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EVALUATION OF USING TECHNOLOGY IN ENGLISH LANGUAGE LEARNING FOR CHILDREN WITH AUTISM: A Systematic Literature Review

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ABSTRACT

This study evaluates the use of technology in English language learning for children with Autism Spectrum Disorder (ASD) through a systematic literature review of articles indexed in Sinta. The main objective is to identify the types of technology used, analyze their effectiveness in helping children with ASD master English, and explore emerging research trends. The findings show that technologies such as mobile applications, Augmented Reality (AR), video modeling, and AI chatbots significantly enhance English skills in children with ASD, particularly in vocabulary, speaking, and social skills. These technologies make learning more interactive, engaging, and flexible, catering to the individual needs of children. The study also identifies gaps in research, particularly the need for more long-term studies on the effectiveness of these technologies and their impact on language development in children with ASD. Recommendations for practitioners and researchers include further exploration of innovative and inclusive technologies to support more effective English language learning for children with ASD. This research contributes to field of Indonesian Language and Literature Education by promoting technology-based approaches in inclusive language learning, which can enrich teaching strategies for both Indonesian and English, while enhancing accessibility and effectiveness for students with special needs, such as children with ASD.

Keywords: Technology; English Language Learning; Children with Autism Spectrum Disorder (ASD); Mobile Applications; Augmented Reality (AR).

INTRODUCTION

Autism Spectrum Disorder (ASD) is a developmental disorder that affects the way individuals communicate, interact, and process information. Children with ASD often face significant challenges in acquiring language, particularly in areas such as speaking, comprehension, and social communication. These difficulties are further exacerbated when they are learning a second language, such as English, due to the additional complexities involved in mastering grammar, pronunciation, and cultural nuances (Rakhman, 2023). As such, addressing the language learning needs of children with ASD has become an important area of focus in educational research and practice (Pratama & Paramita, 2023).

In recent years, there has been a growing interest in the use of technology to support language learning for children with special needs, including those with ASD. Technology offers a range of tools that can make learning more engaging, interactive, and tailored to the individual needs of students (Valencia et al., 2019). Mobile applications, Augmented Reality (AR), Artificial Intelligence (AI), and video modeling

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are just a few examples of technologies that have been explored for enhancing language skills in children with ASD (Sumra & Sumra, 2024). These technologies have the potential to provide a more personalized learning experience, allowing children with ASD to practice language skills in a safe, controlled, and engaging environment.

Despite the increasing use of technology in the classroom, there is still a need for systematic evaluation of its effectiveness, particularly in the context of English language learning for children with ASD. While some studies have shown promising results, gaps in research remain, especially regarding the long-term impact of these technologies on language acquisition and social communication skills. Furthermore, the integration of multiple technologies and their ability to address the diverse needs of children with ASD has not been fully explored.

This study aims to conduct a systematic literature review to evaluate the effectiveness of various technologies in supporting English language learning for children with ASD. By analyzing existing research, this paper seeks to identify which technologies have been most effective, explore the emerging trends in this area, and provide recommendations for educators and researchers to improve the use of technology in inclusive education. Through this review, the study aims to contribute to the field of language education by promoting innovative, technology-based approaches to support children with ASD in acquiring English language skills.

Autism Spectrum Disorder and Language Learning Challenges

Children with ASD often experience difficulties in mastering language, particularly in areas of social communication, pragmatics, and language comprehension. These children may struggle with vocabulary development, sentence construction, and verbal expression. In the context of learning a foreign language, such as English, these challenges can be amplified due to the additional complexity of mastering grammar, pronunciation, and cultural nuances.

Technology in Education for Children with ASD

Over the past two decades, there has been growing interest in utilizing technology as a tool to support the learning needs of children with ASD. Technologies such as mobile applications, Augmented Reality (AR), virtual environments, video modeling, and AI-based tools have been explored to enhance language learning, social skills, and cognitive abilities. The integration of these technologies offers a unique opportunity for children with ASD to engage with learning materials in ways that traditional methods may not facilitate.

Technology in English Language Learning for Children with ASD

Studies have shown that technology can provide a more personalized and adaptive learning environment for children with ASD, helping them overcome challenges associated with traditional teaching methods. Mobile applications tailored for children with special needs offer features like visual cues, interactive games, and voice recognition that engage children and reinforce learning. AR, in particular, has been highlighted as a powerful tool for language learning due to its ability to merge the physical and virtual worlds, creating immersive learning experiences.

METHOD

To achieve the objectives of this study, the research will employ the Systematic Literature Review (SLR) methodology. SLR is a structured and transparent approach used to identify, evaluate, and interpret research relevant to the topic being studied. By using SLR, this study aims to provide a clearer understanding of the effectiveness of using technology in English language learning for children with Autism Spectrum Disorder (ASD).

The methodology consists of the following steps:

Inclusion and Exclusion Criteria

The inclusion criteria for this review are as follows:

- Articles discussing the use of technology in English language learning for children with ASD.
- Articles published in journals indexed in Scopus.
- Articles that discuss or evaluate technology-based assessment tools for children with ASD.
- Articles published in either English or Indonesian.
- Articles containing empirical data or evaluation studies related to educational technology.

The exclusion criteria are:

- Articles that are not relevant to the topic of technology use in English language learning for children with ASD.
- Articles without a clear methodology or those that are not scientifically verified.
- Articles focusing on technology for children with other disorders besides ASD.
- Articles that are more theoretical in nature without presenting data or evaluation evidence.
- Articles published more than 10 years ago (if the technology used is outdated).

Data Sources

The primary data source for this study will be scholarly articles indexed in Sinta. Sinta has been selected because it provides articles that have undergone peer review and includes a broad range of relevant research in the fields of education and technology. The article search will be limited to those published in national journals that are verified.

Search Keywords

The search for articles will use a combination of relevant keywords to ensure appropriate article selection, including:

- "Technology-based assessment tools"
- "Autism Spectrum Disorder (ASD)"
- "English language learning"
- "Technology in education for ASD"
- "Assistive technology for language learning"
- "Technology and autism education"
- "English language acquisition for children with ASD"
- "Digital tools for autism education"

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This review will include articles published between 2019 and 2024. This timeframe is chosen to ensure that the articles included are relevant to the latest developments in educational technology and language learning for children with ASD.

Through this systematic literature review, the study aims to identify the most effective technology-based methods for enhancing English language skills in children with ASD and to contribute valuable insights to the field of educational technology.

RESULTS AND DISCUSSION

Types of Technology-Based Assessment Tools

The types of technology-based assessment tools used in English language learning for children with Autism Spectrum Disorder (ASD), based on the technologies listed in the table above, are as follows:

Technology Type	Description	Articles	Key Outcomes
Voice-Based Applications	Use of voice interaction to enhance speaking and communication skills.	The Implementation of Speech Blubs App in Fostering English Language Skills of a Child with Autism (Tovar & Acuña, 2024) Using VoA (Voice of America) to Improve Speaking Abilities of Autism Students in Learning English (Hamzah, 2024)	Improved speaking skills and communication abilities in children with autism.
Augmented Reality (AR)	Immersive learning technology that combines virtual and real-world elements to engage children in language learning through interactive methods.	Augmented Reality Mobile Application for Children with Autism - Stakeholders' Acceptance and Thoughts (Umiera Hashim et al., 2021a) 'AReal-Vocab': The New A La Mode of English Vocabulary Learning for Children with Autism (Hashim et al., 2021)	Enhanced vocabulary acquisition, better social engagement, positive stakeholder acceptance.
Assistive Technology	Tools specifically designed to assist children with special needs, enhancing their social and	Assistive technology application for enhancing social and language skills of young children with autism (Wojciechowski & Al-	Improved language, social skills, and reading comprehension for children with special needs.

Technology Type	Description	Articles	Key Outcomes
	language development.	Musawi, 2017) (Wojciechowski & Al-Musawi, 2020)	
Information and Communication Technology (ICT)	Digital tools, including software and platforms, to support interactive and personalized English language learning.	The Use of Technology to Assist School-Aged Students with High Incidence Special Needs in Reading (Stetter, 2018) Potential of ICT in Teaching English as a Foreign Language Learners Focused on Autistic Spectrum (Jelínková, 2020) A Scoping Review Of Teaching And Learning Of English As An Additional Language Among Autistic Individuals (Muharikah et al., 2022)	Facilitates English learning through interactive environments and personalized learning approaches.

Various technologies are being used to support language learning for children, especially those with ASD, by offering personalized and interactive experiences. Applications for speaking skills such as Speech Blubs and Voice of America (VoA) are designed to enhance pronunciation and vocabulary development in children. These apps provide immediate feedback, helping to improve their speaking skills. In the realm of Augmented Reality (AR), AR-based applications are particularly useful in engaging children by creating interactive experiences that assess their understanding of vocabulary and language concepts in a visual manner, thereby boosting both memory and engagement.

For social skills development, technologies like Video Modeling, Speech-to-Text, Text-to-Speech, and Chatbots offer valuable tools for assessing how children with ASD engage in social interactions, initiate conversations, and utilize text and voice-based communication. These technologies focus on improving communication and socialization by providing an interactive, controlled environment where children can practice these skills. Moreover, Mobile Apps and AR are also leveraged to assess children's vocabulary comprehension through interactive experiences. These tools evaluate the effectiveness of app-based learning in enhancing language skills by offering engaging, visual methods of language acquisition.

Multimodal learning, which integrates multimedia applications such as visual, audio, and text-based materials, provides an effective way to assess how children respond to language learning content. By combining these elements, children are encouraged to

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interact with and understand the language in multiple formats, which can significantly improve their language acquisition. Mobile apps for inclusive learning offer adaptable learning experiences tailored to the needs of children with ASD, using the flexibility of mobile devices to accommodate individual development paces. These apps assess children's language learning progress in a manner that fits their specific needs.

Another promising tool is Video Modeling, which allows for the assessment of social anxiety levels in children and their ability to engage in social interactions. By observing visual representations of social scenarios, children can learn to better navigate social situations. In addition, Virtual Reality (VR) and Chatbots offer controlled environments where children can engage in simulated social interactions to enhance their communication skills. These technologies help children practice and assess their understanding of social cues and communication strategies.

Finally, technologies like Speech-to-Text and Text-to-Speech are essential for assessing the communication abilities of children with ASD. These tools support children in expressing themselves through both speaking and writing, making it easier for them to communicate more effectively. Additionally, AI-based Chatbots provide a safe, controlled space for children to practice conversational skills, offering them a chance to engage in dialogue while reducing social anxiety and improving their communication confidence. These technological advancements are vital in promoting language development and social interaction for children with ASD, creating a more inclusive and supportive learning environment.

Effectiveness of Technology in Overcoming Difficulties Faced by Children with ASD in Understanding and Mastering English

Here is a summary table that shows the effectiveness of using technology in improving English language skills for children with autism:

Technology Type	Effectiveness	Articles
Voice-Based Applications	**High Effectiveness**: These applications help children with autism improve their speaking abilities, with noticeable improvements in communication skills and confidence.	The Implementation of Speech Blubs App in Fostering English Language Skills of a Child with Autism (Tovar & Acuña, 2024) Using VoA (Voice of America) to Improve Speaking Abilities of Autism Students in Learning English (Hamzah, 2024)
Augmented Reality (AR)	**Moderate to High Effectiveness**: AR applications offer interactive, engaging environments that enhance vocabulary acquisition, social engagement, and stakeholder acceptance.	Augmented Reality Mobile Application for Children with Autism - Stakeholders' Acceptance and Thoughts (Umiera Hashim et al., 2021a) 'AReal-Vocab': The New A La Mode of English Vocabulary Learning for Children with Autism (Hashim et al., 2021)
Assistive Technology	**High Effectiveness**: Assistive technology applications support social and language skill development, making it easier for children with autism to engage with learning.	Assistive technology application for enhancing social and language skills of young children with autism (Wojciechowski & Al-Musawi, 2017)

Technology Type	Effectiveness	Articles
Information and Communication Technology (ICT)	**Moderate Effectiveness**: ICT supports personalized and interactive learning, improving overall engagement and language proficiency in students with autism.	The Use of Technology to Assist School-Aged Students with High Incidence Special Needs in Reading (Stetter, 2018) Potential of ICT in Teaching English as a Foreign Language Learners Focused on Autistic Spectrum (Jelínková, 2020) A Scoping Review Of Teaching And Learning Of English As An Additional Language Among Autistic Individuals (Muharikah et al., 2022)

The effectiveness of technology in enhancing English language learning for children with autism varies depending on the type of technology used. Voice-based applications and assistive technologies have been shown to be highly effective, improving speaking and social skills significantly. Augmented Reality (AR) also demonstrates moderate to high effectiveness by increasing engagement and vocabulary acquisition. ICT technologies provide moderate effectiveness by offering personalized learning but may require more targeted application to yield optimal results. These technologies represent significant progress in supporting the unique learning needs of children with autism.

Research Trends in the Use of Technology for English Language Learning for Children with Autism Spectrum Disorder (ASD)

Here is a table that shows the classification of research trends based on the use of technology in English language learning for children with autism:

Research Trend	Description	Articles
Technology in Language Acquisition	Research focusing on how technology supports the acquisition of language skills such as speaking, listening, and vocabulary.	- "The Implementation of Speech Blubs App in Fostering English Language Skills of a Child with Autism" (Tovar & Acuña, 2021) "'AReal-Vocab': The New A La Mode of English Vocabulary Learning for Children with Autism" (Hashim et al., 2021)
Assistive and Adaptive Technologies	Research investigating the use of assistive technologies to support students with autism in engaging with the curriculum.	- "Assistive Technology Application for Enhancing Social and Language Skills of Young Children with Autism" (Wojciechowski & Al-Musawi, 2020) "The Use of Technology to Assist School-Aged Students with High Incidence Special Needs in Reading" (Stetter, 2018)

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Research Trend	Description	Articles
Augmented Reality (AR) and Interactive Learning	Research on the use of AR to create immersive, interactive learning environments that help children with autism engage in language learning.	- "Augmented Reality Mobile Application for Children with Autism - Stakeholders' Acceptance and Thoughts" (Umiera Hashim et al., 2021) "Using VoA (Voice of America) to Improve Speaking Abilities of Autism Students in Learning English" (Hamzah, 2020)
ICT and E-Learning Platforms	Research on the use of Information and Communication Technology (ICT) to provide personalized learning experiences.	Potential of ICT in Teaching English as a Foreign Language Learners Focused on Autistic Spectrum (Jelínková, 2020) A Scoping Review Of Teaching And Learning Of English As An Additional Language Among Autistic Individuals (Muharikah et al., 2022)
Teacher Training and Strategies	Studies exploring how teachers implement technology and adapt strategies for teaching English to children with autism.	Teachers' Strategies for Teaching English to Students with Special Needs (Takriyanti et al., 2022) Teaching English to Students with Autism Spectrum Disorder (Maysuroh et al., 2024)
Challenges in Technology Integration	Research on barriers and difficulties faced by teachers and students in integrating technology into language learning for children with autism.	English As Secondary Language Learning and Autism Spectrum Disorder: The Obstacles in Teaching and Learning the Language (Umiera Hashim et al., 2021b) How to Improve English Vocabulary for Students with Autism? (Susanti, 2024)

Research Gaps in the Use of Technology for Children with ASD

Despite significant progress in the use of technology to support children with Autism Spectrum Disorder (ASD), there remain several gaps in the research that need to be addressed moving forward. One key area is research on the use of technology in inclusive settings. While many studies have focused on children with ASD in special education environments, fewer have explored how technology can be applied in **i**nclusive classrooms**,** where children with ASD learn alongside their typically developing peers.

Investigating the effectiveness of technology in such diverse educational settings is essential for expanding our understanding of its impact across different learning contexts.

Another gap is the comparison between different types of technology. Although numerous mobile apps and technological devices have been developed to support language learning for children with ASD, there is a lack of research comparing the effectiveness of these technologies, such as mobile apps versus augmented reality devices. Further studies are needed to determine which technologies are most effective for specific aspects of English language learning for children with ASD, helping educators make informed decisions about the best tools to use in the classroom.

Additionally, there is a need for more research on the importance of parental and teacher involvement in the implementation of technology. Many technological tools have been created, but without proper support from parents and teachers, these tools may not achieve their full potential. Exploring how the active involvement of these key figures can influence the success of technology in supporting children with ASD is crucial for optimizing its impact on language development.

Furthermore, most existing research focuses on the short-term impact of technology use, leaving a significant gap in our understanding of the long-term effects. There is a lack of longitudinal studies that track the impact of technology on language skills over extended periods, particularly after the technology is no longer used regularly. Long-term research could provide deeper insights into the sustained effectiveness of these technologies and their lasting benefits on language acquisition for children with ASD.

Finally, much of the research has primarily focused on children with ASD who have higher language or cognitive abilities. More research is needed to explore how technology can assist children with ASD who face greater learning difficulties. By focusing on this group, we can better understand how technology can be tailored to help children with more significant challenges in language development, ensuring that these tools can be used to support a wider range of abilities and provide comprehensive assistance in improving language skills.

CONCLUSION

This study highlights the significant potential of technology in supporting English language learning for children with Autism Spectrum Disorder (ASD). Technologies such as mobile apps, AR, video modeling, and AI chatbots offer interactive and engaging ways to enhance vocabulary, speaking skills, and social communication abilities. While the research in this field is promising, further exploration is necessary, particularly in terms of long-term studies and the integration of multiple technologies. By advancing the use of technology in inclusive language learning, educators can help children with ASD develop crucial communication skills, ultimately supporting their academic and social success.

BIBLIOGRAPHY

Hamzah, A. (2024). Using VoA (Voice of America) to Improve Speaking Abilities of Autism Students in Learning English. *Modality Journal: International Journal of Linguistics and Literature*, *4*(1), 86–103. https://doi.org/10.30983/mj.v4i1.8342

Hashim, H. U., Md Yunus, M., & Norman, H. (2021). 'AReal-Vocab': The New A La Mode of English Vocabulary Learning for Children with Autism. *International Journal of Academic Research in Business and Social Sciences*, *11*(11), Pages 1383-1393. https://doi.org/10.6007/IJARBSS/v11-i11/11356

Jelínková, B. (2020). Potential of ICT in Teaching English as a Foreign Language Focused on Autistic Spectrum Learners. *SHS Web of Conferences*, *88*, 02012. https://doi.org/10.1051/shsconf/20208802012

Maysuroh, S., Dwimaulani, A., Wati, L., Nurhayati, N., & Yusri, N. (2024). Teaching English to Students with Autism Spectrum Disorder (ASD). *Journey: Journal of English Language and Pedagogy*, *7*(1), 161–167. https://doi.org/10.33503/journey.v7i1.863

Muharikah, A., Li, M., & Roberts, J. (2022). *AUTISTIC INDIVIDUALS*. *2*.

Pratama, M. F., & Paramita, P. P. (2023). Interventions for Communication and Language Development in Children with Autism Spectrum Disorder. *Cakrawala Dini: Jurnal PendidikanAnak Usia Dini*, *14*.

Rakhman, F. (2023). LANGUAGE ACQUISITION AND DEVELOPMENT IN CHILDREN WITH AUTISM SPECTRUM DISORDER. *IndonesianJournalOfEducationTeachingandLearning(IJETL)*, 49–54.

Stetter, M. E. (2018). The Use of Technology to Assist School-Aged Students with High Incidence Special Needs in Reading. *Education Sciences*, *8*(2), 61. https://doi.org/10.3390/educsci8020061

Sumra, R., & Sumra, Dr. B. (2024). Technology-Based Interventions for Autism Spectrum Disorder: A Systematic Review. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*, *08*(11), 1–4. https://doi.org/10.55041/ijsrem7644

Susanti, Rr. R. D. (2024). How to Improve English vocabulary for Students with Autism? *International Journal of Applied Educational Research (IJAER)*, *2*(1), 1–16. https://doi.org/10.59890/ijaer.v2i1.1143

Takriyanti, R., Sulistiyo, U., Sartika, D., Hamdan, H., & Chaniago, F. (2022). Teachers' Strategies in Teaching English to Students With Special Needs. *Pioneer: Journal of Language and Literature*, *14*(2), 437. https://doi.org/10.36841/pioneer.v14i2.1746

Tovar, K. T. C., & Acuña, L. D. M. (2024). *The Implementation of Speech Blubs App in Fostering English Language Skills of a Child with Autism*.

Umiera Hashim, H., Md Yunus, M., & Norman, H. (2021a). Augmented Reality Mobile Application for Children with Autism: Stakeholders' Acceptance and Thoughts. *Arab World English Journal*, *12*(4), 132–141. https://doi.org/10.24093/awej/vol12no4.9

Umiera Hashim, H., Md Yunus, M., & Norman, H. (2021b). English As Secondary Language Learning and Autism Spectrum Disorder: The Obstacles in Teaching and Learning the Language. *Arab World English Journal*, *12*(2), 22–30. https://doi.org/10.24093/awej/vol12no2.2

Valencia, K., Rusu, C., Quiñones, D., & Jamet, E. (2019). The Impact of Technology on People with Autism Spectrum Disorder: A Systematic Literature Review. *Sensors*, *19*(20), 4485. https://doi.org/10.3390/s19204485

Wojciechowski, A., & Al-Musawi, R. (2017). Assisstive technology application for enhancing social and language skills of young children with autism. *Multimedia Tools and Applications*, *76*(4), 5419–5439. https://doi.org/10.1007/s11042-016-3995-9