

Narrative Review: Digital Educational Applications for Supporting English Speaking Skills among Preschool Children

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ABSTRACT

This narrative review examines how digital educational applications support English speaking skills among preschool children, with particular attention to pronunciation, vocabulary development, oral interaction, and communicative confidence. The increasing integration of digital technologies into early childhood education has transformed the ways preschool children are exposed to English language learning. Interactive applications, augmented reality (AR), speech-recognition systems, and multimodal learning platforms are increasingly used to facilitate oral language development. However, concerns remain regarding pedagogical quality, excessive screen exposure, and the limited evidence specifically addressing speaking proficiency in preschool contexts. This narrative review synthesized peer-reviewed literature identified through searches of major academic databases including Scopus, Web of Science, ERIC and Google Scholar focusing on preschool English language learning, digital educational applications, oral language development and technology-assisted speaking instruction. The review included peer-reviewed empirical and review studies published primarily between 2019 and 2025. Thematic synthesis was employed to identify recurring patterns, debates, challenges, and research gaps. The findings indicate that digital educational applications can support preschool children's English speaking development through multimodal interaction, speech recognition, gamification, and rich audio-visual input. Applications integrating voice interaction and augmented reality were found to enhance pronunciation practice, vocabulary acquisition, learner confidence, and participation. Nevertheless, the review also highlights substantial limitations, including insufficient speaking-specific assessment, uneven app quality, limited theory-driven research, and inadequate attention to teacher-parent mediation. Digital educational applications demonstrate considerable potential in supporting preschool English speaking skills when embedded within guided, interactive, and developmentally appropriate learning environments. Future research should prioritize speaking-specific evaluation, longitudinal studies, and context-sensitive pedagogical frameworks for preschool learners.

Keywords: Digital Educational Applications; Preschool Children; English Speaking Skills; Early Childhood Education; Language Learning Technology.

INTRODUCTION

English speaking competence has become increasingly important in early childhood education due to the growing emphasis on global communication and multilingual learning environments. Preschool years represent a critical developmental stage for language acquisition because young children are highly responsive to auditory input, imitation, and interactive communication. Consequently, many educational institutions and families have begun integrating digital technologies into preschool English learning environments to support early oral language development.

Recent studies suggest that digital educational applications offer substantial opportunities for improving vocabulary acquisition, pronunciation, listening comprehension, and communicative engagement among preschool learners [10], [13], [18]. Technologies such as augmented reality (AR), multimodal touch-and-voice applications, digital storytelling tools, and speech-recognition systems have introduced more

interactive and immersive approaches to language learning. For instance, AR-supported applications allow preschool children to associate spoken words with three-dimensional visual representations, thereby enhancing vocabulary retention and pronunciation practice [1], [22].

In addition, digital applications are increasingly associated with enhanced learner motivation and confidence. Features such as gamification, interactive stories, real-time feedback, and voice interaction encourage repeated speaking practice within low-anxiety environments [4], [3]. These tools also create opportunities for individualized learning experiences tailored to preschool children's developmental needs.

Despite these promising developments, several unresolved issues remain within the literature. Existing studies predominantly focus on vocabulary development, phonological awareness, or general language learning rather than specifically examining English speaking proficiency, oral fluency, or interactional competence among preschool children [9], [17]. Furthermore, many commercially available educational applications lack rigorous pedagogical validation and are insufficiently aligned with research-based principles of early childhood language learning [8], [15].

Another ongoing debate concerns the role of teachers and parents in mediating children's digital learning experiences. While some studies emphasize independent digital learning, others argue that meaningful oral language development occurs primarily when digital applications are integrated with adult scaffolding, conversation, and guided interaction [13], [14]. Questions also remain regarding app quality, screen-time balance, equity of access, and culturally appropriate implementation in multilingual preschool settings.

Therefore, this narrative review aims to synthesize current literature concerning the use of digital educational applications for supporting English speaking skills among preschool children. Specifically, the review examines: (1) the types of digital applications used in preschool English learning, (2) the mechanisms through which these applications support oral language development, (3) the roles of teachers and parents in facilitating digital language learning, and (4) the major research gaps and future directions within this field.

METHODS

Sources of Information

This narrative review synthesized relevant literature identified through searches of major academic databases, including Scopus, Web of Science, Google Scholar, and ERIC, to provide broad coverage of research in early childhood education, educational technology, and language learning. The review focused on studies related to preschool English language learning, digital educational applications, oral language development, augmented reality (AR), speech-recognition technologies, gamified learning environments, and teacher-parent mediation in digital learning contexts.

The use of multiple academic databases enabled the review to capture interdisciplinary perspectives from early childhood education, educational technology, language learning, and child development. In addition, the reference lists of selected relevant articles were manually examined to identify additional studies that may not have been retrieved through the initial database searches. Priority was given to empirical and review studies published between 2019 and 2025, reflecting recent developments in digital learning technologies and preschool language education. However, several earlier foundational studies were retained where they provided important theoretical or pedagogical contributions to the topic.

The literature selection process emphasized peer-reviewed publications with clear relevance to preschool children's English speaking development and technology-assisted oral communication learning environments.

Search Terms and Keywords

The search process utilized combinations of the following keywords and Boolean operators:

Database	Search concepts
Scopus	preschool AND English speaking AND digital applications
Web of Science	preschool AND oral language AND educational technology
ERIC	preschool AND English learning AND digital technology
Google Scholar	preschool English speaking digital applications

The review emphasized studies published between 2019 and 2025, although several earlier foundational studies were also included due to their relevance.

Selection Criteria

The selection criteria for this narrative review were established to identify literature that was relevant to digital educational applications and preschool English speaking development. The review primarily included peer-reviewed journal articles involving preschool children or early childhood education populations in technology-assisted English language learning contexts. Particular attention was given to studies examining oral language development, speaking skills, pronunciation, communicative competence, verbal interaction, and technology-supported communication among young learners. Studies investigating digital educational applications, including augmented reality (AR), speech-recognition systems, gamified learning platforms, digital storytelling tools, multimodal applications, and interactive language-learning technologies, were also considered.

To reflect recent developments in educational technology and digital language learning, the review primarily considered studies published between 2019 and 2025. Earlier publications were retained when they provided important theoretical, conceptual, or pedagogical foundations relevant to preschool language acquisition and technology-supported learning. Only English-language publications were included to ensure consistency in interpretation and synthesis.

Studies were excluded when they were unrelated to preschool or early childhood education contexts, or when they focused exclusively on literacy, reading, spelling, or writing without an explicit oral language or speaking component. Non-peer-reviewed publications, editorials, opinion papers, dissertations, book reviews, and conference abstracts without accessible full-text articles were also excluded. Studies that did not demonstrate clear relevance to digital educational technologies or English language learning were likewise excluded.

The final selection of literature was guided by relevance to the review objectives, methodological clarity, and contribution to understanding preschool English speaking development within digitally mediated learning environments. Reference lists of relevant publications were also examined manually to identify additional studies that met the selection criteria.

Literature Selection Process

The literature selection process followed a structured narrative review approach. Relevant studies were identified through systematic searches of selected academic databases using predefined keywords and Boolean operators. The search strategy incorporated combinations of keywords related to preschool education, English language learning, English speaking skills, oral language development, digital educational applications, chatbots, artificial intelligence and technology-assisted language learning. Titles and abstracts were initially screened to determine their relevance to the focus of the review. Studies that appeared relevant were subsequently examined in greater detail through full-text screening.

The selection process considered several inclusion criteria, including studies published within the specified review period, studies focusing on preschool or early childhood education, research addressing English

language or oral communication development and studies examining the use of digital technologies or technology-mediated learning environments. Studies that were unrelated to the preschool context focused exclusively on other language skills or did not provide sufficient information about their research focus were excluded. Reference lists of relevant publications were also screened manually to identify additional studies that may not have been retrieved through the database searches.

To enhance the consistency of the selection process, the identified literature was compared according to its research objectives, participants, technological context, methodology and key findings. Particular attention was given to studies that provided evidence on children's opportunities for interaction, oral language practice, learner engagement and the usability of digital applications. The selected studies were then organised thematically to identify recurring findings, research trends, methodological patterns and gaps in the existing literature. The final literature set was selected based on its relevance to the objectives of the review, methodological clarity, contribution to understanding digital support for preschool English speaking development, and potential relevance to the development and evaluation of technology-supported speaking activities in the Malaysian preschool context.

DISCUSSION

Digital Educational Applications and Preschool English-Speaking Development

The reviewed literature indicates that digital educational applications can support aspects of preschool children's English speaking development, particularly vocabulary acquisition, pronunciation practice and communicative confidence. Augmented reality applications including Wordtastic Kids and AR-based pronunciation systems provide interactive environments in which children can listen to language input, imitate spoken words and respond verbally [10], [1]. These findings suggest that the integration of visual, auditory and interactive elements may provide preschool children with opportunities to engage with English language input in developmentally appropriate digital environments.

Speech-recognition systems also emerged as an important feature for supporting oral language practice. Applications incorporating voice input and immediate feedback provide opportunities for children to repeat pronunciation and receive responses during digital learning activities [18], [21]. Similarly, digital storytelling and AI-driven applications can create opportunities for expressive oral participation by embedding language practice within interactive narratives and contextualized learning activities [5]. These findings indicate that interactive and multimodal features may be particularly relevant when digital applications are designed to encourage active oral participation rather than passive content consumption.

However, the literature also indicates an important limitation. Many studies have focused primarily on vocabulary acquisition and pronunciation rather than broader dimensions of English speaking proficiency. Measures of fluency, conversational interaction, spontaneous verbal expression and communicative competence remain comparatively underdeveloped in preschool digital learning research [9], [5]. Therefore, the available evidence should be interpreted cautiously, particularly when claims extend beyond specific outcomes such as vocabulary, pronunciation or participation. Further research is needed to examine how digital applications can support more comprehensive speaking development among preschool children.

Features of Effective Digital Speaking Applications

Several recurring design features were identified in the reviewed literature as relevant to preschool English speaking applications. First, rich audio-visual input can support comprehension and oral imitation. Applications incorporating videos, animations, 3D objects and interactive storytelling provide opportunities for children to engage with English through multiple modes of representation and can encourage active participation [7], [22].

Second, multimodal interaction combining touch, voice and visual elements provides opportunities for children to engage actively with digital language-learning activities. ETSAApp, for example, integrates voice interaction within curriculum-based activities and was positively evaluated by teachers and children [18].

Gamification features including rewards, role-play and game-like challenges, may further encourage learner engagement and repeated participation in speaking activities [12].

Third, effective applications can incorporate scaffolding mechanisms including verbal feedback, gradual progression in task difficulty and progress-monitoring features [16], [19]. Such features are consistent with developmental learning principles because they can provide children with structured support while engaging in increasingly challenging language-learning activities.

Nevertheless, concerns remain regarding application quality and pedagogical appropriateness. Several studies have raised concerns about commercially available applications that lack evidence-based language-learning principles or developmentally appropriate interaction patterns [8], [6]. These findings highlight the need for educational applications to be carefully designed around preschool children's developmental characteristics and specific oral language-learning needs.

Teacher and Parent Mediation in Digital English Learning

The reviewed literature emphasizes that digital applications alone may not be sufficient to support preschool children's speaking development. Instead, teacher and parent mediation appears to play an important role in transforming digital interaction into meaningful communicative learning experiences.

Teachers function as pedagogical mediators by selecting appropriate applications, structuring speaking activities and scaffolding children's participation [3]. They can also guide children through role-play, conversation prompts, and collaborative oral activities that extend learning beyond passive screen interaction. Similarly, parents can contribute through co-viewing, storytelling, questioning, and regulation of children's digital engagement at home [11], [6].

The concept of co-use emerged across several studies reviewed. Children demonstrated stronger oral engagement when adults actively participated in conversations related to app content rather than allowing independent screen exposure [6], [5]. This finding is consistent with sociocultural perspectives that emphasize the importance of guided interaction, social communication and adult support in language learning.

However, disparities in digital literacy among teachers and parents may influence the implementation of digital language-learning activities. Some parents primarily regulate children's screen time without providing active linguistic scaffolding [20]. Likewise, teachers have reported insufficient methodological training and limited institutional support for integrating digital tools effectively [3]. These findings suggest that the successful integration of digital applications for preschool English speaking development depends not only on application design but also on the availability of appropriate adult support and digital pedagogical competencies.

Research Gaps and Ongoing Debates

Although research concerning digital language learning has expanded substantially, important gaps remain unresolved. First, there is limited research specifically examining preschool English speaking proficiency. Most existing studies focus on vocabulary, literacy, or general language outcomes rather than fluency, interactional competence, spontaneous verbal expression, or sustained oral communication [17], [9]. Consequently, there remains insufficient evidence regarding how digital educational applications influence authentic communicative speaking development among preschool learners.

Second, methodological limitations remain common across the literature. Many studies employ short-term interventions, small samples, or weak experimental designs, reducing the generalizability of findings [2]. Longitudinal, mixed-method, and theory-driven investigations are still scarce, limiting understanding of how sustained exposure to digital applications influences children's long-term speaking development and communicative behaviour. Furthermore, inconsistent assessment approaches across studies make direct comparison of speaking outcomes difficult.

Third, there is insufficient attention to diverse populations and contexts. Studies involving multilingual, low-resource, special-needs, rural, or non-Western preschool settings remain limited [7], [9]. This raises concerns regarding equity, accessibility, cultural appropriateness, and the transferability of findings across different educational environments. Many existing applications are also developed primarily for English-dominant contexts and may not adequately address the linguistic and cultural realities of multilingual preschool learners.

Another important gap concerns the limited integration of theoretical frameworks within digital language-learning research. While many studies report positive learning outcomes, fewer studies explicitly explain findings through established theories such as Lev Vygotsky's Sociocultural Theory, Albert Bandura's Social Learning Theory, or multimedia learning perspectives. This weakens conceptual understanding of how digital interaction, scaffolding, and social communication contribute to preschool oral language acquisition.

In addition, emerging technologies such as artificial intelligence (AI), adaptive learning systems, conversational agents, and speech-recognition tools remain underexplored within preschool speaking instruction. Existing studies primarily evaluate basic gamified applications rather than investigating how AI-supported conversational interaction may facilitate natural speaking practice, pronunciation feedback, or individualized language support.

Significant debate also surrounds the balance between technological accessibility and pedagogical quality. While educational applications increase learning accessibility and learner engagement, excessive reliance on screen-based interaction may reduce meaningful teacher-child communication if not carefully integrated into broader communicative learning environments [15]. Some scholars further argue that repetitive drill-based applications risk promoting passive language imitation rather than authentic conversational competence.

Moreover, concerns regarding screen time, digital dependency, data privacy, and children's socio-emotional well-being continue to generate debate within early childhood education. Questions remain regarding the appropriate duration, intensity, and developmental suitability of digital learning exposure for preschool children.

Finally, limited attention has been given to teacher readiness and parental digital literacy in supporting preschool English speaking development through technology. Teachers and parents may differ substantially in their ability to scaffold oral interaction effectively during digital learning activities, potentially influencing the overall effectiveness of educational applications.

Collectively, these unresolved gaps indicate the need for more theoretically grounded, developmentally appropriate, and context-sensitive investigations into digital educational applications for preschool English speaking development.

Practical Implications

The findings suggest several implications for early childhood education practice. Preschool educators should integrate digital applications within interactive, conversation-based learning activities rather than relying on isolated screen engagement. Developers should prioritize speech interaction, scaffolding, and age-appropriate design principles when creating educational applications for young learners.

In addition, professional development programs are needed to strengthen teachers' competencies in digital pedagogies and oral language facilitation. Parents should also receive guidance regarding effective co-use strategies and balanced digital learning practices.

Importantly, future digital educational applications should emphasize communicative interaction, guided speaking opportunities, and developmentally appropriate conversational experiences rather than focusing exclusively on vocabulary drills or passive content delivery.

LIMITATIONS

This narrative review has several limitations. First, although the review employed searches of major academic databases, the literature search may not have captured every relevant publication. The review primarily focused on peer-reviewed English-language publications and therefore may have excluded relevant studies published in other languages or indexed in databases outside the selected sources.

Second, the included studies demonstrated considerable methodological diversity, making direct comparison difficult. Variations in research design, intervention duration, participant age groups, digital application features and assessment instruments limited the consistency and comparability of findings across studies. In particular, the absence of standardized measures for preschool English speaking proficiency complicated the synthesis of oral communication outcomes.

Third, many studies focused broadly on language or literacy development rather than specifically measuring speaking fluency, conversational interaction, pronunciation accuracy or communicative competence. Consequently, conclusions regarding speaking-specific development should be interpreted cautiously.

Fourth, this review adopted a narrative synthesis approach rather than a systematic review or meta-analysis methodology. Therefore, the selection and interpretation of literature may involve a degree of researcher judgement and the review does not provide statistical aggregation of effect sizes or quantitative comparisons across studies.

Publication bias may also be present because studies reporting positive findings may be more likely to be published than studies reporting neutral or negative outcomes. Furthermore, the emphasis on English-language publications may have limited the inclusion of relevant findings from other linguistic, regional and cultural contexts.

Another limitation concerns the rapidly evolving nature of digital educational technologies. Applications involving artificial intelligence (AI), adaptive learning systems and speech-recognition technologies continue to develop rapidly, meaning that some reviewed findings may become outdated as newer technologies emerge.

Finally, the reviewed studies originated from diverse educational systems and sociocultural contexts which may affect the transferability of findings. Differences in curriculum standards, digital infrastructure, teacher readiness, parental support and children's access to technology may influence how digital educational applications support preschool English speaking development across different settings.

Despite these limitations, the review provides a broad conceptual synthesis of the available literature and highlights important directions for future research concerning digital educational applications and preschool oral language learning.

CONCLUSION

This narrative review indicates that digital educational applications have potential to support preschool children's English speaking development, particularly in relation to vocabulary acquisition, pronunciation practice, communicative confidence, oral participation and learner engagement. Features such as speech recognition, augmented reality, multimodal interaction, adaptive feedback and gamification can provide more interactive and engaging language-learning experiences for young learners. These technologies may provide opportunities for repeated speaking practice, individualized learning experiences and contextualized communicative activities that encourage children to use English in structured and interactive learning contexts.

However, the review also identifies important research and pedagogical gaps. Existing studies frequently emphasize vocabulary and literacy-related outcomes, while comparatively less attention is given to speaking fluency, conversational interaction, communicative competence and authentic oral communication. Many

studies also involve short-term interventions and relatively small samples, which limits the extent to which findings can be generalized to sustained speaking development. In addition, some educational applications lack clearly documented pedagogical foundations, theoretical grounding, and developmentally appropriate designs specifically focused on preschool children's oral language needs.

The findings further indicate that the value of digital applications is influenced by teacher and parent mediation. Guided interaction, conversational scaffolding, co-use practices and collaborative language activities can help transform digital interaction into meaningful communicative learning experiences. Digital applications appear most appropriately positioned as complementary resources within socially interactive and pedagogically structured learning environments rather than as replacements for direct human interaction. This perspective is consistent with sociocultural approaches that emphasize adult support, social interaction and scaffolded communication in early language learning.

The review also highlights concerns related to screen-time balance, pedagogical quality, digital equity and the developmental appropriateness of technology use in early childhood education. Although digital applications can provide additional opportunities for language engagement, excessive or poorly guided technology use may reduce opportunities for face-to-face communication, social interaction and interactive play. Differences in technological infrastructure, teacher digital competencies, and parental digital literacy may also influence the implementation and use of digital language-learning applications across educational and cultural contexts.

Future research should prioritize longitudinal, interdisciplinary and theory-informed investigations examining speaking-specific outcomes among diverse preschool populations. Greater attention should be given to how specific application features, including AI-supported conversational agents, adaptive learning systems, speech-recognition technologies and multimodal interaction designs relate to oral interaction, pronunciation development, communicative confidence and spontaneous language production. Future studies should also consider multilingual preschool settings, children with diverse learning needs and culturally responsive approaches to digital language learning.

For early childhood educators, curriculum designers, application developers, and policymakers, the findings highlight the importance of promoting balanced and pedagogically grounded digital learning environments that combine technological innovation with active human interaction. Future educational applications should move beyond repetitive vocabulary exercises and provide more communicative, interactive, and socially meaningful opportunities for speaking practice. Ultimately, digital educational technologies should be viewed not as replacements for human interaction, but as complementary tools that can support developmentally appropriate oral language learning in early childhood education.

REFERENCES

1. Aladin, M., Ismail, A., Salam, M., Kumoi, R., & Ali, A. (2020). AR-TO-KID: A speech-enabled augmented reality to engage preschool children in pronunciation learning. *IOP Conference Series: Materials Science and Engineering*, 979. <https://doi.org/10.1088/1757-899X/979/1/012011>
2. Bang, H., & Mackey, A. (2024). Chinese parents' involvement in their young children's app-based language learning. *Language Teaching for Young Learners*. <https://doi.org/10.1075/ltyl.00052.ban>
3. Braslauskienė, R., Turauskienė, E., & Jacynė, R. (2024). The potential of digital tools for developing pre-school children's language skills: Teachers' experiences. *Regional Formation and Development Studies*. <https://doi.org/10.15181/rfds.v42i1.2607>
4. Cavus, N., & Ibrahim, D. (2017). Learning English using children's stories in mobile devices. *British Journal of Educational Technology*, 48, 625–641. <https://doi.org/10.1111/bjet.12427>
5. Chen, G. (2024). The impacts of AI-driven storytelling applications on language acquisition and literacy development in early childhood education: A systematic review. *Asian Journal of Advanced Research and Reports*. <https://doi.org/10.9734/ajarr/2024/v18i11770>

6. Chuane, Q., Rong, Z., Islam, M., & Murshidi, G. (2025). Parents' perceptions on young children's online English learning at home: A mixed-methods study. *Journal of Early Childhood Literacy*. <https://doi.org/10.1177/14687984251357774>
7. Khomyshak, O. (2024). Створення англomовного цифрового освітнього середовища для дітей дошкільного віку: Лінгводидактичний аспект. *Information Technologies and Learning Tools*. <https://doi.org/10.33407/itlt.v9i1.5432>
8. Kilani, H., Markov, I., Francis, D., & Grigorenko, E. (2024). Screens and preschools: The bilingual English language learner assessment as a curriculum-compliant digital application. *Children*, 11. <https://doi.org/10.3390/children11080914>
9. Liu, S., Reynolds, B., Thomas, N., & Soyoof, A. (2024). The use of digital technologies to develop young children's language and literacy skills: A systematic review. *SAGE Open*, 14. <https://doi.org/10.1177/21582440241230850>
10. Mamani-Calapuja, A., Laura-Revilla, V., Hurtado-Mazeyra, A., & Llorente-Cejudo, C. (2023). Learning English in early childhood education with augmented reality: Design, production, and evaluation of the "Wordtastic Kids" app. *Education Sciences*. <https://doi.org/10.3390/educsci13070638>
11. Moorhouse, B., & Beaumont, A. (2019). Involving parents in their children's school-based English language writing using digital learning. *RELC Journal*, 51, 259–267. <https://doi.org/10.1177/0033688219859937>
12. Ongoro, C., & Fanjiang, Y. (2024). Digital game-based technology for English language learning in preschools and primary schools: A systematic analysis. *IEEE Transactions on Learning Technologies*, 17, 202–228. <https://doi.org/10.1109/TLT.2023.3268282>
13. Rui, Y. (2025). The application of digital media in preschool English education. *Communications in Humanities Research*. <https://doi.org/10.54254/2753-7064/2025.19900>
14. Soyoof, A., Reynolds, B., Neumann, M., & Vazquez-Calvo, B. (2024). Maternal scaffolding of Iranian children's extramural informal digital learning of English (IDLE): A qualitative study. *Early Childhood Education Journal*, 53, 1865–1881. <https://doi.org/10.1007/s10643-024-01675-z>
15. Tan, R., Djonov, E., & Chik, A. (2025). Balancing professionalism and accessibility: Comparing preschool English teaching by teachers and by apps. *Education and Information Technologies*, 30, 20317–20346. <https://doi.org/10.1007/s10639-025-13576-8>
16. Taylor, G., Kolak, J., Norgate, S., & Monaghan, P. (2022). Assessing the educational potential and language content of touchscreen apps for preschool children. *Computers and Education Open*. <https://doi.org/10.1016/j.caeo.2022.100102>
17. Verhoeven, L., Voeten, M., Setten, E., & Segers, E. (2020). Computer-supported early literacy intervention effects in preschool and kindergarten: A meta-analysis. *Educational Research Review*. <https://doi.org/10.1016/j.edurev.2020.100325>
18. Wook, T., Noor, S., Ashaari, N., Mohamed, H., Hussain, N., & Zakariya, R. (2023). Evaluation of the effectiveness of preschool English learning applications based on touch and voice multimodal interaction technique. *Universal Access in the Information Society*, 1–15. <https://doi.org/10.1007/s10209-023-01075-x>
19. Wulansari, N., & Hardianto, D. (2025). Enhancing elementary students' language development through speaking skills and interactive teaching: A systematic literature review. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. <https://doi.org/10.31004/obsesi.v9i1.6779>
20. Xia, J., & Gao, X. (2022). Parental involvement in Chinese preschool children's mobile-assisted foreign language learning. *Porta Linguarum Revista Interuniversitaria de Didáctica de las Lenguas Extranjeras*. <https://doi.org/10.30827/portalin.vi.23840>
21. Xia, K., Xie, X., Fan, H., & Liu, H. (2021). An intelligent hybrid-integrated system using speech recognition and a 3D display for early childhood education. *Electronics*. <https://doi.org/10.3390/electronics10151862>
22. Yao, W., Wang, L., & Liu, D. (2024). Augmented reality-based language and math learning applications for preschool children education. *Universal Access in the Information Society*, 24, 759–770. <https://doi.org/10.1007/s10209-024-01101-6>