# ASSISTIVE TECHNOLOGY FOR DISTANCE EDUCATION IN METAVERSE-BASED ENVIRONMENTS

This briefing reports scientific evidence on a study regarding assistive technology solutions for distance education in metaverse-based environments.

FINDINGS

Assistive technology solutions for distance education using the metaverse evolved over the years and its empirical evaluation strategies.

- The use of assistive technology solutions for distance education using the metaverse has increased, especially in recent years.

- Most solutions were published in journals, with a smaller percentage in conferences.

- 2020 had the highest number of publications, including journal articles and conference papers.
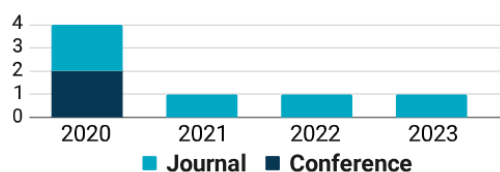
- Most solutions employed evaluation research as the research strategy, followed by validation research and personal experience reports.

- Experiments were the most common empirical research method, followed by case studies and general surveys.

- A qualitative-quantitative approach was the predominant methodological approach used in the solutions.

- Although this field has been increased, studies are still immature in the scientific literature.

Solutions addressing accessibility in distance education using the metaverse.

- The domain of Chemistry Lab was the most explored in solutions followed by Accessibility Evaluation of E-Learning Tools, Education in Construction, Medicine, and Collaborative Learning.

- Solutions in the Chemistry Lab domain focused on providing virtual reality experiments and alternative learning methods for students with disabilities.

- Accessibility evaluation solutions assessed the accessibility of virtual world tools for students with limitations.

- Solutions in Education in Construction aimed to create collaborative virtual spaces for students to visit inaccessible sites.

- Collaborative Learning solutions introduced a platform to support collaborative learning activities in virtual worlds.

- Medicine solutions examined the role of virtual reality in online courses on human anatomy.

Challenges in implementing accessibility in educational platforms using the metaverse.

- Providing all students with the necessary virtual reality equipment and resources is a significant challenge.

- Technical issues such as inconsistent audio, low-resolution images, and internet connectivity problems can affect the accessibility of metaverse platforms.

- Complex systems and a steep learning curve can hinder usability and negatively impact student performance.

- The lack of specific evaluation tools for metaverse system accessibility poses a challenge.

- Combining different types of assessments may be necessary to evaluate the accessibility of metaverse platforms effectively.

- Interaction among multiple users in a massive educational environment is a challenge for accessibility in the metaverse.

Emergency Remote Teaching vs. Distance Education

- Implementing the metaverse in emergency remote teaching and distance education presents distinct challenges.

- Emergency remote teaching requires a rapid transition to a virtual environment and adequate technical support for educators and students.

- The challenges of distance education revolve around establishing an engaging and interactive online learning environment while maintaining student motivation and engagement.

- The metaverse can be a valuable tool for both types of teaching but requires careful consideration and adaptation to specific educational contexts.

Industry Engagement and Practical Application

- Implementing the metaverse in education involves using diverse technologies to deliver immersive and interactive learning experiences.

- Open-source solutions, such as virtual chemistry labs in virtual reality and the VoRTex platform, can be valuable resources for professionals.

- Collaboration among technical, pedagogical, and research teams is essential to align technology with pedagogical goals and assess the impact of metaverse applications on teaching and learning processes.

- The lack of sense of presence in the metaverse affects academic performance, student dropout rates, and student-teacher interaction.

Adapting associated technologies

- E-learning platforms like Moodle, Second Life, and 3DVWs provide virtual student interaction and collaboration environments.

- Mozilla Hubs, Autodesk Revit, and SimLab GLTF exporter tools are used for communication and content creation within the metaverse.

- Virtual reality (VR) features such as Google Cardboard VR viewers and the magic window setup enable VR visualization on smartphones without a headset.

- VR headsets like Oculus Quest and HMDs are used for visualization and interaction in the virtual educational environment.

- Software applications like BananaVision and BanAnatomy support VR experiences in education.

Damasceno, A., Soares, P., Santos, I., Souza, J., Oliveira, F. . Assistive Technology for Distance Education in Metaverse-Based Environment: A Rapid Review. Simpósio Brasileiro de Informática na Educação, 2023.

Who is this briefing for?
Software engineering practitioners who wish to make informed decisions based on scientific evidence about the implementation and use of assistive technology for distance education, particularly in metaverse-based environments.

Where the findings come from?
All findings of this briefing were extracted from the rapid review conducted by Damasceno et al. 2023.

What is included in this briefing?
The main findings of the original rapid review and brief contextual information about the context of the findings.

What is not included in this briefing?
Findings that are not based on scientific evidence as well as the description of the research method or details about the primary studies analyzed in the original rapid review.