Improving Indonesian Children's Reading Skills through Virtual Reality Media: A Literature Review

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Abstract
In the era of Society 5.0, the integration of technology into education has become increasingly prevalent; however, its effectiveness in enhancing student learning processes, abilities, and outcomes remains a subject of debate. This study aims to explore the potential of Virtual Reality (VR) as a technological innovation to enhance motivation, understanding, and learning effectiveness in elementary education, particularly in the context of Society 5.0. This study employed a descriptive qualitative approach using a literature review-based research method. Data were collected and analyzed from various academic sources focusing on the use of VR in elementary education settings. The findings highlighted the significant potential of VR, particularly when integrated with artificial intelligence, to personalize learning, enhance student competencies, and assist teachers in developing intelligent and contextually relevant content. The literature also showed that VR implementation in elementary schools improves students' motivation, conceptual understanding, and overall learning effectiveness. In conclusion, the application of VR in elementary education demonstrates strong potential as an innovative and adaptive learning tool in line with the goals of Society 5.0. Although challenges such as cost, infrastructure, and teacher readiness persist, the benefits of VR in fostering interactive and student-centered learning make it a valuable area for further research and development.

Keywords: virtual Reality, elementary school, Indonesian language, reading skills

INTRODUCTION

Primary school children's language skills are an important foundation in their learning process. When learning to speak, children not only develop the ability to communicate clearly and effectively, but also build a foundation for a deeper understanding of other subject matter (Murdy & Wilyanita, 2023). In primary school, children begin to learn to read, write and speak in Indonesian. They are encouraged to recognize letters, form words, and construct simple sentences. This process not only hones language skills, but also develops their creativity in expressing ideas and feelings.

In addition, children are encouraged to listen well, understand the teacher's instructions, and interact with classmates. This is the early stage where they learn how to use language to collaborate and share knowledge (Wicaksono, 2016). Through speaking in front of the class, discussing, and role-playing, they learn how to communicate confidently. Language skills also help children develop the ability to read well, understand texts, and express their thoughts in writing. Teachers play an important role in guiding them on basic grammar, proper use of vocabulary, and how to organize ideas in a logical order.

Outside the classroom, children are also invited to appreciate the diversity of Indonesian language and culture. They are introduced to folklore, poetry, folk songs, and various art forms that use language as a medium of expression. This helps them understand that language is not only a means of communication but also a part of their cultural identity. The importance of language skills in basic education suggests that language learning is not just about understanding structures and rules, but also about opening doors to a deeper understanding of the world around them (Irfani et al., 2024). By mastering language well, children can expand their horizons, improve their learning abilities, and open up opportunities for a brighter future.

This outdoor activity not only enriches the learning experience but also instills a sense of love for the nation's cultural wealth. Through this approach, children learn that language is not just a tool for communication, but also a part of cultural identity that must be preserved and valued. They began to understand that every form of linguistic expression has deep historical, social, and emotional value. Language learning also becomes a means to recognize one's identity and broaden national horizons.

As technology evolves, outdoor learning activities are also transforming. Similarly, the approach to language learning has also undergone a transformation. One of the innovations that has captured attention in modern education is the utilization of Virtual Reality (VR) technology. This technology allows children to have a more immersive, interactive, and contextual language learning experience. They can learn not only through text or audio, but also through direct interaction in virtual environments that resemble the real world.

Improving children's language skills using VR technology has become an interesting topic in modern education. With VR, children can experience a more immersive and interactive learning experience in understanding languages, be it Indonesian or foreign languages. One of the main advantages of VR in language education is its ability to create an immersive learning environment. Children can be brought into simulated situations that are close to real life, such as being in a traditional Indonesian market, where they can interact with sellers and buyers while practicing daily conversations in Indonesian. In addition, VR also allows for adaptive learning. VR programs can be tailored to each child's ability level, providing challenges that match their abilities (Suryani et al., 2016). For example, a child who is more advanced in

language might be given more complex scenarios or higher language skill tests, while a child who is just learning a language can start with simpler basic exercises.

Furthermore, the interactive aspect of VR also increases children's learning motivation. They are not just listening to or reading text but also actually engaging in an interesting and fun learning experience (Adawiyah et al., 2022). For example, they can participate in language-based games within the VR environment, where they have to use words or sentences to complete missions or solve puzzles. In addition, the use of VR can also expand the accessibility of language education. Children in remote areas or who do not have easy access to traditional educational resources can access quality language learning experiences through VR technology.

This helps to reduce the access gap and ensure that all children have equal opportunities to acquire essential language skills. However, challenges that need to be overcome include cost and infrastructure. The implementation of VR technology requires significant investment in hardware and software, as well as teacher training to integrate VR into their curriculum. In addition, it needs to be ensured that the content presented through VR complies with educational standards and promotes effective learning.

Therefore, the use of Virtual Reality in improving children's language skills promises great potential to stimulate interest in learning, improve communication skills, and prepare the younger generation to face future global challenges more confidently and knowledgeably in multiple languages.

METHOD

This research utilized a descriptive qualitative research method with a literature review approach. Data was obtained by analyzing various sources such as books and journals related to the research objectives. This research was a type of literature review research that looked for theoretical references that were relevant to the case or problem found. According to Creswell (2014) states that a literature review is a written summary of articles from journals, books, and other documents that describe theories and information, both past and present, organizing the literature into the required topics and documents.

This research analysis used a Systematic Literature Review (SLR) that focused on improving reading skills using VR media. This research went through several stages like the research conducted by Fitri et al. (2024), namely: (1) framing questions (PICO) (Pico et al., 2021); (2) searching for articles through the Google Scholar database; (3) reading the titles and abstracts of the articles that have been collected; (4) abstracting information from the selected articles.

FINDINGS AND DISCUSSION
Findings

The first step was to determine the criteria for included articles using the PICO technique, namely Participant – Intervention – Comparator – Outcome (Pico et al., 2021). The participants included were students in Indonesia, the intervention was the use of VR, the comparator was the research method or learning model used, and the outcome was the results obtained. After establishing research boundaries related to the articles included in the category. The second step, based on the Google Scholar database, identified eight relevant articles that met the inclusion criteria. The following are the results.

Table 1. The Articles Included in the Category

Participants	Intervention	Checklists	Result
Elementary School Students	Use of VR media	TPACK-Based	Improving the literacy of 21st century students
Elementary School Students	The use of VR in English language learning	Through teacher training	Improve students' language skills, interests, effectiveness, and engagement
Junior High School Students	VR-based learning media	The development of VR media	To make it easier for students to read and write and explore ideas through literary learning experiences
Vocational High School Students	VR learning media	VR-based computer assembly learning media	Valid, Highly practical, and effective in overcoming the limitations of practical tools and improving students' ability to comprehend reading
Junior High School Students	VR learning media	Research through pretests and posttests	Improve reading skills, motivation to learn and show differences in students' cognitive abilities
Elementary School Students	The use of VR in English learning	Through teacher training	Improve students' reading skills and learning outcomes
Elementary School Students	The use of VR in Indonesian learning	Qualitative research	Fostering students' creativity, curiosity, and confidence in reading, understanding and expressing the content of fairy tales and short stories creatively
Elementary School Students	The use of VR in Indonesian learning	Quasi-experimental quantitative research	Improve reading and comprehension skills, creative writing skill

The third step is to read the titles and abstracts of the collected articles. At this stage, the researcher selects relevant articles by identifying the problem formulation or research question that aligns with the title of the design and the type of research used. In this case, the researcher found eight articles relevant to this study.

The fourth step is to abstract information from the selected articles by abstracting the information from the articles and entering it into a table according to the data analysis matrix as follows:

Table 2. Data Analysis in the Included articles

No.	Author	Research Results
1.	Sugiarni et al. (2022)	The use of TPACK-based Virtual Reality media with the Drilling and TPR methods has been proven to increase the literacy of 21st century students, which is shown by the increase in pre-test and post-test results at SDN 3 Cimacan.
2.	Saepuloh & Salsabila (2022)	The use of Virtual Reality in learning English vocabulary at SD Negeri Cipanas 2 has been proven to improve students' language skills, interests, effectiveness, and involvement, thus making the learning process more interesting and enjoyable.
3.	Dellia & Amil (2021)	The development of Virtual Reality-based learning media "Jokotole A Guerra" has proven to make it easier for students to read and write and explore ideas through an attractive, effective, and local wisdom learning experience in Madura.
4.	Musril et al. (2020)	The development of Virtual Reality-based computer assembly learning media through a combination of 4D and Luther-Sutopo models proved to be valid (0.79), very practical (84.11), and effective (0.78) in overcoming the limitations of practical tools and improving students' ability to understand reading.
5.	Suryani et al. (2016)	The use of Virtual Reality learning media "Eduwisata Biota Laut VR" has been proven to improve reading ability, learning motivation and show differences in students' cognitive abilities, although not statistically significant.
6.	Adawiyah et al. (2022)	The use of virtual reality in teaching English vocabulary at SDN Sindanglaka Cipanas improves students' reading skills and learning outcomes, although initial motivation still needs to be improved through the active role of teachers in encouraging technology exploration.
7.	Dumayanti & Kusumawati (2024)	The use of Virtual Reality media in Indonesian learning in grade III MIN 1 Medan has been proven to foster students' creativity, curiosity, and confidence in reading, understanding and expressing the content of fairy tales and short stories creatively.
8.	Arta et al. (2025)	The use of Virtual Reality in Indonesian learning significantly improves reading and comprehension skills, creative writing skills, motivation, and engagement of grade V students, although its implementation requires infrastructure support and teacher training.

Discussion

VR is a digital technology breakthrough that allows a person to experience being in an environment entirely created by a computer, yet feels incredibly real. This technology works by using special devices like VR headsets, which are equipped with

display screens, speakers, and motion sensors, to create the illusion of a three-dimensional space that is responsive to the user's movements. When someone moves their head or body, the sensors in the device track those movements in real-time, then adjust the visual and audio display received by the user, thus providing a sense of immersion or full engagement in the virtual world. In the context of education, the advantage of VR lies in its ability to create contextual, exploratory, and safe learning situations, such as visiting historical sites, conducting science experiments, or practicing communication in a foreign language without actually being there.

Due to its interactive and engaging nature, VR is increasingly being utilized in various fields, not only for entertainment and gaming, but also for medical training, flight simulation, architectural design, and the development of more personalized and adaptive learning that meets user needs (Dellia & Amil, 2021). This creates an immersive and engaging experience that can be used in various applications including entertainment, education, training, art, and other fields. The research conducted by Dellia & Amil (2021) showed that the learning process was carried out well, with feedback from student and teacher interviews indicating that they were very enthusiastic and happy with the use of VR media. Additionally, VR was used for literature material in the form of a folktale titled "Jokotole A Perang". Therefore, it can be concluded that VR media can be an alternative in Indonesian language learning.

Improving Reading Comprehension One of the key benefits of VR is its ability to create immersive and engaging learning experiences. In the context of reading, VR provides direct access to a variety of reading materials in interesting and imaginative formats, such as digital books presented in 3D environments and more dynamic narrative forms (Dellia & Amil, 2021). In the context of reading, VR not only presents text digitally but also changes the way students interact with reading materials, for example, through digital books placed within a 3D environment that can be explored virtually. The narratives in the reading can also be brought to life through animation, sound, and visual effects, creating a more dynamic and imaginative story that helps students understand the content better because they can "see" and "feel" the setting, characters, and atmosphere of the story directly. This statement is in line with Kristiningrum (2018) who states that the skills needed can cover various areas, including: language skills, mathematics skills, problem-solving skills, communication skills, social skills, information technology skills, and others. The development of each skill is necessary to help students prepare for a better future. The importance of competence in education is reflected in the goals of modern education, which emphasize not only mastery of a subject but also the development of skills necessary for success in personal and professional life. This allows students to be more independent, creative, and adaptable to changes in the world around them.

Developing skills such as students' reading skills is a concern for all sectors, both the government and society. Various policies implemented by the government with strenuous efforts to cultivate reading interest aim to attract public interest in reading. Reading interest in Indonesia is a complex issue that requires time to change people's mindsets to enjoy reading and improve children's literacy skills (Maryatiningsih & Abduh, 2024).

VR technology offers the opportunity for personalized learning experiences, which is a learning process specifically designed to meet the needs, interests, and learning styles of each student (Sugiarni et al., 2022). The research conducted by Sugiarni et al. (2022) resulted in excellent learning activities. Not only can they choose the content, but students can also interact with it in their own way. For example, some prefer to read text

while listening to audio narration, while others are interested in actively exploring visual elements and 3D environments within a story. Literacy includes not only the ability to read and write, but also a deep understanding of texts and the ability to use information effectively in a variety of contexts. Key challenges in child literacy in Indonesia include access to quality education across the country, disparities between urban and rural areas, and challenges in promoting interest in reading among children (Nahdi & Yunitasari, 2019). Despite this, there are various efforts being made to improve literacy in Indonesia.

VR allows for this kind of flexibility because it presents an immersive and interactive learning environment, making students feel more engaged and not just passive readers. With this flexibility, the learning process becomes more relevant and focused, as the material being studied feels closer to the students' world and personal preferences. Additionally, this approach helps overcome common challenges in reading comprehension, such as boredom, difficulty understanding context, and a lack of emotional connection with the text. Overall, VR-facilitated personalization makes learning more effective and meaningful, and enhances the potential for individual reading competency achievement.

Similarly, in the medical field, doctors and healthcare professionals can practice performing surgeries or critical procedures in VR simulations, making them technically and mentally prepared before facing patients directly (Adawiyah et al., 2022). This allows training to be repeated without material loss and with maximum safety. Furthermore, Adawiyah et al. (2022) explain that vocabulary instruction can be done with VR technology. To achieve maximum results in improving students' reading abilities, it must also be accompanied by the digital literacy skills of the teaching teachers, the students involved, and the students who serve as assistants when the teacher is teaching. Additionally, it is necessary to introduce and provide motivation first so that students are interested in using VR technology in learning, which is something new to them.

Although VR technology is rapidly developing, challenges still need to be overcome, such as the high cost of hardware, the need for high-quality content, and the ability to mitigate potential health issues (Suryani et al., 2016). However, the great potential of technology to change the way we learn, work, and play makes VR a field that remains exciting for future exploration and development. VR promises a revolution in education by expanding the traditional boundaries of classroom learning. This technology offers an immersive and interactive learning experience by imagining 3D environments that students can explore. From the results of research conducted by Suryani et al. (2016), it was found that statistical testing showed a significant difference in students' cognitive abilities after using this VR application, with a P-value of 0.448, compared to their cognitive abilities before using the VR application. From a motivational perspective, it can be concluded that the average student agreed with each statement on the questionnaire. This indicates that students experience increased learning motivation when using the VR application.

One of the main advantages of VR in education is its ability to create highly realistic simulations that closely resemble real-world experiences, allowing students to learn through direct exploration in virtual environments (Saepuloh & Salsabila, 2022). Unlike traditional passive learning methods such as reading books or watching videos, VR allows students to "immerse themselves" directly into the situations or events being studied. For example, in history class, students can not only read about ancient Egyptian civilization but also virtually walk around the Giza pyramids, see hieroglyphs on the walls, or interactively witness simulations of ancient society. They can even "attend"

important events like the Declaration of Independence or the Industrial Revolution in the form of visually and sonically rich immersive experiences.

Research conducted by Saepuloh & Salsabila (2022) explain that VR is one of the effective and enjoyable learning media as a supporting tool in the vocabulary teaching and learning process, which is very easy to implement. This media helps teachers teach English, especially vocabulary, in a more engaging way, and students feel happy and interested in using it throughout the activity process. The classroom environment, which was initially monotonous and boring, became more lively and active when virtual reality media was implemented in the vocabulary teaching and learning process. Students who were initially passive in responding to learning became more active and interactive.

The use of VR in reading instruction presents an innovative and transformative approach in the world of education, particularly in assisting children and students who experience difficulties with basic literacy skills (Musril et al., 2020). The results of the research conducted by Musril et al. (2020) indicate that student response was very good, and students were very enthusiastic about using this learning medium. The results of the black box testing indicate that this learning medium functions as intended and expected. Common challenges such as low reading interest, difficulty understanding texts, or a lack of engaging visual stimulation and context often make learning to read boring or difficult to follow. Because literacy development is also not just limited to reading and writing skills, but also includes a deep understanding of texts and the ability to analyze, interpret and synthesize the information they receive. This is important to prepare them for an increasingly complex and globally connected world. Apart from formal education, the importance of literacy is also reflected in efforts to promote a reading culture in the wider community (Sari, 2020). Initiatives such as literacy campaigns, community libraries and cultural activities that emphasize the importance of reading can help increase children's interest in reading from an early age. Reading literacy is one type of literacy activity that is crucial to the advancement of education as it may expand one's horizons and provide a variety of fresh knowledge (Safitri & Sukartono, 2023). Students who are proficient readers can learn a great deal of new information.

VR presents itself as a solution offering an immersive reading experience, where students not only read words on a page but also directly engage with the story world or visual context that supports their understanding. For example, when reading a story about life in a tropical rainforest, students can "enter" a virtual environment featuring dense trees, animal sounds, and lively story characters. With this approach, attention and learning motivation increase because the reading process no longer feels passive, but rather becomes an active and enjoyable experience. Compared to traditional media like printed books or slideshows, VR can combine visual elements, sound, and direct interaction, which helps strengthen understanding of vocabulary, sentence structure, and story context. Additionally, VR allows for learning tailored to students' abilities, where content can be adjusted from basic to complex levels, supporting a gradual and adaptive learning process. Thus, using VR to improve reading skills not only serves as a technological aid but also as a pedagogical strategy that can more effectively and comprehensively overcome literacy barriers.

Another study conducted by Dumayanti & Kusumawati (2024) found that the use of VR media in Indonesian language learning in third grade was proven to foster students' creativity, curiosity, and self-confidence in understanding and expressing the contents of fairy tales and short stories creatively. This shows that VR provides many benefits to support classroom learning. Not only as a tool to improve reading skills, but also to

increase students' creativity, curiosity, and self-confidence. This can certainly address the literacy issues facing Indonesia. Several studies have shown that literacy needs to be introduced early through early childhood education and primary education programs that emphasize the importance of reading and writing (Fikriyah et al., 2020). By building this strong foundation, children can develop good reading skills from an early age, which helps them in understanding more complex concepts in the future. In addition, the use of technology has also helped in expanding access to reading materials and varied literacy content (Herliana & Anugraheni, 2020). In this study, the technology that can be used is VR, which has been proven to improve students' literacy skills.

This opinion is also supported by another study conducted by Arta, et al. (2025) which explain that the use of VR in Indonesian language learning significantly improves students' comprehension of reading, creative writing skills, motivation, and student engagement. Reading is a very important activity to be developed early in children. Reading is one of the essential skills that students must master in learning, in addition to listening, speaking, and writing (Abbas & Masdelima, 2018). The reading process is not only about introducing letters and words to them but also opening the door to a wide world of knowledge, imagination, and language (Irfani et al., 2024). By providing proper attention and support, reading can be a fun and rewarding activity for children's development. It not only helps them in developing language and literacy skills but also opens a window to an infinite world of knowledge and imagination.

Thus, the use of VR in reading is not merely a technological aid, but serves as a new learning media that supports a deeper understanding of reading. Besides the immediate benefits of increasing interest in reading, VR can also help overcome some of the challenges that often hinder reading learning, such as lack of concentration and boredom with traditional learning methods. However, using VR to improve reading comprehension requires investment in technological infrastructure, development of high-quality content, and training for educators to use this technology effectively. Therefore, VR has great potential to enrich the reading experience of children and students and motivate them to explore the world of literacy in new and exciting ways.

Despite these challenges, the potential of VR in education is very promising. This technology can provide a dynamic and enjoyable learning experience that not only facilitates cognition but also stimulates students' affect and psychomotor skills. Additionally, VR has the potential to create a more inclusive education system, as content can be adapted for students with special needs to support equal learning. Therefore, if used wisely and strategically, VR can be a driving force for the global transformation of education towards a more collaborative, participatory, and meaningful direction.

CONCLUSION

Based on the results of the research conducted, the development of VR learning media can improve students' reading and literacy skills. Students from elementary to high school can use VR. VR offers various benefits beyond improving reading skills, including increased interest in learning, motivation, creativity, skills, and more. However, in order to effectively implement this technology in the education system, there are some challenges that need to be anticipated. One of the main challenges is the cost of hardware, such as VR headsets and supporting computers, which is relatively expensive, making it unaffordable for all schools to adopt. Additionally, developing VR-based learning content also requires significant investment in terms of time, expert personnel, and appropriate instructional design to ensure the content is truly educational and relevant to the

curriculum. Another equally important factor is teacher training, because without a good understanding of how to use and integrate VR into the teaching and learning process, this technology will not provide optimal benefits. This study is limited by its reliance on secondary data and lacks empirical testing in actual classroom environments. Therefore, future research should focus on experimental or quasi-experimental studies to assess the real-world impact of VR on student performance and engagement. In addition, further investigation is recommended to explore cost-effective implementation models and scalable teacher training strategies to support broader adoption of VR in education.

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