырып оқыту.

*Абишева С.К.[1], Мирза Н.В.[2]
[1,2] НАО "Карагандинский университет академика Е.А. Букетова», Караганда, Казахстан

СОВЕРШЕНСТВОВАНИЕ РЕЧЕВОГО РАЗВИТИЯ ДЕТЕЙ РАННЕГО ВОЗРАСТА С ПОМОЩЬЮ ЦИФРОВЫХ ТЕХНОЛОГИЙ: СИСТЕМНЫЙ ОБЗОР

Аннотация

Стремительная интеграция цифровых технологий в структуру образования существенно меняет картину традиционных методов развития речи в раннем детском возрасте. В этом систематическом обзоре рассматривается область цифровых инструментов и их применение для обеспечения развития речи и речевых навыков у детей младшего дошкольного возраста. Основываясь на отдельных эмпирических и теоретических исследованиях, опубликованных в период с 2020 по 2024 год, авторы обобщают результаты систематического анализа научных исследований для определения влияния, преимуществ и проблем использования цифровых технологий в развитии речи в раннем детстве. Основные выводы показывают значительную роль интерактивных приложений, игр и передовых технологий в расширении словарного запаса, точности произношения и коммуникативной компетентности детей раннего возраста. Кроме того, в статье подчеркивается роль родительского контроля для обеспечения сбалансированного и качественного взаимодействия детей раннего возраста с цифровым контентом. Несмотря на положительные результаты, в статье также перечисляются потенциальные недостатки употребления инновационных технологий, в том числе проблемы с количеством экранного времени и качеством обучения. В заключение, в обзоре предлагается подход разумной интеграции цифровых технологий в процесс развития детей раннего возраста, обосновывается роль контента, родительского контроля и баланса между взаимодействием в виртуальном и реальном мире.

Ключевые слова: раннее обучение, развитие речи, цифровые технологии, усвоение языка, родительский контроль, продолжительность времени перед экраном, интерактивное обучение, обучение с использованием цифровых игр.